The influence of online information on investing decisions of reward-based crowdfunding☆

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ABSTRACT

How does online information influence investor decisions? Funders or investors have access to a variety of information about a project or product when they make investment decisions. Which kind of information affects investor behavior the most? Based on the elaboration likelihood model, we developed a research model and conducted an empirical study using objective data collected from a Chinese crowdfunding website. It was found that signals of quality and electronic word of mouth have significant positive effects on funder investment decisions. Results show that larger introduction word counts and video counts make funders feel the project has higher quality, and higher "Like" counts and online reviews make funders feel the project has good electronic word of mouth. Furthermore, analysis of the data here reveals that the central route information (signals of project quality) and the peripheral route information (e-word of mouth) have almost equal effects on funder investment decisions in the Chinese crowdfunding context. On the other hand, the central route was significantly more important for Science & Technology and Agriculture projects, whereas the peripheral route was more important for Entertainment and Art projects.

1. Introduction

In recent years, crowdfunding has become a valuable alternative source of funding for entrepreneurs seeking external financing. It is an emerging approach for entrepreneurs to implement their ideas despite not having traditional monetary resources such as banks and venture capital. Through crowdfunding platforms, the crowd can invest in business ideas and projects, and entrepreneurs can raise funds via the Internet. According to a report from massolution.com (2013), global crowdfunding experienced accelerated growth in 2014, expanding by 167% to reach 16.2 billion dollars, up from 6.1 billion dollars in 2013. In 2015, the industry is set to more than double once again; it is well on its way to raising 34.4 billion dollars. Using one of the most popular reward-based crowdfunding sites, kickstarter.com, >3.5 million people from nearly 20 countries on Earth pledged over 2.47 billion dollars to bring 108,437 creative projects to life, from the date kickstarter.com established till now. In China, crowdfunding sites emerged in 2013 and as of the end of 2014, the number of crowdfunding platforms was over 115 and over 0.9 billion Yuan had been raised using them.

Depending on what investors receive for their contributions, the categorization of crowdfunding platforms has four main types: donation-based, reward-based, lending, and equity (Hemer, 2011). Prior studies have investigated all four kinds of crowdfunding platforms from different perspectives: Meer (2014) used data from a donation-based crowdfunding website to estimate the effect of price efficiency on giving, suggesting that price efficiency plays a crucial role in donation crowdfunding project performance and that competition plays an important role in the market for donations. Mollick (2014) summarized a description of the underlying dynamics of success and failure among crowdfunded ventures based on a dataset of over 48,500 reward-based projects. Those results suggesting that personal networks and underlying project quality are associated with the success of reward-based crowdfunding projects. Allison, Davis, Short, and Webb (2015) found that in lending crowdfunding platforms, lenders respond positively to narratives highlighting the venture as an opportunity to help others, and less positively when the narrative is framed as a business opportunity. In the equity crowdfunding context, Ahlers, Cumming, Günther, and Schweizer (2015) used signaling theory to examine the impact of firms' financial roadmaps, external and internal governance, and risk factors on fundraising success. As we can see from the existing literature, most prior researchers tried to find how entrepreneurs who started various projects can raise more money in crowdfunding sites from a "creator's" perspective. They do not provide a model of the formation of funders' attitude toward a crowdfunding project nor how such attitudes relate to the funders' online investing or funding decisions. Few studies explore how funders evaluate the content quality of crowdfunding project information. This limits our understanding of how online information about crowdfunding projects can be managed to increase the crowdfunding project success ratio.

The elaboration likelihood model (ELM) is a major theoretical model used in online behavior research (Cheng and Ho, 2015; Chu and Kamal, 2008; Gupta and Harris, 2005; Ho and Bodoff, 2014; Shih, Lai, and Cheng, 2013; Park and Kim, 2008; Lee and Youn, 2009; Sher and Lee, 2009). In preceding literature, information about production quality and specifications is always classified as the central route, and the electronic word-of-mouth cues are the peripheral route (Cheng and Ho, 2015). Several researchers have explored the influence of factors related to these two routes on consumers' final attitudes toward the product and willingness to purchase (Ho and Bodoff, 2014; Luo, Wu, Shi, and Xu, 2014; Lee, Park, and Han, 2008; Lowry et al., 2012). However, few studies explore the effect of the two routes of ELM on decisions to invest in a crowdfunding context. As said in former chapter, the categorization of crowdfunding platforms has four main types, the process complexity and risk varies greatly in these four different categorizations. In donation-based crowdfunding platforms, investor join crowdfunding activities without desire to get rewards, they donate their money and time due to sympathy and empathy factors (Gerber, Hui, and Kuo, 2012; Meer, 2014). In donation-based crowdfunding context, the process complexity and risk are both very low, investor act like donator (Hemer, 2011; Gerber et al., 2012; Meer, 2014), so we cannot implement ELM model in donation-based crowdfunding research. Contrast to donation-based crowdfunding, the process complexity and risk are much higher in lending and equity crowdfunding, investors always face much more information and have much deeper consideration (Hemer, 2011; Joenssen, Michaelis, and Müllerleile, 2014). In some lending and equity crowdfunding platforms, platform provide due diligence service to online investors. Meanwhile, some investors require creators provide project finance roadmap (Ahlers et al., 2015; Magdalena and Bart, 2015). All of these illustrate that the decision process is very complex in lending and equity-based crowdfunding context, investors have different perception path and behavior patterns in different crowdfunding context. In prior literature, some researchers have figured out investors always act like consumers in reward-based crowdfunding platforms, because the major business model of reward-based crowdfunding is "pre-selling" (Hemer, 2011; Mollick, 2014; Massimo, Chiara, and Cristina, 2015; Magdalena and Bart, 2015). When investors considering whether to fund these "pre-selling" project, their online behavior just like consumers buy goods (Hemer, 2011; Mollick, 2014). So, in reward-based crowdfunding context, we can use ELM to investigate factors affecting the investment decisions about reward-based crowdfunding projects. Potential factors affecting funders' decisions are classified into one of the two routes. Based on previous literature, this study defines the signals of project quality as the central route and electronic word-of-mouth as the peripheral route in assessing the investors' attention to the two routes and the routes' influences on investment decisions.

