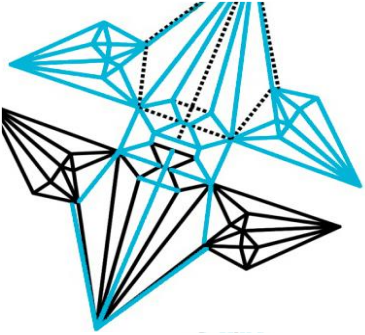

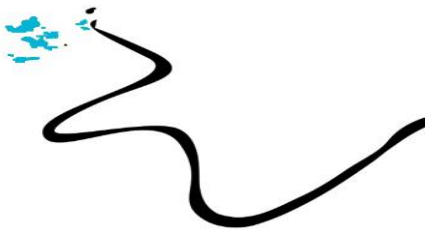

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Master Thesis

CROWDFUNDING IN VIETNAM: THE IMPACT OF PROJECT AND FOUNDER QUALITY ON FUNDING SUCCESS

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ABSTRACT

This study seeks to give an analytical understanding of crowdfunding in Vietnam by examining the impact of project quality and founder quality on the success of crowdfunding. Based on a sample of 122 crowdfunding projects on Vietnamese platforms, three factors are found to drive successful fundraising. In particular, the presence of more quality signals and provision of additional founder information are associated with a higher probability of success. These findings confirm the role of quality in project outcomes. By having more project and founder quality indicators, the information asymmetry problem becomes less severe and investors have more trust to invest in a project. Further analyses conducted separately for two types of crowdfunding show that the main results hold for the equity-based subsample. Meanwhile, in reward-based crowdfunding, the impact on success becomes weaker for project quality signals and insignificant for founder quality signals. The explanation for this difference lies in both the average amount of investment involved and the degree of riskiness of the specific crowdfunding type.

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I. INTRODUCTION

Among other resources, sufficient finance is crucial to the sustainable development of new ventures. As a result, one of the most important tasks for entrepreneurs who want to realize their ideas into successful businesses is searching for capital (Clarysse et al., 2005; Oviatt & McDougall, 2005; Wong et al., 2009). Considering the difficulties a new company has to face in accessing traditional funding through bank loans or bond issuances, entrepreneurs are actively seeking new ways to attract investment money. Among these efforts, crowdfunding has emerged as a unique form of alternative finance where entrepreneurs call for contributions, usually in small amounts, from the public, or the "crowd", instead of a limited group of professional investors (banks or venture capitalists) to fund their ventures. Although other methods are possible, for example mail-order subscriptions (Wikipedia, 2017), crowdfunding is typically performed via Internet-based moderating websites (the "platforms) where project owners (the "founders") propose their ideas, and individuals (the "backers"/the "funders") click to contribute money to support them and receive some kind of rewards or privileges in return. These returns can vary from a credit, a product to a share in future profits.

Crowdfunding statistics have grown rapidly over the past few years worldwide, especially in North America and Europe. Numerous online platforms are developed to support the growing demand, for example Kickstarter, Gofundme, Indiegogo, etc., whose values of successful funding are measured in hundreds of million dollars. During the period from 2012 to 2015, the total global crowdfunding volume had grown by almost 13 times to reach USD 34.4 billion (Statista, 2017). The emergence of this phenomenon can be explained partly by the fact that it overcomes the challenge of distance in venture investment (Agrawal et al., 2011) with the help of the Internet. However, still little is known about the mechanism and dynamics of crowdfunding, how it contrasts or fortifies existing theories on other forms of business venturing, and whether it will be able to ultimately replace traditional financing methods (Mollick, 2014).

Despite the fact that crowdfunding has emerged in recent years as a promising alternative method for individuals and firms to fund their startups, due to its newness, not much literature can be found on the topic and much of which is in the form of working papers. Crowdfunding has its roots in notions of alternative finance including microfinance, peer-to-peer lending, and is considered part of crowdsourcing. Crowdsourcing first appeared in a technology article (Howe, 2006) to refer to the outsourcing of tasks to the general public, and was researched in more details in studies of Kleemann et al. (2008) and Brabham (2008), to name but a few.

Schwienbacher & Larralde (2010)'s research on a French media startup company is one of the first to focus on crowdfunding as an alternative financing approach. Agrawal et al. (2011) examine a group of musicians raising fund for their albums through a website and conclude that the use of an online platform removes some geographic limitations on fundraising; however, distance still plays a role in social-related matters. Belleflamme et al. (2014) use a unified model to explain an

entrepreneur's choice between two forms of crowdfunding: pre-ordering and profit sharing. These early works have founded a basis for crowdfunding literature.

Some papers specifically consider factors that drive the successes or failures of crowdfunding ventures. This can be seen from the perspective of backers or founders. As an investor, the decision to invest in a particular project is largely determined by observing other investors' actions. For example, using Kickstarter data, Kuppuswamy & Bayus (2013) find a negative relationship between new and past investments. In other efforts, Colombo et al. (2014) study the role of contributions in the early phase of the crowdfunding cycle, whereas Bi et al. (2017) focus on the impact of electronic word-of-mouth on funding success. In entrepreneurial venturing from the perspective of founders, language together with the underlying quality of projects and founders are key success factors. Mitra & Gilbert (2014) and Parhankangas & Renko (2017), among other studies, show the role of verbal content and style in predicting success of crowdfunding initiatives. Focusing on signaling theory, Ahlers et al. (2015) examine equity crowdfunding data in Australia to uncover that the success of a crowdfunding project depends on the delivery of credible signals, sufficient information disclosure and the perceived quality of founders; while Mollick (2014) shows the importance of founders' personal connections, project quality, and geography.

As an emerging economy in the Southeast Asia (Bloomberg, 2016), Vietnam is merely new to the market. Though there are differences in the institutional background between Vietnam and more developed countries, this should not hinder the development of crowdfunding in the country. The first recorded successful crowdfunding campaign in Vietnam took place in mid-2014 to support the publishing of a comic book named "Long Than Tuong". After two months, this project was able to raise VND 330 million (equivalent to USD 14,537), 10% exceeding its funding goal, and was considered the most successful and well-known crowdfunding efforts until then (Long Than Tuong, 2017). Though this amount cannot compared with those of Kickstarter or Indiegogo projects, with its success, "Long Than Tuong" has introduced a new financing method to Vietnamese entrepreneurs and proved that crowdfunding can actually be effective and help them achieve their goals through socialization. Apart from projects posted on well-established global crowdfunding platforms such as Kickstarter and Indiegogo, the last three years have witnessed the birth of several domestic crowdfunding websites which allow for more localization. They have successfully housed a fair and increasing number of projects in diverse areas, marking the participation of Vietnamese entrepreneurs and getting the attention of the public to crowdfunding.

This paper will provide a review of crowdfunding literature with a focus on success factors, as well as an empirical test of the role of important factors in Vietnam context. Specifically, by using a unique dataset of 122 projects on five crowdfunding sites in Vietnam between 2014 and 2016, I seek to provide an analytical understanding of crowdfunding, with a focus on the research question:

"What are the impacts of project quality and founder quality on the success of crowdfunding?"

To answer this question, summary statistics are used in combination with statistical models to analyze the influence of different factors on the result of fundraising. A preliminary descriptive analysis can reveal some prominent patterns of the phenomenon, while subsequent analyses provide a further investigation of underlying factors which have impact on the result of fundraising. Based on previous studies, factors related to signals of project and founder quality will be taken into account with an expected positive relationship with the likelihood of success. As a preliminary test, t-test is used to reveal whether and how successful and unsuccessful projects differ in terms of their conveyance of project quality and founder quality signals. For multivariate testing, I employ a logistic regression of the success flag - an indication of whether an effort is successful or failed - on different quality- and founder-related factors, controlling for project-specific characteristics.

The study contributes to crowdfunding literature as one of the first academic works to take a look into this phenomenon in Vietnam. Crowdfunding studies in Asian countries are rare (see Bechter et al., 2011; Kuo et al., 2014; Royal & Windsor, 2014, for example). In addition, they are usually taken from the perspective of informational science or focus on motivations to participate in crowdfunding rather than identify success factors. Moreover, unlike previous papers which are based on either equity-based crowdfunding (Ahlers et al., 2015) or reward-based crowdfunding (Bi et al., 2017; Mitra & Gilbert, 2014; Mollick, 2014), this analysis covers both of these prominent crowdfunding types. By doing so, I will be able to identify differences in factors leading to funding success under each scheme.

The rest of this paper is structured as follows. Section II provides a literature review of crowdfunding. Section III is an overview of the institutional environment and background of crowdfunding in Vietnam, followed by a development of hypotheses about the impact of project and founder quality signals on the likelihood of crowdfunding success in Section IV. Section V is devoted to research methodology with regards to sample selection, data, variables and statistical models. Section VI analyzes findings about the relationship between success probability and signals. This section also tests robustness of the results. Finally, a summary of thesis findings, concluding thoughts, and suggestion for further research are presented in Section VII.

II. LITERATURE REVIEW

1. DEFINING CROWDFUNDING

A simple definition of crowdfunding involves the practice of raising money to finance a venture or project from the general public, rather than professional financiers such as banks or venture capitalists. It is widely considered as a novel form of alternative finance.

More conceptually, starting from Kleemann et al. (2008)'s definition of crowdsourcing, Belleflamme et al. (2014) provide the following description: "Crowdfunding involves an open call, mostly through the Internet, for the provision of financial resources either in the form of donation or in exchange for the future product or some form of reward to support initiatives for specific purposes". Although this description is relatively broad, Mollick (2014) argues that it still misses cases such as internet-based peer-to-peer lending and fan-initiated fundraising initiatives. He, therefore, suggests using a narrower definition when crowdfunding is referred to specifically in the fields of business venturing and entrepreneurial finance, as "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". He identifies four forms of crowdfunding based on the type of benefit that funders receive with their investment: donation-based model, lending-based model, reward-based model, and equity-based model.

Theoretically speaking, individuals already indirectly finance companies by depositing their money in banks who later lend this money to those in need. However, with crowdfunding, the investment procedure occurs without any intermediation, but directly between entrepreneurs and funders, typically by making use of online platforms (Schwienbacher & Larralde, 2010), to name but a few Kickstarter, Indiegogo, Fundable, Kiva. It is common that new ventures start with limited internal funds and usually have difficulties in getting access to external sources of capital (bank loans or venture capital) due to the lack of valuable collaterals (Schwienbacher & Larralde, 2010). In such cases, crowdfunding provides them with a promising alternative financing opportunity.

2. THE ROOTS OF CROWDFUNDING

To have a better understanding of the "crowdfunding" concept, we can trace its meaning to related notions in alternative finance such as microfinance, peer-to-peer lending, and crowdsourcing.

Microfinance historically refers to the provision of financial help, usually in the form of uncollateralized loans, to low-income individuals and households who lack access to bank credit (Khavul, 2010). Previously considered as a "win-win" solution between the lenders and the borrowers, with poverty alleviation prospects, microfinance programs, although undeniably bring hope and the opportunity for poor debtors to improve their lives, are hardly profitable for

banks and depend heavily on subsidization (Morduch, 1999). Today, microfinance has diversified in its forms and context, involving a wide range of financial services (loans, equity financing, venture investments, insurance, etc.) denominated in small amounts (Bruton et al., 2015).

A newer and among the most widely adopted financing alternatives, peer-to-peer lending, also known as crowdlending, allows individuals to lend to other individuals or companies (Pierrakis & Collins, 2013) through online platforms without the actual intermediation of financial institutions (Bachmann et al., 2011). This method has emerged as a result of extremely low interest rates on traditional deposits. Peer-to-peer loans are usually unsecured and the lending decisions are largely based upon the perceived trustworthiness of applicants (Duarte et al., 2012).

Sharing the most similarity and considered the parent notion of crowdfunding is crowdsourcing, which first appeared in a technology magazine to describe the idea of turning to a group or the public for help to accomplish a task that would otherwise be difficult for a person to complete alone. In his article, Jeff Howe (2006) shows a case of a museum that is in need of a large quantity of pictures but does not have the financial resource to purchase them from professional photographers. The problem is then solved with iStockphoto, a marketplace where people can buy images from amateurs at much more lower prices. In one of the first academic article to use the term "crowdsourcing", it is explained to be "an online, distributed problem-solving and production model" (Brabham, 2008a). More specifically, Kleemann et al. (2008) defines crowdsourcing as a phenomenon when "a profit oriented firm outsources specific tasks essential for the making or sale of its product to the general public (the crowd) in the form of an open call over the internet". With crowdsourcing, consumers, who were conventionally mere passive takers of products and services, are transformed into voluntary taskforce working for the firm for free or significantly less money than the worth of their contributions. Using "the working consumer" instead of highly skilled staff, firms can generate value and profits, especially in the stages that require creativeness such as product design, marketing, product review or problem debugging. The development of crowdsourcing would not be made possible without the aid of "Web 2.0" (Brabham, 2008a; Kleemann et al., 2008) which is a computer-based internet structure that allows users to make interactive communication with each other, to create and upload any content and to contribute freely to networks. According to Lee et al. (2008), the motivation for people to do so is an expectation of rewards, in the form of intangible appreciation or in-kind products. They also identify three characteristics of Web 2.0 that make it crucial to the crowdsourcing process: collaboration, openness, and participation. Some examples of crowdsourcing include Wikipedia - "a free online encyclopedia, created and edited by volunteers around the world" (Wikipedia, 2017), 99designs - "the world's largest online graphic design marketplace" (99designs, 2017), and InnoCentive - "web-based community matching scientists to research and development challenges presented by companies worldwide" (InnoCentive, 2017).

Looking at the definitions of crowdfunding and crowdsourcing, we can see why the former can be seen as an element of the latter (Schwienbacher & Larralde,

2010). The basic idea is the same: using a large audience ("crowd"), instead of a small group of people, for resources, generally through social networks or specialized online platforms. In crowdsourcing, these resources may include ideas, solutions, opinions or any kind of support in a broad sense, while in crowdfunding, they refers specifically to money (financial resources) as investment in projects. This is how crowdfunding is embedded in the concept of crowdsourcing.

3. PREVIOUS RESEARCH

Crowdfunding is a new field of research (Bi et al., 2017). Most of the early literature uses exploratory approaches (Mollick, 2014) or case studies (Schwienbacher & Larralde, 2010; Gleasure, 2015). Table 1 summarizes prominent prior studies on crowdfunding relevant to this paper in a chronological order. This provides an overview theoretical framework as well as exhibits an evolution of crowdfunding literature.

Studies on crowdfunding is multi-faceted and are taken from different perspectives such as industrial organization (Belleflamme et al., 2010), entrepreneurial finance (Mollick, 2014; Parhankangas & Renko, 2017; Schwienbacher & Larralde, 2010), and informational science (Gleasure, 2015; Mitra & Gilbert, 2014). Researchers primarily aim at providing general foundation knowledge, exploring the logics of founders and backers, and identifying success factors in crowdfunding (Table 2). Among them, the most prominent issue frequently addressed in recent studies is what influences the final result and progress of a crowdfunding project. As can be observed, most success predictors are venture-related (project and founder). Following this strand of research, the objective of this paper is to provide a literature review of crowdfunding, focusing on success factors and to empirically test the impact of venture-related factors in the context of Vietnam.

In the following sections, I will provide a literature review on the influence of geography in crowdfunding, motivations and deterrents to crowdfunding creators and backers, and success factors in crowdfunding.

Table 1. Summary of prior studies

Paper	Focus/Research question	Contributions	Theory	Paradigm/Method	Sample/Context	Main findings
Belleflamme et al. (2010)	Identifying a number of prominent issues related to crowdfunding from the perspective of industrial organization Modelization of crowdfunding	Providing a systematic view of crowdfunding from an industrial organization perspective Developing two models of crowdfunding: pre-ordering and price discrimination	Definition, features, strands of research of crowdfunding	Summary statistics from a previous study Unified model to explain the choice of crowdfunding versus external financing based on trade-off	Hand-collected data from various sources on 51 crowdfunding initiatives Questionnaire	When firms can use crowdfunding and pre-ordering to screen high-paying customers, crowdfunding is preferred over external funding if the fixed cost to produce goods is not too high and the discount factor is sufficiently large. When firms use crowdfunding to reveal their preference about horizontal attribute of products, the choice of non-profit status is more likely to be chosen with crowdfunding than external funding if the cost of higher quality is sufficiently small and the degree of horizontal differentiation is sufficiently large.
Schwienbacher & Larralde (2010)	Studying crowdfunding as an emerging financing alternative, focusing on small entrepreneurial ventures	Providing a theoretical discussion of crowdfunding concept, looking at it from the perspective of entrepreneurial finance and developing a classification of crowdfunding models based on reward type	Definition & the market of crowdfunding, and motivations for participation Factors influencing the use of crowdfunding Business models of crowdfunding	Literature review Case study (qualitative and quantitative analyses)	Media No Mad - a company that has successfully used crowdfunding Data from interview, web information, survey	Crowdfunding tends to be preferred over conventional forms of financing when the amount of required capital is reasonably low; entrepreneurs have an interesting idea, are willing to extend their skills and familiar with Web 2.0. These characteristics are especially suited for small ventures.
Agrawal et al. (2011)	What is the role of geography in crowdfunding and funding behaviors of investors in specific?	Being the first empirical study of the role of geography in crowdfunding	Reduced market frictions related to geographic distance thanks to the use of a platform Different levels of information asymmetry faced by local and distant investors (family and friends)	Descriptive statistics Linear probability model (controlling for fixed effects) for investment propensity, local versus distant investors, mediation role of family and friends	34 campaigns which reached the USD 50,000 target on Sellaband, an Amsterdam-based platform for musical projects, during 08/2006 - 09/2009	Crowdfunding via online platforms can overcome offline limitations and thus reduce the role of geography in fundraising. Aggregately, the propensity to invest increases with the amount accumulated. However, local investors tend to invest early, and become less responsive to subsequent happenings. This effect is driven by those having personal connections with the entrepreneur, i.e. family and friends