This study extends the prior effort that examines the factors of crowdfunding projects in two ways. First, crowdfunding is an emerging field of research (Zheng, Li, Wu, and Xu, 2014). Most of the preliminary literature applied exploratory research methods, such as the case study (Hemer, 2011; Ordanini, Miceli, Pizzetti, and Parasuraman, 2011; Schwienbacher and Larralde, 2010) and the grounded theory approach (Gerber et al., 2012; Bradford, 2012). There is a lack of underlying theories and theoretical models in the current crowdfunding literature. This study aims to be one of the first to introduce the elaboration likelihood model to the crowdfunding literature. The elaboration likelihood model (ELM) is a persuasion theory (Petty and Cacioppo, 1986). When a person is exposed to messages, ELM models how the characteristics of the message influence the person's attitude formation and, subsequently, his or her behavior (Ho and Bodoff, 2014). A funder or investor will face a variety of information about a project or product when he or she considers whether to invest or not. Thus, ELM is an appropriate basis for modeling the factors that influence investor attitude formation toward crowdfunding platform project information as a whole. On the basis of the theory of the elaboration likelihood model, this study

develops a theoretical model to examine the effects of the central route and peripheral route on investment decisions by funders.

Second, there are different types of projects on crowdfunding websites. Projects are categorized by Kickstarter into a number of categories, including Film, Dance, Art, Design, and Technology. In zhongchou.com website, a famous crowdfunding platform in China, reward-based projects are divided into Entertainment, Games, Science and Technology, Agriculture, Art, and Publishing. Product type influences the effect of online information on people's online behavior (Mudambi and Schuff, 2010; Weathers, Sharma, and Wood, 2007; Huang, Lurie, and Mitra, 2009 Similarly, when funders face different kinds of projects, the information that draws their attention is not the same (Weathers et al., 2007). For example, when funders consider whether to invest in a Science and Technology product, they will pay attention to the specifications and care more about the indexes of production characteristics. However, if an investor wants to join an Entertainment activity through crowdfunding, he or she may care more about the online reviews of this activity. This paper investigates which kind of information attracts the most attention of funders when they make decisions regarding different kinds of reward-based crowdfunding projects. Specifically, this study will investigate which route, the central route or peripheral route, will have higher influence on the funders' investment decisions.

The remainder of this paper is organized as follows. We first provide a literature review of the current research in crowdfunding and the elaboration likelihood model. Then, we develop a research model and the corresponding research hypotheses. Next, we present an empirical study using data collected from a Chinese crowdfunding website. Finally, we discuss the findings and draw some implications for research and practice. We hope the results of such an empirical study will help researchers and industry practitioners understand how the basic principles of crowdfunding apply worldwide and whether some universal rules can be revealed.

2. Literature review

2.1. Crowdfunding and reward-based crowdfunding

The research community has paid attention to crowdfunding due to its popularity in practice. The preliminary research findings focus on the following three areas. First, some studies have discussed the definition of crowdfunding and the crowdfunding business model. The concept of crowdfunding originated from crowdsourcing, a broader concept, which refers to using the crowd to obtain ideas, feedback, and solutions to develop corporate activities (Belleflamme, Lambert, and Schwienbacher, 2014; Bayus, 2013; Kleemann, Voß, and Rieder, 2008). In one of the few published overviews of the topic, Schwienbacher and Larralde (2010) defined 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." Buysere, Gajda, Kleverlaan, and Marom (2012) stated that crowdfunding could be defined as "a collective effort of many individuals who networked and pooled their resources to support efforts initiated by other people or organizations." However, Mollick (2014) argued that for academics examining new ventures and entrepreneurial finance where crowdfunding is particularly salient, a narrower definition of the term is preferable. He gave this definition of crowdfunding: "Crowdfunding refers to the efforts by entrepreneurial individuals and groups cultural, social, and for profit to fund their ventures by drawing on relatively small contributions from a relatively large number of individuals using the internet, without standard financial intermediaries." After clarifying the definition of crowdfunding, Hemer (2011) argued that the categorization of the four main types of crowdfunding (donation-based, reward-based, lending, and equity) is based on what, if anything, investors receive for their contributions, and the legal complexity and

the degree of information asymmetry between fundraiser and investor differ significantly depending on the type of crowdfunding.