Kuppuswamy & Bayus (2013)	How does social information influence the behavior of backers during crowdfunding cycle?	Focusing on reward-based crowdfunding and being the first to examine the role of social information Using new theoretical lens based on social psychology theory around diffusion of responsibility effects	Social psychology theory around diffusion of responsibility effects Deadline effect (among bargaining and online auctions)	Linear probability model of new contribution pledge (binary) on past backer support and funding phase	Two years of daily data on 25,058 projects on Kickstarter during 01/01/2010 - 31/12/2011	There is a negative relationship between new backer support and past backer support. The diffusion of responsibility effects weaken towards the closing phase of the funding cycle. As the project deadline approaches, updates also tend to increase. These both lead to higher project support in the final stages of funding.
Gerber & Hui (2014)	What motivates and prevents participation (creating or supporting) in the crowdfunding community?	First cross-platform qualitative study of crowdfunding Shedding light on motivations and deterrents to crowdfunding participation	Four elements of crowdfunding: online philanthropy, online consumer behavior, online peer-to-peer lending, and online peer production to explain why people choose to participate or refrain from crowdfunding	Semi-structured interviews: professional background and the involved project, introduction to platforms and current involvement, motivations and deterrents	83 US-based participants including different types of creators and supporters who engage in various project categories from Kickstarter, RocketHub, and IndieGoGo	Creator motivations include the need to raise funds, publicize their work, form connections, gain approval, preserve control, and learn new skills. Supporter motivations include rewards, the desires to help others, feel part of a community, and support a cause. Creator deterrents include fear of inability to attract supporters, fear of public failure and exposure, and time and resource commitment. Supporter deterrents include lack of trust.
Mollick (2014)	Exploring the underlying dynamics on how crowdfunding operates (drivers of success, impact of geography, post-funding behaviors)	Early attempts to gain an analytic understanding of the dynamics of crowdfunding by using a large dataset	Uncertainty of investments and the role of key quality signals Impact of network size in providing connections and endorsing quality The influence of geography on crowdfunding patterns	Descriptive statistics Logistic regression of the probability of success on project different quality signals and network size variables STATA modules for distance information + Logistic regression of success on distance and local creativity Cox model for delays in delivery	48,526 US-based crowdfunding efforts on Kickstarter since it was established in 2009 through 07/2012 across all categories	Underlying project quality (as implied by the presence of video, updates and spelling correctness) and personal networks (Facebook friends) are positively related to success of fundraising. Both project type and funding success are influenced by geography. The majority of founders try to fulfill their promise to funders, but most of the time not in a timely manner, with longer delays found in larger and overfunded projects.
Allison et al. (2014)	In prosocial lending, how can linguistic cues frame	Introducing cognitive evaluation theory to	Cognitive evaluation	OLS regression of time to funding on intrinsic cues,	36,665 microloans made to	Lenders respond positively to narratives implying the venture to be an opportunity to

	lending application descriptions as a business opportunity or a scheme to help people, and consequently affect the result of fundraising?	explain why people choose to participate in crowdfunding Explaining the role of the language of narratives in conveying cues (intrinsic and extrinsic) to potential lenders Comparing the relative importance of intrinsic and extrinsic cues to lender decisions	theory	extrinsic cues and other language variables	entrepreneurs from different countries via Kiva, an online crowdfunding platform	help others, and less positively to those which are framed as a business opportunity.
Mitra & Gilbert (2014)	What is the impact of language, i.e. words and phrases, used in project pitches on the success probability of crowdfunding projects?	Contributing to crowdfunding knowledge by identifying language as a fundamental force to drive investors' funding decisions	Theories of persuasion: the rule of reciprocity, scarcity principle, social proof, social identity theory, authority, liking	Penalized logistic regression of success (binary) on 20,391 phrases used as predictive variables	45,810 Kickstarter projects which closed on or before 02/06/2012	The language contained in project pitches has a crucial role in driving final success, explaining 58.56% of the deviance around success. Phrases that are highly predictive reflect different persuasion principles: reciprocity, scarcity, social proof, social identity, liking, and authority.
Colombo et al. (2014)	Why are early contributions so important for crowdfunding success? What factors are associated with the attraction of early contributions?	Contributing to crowdfunding literature by analyzing the association between early support (in both forms of capital and backers) and final success Contributing to research on the role of social capital in crowdfunding via attracting early contributions, being the first to investigate within-platform connections	Uncertainties and information asymmetries at the beginning phase of crowdfunding The role of early contributions: observational learning, word-of-mouth, feedback provision The role of internal social capital in attracting early contributions	Probit model of the probability of success on early backers and early capital Tobit model of early contributions (backers and capital) on internal social capital Mediation model using probit estimates to test the relationship between internal social capital and success	669 completed projects on Kickstarter during 20/10/2012 to 10/01/2013 in four categories: design, technology, video games	Internal social capital is crucial in attracting funders and raising funds in the early stage of a crowdfunding project. These early contributions are positively related to the probability of final success so that they fully mediate the impact of internal social capital on crowdfunding success.
Belleflamme et al. (2014)	What factors influence an entrepreneur's choice between pre-ordering	Being the first to analyze the choice of a particular form of crowdfunding	Literature review of definition and two forms of	A unified model (theoretical) comparing pre-ordering and profit	n/a	Assuming entrepreneurs create community benefits which increase backers' utility, they favor pre-ordering when initial required

	and profit sharing as a form of crowdfunding?	using a theoretical model	crowdfunding Product quality uncertainty and asymmetric information	sharing		capital is small compared to market size; and favor profit sharing otherwise. The model is extended to cover the impact of uncertainty of product quality.
Ahlers et al. (2015)	How does venture quality (human, social and intellectual capital) and uncertainty level (equity share, financial projections) impact crowdfunding success?	Being the first empirical study of the impact of signals used by entrepreneurs to attract investors to support an equity-based crowdfunding project	Information asymmetries in crowdfunding Signaling value of venture quality attributes and level of uncertainty indicators to influence probability of success	Univariate (difference) tests between fully-funded and not fully-funded projects Count model zero-inflated negative binomial regressions of number of investors OLS regressions of absolute funding amount Exponential hazard models for speed of investment	104 equity crowdfunding campaigns published on ASSOB between 10/2006 and 10/2011	Regarding venture quality signals, human capital is positively related to funding success; while there is little evidence supporting the role of social capital and intellectual capital. Retaining equity and providing detailed financial forecasts can act as effective signals to decrease information asymmetry and therefore increase the probability of success.
Gleasure (2015)	Why do entrepreneurs avoid using crowdfunding?	Investigating non-users to have a better understanding of resistance from an impression management perspective Identifying key trade-offs of crowdfunding as perceived by entrepreneurs	Impression management perspective: entrepreneurs are resistant to crowdfunding in an effort to manage perceptions of their ventures from the public	Positivist case study, in which data is collected and analyzed to identify factors/hypotheses to be tested in subsequent research	Data from 20 entrepreneurs in Ireland during 03/2014 - 03/2015 using a theoretical sampling strategy Interview + online information	Entrepreneurs' resistance is affected by their perceived costs and benefits of switching to crowdfunding. Entrepreneurs' resistance is affected by their fear of failure to raise enough funding, fear of information disclosure, and fear of bad image when using crowdfunding.
Dorfleitner et al. (2016)	What is the impact of soft information extracted from description texts on funding success and on the probability of default in peer-to-peer lending?	Being the first to study the role of description text-related soft factors simultaneously for two platforms with the same target but different designs	Psychological role of orthography Signaling effect of text length and certain keywords to predict funding success	Simultaneous IV probit regression of the probability of success and default (binary) on text-related factors	For funding success: 76,945 loan applications from Auxmoney + 10,423 from Smava Default probability: 3,298 granted loans from Auxmoney + 2,216 from Smava	Spelling mistakes, text length and the positive emotion-evoking keywords are significantly related to the probability of funding success on Auxmoney - the less restrictive site; while being insignificant for the other. For granted loans, these soft factors, however, do not sufficiently predict probability of default for both platforms.

Bi et al. (2017)	What is the impact of online information on investing decisions in reward-based crowdfunding?	Extending prior research on elements of a crowdfunding project by introducing the elaboration likelihood model to crowdfunding literature and investigating which type of online information has the strongest influence on investment behaviors	Elaboration likelihood model: two routes in which information can influence the decision to invest: central route (project quality signals) and peripheral route (electronic word-of-mouth)	Hierarchical multiple regression of the number of backers on project signals (word count, video count) and e-word of mouth factors ("Like" count, review count) for full sample and each project category	999 reward-based projects from zhongchou.com, a Chinese platform, in the categories of Entertainment, Science & Technology, Art, and Agriculture	Long description texts and higher video counts signal higher project quality; more "Like" counts and reviews imply better electronic word-of-mouth. Overall, the effects of central route and peripheral factors on investors' funding decisions are almost equal. At the category level, the central route is more important for Agriculture and Science & Technology initiatives, while the peripheral route is more important for projects in Art and Entertainment.
Parhankangas & Renko (2017)	How does the linguistic style of a crowdfunding pitch relate to the success of fund raising?	Building on the view that entrepreneurship is a course of social interaction Filling the gap about the role of linguistic style in entrepreneurial finance Investigating the communication role of language in new fields at a more micro level	Language expectancy theory: people develop expectations based on language behaviors Incomplete social categorization	T-test of the differences in linguistic between commercial and social ventures Binary logistic regression of crowdfunding success on variables indicating commercial/social categorization, word count and language styles	656 Kickstarter campaigns (411 commercial + 245 social) during 2013–2014 in the categories of software and technology, hardware, computer games, product design	By compensating for the lack of social categorization, linguistic style (accurateness, concreteness and interactivity) improves the success probabilities of emergent social ventures, while psychological distancing has a negative impact. On the other hand, established commercial ventures are not really influenced by such factors.

4. CROWDFUNDING IN RELAXING GEOGRAPHIC CONSTRAINTS

A distinctive characteristic of crowdfunding which explains its recent wide spreading and entrepreneurs' preference over traditional fundraising methods is that crowdfunding can mitigate distance problems, enabling founders to attract investors from all over the world.

Contrary to the case of fundraising for established and listed corporations, investors in early-stage ventures are often local. Whether an effort to secure funds from traditional sources of financing succeeds depends largely on the geographic distance between the entrepreneurs and capital providers. This is due to the need of investors to collect information, monitor performance and communicate with lead ventures, and the sensitivity of the costs associated with these activities to distance (Chen et al., 2009; Stuart & Sorenson, 2003; Mason, 2007).

However, more recent studies have demonstrated that crowdfunding is able to relax such geographic constrains on fundraising (Agrawal et al., 2011; Mollick, 2014).

Using data of early-stage musical projects seeking financing via a crowdfunding website, Agrawal et al. (2011) find great geographic dispersion of funders, i.e. an average distance of approximately 3,000 miles between entrepreneur and investor, strikingly higher than the 304-mile distance between venture capital firm and target firm reported by Stuart & Sorenson (2003). This result implies that crowdfunding reduces the role of spatial proximity in financing success and in this way enables entrepreneurs to reach a larger investor base. The mitigation of geography-related frictions is brought by the use of online platforms through which musicians can directly market their projects to the funder community. Nevertheless, distance still matters as investors are generally more likely to invest and invest larger amounts in co-located ventures. The distinction becomes clearer when we compare the timing and patterns of investment between distant and local investors. While the former reacts quite quickly to investment decisions of others, the latter tend to invest early and are less responsive to subsequent changes. This effect is found to be driven by locals who are personally connected with the entrepreneur.

In addition to confirming Agrawal et al. (2011)'s finding about the proximity - funding status relationship and that there is still geographic concentration of early-stage ventures in crowdfunding, Mollick (2014) shows that location also influences the popular category of projects. Theorizing that more talented and innovative population can facilitate higher productivity of that area (Florida, 2002), he finds crowdfunding efforts founded in a location with higher proportion of creative individuals to have a better chance of success.

5. UNDERSTANDING THE FOUNDERS

5.1. MOTIVATIONS

A number of objectives explain why entrepreneurs engage in a crowdfunding campaign, the first and most important of which is funding. According to Kleemann et al. (2008), while referring to Grün, Brunner 2002), companies

initiate crowdsourcing basically for profit-related purposes (cost reduction, productivity gains, and increase of turnover) by transferring internal tasks to customers through self-servicing. In the case of crowdfunding, backers provide the required money for entrepreneurs to realize their projects/ventures. The amount of financing can be as small as a thousand dollars to support a specific one-time project (Mollick, 2014), often supplied by friends and family in such cases, or, increasingly can serve as a source of necessary seed funding to get a new firm started in the very early stage, especially for small businesses (Schwienbacher & Larralde, 2010). For example, on Kickstarter, many successfully crowdfunded companies are still operating on an ongoing basis (Mollick, 2014). While using the Internet to call for crowdfunding may be very convenient and efficient, there are several problems that limit the wide spreading of this financing method, especially when it involves equity crowdfunding because national regulators are cautious in laws about this (Belleflamme et al., 2010; Bruton et al., 2015; Mollick, 2014). In the United States, the JOBS (Jumpstart Our Business Startups) Act signed in 2012 facilitates new funding opportunities and crowdfunding in particular. This document has made it legal from mid-2016 for companies to sell their stocks (but only in limited amounts) to the public via online platforms and social networks, which had been prohibited before. Even then, the risks associated with crowdfunding (fraudulent projects, unselective funders, dispute over rights and responsibilities, etc.) cannot be completely eliminated, and regulations are subject to changes, therefore crowdfunding must be taken with care (Stemler, 2013).

However, there is more in crowdfunding than just funding: founders may use it jointly with other forms of crowdsourcing. Thanks to the convenience of Web 2.0, crowdfunders can help entrepreneurs further by engaging in the creation, testing, advertisement, reviewing and improvement of products and services, helping the producer to better understand the taste of customers, and sometimes they even join in strategic decisions of the project or have voting rights (Belleflamme et al., 2010). This idea is based on the notion of the "wisdom of crowd" (Brabham, 2008b) which suggests that a large and diverse group is better than individuals, even the smartest ones in them, at solving problems, thanks to the aggregation, not averaging, of solutions (Surowiecki, 2004), and that advanced communication tools are the most useful instruments for achieving collective intelligence (Lévy, 1997).

Another possible goal of a crowdfunding effort is to market a product or service, attracting public attention to it before being launched. The investment decisions of backers indicate their strong belief in the quality of products and are even more powerful than normal word-of-mouth. According to Mollick (2014), this is especially useful when there is a need for complimentary good to be developed, as in the cases of the Pebble smartwatch and the Ouya gaming console which have applications written for by developers intrigued by the successful crowdfunding campaigns of these products even before they were officially released to the market.

Founders will also benefit from the hype created by the media around the project which potentially increases the number of future buyers.

Crowdfunding is also used to test-measure the demand for a prospective product. Responses to a crowdfunding call can provide valuable signals on the potential of its offered product. The Pebble smart watch was able to get USD 15 million in venture funding after its campaign on Kickstarter, while previously had been rejected by venture capitalists (Dingman, 2013). This example shows that successful crowdfunding can help to increase the chance of funding from other sources which would otherwise be difficult to obtain due to uncertain project prospects. In contrast, a crowdfunding project receiving little interest from the public suggests that the founders improve it further or choose to stop without having to invest more money and effort (Mollick, 2014; Schwienbacher & Larralde, 2010).

5.2. DETERRENTS

Literature documents different types of concern related to crowdfunding that prevent an individual from becoming a creator of a project.

The first deterrent is the fear of failing to attract funds (Gerber & Hui, 2014; Gleasure, 2015). Many entrepreneurs do not want to crowdfund their ideas because they believe that the crowdfunders' community is not the appropriate market for their products or that they cannot provide adequate rewards.

Secondly, creators are discouraged by the fear of public failure (Gerber & Hui, 2014; Gleasure, 2015). They are concerned about negative impacts associated with being unable to reach funding targets, such as personal embarrassment, decreasing chances with future investors and future customers, and ruining their professional image.

Besides, entrepreneurs may not choose crowdfunding because they fear having to disclose confidential information (Gerber & Hui, 2014; Gleasure, 2015). Crowdfunding requires significant public exposure, and in many cases competitors can easily steal the idea from the creator and execute it first.

The next construct is a fear of projecting desperation, i.e. negative impacts on image when adopting crowdfunding in general (Gleasure, 2015). Many people feel that the use of crowdfunding could create a "cheap" perception of their brand or suggest that they fail to interest conventional investors and are struggling for funds.

Finally, some investors may find crowdfunding too time- and resource-consuming (Gerber & Hui, 2014). The internet enables founders to reach a large potential investor base, but at the same time it also means huge workload of answering, updating, managing funders regularly in addition to the initial resource commitment to create an attractive project description.

6. UNDERSTANDING THE BACKERS

6.1. MOTIVATIONS

As there is a wide variety of founding goals, individuals also have different reasons for investing in a crowdfunding project. Kleemann et al. (2008) indicate that people respond to crowdsourcing calls for extrinsic or intrinsic values. A person with intrinsic motivations behaves for the sake of pleasure, fun or the activity itself, while a person with extrinsic motivations is driven by the expectation of getting an external reward which can be monetary (cash, products, etc.) or non-monetary (benefit for career, peer recognition, common satisfaction, etc.). According to Brabham (2008b) in his survey-based research of iStock users, people participate in crowdsourcing for economic benefits and the opportunity to improve their skills, while recognition and networking purposes do not have a big impact on the decision.

With a particular focus on crowdfunding, Mollick (2014) identifies four types of incentives which induce people to support a crowdfunding effort. Because these contexts need not be mutually independent, backers are able to achieve multiple goals with their decision. He also emphasizes that, even within each context, different individuals may have very different motivations.

In the first context, crowdfunding efforts are framed as humanitarian or philanthropic projects where funders act as donors and not expecting any kind of return for their giving. According to Gerber & Hui (2014), the motivations for participating in such projects are feelings of sympathy and guilt for not donating.

The second case involves crowdfunding in the form of a lending model. Similar to peer-to-peer lending, supporters of a debt crowdfunding project offer funds as a small loan in return for some interest payment; however, in the case of microfinanced lending, the willingness to increase social welfare may be more important than any monetary benefits, creating overlapping intentions with the donation-based model.

The majority of crowdfunding projects available to the time of this paper belong to the third model called reward-based crowdfunding. In this model, backers participating in a call receive a reward, either non-monetary or monetary. This can range from appearing in the credit list, a thank-you postcard from the project team to being given an appointment with the founders. More “material” benefits include receiving an e-copy of the publication or the product being developed. In this way, funders are considered customers who are entitled to some privileges for funding the production process, such as being able to buy the product before it is introduced to the market (pre-selling) or at more favorable prices (price discrimination).

Lastly, equity-based crowdfunding involves offering equity stakes to backers, making them investors of the project/company. Due to numerous restrictions adopted by regulators, this type of crowdfunding is not very

popular: contributing 7% to the total crowdfunding volume worldwide in 2015 (CrowdExpert, 2016). In most countries, companies must obtain permission from their national regulator before they can make a public solicitation for equity and in some cases, there is a limit on the number of shareholders a firm can have. For instance, in Larralde & Schwienbacher (2010)'s, the French startup Media No Mad could have a maximum of 100 investors. Even in jurisdictions where equity crowdfunding is legal, there are continuous debates over the risks associated with it. Nevertheless, regulations are evolving to support the emergence of this phenomenon (see, for example, the JOBS Act). This context also extends to circumstances where the return offered is not equity, but has similar characteristics, for example: a portion of future profits, a share of another investment, etc.

Aggregated from a number of other papers on this topic (Gerber & Hui, 2014; Hemer, 2011; Bretschneider et al., 2014), motivations for funders to back a crowdfunding project are complex, but may be categorized into the following: the expectation for future rewards or return; altruistic intentions and the willingness to contribute to social good (these two are the ones mentioned in Mollick (2014)'s); the opportunity to expand one's personal network and attract funders to his own project; supporting a person they know; being truly interested in the project ideas; and the enjoyment from being involved in the project realization process.

6.2. DETERRENTS

From the perspective of funders, the biggest deterrent for investing is the lack of trust of founders' use of funds and delivery of rewards (Gerber & Hui, 2014).

On some platforms with all-and-more funding model, founders are allowed to keep the amount of funds raised even if their goal is not reached, leading investors to worry about how their money will be used. This is one reason why the all-or-nothing principle as adopted by Kickstarter and major crowdfunding platforms is prevalent. However, even with this model, potential funders still have reason to question the use of funds of entrepreneurs. Although many creators on crowdfunding platforms have brilliant ideas, they may not possess the right knowledge and experience about business planning and how to use money effectively. Consequently, projects can last longer than expected, need additional funds or even fail, leaving funders with late receipt of incentives or nothing in the worst situation.

7. FACTORS AFFECTING FUNDING SUCCESS

Crowdfunding has emerged as an innovative method of financing, thus researchers are curious to understand the underlying factors that affect the success or failure of a crowdfunding campaign from different perspectives.

Among other issues, some papers specifically consider factors that drive the successes or failures of crowdfunding initiatives. These factors can be viewed as related to geography, the backers, or the ventures (Table 2). The role of geography

in crowdfunding is analyzed in Section II.4, and backer- and venture-related factors are discussed below.

7.1. BACKER-RELATED FACTORS

Firstly, as an individual, you decide whether you would like to support a crowdsourcing/crowdfunding call or not, and this decision of yours is affected by a number of factors including behaviors of other investors. The more people decide to invest, the more likely that a project will succeed. Earlier studies suggest that a person is less likely to invest in a project which has high past backer support; but a popular campaign or one able to attract large contributions in the early phase is more likely to be supported and succeed finally.

- Social information:
  Using projects on Kickstarter, Kuppuswamy & Bayus (2013) find the impact of social information (i.e. backers are able to see amount and timing of other backers before deciding to invest) on funding behaviors of backers. For example, people are less likely to support a project which has already received a lot of contributions. This reflects the social psychology theory regarding diffusion of responsibility effects.
- Early contributions:
  Colombo et al. (2014) examine the association between early contributions (in both forms of capital and backers) and the crowdfunding success. Uncertainties are significant at the beginning phase of crowdfunding, and early support reduces them via observational learning, word-of-mouth, and feedback provision. Thus, it is positively related to the probability of success; however, this relationship is mediated by within-crowdfunding community social connections.
- Electronic word-of-mouth:
  Projects which have good reputation also have higher chances of success. Using an elaboration likelihood model in which electronic word-of-mouth influences investor behaviors via the peripheral route, Bi et al. (2017) find that the number of "Likes" and reviews can promote funding decisions as equally as central route factors (project quality).

7.2. VENTURE-RELATED FACTORS

The latter dimension focuses on the project founders (and the projects) themselves by exploring what a typical successful crowdfunding initiative looks like. Previous work indicates that some specific features owned by a project may lead to its higher chance of being funded by investors. Particularly, a project is more likely to succeed if it has suitable verbal content and styling, includes some features that are associated with higher quality by investors, or if the founders have wider network connections.

Table 2. Review of success factors in crowdfunding

Paper	Focus					Theory
	General knowledge	Logics of participation	Success factors & dynamics			
			Geography	Backer-related	Venture-related	
Belleflamme et al. (2010)	Definition, modelization					n/a
Schwienbacher & Larralde (2010)	Definition, modelization	Motivations				n/a
Agrawal et al. (2011)			Geography			Information asymmetry
Kuppuswamy & Bayus (2013)				Social information		Social psychology theory
Gerber & Hui (2014)		Motivations & Deterrents				Four behavioral elements
Mollick (2014)			Geography		Project quality Founder quality	Information asymmetry Signaling effect Network ties & reputation
Allison et al. (2014)					Language	Cognitive evaluation theory
Mitra & Gilbert (2014)					Language	Theories of persuasion
Colombo et al. (2014)				Early contribution	Founder quality	Learning & environmental impact Information asymmetry
Belleflamme et al. (2014)	Choice of crowdfunding form					Information asymmetry
Ahlers et al. (2015)					Project quality Founder quality	Information asymmetry Signaling effect
Gleasure (2015)		Deterrents (founders)				Impression management
Dorfleitner et al. (2016)					Language Project quality	Psychology theory Signaling effect
Bi et al. (2017)				Word-of-mouth	Project quality	Environmental impact Signaling effect
Parhankangas & Renko (2017)					Language style	Language expectancy theory

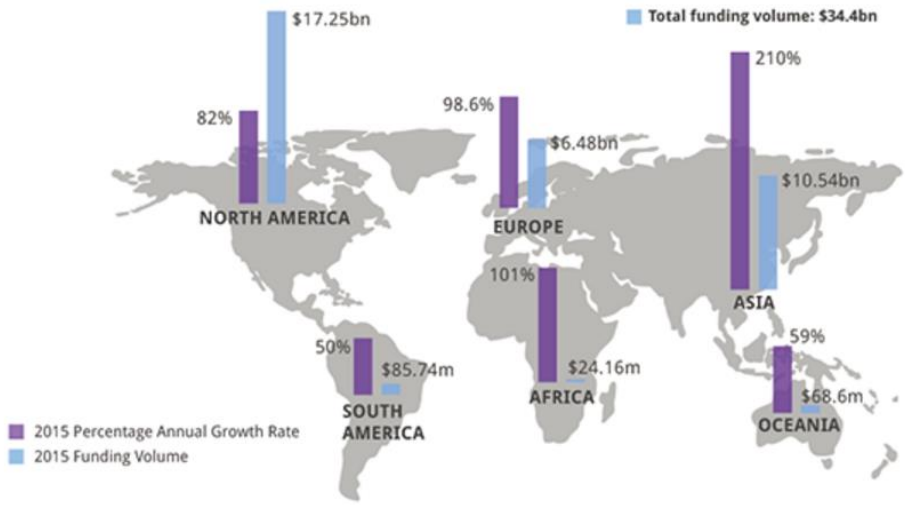
In the scope of this study, I will focus on the two latter factors given their importance in crowdfunding literature and practice, i.e. signals of project quality and signals of founder equity. Their impacts on success of crowdfunding will be discussed further in following sections.

- Language:
  The association between language and social behaviors has long been studied. Mitra & Gilbert (2014) reveal from Kickstarter data that the language used to describe projects has a surprisingly high predictive power of success (more than 50%). According to this study, pitches that contain some specific phrases expressing principles of persuasion (for example, the rule of reciprocity, the principle of scarcity, or the social identity theory) are more probable to lead to successful fundraising than others. In the context of microloans provided via crowdfunding platforms, Allison et al. (2014) also highlight the relationship between cues used to describe the purpose of a loan application and its granting.
- Language style:
  In addition to the content in project pitches, how the message (linguistic style) is said also factors into the success of a crowdfunding campaign. Based on the idea of language expectancy theory, Parhankangas & Renko (2017) examine a data set of Kickstarter projects and reveal that by compensating for the lack of social categorization, accurateness, concreteness and interactivity improve the success probabilities of emergent social ventures, while psychological distancing has a negative impact. On the other hand, established commercial ventures are not really influenced by such factors.
- Signals of project quality:
  Some researchers have employed communication theories, and signaling theory in particular, in understanding crowdfunding success (Ahlers et al., 2015; Bi et al., 2017; Colombo et al., 2014; Dorfleitner et al., 2016; Mollick, 2014). They argue that investors are encouraged to invest when entrepreneurs are able to deliver indicators of quality such as well-preparedness, completeness and timely updating. Empirical studies also confirm the positive influence of observable signals of project quality (presence of a video, fewer spelling mistakes, word count, etc.) on success by mitigating information asymmetry problems (Ahlers et al., 2015; Bi et al., 2017; Dorfleitner et al., 2016; Mollick, 2014).
- Signals of founder quality:
  In addition, based on the same signaling theory, funding success is expected to positively relate to signals of founders' quality. When founders can prove their credibility and capabilities, investors' concerns about information asymmetry and the ultimate failure of project are reduced, increasing the likelihood of it being funded (Ahlers et al., 2015; Mollick, 2014). Empirically, Ahlers et al. (2015) find that the quality of entrepreneur team can affect the likelihood of capital acquiring. Meanwhile, Mollick (2014) demonstrates that a project is more likely to succeed if the founder has more Facebook friends.

III. INSTITUTIONAL BACKGROUND IN VIETNAM

Since the first successful crowdfunding campaign in 2014, the total amount of capital raised via crowdfunding has accumulated to VND 36.7 billion (equivalent to approximately USD 1.6 million) which is negligible to billion dollar figures in the United States or the neighbor country Singapore (Lim, 2016). Nevertheless, it is worth noticing that volume has grown by an astounding rate of 58 times over the period 2014 - 2016, signaling great potential for crowdfunding to develop in the coming years.

Figure 1. Crowdfunding volume by region (2015)



Source: CrowdExpert, 2016

Regarding the sustainability of this financing alternative to raise fund for start-ups and non-profit organizations, we must take into account a number of psychological, economic, legal and technological matters which may have an impact on the use of crowdfunding in Vietnam. These factors influence the willingness of people to participate in crowdfunding as well as the availability of infrastructure to support crowdfunding. In addition to determining the development of crowdfunding in general, they are also helpful in explaining potential differences in factors influencing crowdfunding success in Vietnam compared with findings of prior research.

1. ENTREPRENEURIAL ENVIRONMENT AND PSYCHOLOGY

- Psychological considerations can be viewed in relation with deterrents for entrepreneurs to become crowdfunders as outlined in Section II.5.2.

  Figure 2 summarizes findings of Report of Entrepreneurship in Vietnam 2014 (Global Entrepreneurship Monitor & VCCI, 2015).

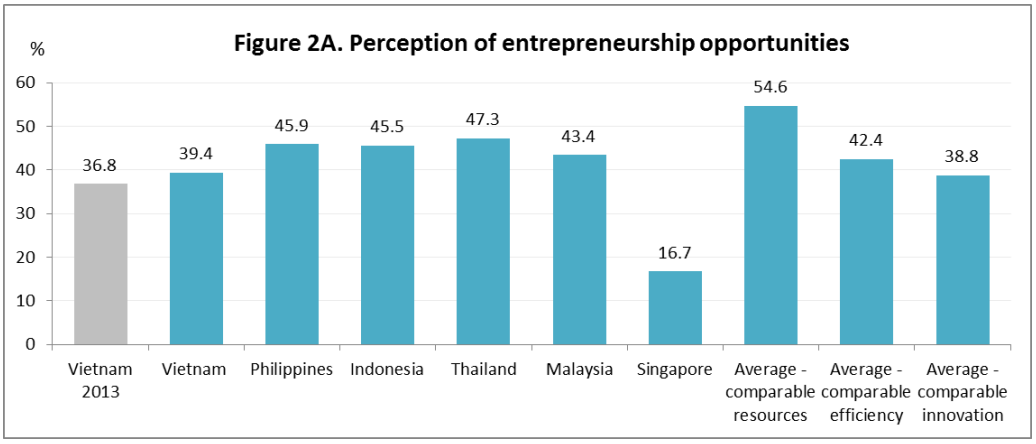
  As can be seen, 39.4% of surveyed people thought they identified opportunities for startups. This showed a small increase from 2013 but was still much lower than the 54.6% average of comparable developing countries.

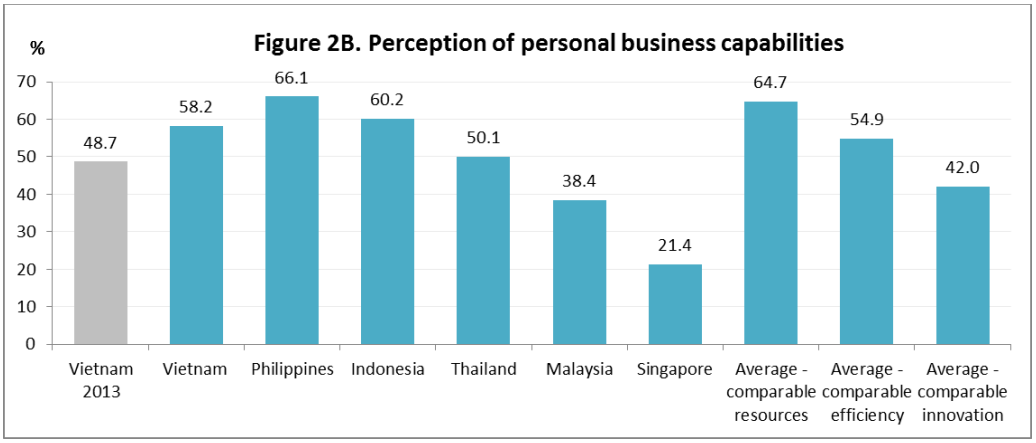
Regarding entrepreneurial capabilities, 58.2% was confident that they had sufficient knowledge, skills and experience to start a business. The figure was much higher than the 47.8% in 2013, however, lower than the average of countries with a similar level of input resources (64.7%). This result suggests that the country needs to improve its education and training system in order to equip individuals with necessary business skills and understanding.

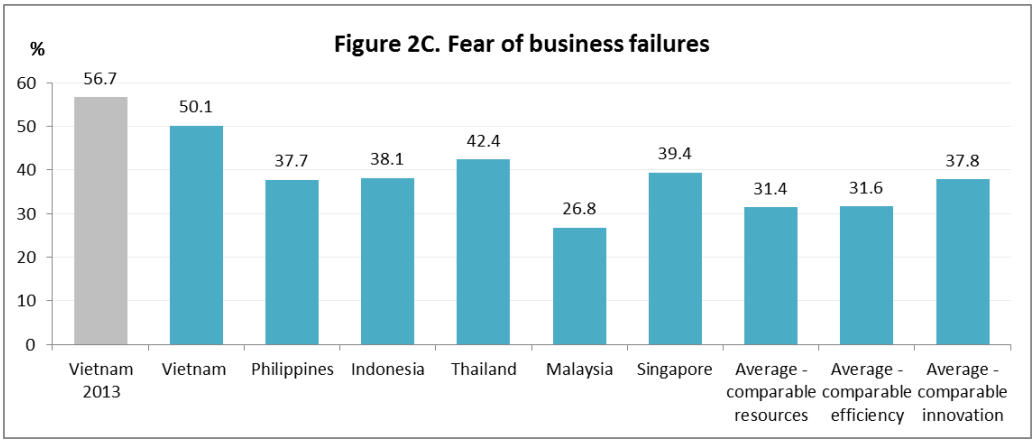
More than half (50.1%) of the respondents were fearful of startup failures. Compared with the 56.7% in the previous year, this increase indicated improvements in the business environment that intensified entrepreneurs' trust and encouraged them to conduct businesses. However, the rate was still much higher than many neighbor countries.

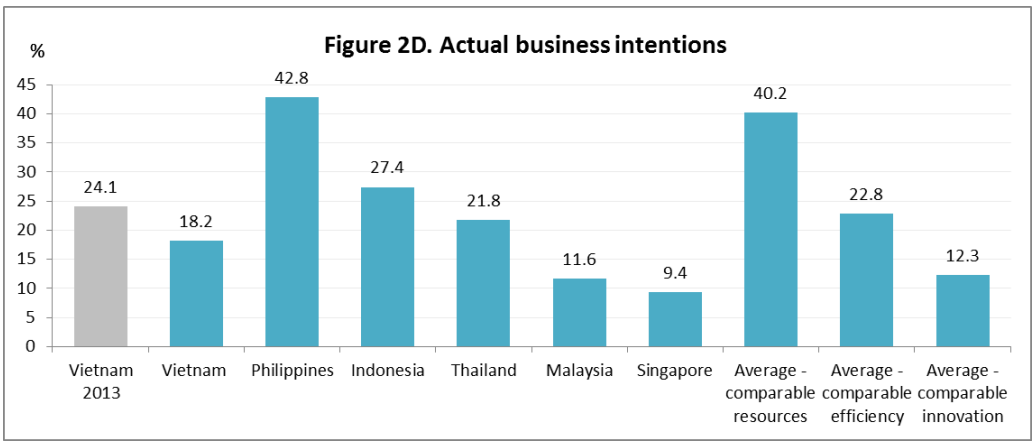
Finally, while perceptions of business opportunities, personal capabilities and failures showed positive signals, the percentage of people who actually intended to start a business decreased from 24.1% (2013) to 18.2% (2014). In terms of actual startup intentions, Vietnam was left far behind countries with comparable development levels.

Figure 2. Entrepreneurial environment and psychology in Vietnam (2014)









In general, the levels of entrepreneurial opportunities, confidence and entrepreneurial spirit are not high among Vietnamese people. Additionally, the fact that the percentage of people with actual startup intentions being extremely low in comparison with the level of identified opportunities and confidence suggests a lack of trust in the market as well as a personal fear for failures. Vietnamese people still do not have positive view about failures, thinking that failing is a bad or embarrassing thing. As a result, many may hesitate to share their ideas and call for investment publicly due to the fear of being criticized, disparaged and losing face if the project does not succeed eventually (Trieu, 2015; Phan Law Vietnam, 2016).

- In terms of investor deterrents, as mentioned in Section II.6.2, the biggest fear is founder's misuse of funds. In the context of Vietnam, face-to-face communication and personal relationships play an essential role in business transactions: mostly people only trust and conduct businesses with those that they know well, or at least have met and talked to in order to mitigate information asymmetry and delivery risk (Turan, 2015). Consequently, it is quite unlikely for them to invest money in a stranger on the Internet (Trieu, 2015; Phan Law Vietnam, 2016). The problem of information asymmetry will be analyzed in more details in next sections.

2. MACROECONOMIC FACTORS

Table 3 provides an overview of the macroeconomic conditions which may have an impact on the growth of crowdfunding in Vietnam.