Second, some studies have explored the motivations of entrepreneurs and sponsors to participate in crowdfunding activities. Gerber et al. (2012), through a qualitative exploratory study of creators and funders on three popular crowdfunding platforms, found that creators are motivated to participate to raise funds, receive validation, connect with others, replicate successful experiences of others, and expand awareness of work through social media. Funders are motivated to participate in order to seek rewards, support creators and causes, and strengthen connections with people in their social networks.

Third, some scholars have investigated the influential factors on crowdfunding performance. Mollick (2014) summarized that personal networks and underlying project quality are associated with the success of crowdfunding efforts. Zheng et al. (2014) conducted a comparative study using objective data collected from China and the U.S., and found that an entrepreneur's social network ties, obligations to fund other entrepreneurs, and the shared meaning of the crowdfunding project between the entrepreneur and the sponsors had significant effects on crowdfunding performance in both China and America. Agrawal, Catalini, and Goldfarb (2010) focused on crowdfunding more specifically. They examined the geographic origin of consumers who invest on the Sella Band platform and observed that "the average distance between artist-entrepreneurs and investors is about 3000 miles, suggesting a reduced role for spatial proximity." However, they established that distance still plays a role insofar as "local investors invest relatively early, and they appear less responsive to decisions by other investors." Mollick (2014) also examined the geography of crowdfunding using data from Kickstarter to examine the determinants of success in crowdfunding ventures. Kuppuswamy and Bayus (2013) examined funded projects listed on Kickstarter and showed that social information (i.e., other crowdfunders' funding decisions) plays a key role in the success of a project. Ahlers et al. (2015) stressed in turn the importance of information going from the entrepreneur to the crowd. Using Australian data, they analyzed equity crowdfunding (i.e., crowdfunding involving equity issuance), presenting evidence that successful crowdfunding initiatives rely on credible signals, quality of the start-up, and sound information disclosure to the crowd.

Reward-based crowdfunding is the most common form as of the time of this writing. In a reward-based crowdfunding platform, individuals contributing to a project do not receive any financial incentives, returns, or repayment in the project in return for their funds. Instead, funders receive a reward for backing a project. This can include being credited in a movie, having creative input into a product under development, or being given an opportunity to meet the creators of a project (Gerber et al., 2012). According to the Kickstarter website, the four most common reward types are: (a) copies of the thing (e.g., the actual product, an assembled version of a DIY kit); (b) creative collaborations of various kinds (e.g., a backer might appear as a hero in the comic, or she may be painted into the mural); (c) creative experiences (e.g., a visit to the film set, a phone call from the author, dinner with the cast, a concert in the backer's backyard); and (d) creative mementos (e.g., photos sent from the filming location, explicit thanks in the closing credits of the movie) (Kuppuswamy and Bayus, 2015). In China, the "pre-selling" of products to early customers is a common feature in most crowdfunding platforms, treating investors as early customers and allowing them access to the products produced by funded projects at an earlier date, better price, or with some other special benefit (Zheng et al., 2014).

We study investor dynamics in a reward-based platform for two primary reasons: (1) When investors consider reward-based crowdfunding projects, the process of making investment decisions is similar to the process of customers making purchase decisions. Therefore, in the reward-based crowdfunding context, we can implement the elaboration likelihood model to explore investors' online behavior. (2) Reward-based crowdfunding has the largest number of online

platforms and is the fastest growing form of crowdfunding (massolution.com, 2013).

2.2. Elaboration likelihood model

The elaboration likelihood model (ELM) is a persuasion theory (Petty and Cacioppo, 1983, 1986), and it is a major theoretical model in online behavior research (Chu and Kamal, 2008; Gupta and Harris, 2005; Ho and Bodoff, 2014; Shih et al., 2013; Park and Kim, 2008; Lee and Youn, 2009; Sher and Lee, 2009). ELM is not only well-constructed to clearly and simply articulate the persuasion process. It is also so descriptive that it can accommodate a number of different outcomes and hence can be used as support in many situations. ELM also has academic precedent. The model is so well cited in new research that its inclusion is expected, anticipated, and often required by journal editors and reviewers alike, representing one of marketing communication's sacred and most-cited models (Bhattacherjee and Sanford, 2006; Ho and Bodoff, 2014; Pasadeos, Phelps, and Edision, 2008; Angst and Agarwal, 2009).

While investigating the determinants of online behavior, various previous studies (Luo et al., 2014; Cheung, Lee, and Rabjohn, 2008; Chu and Kamal, 2008; Jones, Sinclair, and Courneya, 2006; Park, Lee, and Han, 2007; Shih et al., 2013) utilized the elaboration likelihood model as their theoretical background. ELM considers there to be two routes to affect any reader's information credibility perception: the central route and peripheral route. The central route involves carefully scrutinizing the content of the information with extensive cognitive effects, whereas peripheral route often relies on the environmental characteristics associated with the information without any deep thought (Luo et al., 2014).

In prior literature, researchers always considered information about production quality and specifications to be in the central route and electronic word-of-mouth cues to be in the peripheral route as they explored the influence of the factors related to the two routes on consumers' final attitudes toward the product and willingness to purchase (Cheung et al., 2008; Chu and Kamal, 2008; Gupta and Harris, 2005; Lee et al., 2008; Park et al., 2007; Park and Kim, 2008; Park and Lee, 2008; Sher and Lee, 2009).