Table 3. Macroeconomic factors across countries (2011 - 2015)

	2011	2012	2013	2014	2015
Panel A: GDP per capita (USD)					
Vietnam	1542.7	1754.5	1907.6	2052.3	2111.1
Philippines	2371.9	2604.7	2786.0	2873.1	2904.2
Indonesia	3647.6	3700.5	3631.7	3499.6	3346.5
Thailand	5539.5	5915.2	6225.1	5969.9	5814.8
Malaysia	10427.8	10834.7	10971.4	11305.9	9768.3
Singapore	53093.7	54451.2	55617.6	56007.3	52888.7
United States	49781.8	51433.0	52749.9	54539.7	56115.7
Source: World Bank (n.d.)					
Panel B: Annual GDP growth rate (%)					
Vietnam	6.2	5.2	5.4	6.0	6.7
Philippines	3.7	6.7	7.1	6.2	5.9
Indonesia	6.2	6.0	5.6	5.0	4.8
Thailand	0.8	7.2	2.7	0.8	2.8
Malaysia	5.3	5.5	4.7	6.0	5.0
Singapore	6.2	3.7	4.7	3.3	2.0
United States	1.6	2.2	1.7	2.4	2.6
Source: World Bank (n.d.)					
Panel C: Real interest rate (%)					
Vietnam	-3.6	2.3	5.4	4.8	7.3
Philippines	2.5	3.6	3.6	2.3	6.2
Indonesia	4.6	7.8	6.4	6.8	8.1
Thailand	3.1	5.1	5.1	5.8	6.3
Malaysia	-0.5	3.7	4.4	2.1	5.0
Singapore	4.2	4.6	6.1	5.3	3.7
United States	1.2	1.4	1.6	1.4	2.2
Source: World Bank (n.d.)					
Panel D: Online spending (USD)					
Vietnam	-	-	-	-	55
Philippines	-	-	-	-	38
Indonesia	-	-	-	-	160
Thailand	-	-	-	-	108
Malaysia	-	-	-	-	66
Singapore	-	-	-	-	1292
United States	-	-	-	-	1757
Source: Clifford (2015)					

- Vietnam is classified as a lower middle-income country (World Bank, 2017) with a GDP ranking of 47th in 2015. Over the past 5 years, GDP per capita has increased by nearly 40%, however, is still lower than that of many ASEAN countries. An investigation in mid-2016 revealed that poor households

accounted for 10% of the total population (Mai, 2016). With such low income, consequently, most people do not think of or even do not know about the existence of crowdfunding. However, Vietnam's annual GDP growth rates were usually higher than neighboring countries and remained at stable levels during the period. A fast-growing economy will create a favorable environment for entrepreneurs to start a business in general and start a business via crowdfunding in particular.

- The level of real interest rates - lending rates adjusted for inflation - in Vietnam are relatively high at around 7%, especially when compared with more developed countries. High interest rates, together with stringent requirements of financial institutions in providing private lending (e.g. collaterals, business plans, proof of financial capacity) may deter entrepreneurs from seeking bank financing. Instead, they will turn to methods that involve less resource commitment and strict inspection such as crowdfunding. This is especially true in the case of artistic and innovative projects where it is hard to persuade creditors about the certainty of successful implementation.

3. LEGAL MATTERS

Next, the lack of crowdfunding-specific regulations may hold entrepreneurs back from using this funding type and potential backers from investing in fear of difficulties in justifying their work to others and future statutory changes. In some developed countries, crowdfunding has been recognized as a legal form of financing and regulations have evolved to provide directions for the use of it (e.g. the JOBS Act in the United States effective May 2016 prescribes that the general public can invest money in early-stage ventures). Meanwhile, in Vietnam, no official provision in legislation has directly addressed crowdfunding. As a result, everything has to be implied from current electronic commerce and investment laws. Whereas reward-based crowdfunding is widely acceptable, in some countries equity-based crowdfunding projects may not truly be for the crowd due to the uncertainty that whether it is legal. For example, in Singapore, equity-based crowdfunding is considered an offer of securities and are subject to very strict regulatory requirements. Entrepreneurs who wish to raise funds via equity must ensure that their projects are exempted from the prospectus requirement by limiting the amount of offering and the number of investors. In addition, crowdfunding platforms which provide equity-based services must obtain a specific license. The regulatory agency in charge (The Monetary Authority of Singapore) has not shown any intentions of changing the laws to make equity-based crowdfunding easier (Singapore Legal Advice, 2017). In Vietnam, the current situation is relatively similar. Practically, after getting the list of potential backers via crowdfunding platforms, further details will be discussed and private contracts will be signed between the founder and each backer as in the case of investing in a joint-stock company. The amount of capital and the number of investors are also usually limited.

Good news for entrepreneurs and investors is that in its draft of the law for supporting small and medium enterprises (SMEs) in mid-2016, the National Assembly has put some content about crowdfunding, stating that crowdfunding

is “an activity to facilitate the access to funding of SMEs”. Specifically, crowdfunding is defined as a method of fundraising from many individuals through intermediaries which provide information and consulting services to support online fundraising. Fund providers and fund acquirers shall bear their own risks and responsibilities of providing and repaying funds. Fund acquirers may give return in the form of gifts, equities, lending or others. With this law, the establishment of organizations providing crowdfunding services will be legalized. It also specifies minimum information disclosure for a crowdfunding project: the party appealing for funds, project, requested amount, plan for fund usage, project duration, method and plan for repayment. Finally, the amount of investment is limited for each investor: maximum annual investment of VND 1 billion (USD 44,053), not exceeding VND 50 million (USD 2,203) for a reward-based project, not exceeding 500 million (USD 22,026) for an equity-based project and not exceeding 100 million (USD 4,405) for a lending-based project. Though general and brief (18 lines), this paragraph reflects the attention of national regulators to the emergence of crowdfunding and their effort to keep legislation up-to-date to promote the growth of the SME sector.

4. TECHOLOGICAL DEVELOPMENT

- As an online-based financing method, crowdfunding’s development is largely affected by the growth level of Internet infrastructure. Up to 2016, 52% of the population in Vietnam has access to the Internet, making it to the top 20 countries in the world in terms of the number of the Internet users (Internet Live Stats, n.d.). Among 49 million users, 79% uses the Internet daily (VNReview, 2017). These percentages, although lower than those of developed countries, demonstrate opportunities for popularizing crowdfunding among the public and attracting a large number of potential investors.
- Online payment is another hindrance to the growth of crowdfunding in Vietnam. In all crowdfunding platforms, wire transfer is the dominant and sometimes only means of investing in a project. Although 73.49% of the population have a bank account (Thanh, 2017), they use it primarily for savings purpose. It is reported that out of 72 million ATMs issued until 2014, only 3 million cards are registered for online payment. These numbers suggest that most people are not familiar with e-payment and cash still dominates the economy, with only 7% of all transactions processed online in 2015. On average, a Vietnamese paid a sum of merely USD 145 via online gateways each year, totaling USD 2.97 billion of e-commerce, representing 2.12% of the domestic retail sales volume (Vecita, 2015; Vecita, 2016). The amount of online shopping per user is only USD 55, very modest when compared with those of other Asian and Western countries. This unpopularity of online payment will be a limitation for crowdfunding because in some cases, investors want to invest but they hesitate to make payment via an unfamiliar method.
- Currently, there are five major crowdfunding platforms in Vietnam. They are similar in their funding mechanisms and all follow the all-or-nothing model. However, they differ in terms of popularity, focus area, website design,

information requirements, etc. which gives entrepreneurs more choice of which one best suits their project.

- Betado was established in 2015 to provide a platform for projects in various categories, with priority given to social and artistic ones. However, the website only accepts commercial, not patronage projects. A project also needs a certain level of achievement (e.g. a draft for a book) to be listed.
- Comicola was established in 2015 as a sub-page of Comicola.com - a website specially created for the comic/anime community in Vietnam. The specific purpose is to support artists in popularizing and having their works published. Users can read for free or purchase books and comic-related products (including those being crowdfunded) on this site.
- Firststep was established in 2014. Besides providing a crowdfunding platform for projects in various areas, Firststep is also an informative blog for entrepreneurs and startups with abundant news and advice.
- Fundingvn was established in 2013 and is one of the first crowdfunding platforms in Vietnam. The main function of Fundingvn is to connect entrepreneurs with the general public, individual and business investors. After being uploaded and before being available for crowdfunding, projects are carefully checked and assessed by Fundingvn experts in order to minimize risks. Technically, projects on Fundingvn can be patronage, reward-based or equity-based, but all projects posted on this platform at the time of this writing are equity-based, in which Fundingvn only acts as a bridge to bring projects to investors. Detailed contracts will be signed afterwards between project owners and investors specifying all terms and conditions related to their investments.
- Fundstart, established in 2015, is dedicated to crowdfunding for projects of various areas.

Considering these distinct features of the institutional environment in Vietnam, the question is whether findings about the relationships between project and founder quality signals and crowdfunding success as suggested by previous studies (mostly based in the United States and other developed countries) still hold, or there are other selection mechanisms.

IV. RESEARCH HYPOTHESES

1. TRUST AND INFORMATION ASYMMETRY

According to Gerber & Hui (2014)'s survey-based study, the biggest concern that prevents funders from investing in a crowdfunding project is distrust of creators' use of funds when they cannot verify whether the latter do things correctly with their money. Unlike e-commerce, reward-based crowdfunding deals with ideas rather than real existing businesses and supporters often pay weeks or even months before the advertised goods is produced. Similarly, there is a lack of legal terms that bind the entrepreneur to fulfill their obligations to equity crowdfunders at the time they click the "support" button. The risk that the product will not come into existence or the project will not be realized at all is inherent, and it is expected that trust considerations are significantly relevant for crowdfunding backers in their decision-making process. Similarly, Colombo et al. (2014) mention potential funders' doubt about project founders' abilities and trustworthiness as one main source of uncertainties in crowdfunding. As a result, it is a crucial task for an entrepreneur to convince potential investors, ensuring that they have trust in his project (Belleflamme et al., 2014). Trust can be built on an individual's appearance (Duarte et al., 2012), orthography (Dorfleitner et al., 2016), or using an interactive language style (Parhankangas & Renko, 2017), which eventually helps increasing the chance of the project to receive higher funding and end successfully. However, most importantly trust is linked with the provision of information or we can say trust is "a function of increased information" (Sriram, 2005).

Information is necessary for individuals in the decision-making process. However, there are public information which is freely available to everyone and private information which is available only to part of the public. Information asymmetries arise between those who have access to that private information, and thus can potentially make better decisions, and those who do not (Connelly et al., 2011). As a result, sufficient information provided by entrepreneurs will alleviate information asymmetries, increasing investors' level of trust in a project because it provides them with a better basis for evaluation. On the other hand, lack of available information intensifies the asymmetry problem, making it difficult for investors to come up with sensible decisions and creating doubts about the entrepreneurs trying to hide bad news. This will result in a lack of trust and eventually investors' unfavorable treatments to the venture such as decisions not to fund or charging extra premiums and higher interest rates. This framework is relatively straightforward and widely addressed in various fields of finance such as corporate finance, microfinance, entrepreneurial finance, risk management (for example see Bauwhede et al., 2015; Cvetkovich, 2002; Howorth et al., 2004; Sriram, 2005).

Asymmetric information is a fundamental problem that entrepreneurs have to face in their search for external financing because insiders (entrepreneurs) usually have more information than outsiders (creditors, equity investors) regarding the firm's quality (Cosh et al., 2009). The risks associated with uncertainty, consequently, make external finance more expensive or even

unavailable. This issue is especially pronounced for new businesses and startups given their insufficient collaterals and track record. In addition, for early-stage investments, information gathering, monitoring and input provisions are even more important (Agrawal et al., 2011).

Indeed, information asymmetry, and hence trust problem, is exacerbated in the crowdfunding context. Unlike conventional lenders, venture capitalists or business angels, crowd investors are usually non-professionals and thus lack sufficient knowledge about the industry, the technology, management, experience and capabilities of the entrepreneurs as well as other types of information to make a decent assessment (Schwienbacher & Larralde, 2010). Furthermore, the level of uncertainty in crowdfunding is higher than other forms of financing due to the fact that most crowdfunding projects are "works-in-progress" that can be constantly changing, incorporating feedback from the crowd (Colombo et al., 2014). In addition, the fear of exposure may make entrepreneurs even more reluctant to publicize sensitive information (Schwienbacher & Larralde, 2010). In crowdfunding, the entrepreneur needs to disclose a lot of information insecurely over the Internet to a mass audience, not only an individual or a group of investors as under traditional forms of financing. This makes them particularly vulnerable to idea theft (Gerber & Hui, 2013; Gleasure, 2015).

The impact of information asymmetry is frequently discussed in crowdfunding literature. In a study comparing two forms of crowdfunding, Belleflamme et al. (2014) highlight the effect of asymmetric information on the choice of crowdfunding form. Using a unified model, they reveal that, in the presence of information asymmetry where entrepreneurs have private information about the product quality which the crowd does not, investors prefer profit-sharing schemes to pre-ordering in order to secure their utility. Moreover, information asymmetry influences funders' decisions and responsiveness in the funding process. Agrawal et al. (2011) find that family-and-friends investors tend to invest earlier and are slower to react to other investors' decisions because they face lower levels of information asymmetry compared to strange fund providers. Many other studies also recognize the difficulty caused by asymmetric information between entrepreneurs and potential investors in crowdfunding (Ahlers et al., 2015; Mollick, 2014; Turan, 2015; Zott & Huy, 2007). However, Bi et al. (2017) note that the degree of information asymmetry is not the same depending on crowdfunding type (donation-based, reward-based, lending-based, equity-based). Consistently, according to Schwienbacher & Larralde (2010), the disclosure requirement may differ among investors. Typically, equity investors demand more information than creditors because they are exposed to higher levels of risks and uncertainty.

2. SIGNALING THEORY

Signaling is a useful approach to mitigate information asymmetries between two parties, and is widely applied in a variety of areas including strategic management, human resource management, and entrepreneurship.

Signaling refers to the conveyance of some information (signal) by the sender (agent) to the receiver (principal) who must decide how to interpret it (Connelly et al., 2011). By doing so, the informational gap between them is reduced, leading to lower information asymmetry costs. For example, as the first to put forth this theory, Spence (1973) demonstrates the signaling role of education in the job market. According to his work, a job candidate knows his or her capability while the potential employer is not able to ascertain such an intangible attribute. Therefore, to get around this information asymmetry problem, the candidate obtains education as a signal of his level of quality. In this case, because capability is a desirable trait, signaling is beneficial to both parties. In contrast, when a signal reveals undesirable information, the agent may not send it. In their model, Kirmani & Rao (2000) distinguish between a high-quality firm and a low-quality firm. Information asymmetry is present as investors and customers lack information about the true quality of the firms. In this case, each firm can choose whether to signal this information to the market. Results show that when the high-quality firm signals, it receives higher payoff than when it does not. On the other hand, the low-quality-firm receives less when it signals than when it does not. Given these results, only good firms have the incentive to signal while bad firms may want to hide private information. In signaling models, the distinguishing characteristic is typically quality which refers to "the underlying, unobservable ability of the signaler to fulfill the needs or demands of an outsider observing the signal" (Connelly et al., 2011).

In crowdfunding literature, signaling theory has been used by researchers to explain the success of a project by mitigating information asymmetries. To attract more funds, a high-quality entrepreneur will use signaling to convince potential investors of the superior quality of his product (Belleflamme et al., 2014). However, not all information provided by an entrepreneur about quality is perceived as effective signals which can encourage investors to invest. To be effective, a signal must be observable to investors and difficult/too expensive for low-quality ventures to mimic so that it only benefits good-quality ones (Ahlers et al., 2015). Because entrepreneurs understand that investors will infer the unobservable quality of their venture from observable attributes, those who fail to provide such information should be assessed as of low prospects. The impact of these signals, according to Mollick (2014) while quoting Merton (1957), is amplified through a Matthew Effect in the context of crowdfunding. In particular, by implying higher quality, signals draw investors who may introduce the project to other potential funders or promote it on external media, multiplying the attractiveness of the project. Researchers have also tried to identify different signals which are effective in drawing funds from investors and increasing the likelihood of crowdfunding success (Ahlers et al., 2015; Bi et al., 2017; Colombo et al., 2014; Dorfleitner et al., 2016; Mollick, 2014; Zott & Huy, 2007). In the context of Vietnam where both entrepreneurs and investors tend to be risk-averse, the value of signaling is expected to be even higher as it establishes a connection between them, decreasing information asymmetry, and helping entrepreneurs to gain trust from investors.

Quality signals can be classified as related to the quality of the project or the quality of the founder.

3. SIGNALS OF PROJECT QUALITY

In prior studies, researchers have proposed that signals reflecting the quality of a project, including well-preparedness and completeness, have a significant impact on the result of fundraising (Ahlers et al., 2015; Bi et al., 2017; Colombo et al., 2014; Dorfleitner et al., 2016; Mollick, 2014).

Attributes such as a video, updates, a low a fraction/absence of spelling mistakes, and a long description text demonstrate more intensive preparation by entrepreneurs and therefore signal higher quality, which might lead to success (Mollick, 2014). Most crowdfunding platforms advise creators to give an introductory video in their pitch. Consequently, including a video should be "a clear signal of at least minimum preparation" and therefore leads to higher success probabilities (Bi et al., 2017; Colombo et al., 2014; Mollick, 2014). Similarly, as it is recommended by platforms to provide updates soon after project launch, speedy updates should imply a prepared entrepreneur (Mollick, 2014). Another measure of quality is spelling mistakes. More errors indicate a lack of basic proofreading and therefore signal insufficient preparedness and quality, reducing funding probabilities (Dorfleitner et al., 2016; Mollick, 2014). Finally, when starting a crowdfunding campaign, every founder needs to create an introduction to describe the purpose of the project, how it works and what the expected deliverables are. A longer text is more time-consuming and usually requires more effort. Therefore, it is predicted that comprehensive project descriptions, indicated by a higher word count, are associated with a higher chance of success (Bi et al., 2017; Dorfleitner et al., 2016).

Completeness is another dimension of project quality. Word count, apart from showing the degree of preparedness, can proxy the amount of information delivered to readers. For example, in the description of a film project, the creator may give details about the main plot, the crew, the expected time of preview, and the use of funds. These pieces of information are especially important to investors to assess the potential of the project and whether they are interested. The more detailed it is, the fewer information asymmetries are associated and the more likely readers are to invest (Bi et al., 2017; Dorfleitner et al., 2016). Following another channel, Ahlers et al. (2015) explore the signaling value of whether ventures provide sufficient financial projections. They argue that companies which include forecasts or a disclaimer for not providing forecasts (due to lack of a reasonable basis) can increase the chance of successful funding by reducing the level of uncertainty.

Empirically, the relationship between fundraising result and project quality signals has been confirmed in a number of studies: projects which have the presence of more signals have higher probabilities of success and projects which lack signals are more likely to end up unfunded. Mollick (2014) follows Chen et al. (2009)'s framework about the impact of the quality of preparation in persuading investors to fund new ventures. In an analysis of Kickstarter projects, he shows that project quality signals (a video, updates, and absence of spelling mistakes) are associated with higher probabilities of success. Following his work, Bi et al. (2017) highlight the positive impact of videos and description text length on success for Chinese reward-based crowdfunding initiatives.

Dorfleitner et al. (2016) also report that higher word count and lower proportion of spelling mistakes boost the funding probability in peer-to-peer lending. Ahlers et al. (2015) examine equity crowdfunding data in Australia and uncover that successful crowdfunding projects are those able to provide sufficient information including, among other things, financial projections to investors.

Based on prior theories and empirical findings, I hypothesize that crowdfunding projects which have the presence of more project quality signals (video, updates, few spelling errors, complete information, etc.) will be more likely to succeed.

Hypothesis 1: Projects that demonstrate more project quality signals have higher probabilities of success.

4. SIGNALS OF FOUNDER QUALITY

Based on the same signaling approach, funding success is expected to relate to signals of founders' quality. Such signals can reduce investors' concern about information asymmetry and the ultimate failure of project (Ahlers et al., 2015; Hsu, 2007; Mollick, 2014; Shane & Cable, 2002; Zott & Huy, 2007).

Firstly, founder quality can be thought of as founder's capabilities and skills. Following Ahlers et al. (2015), human capital is a determinant of venture success because higher-quality human capital are better at "identifying and exploiting business opportunities", "defining and realizing a venture's strategy" and "building a positive basis for future learning". In line with this logic, venture capitalists usually use entrepreneurs' experience, management skills and educational degrees of the entrepreneur team as important selection criteria. Such signals reflect higher venture quality and therefore should have a positive impact on funding success.

In another strand, Mollick (2014) suggests that personal networks of the project founder play an important role in his project's success. There are two reasons: social networking helps to connect the founder with the funders, as well as assures them of project quality. The underlying ground for this argument is rooted from Hsu (2007) and Shane & Cable (2002) who propose that entrepreneurs' social network helps overcome information asymmetry in venture finance decisions, and affects the likelihood of funding via direct and indirect ties, with reputation acting as a mediator.

The impact of entrepreneur quality on funding success has been supported by empirical findings. Ahlers et al. (2015) look into the founding team of equity-based crowdfunding projects and find that the amount of human capital and education (proxied by the number of board members and the percentage of board members having an MBA degree, respectively) are positively related to success. Using Kickstarter data, Mollick (2014) demonstrates that a project is more likely to success if the founder has more Facebook friends. Finally, in a field study, Zott & Huy (2007) theorize how symbolic actions can shape legitimacy and ultimately facilitate resource acquisition. Without formalizing any initial hypotheses, their final results suggest that conveying the entrepreneur's personal credibility is one of the four categories of symbolic

actions (besides professional organizing, organizational achievement, and the quality of stakeholder relationships) that help with acquiring resources. In particular, founders who are able to show their capability (degree, relevant research) and commitment to the venture (financial sacrifice, delayed personal gratification) are likely to get more funding.

Based on prior theories and empirical findings, I hypothesize that crowdfunding projects which have the presence of more founder quality signals (more information about the founders, resulting in less information asymmetry) will be more likely to succeed.

H2: Projects that demonstrate more founder quality signals have higher probabilities of success.

V. METHODOLOGY & DATA

1. METHODS

Depending on the dependent measure, different statistical models have been used to investigate factors affecting funding success. When the dependent variable is metric (e.g. time to funding, total funding amount, number of backers), OLS multiple regression is the most prevalent method (Ahlers et al., 2015; Allison et al., 2014; Bi et al., 2017), besides the occasional use of tobit regression (Colombo et al., 2014). If speed of investment or delivery is involved, hazards model is adopted. However, most of the time success is defined binomially as whether the funding target is reached or not. In this case, linear probability model (Agrawal et al., 2011; Kuppuswamy & Bayus, 2013), logistic regression (Mitra & Gilbert, 2014; Mollick, 2014; Parhankangas & Renko, 2017) or probit regression (Colombo et al., 2014; Dorfleitner et al., 2016) are the appropriate approaches. The linear probability model is simple to apply but a drawback is that estimated probabilities can fall outside the range between 0 and 1 unless restrictions are imposed on beta coefficients. Logit and probit models correct for this problem, and hence are more commonly used in prior crowdfunding studies. These two methods are based on closely related distributional assumptions, while the tails of probit function are slightly thinner than those of logit function (Dey & Astin, 1993). However, in most cases, the two techniques are very similar in their prediction ability and lead to similar conclusions (see, e.g. Dey & Astin, 1993).

1.1. LOGISTIC REGRESSION

In this analysis, to examine the impact of different factors on the result of fundraising I employ logistic regression models. Since our main dependent variable is a binary indicator of whether a project is successful or not, it is appropriate to use logit or probit model. Given logistic regression's higher level of popularity and ease of interpretation in terms of odds, I decide to use this method.

Logistic analysis is a specialized form of regression that estimates "the relationship between a single non-metric (binary) independent variable and a set of metric or non-metric independent variables" (Hair et al., 2014). It can be seen as the combination of multiple discriminant analysis and multiple regression. Logistic regression is similar to discriminant analysis and distinguished from multiple regression in that the dependent variable is dichotomous. The non-metric scale of dependent variable requires a specialized estimation technique and assumptions about the underlying distribution to control for dichotomy and non-normally distributed error terms. Other than that, basic factors used in multiple regression are also considered in logistic regression. While both accommodating non-metric dependent variable, logistic regression has some advantages over discriminant analysis. Firstly, both metric and non-metric independent variables can be incorporated, and secondly it is more robust when assumptions of multivariate normality and equal variance-

covariance matrices across groups are not met. Logistic regression is straightforward in approach and has a wide range of diagnostics, thus is suitable in many situations when we need to predict a binary outcome (e.g. success or failure of a product, whether to a firm will be successful, whether an applicant should be granted credit) (Hair et al., 2014).

The logistic model is based on the cumulative distribution function as follows, where P_i is the probability that a crowdfunding project will be successful given conditions established by explanatory and control variables (Datta et al., 2009).

$$P_i = F(a + bX_i)$$

For our analysis, the dependent variable - funding result - is a binary indication of whether an effort is successful (actual funding amount is equal to or higher than funding goal) or not (actual funding amount is lower than funding goal). Given that there is no potential concern for endogeneity regarding the explanatory variables, the choice of logit is suitable (Colombo et al., 2014).

In particular, the likelihood of success is modeled as a function of project quality signals and founder quality signals, controlling for project-specific characteristics. Coefficients of the independent variables determine the probability that a crowdfunding project will be fully funded.

$$Likelihood\ of\ success = f(Project\ quality\ signals, Founder\ quality\ signals, Additional\ controls)$$

Before performing the regression, we should get to know about odds ratios, logit values and how a probability is transformed into such variables. In logistic regression, the actual values of the dependent variable can only be 0 or 1 (here 1 is assigned to occurrence and 0 to non-occurrence, but the coding could have been reversed). A single metric variate is estimated from the logistic coefficients and the corresponding explanatory variables to predict probabilities. However, unlike with multiple regression, in this case the predicted values are constrained to the range of 0 and 1. Using the logistic curve, if the estimated value is higher than 0.5, the prediction is that the event occurs (the outcome is 1); otherwise, if the estimated value is lower than 0.5, the prediction is that the event does not occur (the outcome is 0). A problem then arises that estimated probabilities may be negative or larger than 1. Can we restate the probability in a way so that the new variable never falls outside this range? Odds are expressed as the ratio of the probability of the two outcomes of the dependent variable, or $\Pr obability_i / (1 - \Pr obability_i)$. In this way, odds value becomes a metric variable that ranges from 0 to infinity and can be directed estimated. Odds can also be converted back into probabilities which are now constrained to the range from 0 to 1. An odds value higher than 1 is equivalent to a probability higher than 0.5 which predicts occurrence; an odds value lower than 1 is equivalent to a probability lower than 0.5 which predicts non-occurrence; and an odds value of 1 translates into a probability of 0.5

which means both events have an equal chance to happen). Therefore, by predicting the odds ratio then transforming it back to a probability, we can ensure that the predicted probabilities always fall between 0 and 1. Let us take an example to illustrate the calculation of odds. If the probability of a project to be successful is 0.6, then the probability of it to fail is 0.4 (0.4 = 1 - 0.6). From these values, we calculate the odds of success by dividing the probability of success by the probability of failure:

$$odds(success) = 0.6/0.4 = 1.5$$

This number means that success is 1.5 times more likely to happen than failure. Conversely, the odds of failure are measured as:

$$odds(failure) = 0.4/0.6 = 0.7$$

Or we can say that failure happens as much 70% as success.

Although using odds helps with keeping probability values between 0 and 1, what should we do if the estimated odds go below 0 (because odds can only range between 0 and infinity)? To solve this problem, the logit value is used for estimation, which is determined by taking the logarithm of the odds. In this way, odds ratios lower than 1 correspond to a negative logit value, odds ratios higher than 1 correspond to a positive logit value, and odds of 1 correspond to a logit value of 0. Now each estimated logit value, negative or non-negative, can always be transformed into an odds value greater than 0 or a probability value between 0 and 1. As can be seen, the logit value is a metric variable which can take both positive and negative values and can always give valid predicted probabilities. However, it should be noted that the logit value cannot actually be 0 or 1.

The process used to estimate logistic model is similar to that for multiple regression, except that the logistic dependent variable can only take two actual values (0 and 1). Either the odds value or the logit value can be used as the dependent measure in estimating coefficients for the independent variables (binary or metric). Although both choices are equivalent, whichever chosen influences how the coefficients are estimated and interpreted. In addition, the nonlinearity of the logistic transformation requires a different means of estimating the coefficients, namely the maximum likelihood technique. Instead of minimizing the sum of the squared deviations between the dependent variable's predicted and observed values like in the ordinary least squares method, logistic regression tries to maximize the likelihood that an event will happen.

There are several methods to measure how well the maximum likelihood estimation fits with actual data. The first way is to use the likelihood value which is similar to the sum of squares in multiple regression. Specifically, model fit is measured with the value of -2 times the logarithm of the likelihood value, often denoted as -2 log likelihood or -2LL. The lower the -2LL value, the better the estimated model fits. When a model is a perfect fit (likelihood = 1), -2LL takes the minimum value of 0. The -2LL value can also be used to compare two proposed models in terms of fit or to calculate pseudo R^2. The Omnibus test of model coefficients is employed to check

whether the new model improves compared to the baseline model using chi-square tests. If there is a significant reduction in the -2LL value from the baseline to the new model, this suggests that the latter is better at explaining the variation of the outcome and hence is an improvement. Vice versa, if the chi-square statistic is not significant, it means there is no difference between the two models. In addition, pseudo R^2 values can be calculated to reflect the percentage of variation explained by the logistic model. Two widely used measures are the Cox & Snell R^2 and the Nagelkerke R^2, which operate similarly but the latter ranges from 0 to 1 while the former cannot reach the value of 1.

In addition to the likelihood value, the predictive accuracy of a logistic regression model is commonly measured with a classification matrix and chi-square based measures. The classification matrix approach calculates a hit ratio, or the percentage of cases correctly classified as occurring or non-occurring by the model versus actual outcome. The Hosmer and Lemeshow test, on the other hand, measures goodness of fit based on actual prediction of the dependent variable by calculating the chi-square statistic. It assesses whether the actual event rates is the same as predicted event rates across sub-classes of the population. A small p-value indicates poor fit, while a larger p-value suggests a lack of evidence to reject the null hypothesis.

Regarding the interpretation of logistic coefficients, they can be expressed in the original form or the exponentiated form. Original coefficients reflect the impact of the independent variables on the dependent variable in terms of logit value. However, this type of coefficient is difficult to interpret because we use logarithms as the dependent measure. Therefore, in this analysis I choose to use exponentiated coefficients for interpretation. Being the anti-logarithm of the original coefficients, exponentiated coefficients reflect changes in odds and will never be negative. An exponentiated coefficient of 1 corresponds to an original coefficient of 0 which suggests no effect. Thus, exponentiated coefficients higher than 1 (equivalent to positive original coefficients) actually indicate a positive relationship, and numbers lower than 1 (equivalent to negative original coefficients) indicate a negative relationship.

To test the impact of quality signals on funding success, logistic regressions will be estimated for four specifications: (A) Control variables only, (B) Project quality signals + Control variables, (C) Founder quality signals + Control variables, and (D) All explanatory variables. As the first step, I use only control variables in the regression to assess the baseline model's performance as well as the power of these variables in explaining whether an effort will be funded or not. Next, the analysis is expanded to include each type of quality signals before incorporating all predictive variables to see if there is any significant improvement of model goodness. Each set of specifications is run for: (1) The full sample, (2) The reward-based sample, and (3) The equity-based sample (The patronage sample has only 3 observations and thus is not considered).

1.2. OLS MULTIPLE REGRESSION

Despite the convenience of logistic regression, using a dichotomous dependent variable has some disadvantages because it conveys less information than a continuous one. With logistic regression, we can only analyze the influence of determinants on whether a project is likely to reach the funding target, but not how close it is to that success. Hence, it may be worthy to examine other metric indicators of how successful a crowdfunding project is, or in other words, its degree of attractiveness. These variables include the actual amount of funding or backers that a crowdfunding project is able to draw, and the ratio of actual versus target funding. Given that these measures are metric, Ordinary Least Squares (OLS) should be the method of choice.

Multiple regression predicts the value of a single metric dependent variable from a number of metric independent variables and is considered the most popular and versatile dependence techniques. The impact of the independent variable on the dependent variable is represented by its regression coefficient which expresses the amount of change in the latter due to a one-unit change in the former. In the "least squares" procedure, the values of coefficients and intercept are estimated such that the sum of squared errors is minimized.

To evaluate the predictive accuracy of a multiple regression model, the coefficient of determination (R^2) is most commonly used. Calculated as the squared correlation of observed and predicted dependent values, it ranges between 0 and 1 and represents how much variance in the dependent variable is explained by the independent variables. The higher the R^2 value is, the better predictive power the model has. This measure is also used to compare models.

OLS regressions with actual funding amount, actual number of backers and actual funding percentage as dependent variables are conducted in robustness checking with two specifications: (A) Control variables only, and (B) All explanatory variables.

2. VARIABLES

Previous studies (Ahlers et al., 2015; Allison et al., 2014; Dorfleitner et al., 2016; Mitra & Gilbert, 2014; Mollick, 2014; and Bi et al., 2017) provide a good understanding of factors that potentially have an impact on the success or failure of a crowdfunding initiative. Based on this foundation, the following factors related to project quality signals, founder quality signals and general project features are considered and described below. For a summary variable list, please see Appendix A.

2.1. DEPENDENT VARIABLE - FUNDING STATUS

- **Success flag**: dependent variable (main) - dummy variable to indicate the status of success or failure of a fundraising effort, which takes the value of 1 if a project is funded and 0 otherwise. All platforms in this

analysis follow the "all or nothing" principle which is also the most popular approach to crowdfunding currently. In this model, the project owners receive money only if their funding goal is reached; otherwise pledges are returned to funders. A project is considered to be "funded" or "successful" if the actual amount raised is equal to or higher than its funding target (overfunding).

This binary indicator has been used as dependent variable in many crowdfunding studies to measure success (Ahlers et al., 2015; Colombo et al., 2014; Dorfleitner et al., 2016; Mitra & Gilbert, 2014; Mollick, 2014; Parhankangas & Renko, 2017).

The following variables are alternative measures of the degree of funding success and are used as dependent variables in OLS regressions in robustness checking.

- **Actual funding amount**: the amount of fund that is actually raised, in million VND (USD). In later multiple regressions, the natural logarithm of (actual funding amount plus 1) is used.
- **Actual funding level**: the percentage of fund that is actually raised against project goal, calculated by actual funding amount divided by funding goal.
- **Number of backers**: the number of funders contributing to the project. In later multiple regressions, the natural logarithm of (number of backers plus 1) is used.

The following variable related to funding status will not be used in main regressions but only for descriptive purposes and subsampling.

- Average funding amount: the average amount of pledge per backer, in million VND (USD), calculated by dividing the total actual funding level by the number of backers.

2.2. INDEPENDENT VARIABLES - SIGNALS OF PROJECT QUALITY

The variables in this section are mostly found in project pitches and act as tools for the project founders to provide information and attract potential backers. By investigating and judging these components, one can get a perceived level of the quality of the project, and decide whether to become a backer. Thus, their presence should have an influence on the success of a project.

- **Project quality index**: composite variable based on the sum of five dummy indicators: Video, Product demo, Update, Spelling mistake free, and Project website/page, to measure the overall project quality signals. As each factor in the index is expected to positively relate to success (see below), I predict that a higher composite score indicates a higher probability of a project to be funded. For a detailed description of index construction, please refer to Appendix B. The reason to use an aggregated index is to avoid potential overfitting problems - a common problem involved with a large number of independent variables with regards to sample size (e.g. Mitra & Gilbert, 2014). My sample size is

not large (see below), thus including individual variables may lead to this issue.

- **Video**: dummy variable to indicate whether founders provide a video in the project description. Most crowdfunding platforms strongly advise creators to include a video as an illustrative introduction of the project and project team. Videos and pictures can say more than words and show adequate preparation of founders. Thus, the presence of a video serves as a signal of high-quality projects, which should be associated with higher success rate (Mitra & Gilbert, 2014; Mollick, 2014; Bi et al., 2017).
- **Product demo**: dummy variable to indicate whether a demo is available (in the introductory video, pictures, or provided links). A demo is understood as a version of the finished product, showing how it looks and works (if possible). In this way, it should be an important material to demonstrate serious attempts and passion of the founders for the project as well as to communicate signals about its feasibility. A product demo helps increase the certainty of a project by providing additional information and thus is useful in attracting funders. Based on Ahlers et al. (2015)'s findings about the role of sufficient information provision in reducing uncertainty, it is hypothesized that the presence of a product demo leads to a higher chance of success.
- **Update**: dummy variable to indicate whether founders of a project post updates about the progress of the project. Quick and frequent updates show an effort of founders to provide latest information to the public, indicating that the founders are potentially responsible and serious, and that the project is making progress, which should increase the chance successful fundraising (Mitra & Gilbert, 2014; Mollick, 2014).
- **Spelling mistake free**: dummy variable to indicate whether a project pitch is free of spelling mistakes. Mistakes result from insufficient preparedness, thus negatively affect the chance of success (Dorfleitner et al., 2016; Mollick, 2014). In contrast, a mistake-free project description indicates higher quality and may signal greater success. In this analysis, I use Vspell online spell-checking tool and manual scanning to identify spelling mistakes in the description of projects.
- **Project website/page**: dummy variable to indicate whether there is a separate website or fan page dedicated to the project. The existence of such pages demonstrates high levels of efforts put by project founders and provides additional information to investors about the project. In accordance with Ahlers et al. (2015)'s theory on the impact of sufficient information disclosure, this can be considered a hint of quality and is expect to imply greater success.