However, few studies have explored the effect of the two routes of ELM on funders' decision making. To address this gap, this study investigates the factors affecting the funder decision making process in the reward-based crowdfunding context. Potential factors affecting funders' decisions are classified into one of the two routes. Based on the literature, this study defines signals of project quality as the central route and electronic word-of-mouth as the peripheral route in evaluating the funder adoption of the two routes and their influence on decision making.
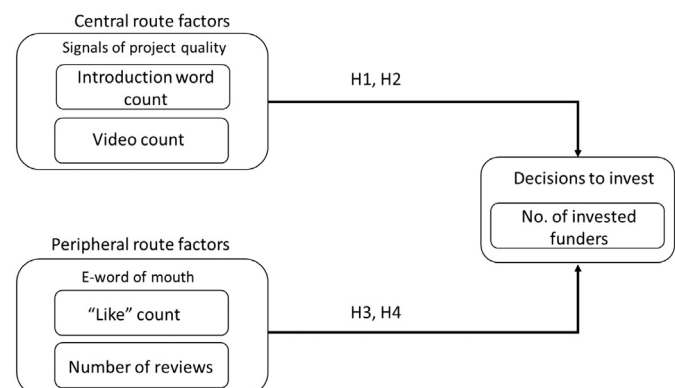

Fig. 1. Conceptual model.

Table 1
Descriptive statistics of the dependent and independent variables.

Variable	Groups	Number of projects	Mean	SD
Goal (¥)	Science &Technology	268	38,134.51	94,608.24
	Entertainment	246	79,395.34	401,962.84
	Agriculture	287	15,442.97	35,876.01
	Art	198	25,943.65	88,260.319
	Total sample	999	39,350.77	211,095.09
Duration (days)	Science &Technology	268	36.38	13.79
	Entertainment	246	43.15	25.94
	Agriculture	287	39.07	18.09
	Art	198	41.59	21.30
	Total sample	999	39.85	20.151
Introduction word count	Science &Technology	268	776.94	287.78
	Entertainment	246	1170.6	448.13
	Agriculture	287	657.01	357.43
	Art	198	1014.68	322.488
	Total sample	999	886.54	412.46
Video count	Science &Technology	268	0.3	0.46
	Entertainment	246	0.37	0.48
	Agriculture	287	0.27	0.45
	Art	198	0.27	0.45
	Total sample	999	0.3	0.46
"Like" count	Science &Technology	268	57.53	60.74
	Entertainment	246	39.34	57.27
	Agriculture	287	21.66	32.64
	Art	198	11.26	18.289
	Total sample	999	33.58	49.66
No. of reviews	Science &Technology	268	24.81	32.03
	Entertainment	246	19.76	43.23
	Agriculture	287	5.83	10.6
	Art	198	5.6	6.36
	Total sample	999	14.31	29.09
No. of invested backers	Science &Technology	268	51.24	70.61
	Entertainment	246	38.96	77.81
	Agriculture	287	18.17	34.66
	Art	198	11.75	22.978
	Total sample	999	30.89	59.29

3. Research model and hypotheses

3.1. Signals of project quality

According to prior literature, researchers have shown that investment intention or funding success are significantly related to project quality signals such as preparedness, narrative, and others' contribution decisions, as well as individual quality signals like personal characteristics, creditworthiness, and social networks (Mollick, 2013, 2014;

Table 2
Correlations of variables.

	1	2	3	4	5	6	7
1. No. of invested funder	1						
2. Goal	0.014	1					
3. Duration	−0.101**	0.132**	1				
4. Introduction word count	0.521**	0.013	−0.056	1			
5. Video count	0.506**	−0.028	−0.080*	0.440**	1		
6. "Like" count	0.725**	0.032	−0.034	0.369**	0.379**	1	
7. No. of reviews	0.724**	0.021***	−0.031	0.373**	0.349**	0.702**	1

* p < 0.05.
** p < 0.01.
*** p < 0.001.

Colombo, Franzoni, and Rossi-Lamastra, 2013; Younkin and Kashkooli, 2013; Zvilichovsky, Inbar, and Barzilay, 2013; Burtch, Ghose, and Wattal, 2013). The identifiable signals of project quality can predict project success; better-quality projects receive funding and lower-quality projects receive few or no backers. The significance of quality signals is further magnified through a Matthew Effect (Merton, 1957) that multiplies the impact of project quality. High-quality projects attract funders who may promote the project to other potential investors or external media, thus increasing the draw of the project (Mollick, 2013, 2014).

In a reward-based crowdfunding platform, such as Kickstarter or zhongchou.com, a "creator" creates a webpage for the project on the platform to introduce his or her project. The introduction aims to explain the purpose of the project and the specific deliverables that they aim to produce with the contributed funds (Kuppuswamy and Bayus, 2015). In the introduction of the crowdfunding project, the creator needs to offer much detailed information. For example, in a technology project, the creator will clarify product specification information, saying which colors can be chosen, describing the usage scenarios, etc. In Entertainment projects, such as a film project, the creator needs to outline the main plot of the movie, introduce the director and actors, and explain the specific deliverables they will offer to investors. Overall, in this study, we believe that the detailed narrative of a project, more specifically, the introduction word count of a reward-based crowdfunding project is a typical signal of project quality: the more detailed the introduction (judging by word count), the more readers will decide to invest.

In Mollick's (2013, 2014) exploratory empirical study, he followed the lead of Chen, Yao, and Kotha (2009) in focusing on the role of preparedness as a signal of quality to investors. In Mollick's (2014) study, he believes that when project initiators are making preparatory material, most crowdfunding platforms advise that the key to demonstrating preparation is to include a video. For example, Kickstarter suggests that: "There are few things more important to a quality Kickstarter project than video. Skipping this step will do a serious disservice to your project." Given the strength of this admonition, producing a video is a clear signal of at least minimum preparation, so we follow Mollick's (2014) method and use whether a project had a video as one indicator of a higher-quality project. So, video count is a binary variable rather than an actual count of the number of videos in the pitch. Thus,

H1. High introduction word count for a reward-based crowdfunding project has a positive effect on funder investment decisions.

H2. Having a video in a reward-based crowdfunding project introduction has a positive effect on funder investment decisions.

3.2. Online reviews and electronic word-of-mouth

Scholars and practitioners have recognized that online reviews are the most effective marketing tool, since people's online behavior will be deeply affected by electronic word-of-mouth and online shoppers rely heavily on online product reviews to make purchase decisions (Park and Kim, 2008; Schlosser, 2011; Sen and Lerman, 2007). For instance, consumers always assess online product reviews using ratings, text-rating congruence, source, number of "Likes," and the overall number of positive and negative reviews (Benedicktus, Brady, Darke, and Voorhees, 2010; Forman, Ghose, and Wiesenfeld, 2008; Pan and Zhang, 2011; Schlosser, 2011).

Jiménez and Mendoza's (2013) study states that online product reviews are now usually accompanied by indicators of reviewer agreement and signals of consensus such as the number of "Likes," the number of reviewers who found a review helpful, and the number of reviewers that agree with a review. Sometimes this is done through third party Web sites specializing in product reviews (Benedicktus et al., 2010; Zhu and Zhang, 2010). For instance, the "Like" feature, popularized by Facebook, is becoming a standard. As many as 49% of Internet

Table 3
Hierarchical multiple regression analysis (all samples, all project categories).

Hierarchical variable	Estimate variable	Model 1			Model 2			Model 3		
		β	t	VIF	β	t	VIF	β	t	VIF
Control Variable	Goal	0.028[*]	0.872	1.018	0.026	1.021	1.019	0.005	0.276	1.021
	Duration	−0.104	−3.28[***]	1.018	−0.056	−2.206[**]	1.025	−0.005	−3.064[**]	1.025
Signals of project quality	Introduction word count	–	–	–	0.341	12.13[***]	1.246	0.167	8.17[***]	1.343
	Video count	–	–	–	0.368	13.11[***]	1.242	0.186	9.09[***]	1.345
E − word of mouth	"Like" count	–	–	–	–	–	–	0.342	13.44[***]	2.079
	No. of reviews	–	–	–	–	–	–	0.354	14.03[***]	2.045
Summary of the model specified	F	5.469[**]			146.004[***]			369.778[***]		
	R²	0.011			0.370			0.691		
	ΔR²	0.011			0.369			0.321		

[*] p < 0.05.
[**] p < 0.01.
[***] p < 0.001.

shoppers use this feature in an online retail environment, and 29% indicate that the number of "Likes" is very important to them when reviewing product information (Jiménez and Mendoza, 2013).

Overall, in prior literature, we can find that electronic word-of-mouth has a significant effect on online behavior. We believe that the more online reviews and "Like" counts a reward-based crowdfunding project has, the more people will decide to invest in it. Thus,

H3. A high "Like" count of a reward-based crowdfunding project has a positive effect on funder investment decisions.

H4. A high number of online reviews of a reward-based crowdfunding project has a positive effect on funder investment decisions.

To summarize the above literature, the conceptual framework is drawn to inspect the correlations among signals of project quality, electronic word-of-mouth, and decisions to invest. Fig. 1 shows the conceptual model of the study. The number of invested backers is the dependent variable, and introduction word count, video count, "Like" count, and number of online reviews are the independent variables. These are divided into the two constructs of signals of project quality and electronic word-of-mouth.

4. Research method and results

4.1. Data and methods

Data for our study was derived from publicly available information on the zhongchou.com website (http://www.zhongchou.com/). zhongchou.com was founded in Beijing in February 2013 and has developed into one of the largest crowdfunding websites in China. Similar to Kickstarter, zhongchou.com provides data about crowdfunding projects and real-time performance. Data about a given project includes the goal

of the fundraising, the duration of the project, and the description and introduction of the project. Data about the project's real-time performance includes the final pledge amount, the ratio of pledge over goal, the number of investors, the "Like" count, and the number of online reviews.