2.3. INDEPENDENT VARIABLES - SIGNALS OF FOUNDER QUALITY

Higher-quality entrepreneurs help reduce investors' concern about information asymmetry and ultimate failure of project, hence are associated with higher probability of successful funding (Ahlers et al.,

2015; Hsu, 2007; Mollick, 2014; Shane & Cable, 2002). Ahlers et al. (2015) determine human quality by the number of board members and the percentage of board members with an MBA degree. Meanwhile, Mollick (2014) focuses specially on the size of founder network as indicated by his number of friends on Facebook, and found that more friends is associated with a higher chance of success.

However, due to unavailability of these types of information for my sample, and based on the previously mentioned argument that the main function of social network is to mitigate information asymmetry and to connect the founder with investors, I make a simplification and assume that the presence of a personal website, blog, Facebook/Twitter page or detailed introduction of the founders in project pitches is an indicator of founder quality. The reason is that, through these means, potential investors can get in touch and explore more about the founder's qualifications, achievements, characteristics and get a better idea of his/her trustworthiness and quality, therefore increasing the chance of a project being funded.

- **Founder information**: dummy variable to indicate whether a personal website, social page, blog or additional information (who they are, what they have done, how they come up with the idea) of the project founders is provided. Project owners have the choice to include such personal information when creating a project, with inclusion being able to increase their perceived trustworthiness to investors, as well as the odd of success.

2.4. CONTROL VARIABLES - PROJECT GENERAL FEATURES

The following variables provide general information about a crowdfunding project and are used as control variables in logistic regression.

- **Funding goal**: the desired amount of funding set by founders, in million VND (USD). Since all platforms in this analysis operate on an "all or nothing" basis in which entrepreneurs receive nothing if funding goal is not reached, they should be careful in choosing a realistic and attainable target in order to avoid wastes of time and effort. Prior studies suggest a negative relationship between success and funding goal (Ahlers et al., 2015; Allison et al., 2014; Mitra & Gilbert, 2014; Mollick, 2014). To control for the wide dispersion of funding goal numbers, I use the natural logarithm of funding goal in regressions.
- **Minimum pledge**: the minimum amount of money, in million VND (USD), that can be pledged, which is usually set by project owners. Conceptually, the smaller the minimum pledge is, the more funders the project can attract, because it is easier to convince people to spend small amounts of money than larger ones (Mitra & Gilbert, 2014). To correct for the wide dispersion of minimum pledge amount, I use its natural logarithm in regressions.
- **Number of pledge levels**: the number of funding options available. Different pledge levels are associated with different privileges, with

larger contributions being rewarded with more valuable and exclusive benefits. A project with many pledge options allows for more flexibility and therefore is more accessible to potential backers (Mitra & Gilbert, 2014).

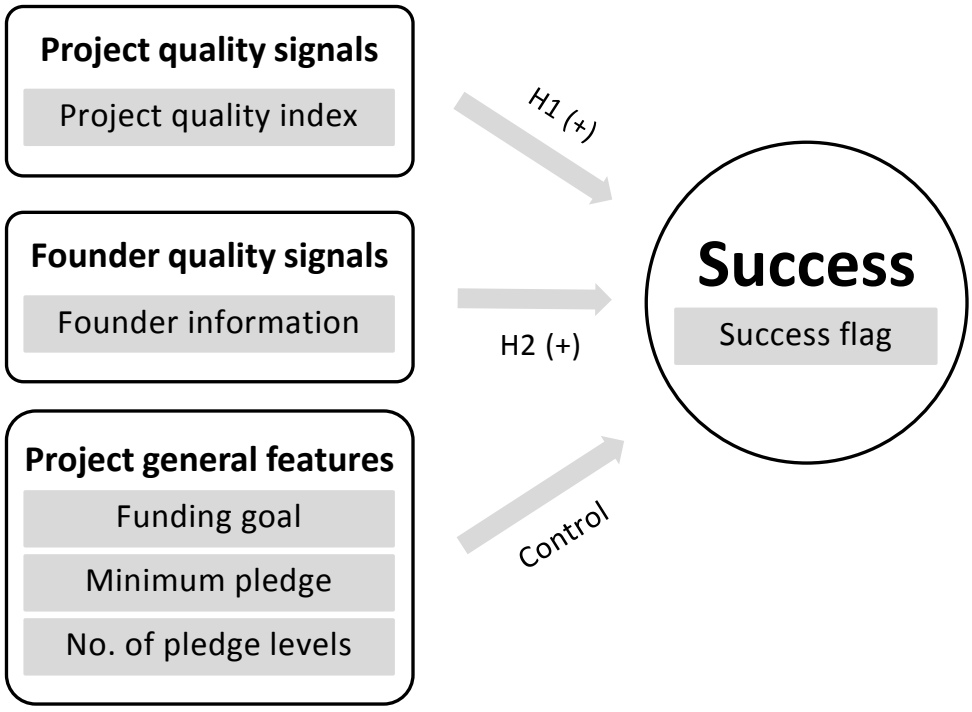
The following variables related to project quality will not be used in main regressions but only for descriptive purposes or subsampling.

- Type: how the crowdfunding initiative is modeled. According to Mollick (2014), there are four types of crowdfunding: patronage, lending-based, reward-based, and equity-based.
- Platform: the platform on which the project is posted (Betado, Comicola, Firststep, Fundingvn, Fundstart).
- Year: the year in which the crowdfunding campaign is initiated.
- Category: the focus area of a project. As the websites in this analysis have different categorizations, I use the classification of Kickstarter, the largest crowdfunding platform worldwide, as the standard with 15 broad categories. Projects from Vietnamese websites will be reclassified after carefully examining their purposes and nature.

Previous studies also use additional control variables related to the length of time a project is posted on the platform (project duration) and whether a project is featured on platform homepage. Unfortunately, because the websites used in this study do not collect or make available of such data, I cannot use them in the analysis.

Figure 3 presents a graphical representation of logistic regression model with specific variables.

Figure 3. Graphical representation of logistic regression model



3. DATA

This study focuses on crowdfunding in Vietnam, hence to provide the most comprehensive view of the phenomenon, and due to the fact that the number of crowdfunding projects in the country is not huge, I hand-collect information of all projects available on five largest existing crowdfunding platforms in Vietnam, namely Betado, Comicola, Firststep, Fundingvn, and Fundstart, since their establishment. Table 4 provides a brief description of the crowdfunding market.

Table 4. Overview of crowdfunding in Vietnam

Platform	Year of establishment	Area of focus	Number of projects	Total successful funding	
				In million VND	In USD [a]
Betado	2015	Various	18	1562	68800
Comicola	2015	Publishing	11	1564	68915
Firststep	2014	Various	7	45	1980
Fundingvn	2013	Various	80	33390	1470925
Fundstart	2015	Various	6	117	5138
Total	-	-	122	36678	1615759

[a] Equivalent amounts in USD, calculated at exchange rate USD/VND = 22700

During the period from 01/01/2014 to 31/12/2016, there are a total of 122 completed crowdfunding efforts made on the selected platforms, including 3 patronage projects, 39 reward-based projects, and 80 equity-based projects. Total successful funding amounts to VND 36.7 billion (equivalent to USD 1.6 million)

Due to the fact that crowdfunding platforms scan project ideas before publishing them on their sites, all collected observations represent serious fundraising efforts and are valid to be included in the analysis. The final sample consists of 122 crowdfunding initiatives which have reached their last date of calling, and hence indicating a clear outcome of being successful (reaching the funding goal) or unsuccessful (failing to reach the funding goal).

I am also aware of the fact that there may be other crowdfunding projects which are not listed on the abovementioned websites, however, the number is expected to be insignificant. Therefore I assume my data to be sufficiently complete and representative of the crowdfunding project population in Vietnam. Moreover, measurement errors should not be a big hindrance to the analyses.

VI. RESULTS

1. DESCRIPTIVE STATISTICS

A preliminary descriptive analysis can be useful in revealing some prominent patterns or features of the phenomenon, such as what the mean success rate is, how crowdfunding projects succeed and fail, or how frequently quality signals are used in describing a project. Besides providing an overview of the crowdfunding picture in Vietnam, this can also serve as a hint of elements associated with the likelihood of success which will be analyzed in more details in the next sections.

The descriptive statistics of metric and binary variables for the full data set and the subsamples based on crowdfunding type are shown in Table 5 and Table 6 respectively.

- Funding status & Project general features

  Our data set consists of 122 completed crowdfunding campaigns including 3 patronage projects, 39 reward-based projects, and 80 equity-based projects. Among them, there are 53 projects in Technology, 15 projects in Publishing, 13 projects in Food, 11 projects in Design, 10 projects in Comics, and the other 20 projects in Crafts, Film & Video, Games, Journalism and Music (not reported in Table 5 and Table 6). It is not surprising that crowdfunding is mostly used by technology entrepreneurs due to the fact that they are more likely to be familiar with Web 2.0 and more expertise at utilizing Internet-based infrastructure to get funding than entrepreneurs in other fields.

  Of the 122 crowdfunding initiatives, 47.5% (58 projects) were successfully funded. The other 52.5% (64 projects) did not reach their target. The ratio of projects meeting or exceeding their goal in our sample is quite close to that reported by Mollick (2014) for his universal sample of 48,526 US-based projects on Kickstarter: 49.4% as of July 2012. This number, however, is relatively high compared with the success rate found in other prior studies, e.g. 37.4% in Colombo et al. (2014); 41% in Parhankangas & Renko (2017). Notably, the success rate among equity-based projects (42.5%), although lower than the rate among reward-based projects (61.5%), is much higher than the 7.2% in Ahlers et al. (2015)'s study on equity crowdfunding. Meanwhile, all three patronage projects failed to attract the required amount of capital.

  On average, a project seeks to raise VND 544 million (equivalent to USD 23,976), and there is considerable variance across our sample. The reason for the high standard deviation appears to lie in the difference in project type, where an equity-based campaign asks for nearly six times more than a reward-based project averagely.

Table 5. Descriptive statistics of metric and binary variables

	N		Mean	Median	Min	Max	SD
Panel A: Funding status & Project general features							
Success flag	122		0.48	0	0	1	0.50
Funding goal	122	million VND	544.26	190	15	8000	1140.71
		USD [a]	23976.18	8370.04	660.79	352422.91	50251.64
Actual funding amount	122	million VND	403.55	77.50	0	6670	922.14
		USD [a]	17777.49	3414.10	0	293832.60	40622.96
Actual funding level	122	%	174.98	80.06	0	2260.00	384.39
Number of backers	122		98.16	19	0	892	191.55
Average funding amount	109	million VND	9.98	10.00	0.10	20.00	8.28
		USD [a]	439.84	440.53	4.41	881.06	364.89
Minimum pledge level	122	million VND	3.32	5	0 [b]	5	2.33
		USD [a]	146.20	220.26	0	220.26	102.69
Number of pledge levels	122		4.20	3	0 [b]	13	2.30
Panel B: Project quality signals							
Video	122		0.62	1	0	1	0.49
Product demo	122		0.71	1	0	1	0.45
Update	122		0.17	0	0	1	0.38
Spelling mistake free	122		0.25	0	0	1	0.44
Project website	122		0.64	1	0	1	0.48
Project quality index	122		2.40	3	0	5	1.20
Panel C: Founder quality signals							
Founder information	122		0.70	1	0	1	0.46

[a] Equivalent amounts in USD, calculated at exchange rate USD/VND = 22700

[b] There is one project which neither sets the minimum amount that can be pledged (Minimum pledge is 0) nor has fixed choices of pledge amounts (Number of pledge levels is 0)

Table 6. Descriptive statistics by crowdfunding type

		Patronage (N = 3)		Reward-based (N = 39)		Equity-based (N = 80)	
		Mean	Median	Mean	Median	Mean	Median
Panel A: Funding status & Project general features							
Success flag		0	0	0.62	1	0.43	0
Funding goal	million VND	88.13	50	138.29	100	759.27	300
	USD [a]	3882.53	2202.64	6092.26	4405.29	33448.11	13215.86
Actual funding amount	million VND	13.71	1.15	89.41	50.30	571.31	112.50
	USD [a]	604.04	50.66	3938.60	2215.86	25167.95	4955.95
Actual funding level	%	8.66	2.30	81.08	101.28	227.00	57.00
Number of backers		16.67	6	243.23	80	30.49	7
Average funding amount	million VND	0.41	0.19	0.69	0.42	15.60	18.17
	USD [a]	17.90	8.44	30.38	18.33	687.28	800.29
Minimum pledge level	million VND	0.07	0.05	0.12	0.10	5	5
	USD [a]	2.94	2.20	5.30	4.41	220.26	220.26
Number of pledge levels		8.33	8	6.33	6	3	3
Panel B: Project quality signals							
Video		0.33	0	0.56	1	0.66	1
Product demo		0.67	1	0.82	1	0.66	1
Update		0	0	0.51	1	0.01	0
Spelling mistake free		0.33	0	0.26	0	0.25	0
Project website		0	0	0.51	1	0.73	1
Project quality index		1.33	1	2.67	3	2.31	3
Panel C: Founder quality index							
Founder information		1	1	0.82	1	0.63	1

[a] Equivalent amounts in USD, calculated at exchange rate USD/VND = 22700

Projects belonging to different types of crowdfunding are also different in other aspects. For example, the mean number of backers is 98 per project, however, a typical reward-based project seems to be able to attract more funders than an equity-based one (243 versus 30). On the other hand, the amount of pledge in an equity project is much larger than a for-reward support: VND 15.60 million (USD 687.28) versus VND 0.69 million (USD 30.38). Reward-based projects also require a lower minimum investment and have more choices of funding amount to choose from. From these numbers, it appears that reward-based crowdfunding is targeted at the general public with small amounts and diverse needs whereas equity-based crowdfunding is attractive to more "professional" investors with larger investments.

Looking at the total amount and percentage of goal pledged at closure, we compute that the typical project is able to attract 175% of its target (remember that amount is not capped at funding goal and a campaign can actually raise more than what is requested). Again, this number is likely to be driven by the equity-based subsample which has a substantially higher mean funding level than the reward-based one (227.0% versus 81.1%). A closer investigation of this variable reveals an interesting distribution. Consistent with Mollick (2014)'s finding for Kickstarter data, projects that fail tend to fail by large margins. In particular, among 64 unsuccessful projects, 13 were not able to raise any money (20.3%) and 29 raised between 0% and 20% of their target (45.3%). However, contrary to his observation that success usually happens by small amounts, 28 out of 58 successful projects in our sample received more than 50% over their goal (48.3%); while only 15 projects are marginally funded with 10% or less over the desired amount (25.9%). Especially, there are five projects which received more than 10 times of their target, all of which are equity-based and small-sized (funding goal equal to or less than VND 100 million or USD 4,405).

In investigating this pattern, I follow Mollick (2014) to first look from the cynical perspective. Since all the crowdfunding platforms in our sample operate on an all-or-nothing basis, i.e. once target is not met, any money pledged until the last day is lost, entrepreneurs may attempt to fill the gap between the actual amount raised and the funding goal using their own money to secure receipt. This may explain why most failures have low funding levels, because if the levels are moderate, founders can complete the goal out of their own pocket without much effort. Similar to Kickstarter, our websites attempt to restrict this action by forbidding using the same personal information when creating and supporting one project. If self-funding is the main reason why most failures happen at low margins, it is reasonably expected that among unsuccessful attempts, smaller projects have a lower average percentage funded than larger projects because they are cheaper to self-invest to avoid failures. Otherwise, self-funding should not be a big concern. Statistics show the mean funding level is higher for smaller projects (funding goal under VND 100 million or USD 4,405: mean 0.28, sd. 0.31) than for larger ones (funding goal above VND 100 million: mean 0.19, sd. 0.25), however, the difference is not significant at 10% level. Thus we cannot conclude whether the efforts to restrict self-funding are

effective for Vietnamese platform, which is contrary to Mollick (2014)'s finding that they work for Kickstarter.

Another reason why some campaigns receive more funding than others lies in their own quality as identified by potential investors, which is the focus of this study. Funders' investment decisions are based on their assessment of the quality of the project and the founder. Quality, however, is a latent variable and can only be conveyed to funders by observable signals. As efforts of entrepreneurs to convince investors of the superiority of their projects, these signals mitigate information asymmetries and induce potential funders to invest. Thus, projects with more signals are supposed to be of higher quality and have a better chance of success, while those without signals are translated as low-quality and receive little or no funding. The descriptive patterns of quality signals are discussed below.

- Quality signals

  The first project quality signal addressed in this study is the presence of a video in the project description. In our sample, 62.3% of the projects provide an introductory video. For those which do, the duration of videos ranges from 37 to 2,618 seconds, averaging 250 seconds. On average, reward-based projects tend to use visuals more intensively than equity-based projects.

  A product demo reduces uncertainties about the project, and thus is another signal for evaluating underlying project quality. 71.3% of the projects in our sample include a preview of the (nearly) finished product in their project pitches.

  Only 17.2% of the projects provide updates about project progress to keep current investors informed or to attract new investors, with an average of 0.36 updates per project. Moreover, although it is not reported in the tables, it is not very common for people to comment on a project (32.8% of all cases). Except for some projects with unusually high number of comments, people rarely leave comments under a project (45% of projects with comments have fewer than 5 comments). Compared with the average number of updates (3.97) and comments (8.76) for Mollick (2014)'s sample, in Vietnam founders and backers seem to be unfamiliar with communicating with each other on the platforms.

  In addition, the quality of a project is reflected by the description text's spelling accuracy. This signal demonstrates the degree of preparedness and, to some extent, the education level of the founder. Misspelled words are relatively common, detected in 91 projects (74.6% of the sample), the majority (70.3%) of which have more than 1 error. This percentage is much higher than the 2% in Mollick (2014). A possible explanation is the lack of proofing tools for Vietnamese in popular office software; however, it cannot be denied that Vietnamese entrepreneurs are quite ignorant of proofreading.

  Another measure of project quality is availability of a separate project website/page. Given that project pitches are limited in terms of length and presentation, a project web page is an important additional source of information which enables investors to better evaluate the quality and prospect of the project. Getting this idea, 78 out of 122 projects (63.9%) in our sample have a website or Facebook page.