We wrote a computer program using the Python computer language to extract information on all projects posted on the platform, collecting each project's information on the day of its deadline. Over five months, we collected information for 1407 projects from zhongchou.com. Other than the dependent and independent variables, we also collected data for two control variables. The crowdfunding goal was measured as the total amount of money that an entrepreneur intended to raise for a particular project. Crowdfunding duration was the number of days from the start to the end of a project. We removed charity projects because charity crowdfunding projects are donation-based crowdfunding (Hemer, 2011). In addition to charity projects, we also removed publishing and games projects because the sample quantity collected in those two categories was too small to do reliable data analysis. After that, we also identified and removed some projects where the ratios of pledges over goals were extremely large, making those projects outliers. After cleaning the data for inaccuracies and incomplete information, in the end, the detailed data available for analysis purposes included 999 crowdfunding projects in the categories Science & Technology, Entertainment, Agriculture, and Art. The descriptive statistics of the dependent and independent variables are shown in Table 1.

4.2. Hypotheses testing and results

We first performed a correlation analysis, the results of which are shown in Table 2. As can be seen from the table, correlations between the dependent variable and all independent variables are significantly positive. The funders' decisions to invest shows significant positive

Table 4
Hierarchical multiple regression analysis (science & technology projects).

Hierarchical variable	Estimate variable	Model 1			Model 2			Model 3		
		β	t	VIF	β	t	VIF	β	t	VIF
Control Variable	Goal	0.137	2.232[*]	1.012[**]	0.052	1.294	1.056	−0.016	−0.521	1.092
	Duration	0.015	0.244	1.012	0.047	1.199	1.020	−0.026	−0.875	1.050
Signals of project quality	Introduction word count	–	–	–	0.481	10.762[***]	1.313	0.299	8.442[***]	1.497
	Video count	–	–	–	0.420	9.529[***]	1.278	0.248	7.118[***]	1.454
E − word of mouth	"Like" count	–	–	–	–	–	–	0.315	7.354[***]	2.196
	No. of reviews	–	–	–	–	–	–	0.269	6.791[***]	1.874
Summary of the model specified	F	2.613			98.839[***]			155.661[***]		
	R²	0.019			0.601			0.782		
	ΔR²	0.019			0.598			0.181		

[*] p < 0.05.
[**] p < 0.01.
[***] p < 0.001.

Table 5
Hierarchical multiple regression analysis (entertainment projects).

Hierarchical variable	Estimate variable	Model 1			Model 2			Model 3		
		β	t	VIF	β	t	VIF	β	t	VIF
Control variable	Goal	0.001	0.016	1.024	0.014	0.344	1.025	0.023	0.617	1.026
	Duration	−0.211	−3.32[***]	1.024	−0.136	−3.443[***]	1.041	−0.089	−2.353[*]	1.094
E − word of mouth	"Like" count	–	–	–	0.318	4.592[***]	2.732	0.195	3.082[**]	3.049
	No. of reviews	–	–	–	0.496	7.770[***]	2.704	0.431	7.044[***]	2.836
Signals of project quality	Introduction word count	–	–	–	–	–	–	0.241	5.171[***]	1.645
	Video count	–	–	–	–	–	–	0.097	2.326[***]	1.307
Summary of the model specified	F	5.648[**]			105.420[***]			86.527[***]		
	R²	0.044			0.636			0.685		
	ΔR²	0.044			0.592			0.049		

[*] p < 0.05.
[**] p < 0.01.
[***] p < 0.001.

correlations with the introduction word count (β = 0.521, p < 0.01), the video count (β = 0.506, p < 0.01), the "Like" count (β = 0.725, p < 0.01), and the number of online reviews (β = 0.724, p < 0.01). Therefore, all hypotheses were supported.

This study also investigates the effect of the two routes of ELM on investment decisions, so a hierarchical regression analysis was used to test the proposed research model. When we just try to find out the correlations between two or more constructs, we always use liner regression analysis, but if the study try to explore the most significant influence factors to dependent variable, researchers always chose hierarchical regression analysis (Anderson, 1986; Tabachnick and Fidell, 2007). Structural equation modeling was not used because the constructs used in this study do not have a complex structural relationship. Another problem in multiple regression analysis is multicollinearity. The reason for the significant issue of multi-collinearity is the high linear dependencies of many explanatory variables (Cheng and Ho, 2015). Generally speaking, the variance of the inflation factor (VIF) is the indicator used to identify the severity of the multi-collinearity problem. A VIF > 10 means that there is a serious multi-collinearity problem between the variables (Cohen, Cohen, West, and Aiken, 2013).

In Table 3, we use the total sample data to do hierarchical multiple regression analysis. As we can see from the table, there are just two controllable variables in model 1. However, in model 2, which does not include the variables for "Like" count and number of online reviews, the introduction word count and video count explain 36.9% of the variance of funder investment behavior. The F value is 146.004 (p < 0.001), and the beta coefficients of the two independent variables are 0.341 (p < 0.001) and 0.368 (p < 0.001), both of which are positive and significant. Model 3 includes the "Like" count and number of online reviews. The overall explained variance increases by 32.1% (ΔR²), and the significant F value is 369.778 (p < 0.001), which shows that the four predictive variables have a significant influence on the perceived usefulness

of the review. The beta coefficients for the introduction word count, video count, "Like" count, and number of online reviews are 0.167 (p < 0.001), 0.186 (p < 0.001), 0.342 (p < 0.001), and 0.354 (p < 0.001), respectively, all of which are significant. The values of VIF (<10) for each variable all indicate that there is no multi-collinearity in the model.