Project quality index is calculated as the sum of 5 dummy project quality variables, i.e. for each project, with the presence of each signal among Video, Product demo, Update, Spelling mistake free, and Project website, one point is added. The minimum index score is 0 where a project lacks all the above-mentioned components, and the maximum score is 5 for a project having all of them. For our sample, on average, a project scores 2.40, with 9 projects having 0 and only 1 project having 5 out of 5.

Besides project quality signals, the second factor influencing the probability of success of a crowdfunding project is founder quality. In this case, a founder is deemed to be of higher quality when he reveals additional information about his qualifications and experience in project description or his/her personal website, blog, LinkedIn or social network pages. As such, potential funders can get a better idea of the project team's capabilities and are more inclined to invest. 85 projects in our sample (69.7%) provide this kind of information, mostly by linking to a personal Facebook account.

2. UNIVARIATE AND BIVARIATE TESTS

For a first broad analysis, this section follows Ahlers et al. (2015) to test whether and in what aspects successful and failed projects differ regarding the hypothesized factors. To do this, I use independent-samples t-tests and chi-square tests to compare the means and medians between the two groups of campaigns in terms of Project quality index, Founder information, Funding goal, Minimum pledge, and Number of pledge levels. The full sample is used for this analysis including 58 successful projects and 64 unsuccessful projects. Results of mean and median equality tests are presented in Table 7. We should bear in mind that although these simple equality tests are useful as a diagnosis, it investigates each explanatory variable independently. Subsequent multivariate tests will control for the effects of determinants and controls simultaneously.

Regarding mean values, successful and failed crowdfunding initiatives are statistically different in terms of all 5 test variables. In particular, successful projects are associated with higher scores for project quality index, i.e. the presence of more quality attributes (difference is significant at the 1% level), and better disclosure of founder information (difference is significant at the 5% level). Especially, the 1.07-point gap in project quality is relatively remarkable when taking into account the fact that the mean value for this variable is 2.40 with a standard deviation of 1.20. These results provide initial support for Hypotheses 1 and 2 that more signals of project quality and founder quality lead to higher probabilities of success; however, we still need to investigate further with multivariate analyses in the next section.

In addition, all control variables are significantly different for the two groups. Consistent with prior predictions, smaller projects with a lower minimum pledge amount and more pledge levels are more likely to be fully funded. Intuitively, such projects require less intensive efforts and provide more flexibility to funders, thus have higher chances to succeed.

The findings of median tests are similar but more limited. Successful projects have significantly higher project quality index score and lower funding target. The difference in Number of pledge levels is not significant, whereas testing on Founder information and Ln(Minimum pledge) is not possible due to the fact that all values for either variable is equal to or less than the median.

Spearman correlations between variables are shown in Table 8. Accordingly, the correlations between both Project quality index and Founder information and Success flag are statistically significant, and two out of three control variables (excluding Minimum pledge) are found to be correlated with the indicator of success. Among independent variables, pairwise correlation coefficients are relatively low except for the correlation between the logarithm of Minimum pledge and Number of pledge levels.

Table 7. Mean/Median comparison between successful and unsuccessful projects

	N	Successful		Unsuccessful		Difference	
		Mean	Median	Mean	Median	Mean	Median
Project quality index	122	2.97	3	1.89	2	1.07 ***	1 ***
Founder information	122	0.79	1	0.61	1	0.18 **	n/a [a]
Ln(Funding goal)	122	18.68	18.42	19.47	19.18	-0.79 ***	-0.76 ***
Ln(Minimum pledge)	121	13.75	15.42	14.36	15.42	-0.61 *	n/a [a]
Number of pledge levels	122	4.71	3	3.73	3	0.97 **	0

* Significant at the 0.1 level

** Significant at the 0.05 level

*** Significant at the 0.01 level

[a] Median test cannot be performed because all values are less than or equal to the median

Table 8. Correlation matrix

	(1)	(2)	(3)	(4)	(5)	(6)
Success flag (1)	1					
Project quality index (2)	0.45***	1				
Founder information (3)	0.20**	0.07	1			
Ln(Funding goal) (4)	-0.29***	-0.07	-0.01	1		
Ln(Minimum pledge) (5)	-0.16	-0.14	-0.22**	0.39***	1	
Number of pledge levels (6)	0.21**	0.18**	0.20**	-0.24***	-0.79***	1

** Significant at the 0.05 level (2-tailed)

*** Significant at the 0.01 level (2-tailed)

3. MULTIVARIATE TESTS

To provide a more detailed understanding of factors associated with success in crowdfunding, I next use multivariate settings to control for the effects of different determinants simultaneously.

To investigate the role of quality signals, I conduct logistic regressions of the likelihood of success on Project quality index (proxy for project quality) and Founder information (proxy for founder quality). In the analysis, I also control for features related to crowdfunding design including the logarithm of Funding goal, the logarithm of Minimum pledge and Number of pledge levels. An advantage of logistic regression compared to multiple regression and discriminant analysis is that it does not require strict assumptions concerning the distributional form of independent variables and linear relationships between the dependent and independent variables (Hair et al., 2014).

As some projects have exceptionally high values for Number of pledge levels, this variable is winsorized at the 5^{th} and 95^{th} percentiles to reduce the impact of outliers.

Logistic regression will be conducted for the full sample, the reward-based sample, and the equity-based sample. In each analysis, there are four model specifications. The first specification (A) includes only three control variables. In the second specification (B), Project quality index is added to test the impact of project quality signals. The third specification (C) includes control variables and Founder information as a proxy for founder quality signals. In the fourth specification (D), all explanatory variables are used. Model estimations are presented in Tables 9-11.

3.1. SUCCESS FACTORS OF A CROWDFUNDING PROJECT

Table 9 reports the result of logistic regression of success likelihood on different determinants for the full sample. Within 122 projects, one case does not set the minimum amount to be pledged (logarithm of Minimum pledge is unspecified) and thus is excluded, reducing the sample size to 121 projects including 58 successful and 63 unsuccessful projects.

The first model specification includes three control variables and is used as the baseline for making comparisons of model fit's improvement when adding signal indicators. In this case, our baseline model is statistically significant from the null model which includes only constant ($\chi^2 = 13.52$, $p < 0.01$ (not reported)). It can explain 14% (Nagelkerke R^2) of the variance in crowdfunding success outcome and correctly classifies 66.1% of the cases. The Hosmer & Lemeshow statistic is not significant ($p > 0.1$), suggesting that the model is correctly specified. Moving on to the independent variables, only one out of the three controls is significant, namely Ln(Funding goal). Setting a higher funding target is associated with a reduction in the likelihood that the project will succeed (exp(B) = 0.63, $p < 0.01$). This is consistent with the finding in prior studies (Ahlers et al., 2015; Allison et al., 2014; Mitra & Gilbert, 2014; Mollick, 2014) that a lower and more realistic goal is easier to reach, leading to a higher

chance of successful funding. In contrast, Ln(Minimum pledge) and Number of pledge levels do not affect the likelihood of success. These unclear relationships can be explained by the fact that many projects in our sample have the same minimum pledge amount or number of pledge levels as a common practice among the crowdfunding community. Moreover, even if setting a low minimum pledge makes the project possible to invest for less wealthy individuals, it actually becomes harder to reach the target if everyone chooses to support with such small amounts.

I test for the impact of quality signals on success in the next three models. In Model 2, Project quality index is introduced as a proxy for project quality. Model 3 includes Founder information as a proxy for founder quality. Finally, Model 4 is built on both types of signals. By including signal variables, we find an improvement in model fit and significant coefficients on Project quality index and Founder information. Specifically, Omnibus tests show that the three proposed models have statistically lower -2LL values than the baseline (p-values <0.05), which means they can explain more of the variance of project outcome. Model 4 with all variables has the lowest -2LL value, followed by Model 2 with project quality only and last is Model 3 with founder quality only. Similarly, other goodness-of-fit measures (Pseudo R^2 and Percentage correctly classified) also improve when new variables are added, with the full model (Model 4) always outperforming the others. The p-values for Hosmer & Lemeshow χ^2 are larger than 0.1, which means the models fit data well. These results indicate that both Project quality index and Founder information significantly contribute to a better prediction of project outcome.

Project quality index measures the presence of different project quality signals (Video, Product demo, Update, Spelling mistake free, Project website/page) on a 1-5 scale. Its exponentiated coefficient is highly significant in both of Models 2 and 4 (exp(B) = 2.54 and exp(B) = 2.62 respectively, $p < 0.01$). Values above 1 reflect a positive relationship with the dependent variable: a higher index score (more project quality signals) is associated with a higher chance of success. To be precise, with an exponentiated coefficient of 2.62 (Model 4), increasing the index by one point (having one more signal) will increase the odds of success by 162.3%. Assuming a project with all other variables at mean value, this translates to an increase of 22.9% in the probability of success. It is also calculated that compared to a project with no signals (index score is 0), a project with all signals (index score is 5) has a 44.7% higher probability to succeed. Considering the mean success rate of 47.5% across the sample, this result is not only statistically but also economically significant. Our Hypothesis 1 is supported: "*Projects that demonstrate more project quality signals have higher probabilities of success.*" This finding is in line with those found in prior studies which investigate the role of each quality signal separately. Using Kickstarter data, Mollick (2014) shows that the presence of videos, updates, and the absence of spelling mistakes are linked to higher probabilities of success. Bi et al. (2017) find a positive relationship between videos and success for Chinese reward-based crowdfunding

projects. Dorfleitner et al. (2016) also report that a low proportion of spelling mistakes increase the likelihood of being funded in peer-to-peer lending. We can conclude that project quality signals are an effective way for project founders to communicate and provide useful information about the project's underlying quality to potential investors. With sufficient information provision, the problem of information asymmetry is mitigated. This in turn increases investors' trust and makes them more confident to invest in the project, increasing its likelihood of success.

The next type of quality signals relates to the project founder and is proxied by the dummy variable Founder information. The coefficient on Founder information is statistically higher than 1 (exp(B) = 2.68 in Model 3 and exp(B) = 3.13 in Model 4, $p < 0.05$), indicating a positive impact on the likelihood of success. Projects that include additional information about its founders in pitches are approximately three times more likely to succeed than those which do not. In terms of probability, providing detailed personal information helps project founders to increase the probability of success by a remarkable 26.4%. This result, with both statistical significance and economic significance, supports Hypothesis 2: "*Projects that demonstrate more founder quality signals have higher probabilities of success.*" Similar to project quality signals, Founder information improves the probability of success by acting as a signal of founder quality. A comprehensive introduction of the project team reduces investors' uncertainty about the ones to whom they give money, securing their trust of the founders. As a result, it is more likely that they will support and the project will succeed eventually. This finding confirms the value of founder quality signaling which is studied by previous researchers in the form of founder's network size (Mollick, 2014) or qualifications (Ahlers et al., 2015).

Similar to the baseline, out of the three control variables, only Ln(Funding goal) is significant after adding Project quality index and Founder information to the regression. Its coefficient is always below 1, which suggests that setting a higher target will reduce the probability of successful crowdfunding.

In the next sections, I will re-run the regression separately for the reward-based and the equity-based subsamples. Since these two types of crowdfunding have distinct reward-and-risk characteristics, we expect that investors may have different requirements and expectations when participating in each one. Consequently this will lead to different success factors for a reward-based crowdfunding project from an equity-based one.

Table 9. Success factors in crowdfunding

	(A)	(B)	(C)	(D)
Variables	Model 1	Model 2	Model 3	Model 4
Project quality index		2.54 ***		2.62 ***
		(18.59)		(18.47)
Founder information			2.68 **	3.13 **
			(4.74)	(4.89)
Ln(Funding goal)	0.63 ***	0.59 ***	0.60 ***	0.55 ***
	(8.12)	(8.36)	(9.07)	(9.44)
Ln(Minimum pledge)	1.20	1.22	1.27	1.30
	(0.98)	(0.87)	(1.51)	(1.52)
Number of pledge levels	1.31	1.23	1.29	1.22
	(2.34)	(1.26)	(2.14)	(1.16)
Constant	167.68	54.95	108.23	38.00
	(1.85)	(0.96)	(1.50)	(0.78)
Observations	121	121	121	121
Omnibus χ^2		24.50	4.99	5.19
p-value (Omnibus)		0.00	0.03	0.02
-2 Log likelihood	154.01 [a]	129.51 [b]	149.02 [a]	124.32 [b]
Cox & Snell R^2	0.11	0.27	0.14	0.30
Nagelkerke R^2	0.14	0.36	0.19	0.40
Percentage correct	66.1 [c]	69.4 [c]	62.8 [c]	71.1 [c]
Hosmer & Lemeshow χ^2	5.43	10.62	5.55	12.64
p-value (H & L)	0.71	0.22	0.70	0.13

Note:

Coefficients are reported in exponentiated form, with Wald statistics in parentheses.

* Significant at the 0.1 level

** Significant at the 0.05 level

*** Significant at the 0.01 level

[a] Estimation terminated at iteration number 4 because parameter estimates changed by less than 0.001

[b] Estimation terminated at iteration number 5 because parameter estimates changed by less than 0.001

[c] The cut value is 0.500

3.2. SUCCESS FACTORS OF A REWARD-BASED CROWDFUNDING PROJECT

The reward-based sample consists of 39 projects, in which 1 case is dropped out due to unspecified Ln(Minimum pledge). Therefore, the analysis is performed on 38 observations (24 successful, 14 unsuccessful). Results are presented in Table 10.

In the baseline model, only Number of pledge levels is significant with a positive effect on the likelihood of success ($\exp(B) = 1.60$, $p < 0.1$). Having many pledge levels is a good way to accommodate different needs of investors and attract them to the project. The model can explain 19% of the variance in the dependent variable and classify 68.4% of the cases correctly. In Model 2 and Model 3 when Project quality index and Founder information is added respectively, we find little evidence that model goodness is improved. Although R^2 values and Percentage correct slightly increase for Model 2, Omnibus tests show that compared to the baseline, the new models are not statistically different. Contrary to prior predictions, the coefficients on Project quality index and Founder information are not significant, suggesting no effect of project quality or founder quality signals on the likelihood of success.

The same finding of weak model fit improvements is observed for Model 4 which includes both project quality and founder quality signal variables. However, in the full model, Ln(Minimum pledge) becomes insignificant and Project quality index is significantly above 1 ($\exp(B) = 1.96$, $p < 0.1$). This means having one more quality signal is associated with a 96.1% increase in the odds or a 13.9% increase in the probability of success (assuming mean reward-based success rate). In sum, for the reward-based subsample, we find some support for Hypothesis 1 about the role of project quality signals and no support for Hypothesis 2 about the role of founder quality signals on the probability of successful crowdfunding.

To justify this finding, we should recall that contributions to a reward-based crowdfunding project are usually small; hence the level of risk associated is not high. For such little amounts of money, even if the product turns out to be not as promised, or delivery is late, the loss will still be bearable. Therefore, general investors probably do not have enough motivation to spend time and effort to scan all types of information about the venture. They mostly focus on project quality signals (however the concern is not as strong as for the full sample) and ignore signals about the founder. In this case, information asymmetry would not be a too big problem for them. The value of signaling is moderate, which explains why project quality have little and founder quality signals have no impact on the likelihood of success in reward-based crowdfunding.

Table 10. Success factors in reward-based crowdfunding

	(A)	(B)	(C)	(D)
Variables	Model 1	Model 2	Model 3	Model 4
Project quality index		1.81		1.96 *
		(2.50)		(2.79)
Founder information			1.07	1.96
			(0.00)	(0.40)
Ln(Funding goal)	0.53	0.51	0.53	0.49
	(1.69)	(1.78)	(1.68)	(1.79)
Ln(Minimum pledge)	1.46	2.02	1.46	2.26
	(0.26)	(0.71)	(0.27)	(0.88)
Number of pledge levels	1.60 *	1.54	1.59 *	1.53
	(3.35)	(2.65)	(3.30)	(2.54)
Constant	185.24	2.20	173.35	0.49
	(0.29)	(0.00)	(0.28)	(0.00)
Observations	38	38	38	38
Omnibus χ^2		2.71	0.01	0.40
p-value (Omnibus)		0.10	0.94	0.53
-2 Log likelihood	44.33 [a]	41.62 [a]	44.32 [a]	41.21 [a]
Cox & Snell R^2	0.14	0.20	0.14	0.21
Nagelkerke R^2	0.19	0.27	0.19	0.28
Percentage correct	68.4 [b]	71.1 [b]	65.8 [b]	76.3 [b]
Hosmer & Lemeshow χ^2	6.28	8.34	15.43	6.67
p-value (H & L)	0.51	0.30	0.05	0.57

Note:

Coefficients are reported in exponentiated form, with Wald statistics in parentheses.

* Significant at the 0.1 level

** Significant at the 0.05 level

*** Significant at the 0.01 level

[a] Estimation terminated at iteration number 5 because parameter estimates changed by less than 0.001

[b] The cut value is 0.500

3.3. SUCCESS FACTORS OF AN EQUITY-BASED CROWDFUNDING PROJECT

To investigate the impact of quality signals on successful fundraising in equity-based crowdfunding, logistic regression is performed on a subsample of 80 equity projects (34 successful, 46 unsuccessful). Probably due to platform design, all observations have the same values of Minimum pledge (VND 5 million or USD 220) and Number of pledge levels (3 levels). Therefore, only one control variable, namely Ln(Funding goal), is included in the regression to control for project size when examining the role of Project quality index and Founder information. Table 11 reports the results of different model specifications.

In comparison with the controls-only specification, Models 2-4 have better model fit in terms of reduction in the -2LL value (Omnibus χ^2 statistics are significant at $p < 0.05$), higher pseudo R^2, and higher percentage correct (except for the case of Model 3). These numbers indicate that Project quality index and Founder information have significantly contributed to improving the model's power to explain fundraising outcome.

As a proxy for project quality, Project quality index is found to have high statistical significance in Model 2 ($exp(B) = 2.94$, $p < 0.01$) and Model 4 ($exp(B) = 2.91$, $p < 0.01$). The relationship between the number of project quality signals and success is positive, with the odds of success increasing by 191.4% (or the probability of success increasing by 25.8%, assuming mean equity-based success rate) when having one more signal in the index. Similarly, the coefficient on Founder information is significant and above 1, suggesting a positive effect of founder quality signals on the likelihood of success. Compared to projects not providing additional information about project founders, projects with a detailed personal introduction are about three times more likely to achieve the target ($exp(B) = 4.12$ in Model 3, $exp(B) = 3.84$ in Model 4, $p < 0.05$). This is equivalent to a 31.4% higher in the probability to succeed. Regarding control variables, Ln(Funding goal) is significant and negatively influences the likelihood of success across all four models.