Next, hierarchical multiple regression analysis was done on the data specific to the different project categories to find out the effect of the peripheral route factor and the central route factor on funder investment decisions. The results of hierarchical multiple regression analysis on the different project category data are shown in Tables 4 to 7.

5. Discussion

This study investigates which kind of project online information affects funders' decisions to invest. The findings show that the central route information (signals of project quality) and the peripheral route information (e-word of mouth) have almost equal effect on funder investment decisions. We can see from the hierarchical multiple regression analysis based on all data (Table 3) that in regression model 2, which considers only the two variables for signals of project quality (introduction word count and video count), those two variables explain 36.9% of the variance in the number of funders. However, after also including the two variables of e-word of mouth ("Like" count and the number of online reviews) in Model 3, the explained variance increases by 32.1%. This means that the influence of two routes' factors on funder investment decision are almost the same. Although some published studies show that the signals of project quality has a significant effect on crowdfunding project performance (Ahlers et al., 2015; Mollick, 2014), few papers point out that e-word of mouth has a positive correlation with funder investment decisions or crowdfunding performance. The research presented in this paper gives evidence that the central

Table 6
Hierarchical multiple regression analysis (agriculture projects).

Hierarchical variable	Estimate variable	Model 1			Model 2			Model 3		
		β	t	VIF	β	t	VIF	β	t	VIF
Control variable	Goal	−0.011[*]	−0.190[**]	1.020	0.048	1.185	1.028	0.031	0.832	1.037
	Duration	−0.066	−1.102	1.020	−0.015	−0.369	1.025	−0.017	−0.456	1.029
Signals of project quality	Introduction word count	–	–	–	0.223	4.425[***]	1.563	0.186	3.974[***]	1.589
	Video count	–	–	–	0.583	11.575[***]	1.560	0.460	9.347[***]	1.767
E − word of mouth	"Like" count	–	–	–	–	–	–	0.132	3.190[***]	1.250
	No. of reviews	–	–	–	–	–	–	0.238	5.752[***]	1.248
Summary of the model specified	F	0.667			83.462[***]			74.766[***]		
	R²	0.005			0.542			0.616		
	ΔR²	0.005			0.537			0.074		

[*] p < 0.05.
[**] p < 0.01.
[***] p < 0.001.

Table 7
Hierarchical multiple regression analysis (art projects).

Hierarchical variable	Estimate variable	Model 1			Model 2			Model 3		
		β	t	VIF	β	t	VIF	β	t	VIF
Control variable	Goal	−0.100	−1.376	1.035	−0.087	−1.866	1.041	−0.058	−1.342	1.057
	Duration	0.068	0.933	1.035	0.08	1.881	1.041	0.101	2.333***	1.053
E − word of mouth	"Like" count	–	–	–	0.650	13.449***	1.109	0.540	11.11***	1.321
	No. of reviews	–	–	–	0.246	5.054***	1.122	0.128	2.251*	1.434
Signals of project quality	Introduction word count	–	–	–	–	–	–	0.221	4.415***	1.404
	Video count	–	–	–	–	–	–	0.144	2.508*	1.851
Summary of the model specified	F	1.185			70.417***			61.496***		
	R²	0.012			0.593			0.659		
	ΔR²	0.012			0.581			0.066		

* $p < 0.05$.
** $p < 0.01$.
*** $p < 0.001$.

route information (signals of project quality) and the peripheral route information (e-word of mouth) have similar effects on funder investment decisions in mainland China.

This research also aimed to find out how the category of project influences which kinds of project online information affect funder investment decisions. Hierarchical multiple regression analysis was performed using different categories of project data. In Table 4 and Table 6, we can see the hierarchical multiple regression analysis results for Science & Technology and Agricultural project data. Regression model 1 uses just the two control variables. In model 2, we add the two signals of quality variables (introduction word count and video count), resulting in the variables explaining 59.8% and 53.7% of the variance in the funder investment decisions for Science & Technology and Agriculture, respectively. However, after incorporating the two variables of e-word of mouth ("Like" count and number of online reviews) in model 3, the explained variance increases a mere 18.1% and 7.4% respectively. The results show that the central route factor (signals of quality) is more significant to funders than the peripheral route factor (e-word of mouth) for Science & Technology and Agricultural projects. This signal of quality significance was expected, since project introduction and video are known to be two major factors (Mollick, 2013, 2014). When a project's introduction or description is more detailed, investors will perceive this project as more reliable. Further, a video is another important indicator of the credibility. The results show that the correlation between the video count and a funder's decision to invest is also positive and significant. If creators want to improve their level of success in crowdfunding, they should put a detailed introduction and a terrific video onto the website. For the construct of e-word of mouth, the greater the number of online reviews and the greater the "Like" count is on the website, the greater the result in terms of number of invested funders.

In contrast to the Science & Technology and Agricultural projects results, for Entertainment and Art projects, we have totally different results. In Table 5 and Table 7, we can see the hierarchical multiple regression analysis results based on Entertainment and Art project data. Regression model 1 includes just the two control variables. In model 2, we add the two e-word of mouth variables ("Like" count and number of online reviews), and it is found that these variables explain 59.2% and 58.1% of the variance in funder investment decision respectively for Entertainment and Art projects. However, after incorporating the two signals of quality variables (introduction word count and video count) in model 3, the explained variance increases a mere 4.9% and 6.6%. This result means that that funders in the Chinese online crowdfunding environment will pay more attention to the e-word of mouth information than the signals of quality information when they consider whether to invest in an Entertainment or Art project.

In the online behavior research context, much in the literature has proved that product type is an important moderating variable affecting the correlation between online information and people's online

behavior. For instance, in Mudambi and Schuff's (2010) study, they found that product type moderates the effect of review extremity on the helpfulness of the review. Online review depth has a greater positive effect on the helpfulness of the review for search goods than for experience goods. Chu, Roh, and Park (2015) used the information diagnosticity framework to demonstrate that when exposed to highly-versus lowly-dispersed ratings, consumers evaluate hedonic products more positively than they do utilitarian products. The current study also shows that product or project type moderates the effect of central route information and peripheral route information on funders' decisions to invest.

6. Conclusions

6.1. Limitations

There are several limitations in this study. First, this paper only studies reward-based crowdfunding projects, rather than equity crowdfunding or other forms of crowdfunding. In prior research (Agrawal et al., 2010), scholars have argued that the motivations of backers who act as patrons and customers are similar to those of investors, but there are likely to be differences in how these crowdfunding markets operate (Mollick, 2014). This means that the elaboration likelihood model used here is not suitable for research in the equity crowdfunding context. Second, we only used the introduction word count and video count of a project to measure project quality. Text description and the presence of video are not the only two indicators of a higher-quality project. In crowdfunding platforms, the investor can also evaluate project quality through various visual images. People's cognition and online behavior are always influenced by images (Chen and Teng, 2013; Mitchell, 2001; Fiore, Jin, and Kim, 2005), but in this research we have not extracted image information from the crowdfunding website due to technological limitations. Third, we did not consider other moderating variables, such as the pricing choice problem of the crowdfunding project. Fourth, the sample size used here was relatively small compared with the current trend of big data analysis, which has drawn the attention of the research community.

6.2. Implications for research

This study makes several contributions to the literature. There is a lack of underlying theories and theoretical models in the current crowdfunding literature. This study is one of the first to introduce the elaboration likelihood model to this literature. We investigate the issues of crowdfunding from a specific theoretical perspective to explain its dynamics. Compared with prior literature that was largely exploratory (Ordanini et al., 2011), this is a confirmatory study based on a solid theoretical foundation to test the role of signals of quality and e-word of

mouth in the investment decision process of those who become crowdfunders.

Second, this paper is also one of the first to examine the role of electronic word of mouth in the crowdfunding context. In prior literature, researchers have already verified the role of signals of quality in crowdfunding (Ahlers et al., 2015; Mollick, 2014) but there is little literature on the effect of electronic word of mouth on crowdfunding projects. The empirical evidence in this study is from a crowdfunding context in the Chinese mainland. This is noteworthy because China is a collectivist society, and Chinese people's valuing of collectivism enhances the effect of electronic word of mouth on their online behavior (Luo et al., 2014). We have extended the prior literature, which has a focus on the online shopping context, to a reward-based crowdfunding context through this examination of the effect of electronic word of mouth on people's behavior, in this case the effect of electronic word of mouth on funder investment decisions.

Third, this research demonstrates that project or product type has an important moderating impact on the correlation between online information and funder investment decisions. We submit that when investors consider projects in different categories (e.g. Science & Technology, Art), the information they care about is also different. For all reward-based crowdfunding projects, the central route information (signals of project quality) and the peripheral route information (e-word of mouth) have similar effect on investment decisions. However, when we explore the effect of online information in more detail from the perspective of different project categories, the findings are different. For Science & Technology and Agriculture projects, the central route factor (signals of quality) is more useful to investors than the peripheral route factor (e-word of mouth). In contrast, considering Entertainment and Art projects, potential funders will pay more attention to the e-word of mouth information than the signals of quality information.

6.3. Implications for practice

This research also provides several practical implications for crowdfunding platform creators and entrepreneurs. First, it is critical for creators to leverage the power of the central route information (signals of project quality) and the peripheral route information (e-word of mouth). Creators should provide a detailed description of the project they have launched, which can make investors feel that the project has high quality. Meanwhile, creators should have interaction with visitors and invested funders because electronic word of mouth is a key factor in peoples' purchasing decisions in the reward-based crowdfunding environment. Second, a crowdfunding platform should supply different methods for different project categories. For instance, the crowdfunding platform could encourage creators to provide more detailed information and highlight signals of project quality in websites if the project is classified as Science & Technology or Agriculture. On the other hand, for projects in the Entertainment and Art categories, crowdfunding should highlight online reviews and the "Like" count. This can make visitors and investors think that the projects have great electronic word of mouth.

To summarize, in an effort to extend some of the earliest studies of crowdfunding we have applied the theory of the elaboration likelihood model to study the effect of online information on funders' crowdfunding investment decisions in the Chinese online crowdfunding context. We have provided consistent evidence demonstrating the strong impacts of signals of quality and electronic word of mouth in crowdfunding using data collected in China. Additionally, we have elucidated the different effects of online information on different categories of reward-based crowdfunding projects.

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