These findings are consistent with those observed for the full sample. The effects of Project quality index and Founder information are even stronger for the equity-based subsample than the full sample and the reward-based subsample. Since the amount of each investment in equity-based crowdfunding is relatively large and much larger than in reward-based crowdfunding: VND 15.60 million (USD 687.28) versus VND 0.69 million (USD 30.38), the level of risk that investors have to face is also higher. Thus, they are more concerned about asymmetric information and have enough motivation to really analyze project descriptions, looking for signals to reveal underlying venture quality. Besides the amount of investment involved, it is the nature of equity-based crowdfunding that holds higher levels of risk and uncertainty than reward-based crowdfunding (Schwienbacher & Larralde, 2010). Under such circumstances, the role of signaling is enhanced in that they provide useful information to the investors and mitigate the information asymmetry

problem. Consequently, projects with more project and founder quality signals can gain trust from funders and receive more funding, securing a better chance of success. Hypothesis 1 and Hypothesis 2 are supported for the equity-based subsample.

Table 11. Success factors in equity-based crowdfunding

	(A)	(B)	(C)	(D)
Variables	Model 1	Model 2	Model 3	Model 4
Project quality index		2.94 ***		2.91 ***
		(13.25)		(11.81)
Founder information			4.12 **	3.84 **
			(6.54)	(4.65)
Ln(Funding goal)	0.61 ***	0.59 ***	0.56 ***	0.54 ***
	(7.40)	(7.06)	(8.80)	(8.20)
Constant	9832.17 ***	1479.24 *	24627.20 ***	4334.89 **
	(6.95)	(3.67)	(7.33)	(3.21)
Observations	80	80	80	80
Omnibus χ^2		19.03	7.27	5.07
p-value (Omnibus)		0.00	0.00	0.02
-2 Log likelihood	100.66 [a]	81.63 [b]	93.39 [b]	76.56 [b]
Cox & Snell R^2	0.10	0.29	0.18	0.33
Nagelkerke R^2	0.14	0.39	0.24	0.45
Percentage correct	66.3 [c]	71.3 [c]	65.0 [c]	76.3 [c]
Hosmer & Lemeshow χ^2	15.80	5.19	10.63	7.06
p-value (H & L)	0.05	0.74	0.22	0.53

Note:

Coefficients are reported in exponentiated form, with Wald statistics in parentheses.

* Significant at the 0.1 level

** Significant at the 0.05 level

*** Significant at the 0.01 level

[a] Estimation terminated at iteration number 4 because parameter estimates changed by less than 0.001

[b] Estimation terminated at iteration number 5 because parameter estimates changed by less than 0.001

[c] The cut value is 0.500

[d] All equity-based projects have the same values for Ln(Minimum pledge) and Number of pledge levels, so these variables are dropped from the regressions

3.4. THE ROLE OF AVERAGE FUNDING AMOUNT

This section aims to check whether the amount of money involved per person is a driver behind different results for the reward-based and equity-based subsamples. The idea is to divide all observations into two categories of smaller and larger average funding amounts. It is then noticed that all reward-based projects are those with small average contribution, which would not contribute to any insights. Thus, I will exclude them and use only equity-based projects for this analysis. Out of 80 equity-based projects, 12 which receive no funding are excluded because we cannot examine the role of average contribution in these cases. This produces 34 small-contribution projects (Average funding amount ≤ VND 18 million or USD 729.95) and 34 large-contribution projects (Average funding amount > VND 18 million or USD 729.95). If we find different significant variables across the two categories, we can conclude that it is the amount of contribution per person that drives the differences in findings between the reward-based and equity-based subsamples. Otherwise, if determinants are similar for small- and large-contribution projects, then the type of crowdfunding, or more specifically the level of risk and uncertainty inherent in each type, actually leads to different success factors.

Table 12 presents results of the analysis. The coefficient on Project quality index is significant for both small-contribution and large-contribution projects (Model 2 and Model 4). We should also bear in mind that this variable is significant for the equity-based subsample across all specifications and for the reward-based subsample in the full model. From these findings, it can be concluded that project quality signals are valued by all investors regardless of crowdfunding type or the amount contributed, thus constituting an important and consistent determinant of success. Nevertheless, weaker effects found for reward-based crowdfunding and the small-contribution subsample suggest that type and average funding amount, to some extent, do reduce the role of signaling compared to larger equity-based projects.

In contrast, Founder information is not statistically significant for either small- or large-contribution projects (Model 3 and Model 4). This might result from insufficient sample size because from previous analyses, we know that it is significant for the full sample and the equity-based subsample. Therefore, it is reasonable to attribute the importance of founder quality signals in determining success to the type of crowdfunding. According to Schwienbacher & Larralde (2010), equity-based crowdfunding is more risky and uncertain than reward-based crowdfunding, in which investors are exposed to higher levels of information asymmetry. In equity-based crowdfunding, funders are particularly concerned about the credibility and capabilities of the project founders with whom they share profits, whereas in reward-based crowdfunding the main interest is the product itself. This may explain why customers only care about project quality signals while equity investors look for signals of both project quality and founder quality as a basis for their funding decisions.

Table 12. Small-contribution versus Large-contribution projects

	Small contribution				Large contribution			
Variables	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)
Project quality index		2.56 *		2.69 *		2.90 **		3.54 **
		(3.40)		(3.31)		(4.00)		(4.73)
Founder information			2.37	2.83			2.73	5.22
			(0.93)	(0.91)			(1.08)	(2.15)
Ln(Funding goal)	0.27 ***	0.33 **	0.26 **	0.30 **	0.33 **	0.27 **	0.31 **	0.21 **
	(6.75)	(6.51)	(0.53)	(6.47)	(5.80)	(5.15)	(6.29)	(5.83)
Constant	2.35E+10	67385365 **	3.71E+10 **	168387403 **	7330611373 **	4.47E+10 **	1.14E+10 **	7.64E+11 **
	(6.57) ***	(4.77)	(9.71)	(4.80)	(6.02)	(4.72)	(6.33)	(5.18)
Observations	34	34	34	34	34	34	54	54
Omnibus χ^2		4.57	0.89	5.55		5.38	0.89	7.65
p-value (Omnibus)		0.03	0.35	0.06		0.02	0.35	0.02
-2 Log likelihood	30.37 [a]	25.80 [a]	29.48 [a]	24.81 [a]	34.60 [b]	29.22 [a]	33.71 [b]	26.95 [a]
Cox & Snell R^2	0.33	0.42	0.35	0.43	0.25	0.36	0.26	0.40
Nagelkerke R^2	0.46	0.57	0.48	0.60	0.34	0.49	0.36	0.55
Percentage correct	82.4 [c]	82.4 [c]	88.2 [c]	88.2 [c]	67.6 [c]	73.5 [c]	67.6 [c]	85.3 [c]
Hosmer & Lemeshow χ^2	19.81	10.80	11.09	8.18	7.17	5.37	10.03	7.29
p-value (H & L)	0.01	0.21	0.20	0.42	0.31	0.72	0.19	0.51

Note:

Coefficients are reported in exponentiated form, with Wald statistics in parentheses.

* Significant at the 0.1 level

** Significant at the 0.05 level

*** Significant at the 0.01 level

[a] Estimation terminated at iteration number 6 because parameter estimates changed by less than 0.001

[b] Estimation terminated at iteration number 5 because parameter estimates changed by less than 0.001

[c] The cut value is 0.500

4. VALIDATION AND ROBUSTNESS CHECK

4.1. MODEL VALIDATION

A number of tests are performed to check the validity and predictive accuracy of our full model (Model 4 in Table 9). Although logistic regression is less susceptible to the "overfitting" issue than discriminant analysis, validation is still an essential step, especially when the sample is not large (Hair et al., 2014).

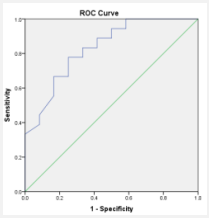
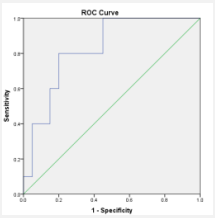
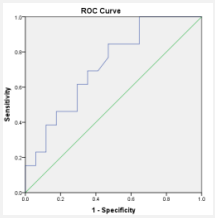
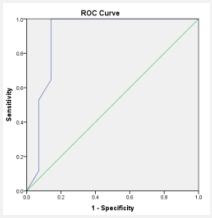
For this analysis I use the k-fold cross validation approach (see, for example, Boyce et al., 2002; Coffey et al., 2004; Dreiseitl & Ohno-Machado, 2002; Hair et al., 2014). In specific, the sample is randomly divided into four parts with subsamples 1 to 3 having 30 cases and subsample 4 having 31 cases. The first subsample is used as the validation dataset, and the remaining three subsamples are used as the training dataset to fit the model. Then the estimated model is applied to the data in the first subsample to calculate the value of dependent variable for each case. It means now we have the predicted logit value of success (which can be converted back into probability and group membership) for each observation from a model that was not built from that observation. From the predicted and actual values of Success flag, a Receiver Operating Characteristic (ROC) curve can be constructed and the area under the ROC curve (ROC AUC) can be calculated. ROC curve is a graphical illustration often used to evaluate the goodness-of-fit of a binary classifier such as logistic regression by plotting Sensitivity, or the true positive rate, and (1-Specificity), or the false positive rate, at various cutoff points. AUC measures the accuracy of the classification model and range from 0.5 to 1.0, with larger values indicating better fit. This whole process is then repeated three more times so that each of the four subsamples becomes the validation data exactly once. The AUC values from the folds are then averaged to produce a single measure of predictive accuracy. As can be seen in Table 13, AUC values are above 0.7 for all four runs, averaging 0.82. Also, the area under the ROC curve is statistically different from 0.5 ($p < 0.05$), which means logistic regression models predict success and failure much better than by chance.

As an additional validation, a bootstrap (see, for example, Steyerberg et al., 2001; Steyerberg et al., 2003) with simple random sampling is used to validate logistic regression coefficients. Based on 1000 samples with replacement, bootstrap results are reported in Table 14. Consistent with findings from the original model, the coefficients on Project quality index, Founder information and Ln(Funding goal) are highly significant, with the first two positively influencing the likelihood of success and the last one having a negative impact. The 95% confidence intervals of each coefficient are also sufficiently narrow.

Results remain unchanged when stepwise (forward selection - likelihood ratio or backward elimination - likelihood ratio) is used instead of simple logistic regression. Project quality index, Founder information and Ln(Funding goal) are the three determinants that remain in the final models. The sign and

magnitude of their coefficients are consistent with those produced by the original model.

Table 13. Four-fold cross validation

	Validation dataset			
	Subsample 1	Subsample 2	Subsample 3	Subsample 4
ROC curve				
AUC	0.83	0.83	0.72	0.90
SE [a]	0.08	0.077	0.09	0.07
Sig. [b]	0.00	0.00	0.04	0.00

[a] Under the nonparametric assumption

[b] Null hypothesis: true area = 0.5

Table 14. Bootstrap for logistic regression

	Bootstrap [a]					
	B	Bias	SE	Sig. (2-tailed)	95% CI Lower	95% CI Upper
Project quality index	0.96	0.07	0.25	0.00	0.61	1.57
Founder information	1.13	0.09	0.55	0.02	0.19	2.36
Ln(Funding goal)	-0.60	-0.05	0.22	0.00	-1.13	-0.26
Ln(Minimum pledge)	0.28	0.03	0.25	0.19	-0.14	0.83
Number of pledge levels	0.21	0.03	0.22	0.23	-0.13	0.78
Constant	3.40	0.14	4.91	0.44	-5.95	13.31

[a] Based on 1000 bootstrap samples

4.2. ALTERNATIVE MEASURES OF FUNDING SUCCESS

In addition to measuring success with a binary indicator, researchers also use the number of backers, the actual amount of money raised and the time to reach full funding to indicate the degree to which a project can attract contributions (Ahlers et al., 2015; Allison et al., 2014; Bi et al., 2017; Colombo et al., 2014). Since our platforms operate on an "all-or-nothing" basis, these parameters do not exactly reflect funding success. The reason is that the project owner only receives money once the funding target is achieved. Regardless of how much funding or how many investors a project

has, it is meaningless if the funding goal set out is too high or the contribution of each investor is too little. However, the number of backers and the actual amount of funding can be useful as relative measures of success in a robustness check to confirm our findings. The data for time to funding is not available, hence will not be used. Instead, I will add another measure which is the actual funding level, or the percentage of actual versus target funding. Because Number of backers and Actual funding amount are widely dispersed and have zero values (i.e. projects which receive no funding), they will be transformed by taking the logarithm of the original value plus 1 (Colombo et al., 2014). OLS regressions are used for model estimation.

As we can see from Table 15, generally the results are consistent with what have been found in the main analyses. Project quality index has a significant and positive impact on all alternative success measures. In particular, higher scores, i.e. having more project quality signals, are associated with the ability to attract more backers, more funding and a higher percentage towards the target amount. On the other hand, Founder information only affects the actual amount of money raised from funders.

Overall, it can be confirmed that quality signaling does have an influence on the funding status of a crowdfunding project, whether it is the final result of success/failure or other statistics reflecting the project's degree of attractiveness to investors.

4.3. MULTICOLLINEARITY

Since there are relatively high correlations among three control variables, this might affect regression results. To check the impact of multicollinearity, I re-estimate the regressions with one or two of the control variables dropped (Table 16). The main results remain robust across different specifications in terms of significance and signs of coefficients: Project quality index, Founder information and Ln(Funding goal) are important determinants; whereas Ln(Minimum pledge) and Number of pledge levels are insignificant. This means our findings are unaffected by high correlations among control variables.

Multicollinearity check is performed in a similar manner for the reward-based subsample (results not tabulated). Results are consistent with those found in the main analyses. Project quality index is significantly above 1 at the 10% level in three out of the six specifications (A, B and D), while Founder information is at all times insignificant.

When checking for correlated controls when using alternative measures of success (results not tabulated), the strong relationship between them and Project quality index remains unchanged, as represented by a significant and above-zero coefficient in all cases. Meanwhile, Founder information becomes a positive determinant of Number of backers, in addition to Actual funding amount. It is still insignificant for Actual funding level.

Table 15. Alternative measures of funding success

	Number of backers		Actual funding amount		Actual funding level	
Variables	(A)	(B)	(C)	(D)	(E)	(F)
Project quality index		0.63 ***		1.75 ***		0.53 *
		(5.63)		(4.20)		(1.95)
Founder information		0.44		2.68 **		0.91
		(1.49)		(2.45)		(1.29)
Ln(Funding goal)	0.26 **	0.26 **	0.65	0.62	-1.16 ***	-1.17 ***
	(2.20)	(2.52)	(1.53)	(0.12)	(-4.51)	(-4.61)
Ln(Minimum pledge)	-0.40 ***	-0.39 ***	-0.31	-0.20	0.87 ***	0.91 ***
	(-2.76)	(-3.00)	(-0.59)	(0.67)	(2.78)	(2.92)
Number of pledge levels	0.19	0.12	0.12	-0.10	0.23	0.16
	(1.46)	(1.03)	(0.26)	(0.82)	(0.81)	(0.58)
Constant	2.87	1.06	7.96	1.88	10.61 *	8.70
	(1.01)	(0.42)	(0.78)	(0.20)	(1.72)	(1.42)
Observations	121	121	121	121	121	121
F	16.46	19.59	1.09	5.73	8.29	6.28
p-value (F)	0.00	0.00	0.36	0.00	0.00	0.00
R^2	0.30	0.46	0.03	0.20	0.18	0.21
R^2 change		0.16		0.17		0.04
p-value (R^2 change)		0.00		0.00		0.06

Note:

Coefficients are reported as unstandardized, with t statistics in parentheses.

* Significant at the 0.1 level

** Significant at the 0.05 level

*** Significant at the 0.01 level

Table 16. Testing for the impact of multicollinearity

Variables	(A)	(B)	(C)	(D)	(E)	(F)
Project quality index	2.62 ***	2.46 ***	2.44 ***	2.65 ***	2.61 ***	2.44 ***
	(18.72)	(18.81)	(18.44)	(19.05)	(18.44)	(18.39)
Founder information	2.89 **	2.40 **	2.36 **	3.15 **	2.84 **	2.36 **
	(4.68)	(3.46)	(3.34)	(5.00)	(4.31)	(3.34)
Ln(Funding goal)	0.59 ***			0.56 ***	0.60 ***	
	(9.58)			(8.94)	(8.51)	
Ln(Minimum pledge)		0.91		1.08		1.01
		(0.74)		(0.38)		(0.00)
Number of pledge levels			1.12		1.02	1.13
			(1.16)		(0.03)	(0.44)
Constant	831.10 **	0.20	0.04 ***	679.48 **	665.52 **	0.31
	(4.58)	(0.83)	(19.01)	(4.18)	(3.65)	(1.10)
Observations	121	121	121	121	121	121
Omnibus χ^2	41.63	31.44	31.89	42.01	41.66	31.89
p-value (Omnibus)	0.00	0.00	0.00	0.00	0.00	0.00
-2 Log likelihood	125.90 [a]	136.10 [b]	135.65 [a]	125.52 [a]	125.88 [a]	135.65 [b]
Cox & Snell R^2	0.29	0.23	0.23	0.29	0.29	0.23
Nagelkerke R^2	0.39	0.31	0.31	0.39	0.39	0.31
Percentage correct	75.2 [c]	68.6 [c]	68.6 [c]	72.7 [c]	75.2 [c]	68.6 [c]
Hosmer & Lemeshow χ^2	11.67	2.91	3.65	10.28	14.24	3.63
p-value (H & L)	0.17	0.94	0.89	0.25	0.08	0.89

Note:

Coefficients are reported in exponentiated form, with Wald statistics in parentheses.

* Significant at the 0.1 level

** Significant at the 0.05 level

*** Significant at the 0.01 level

[a] Estimation terminated at iteration number 5 because parameter estimates changed by less than 0.001

[b] Estimation terminated at iteration number 4 because parameter estimates changed by less than 0.001

[c] The cut value is 0.50

4.4. DISAGGREGATING THE PROJECT QUALITY INDEX

The next test measures the individual impact of Project quality index's components on success. This step is to ensure that all components contribute to the overall power of project quality signaling in explaining funding outcome. Following, each of the variables Video, Product demo, Update, Spelling mistake free and Project website/page will be included in logistic regression separately. Results of this test are provided in Table 17. Out of the five project quality signals, Update fails to have an impact on Success Flag while the other four have significantly above 1 coefficients, indicating a positive relationship with the probability of successful funding. From descriptive statistics, we know that the interaction between founders and backers on crowdfunding platforms are not strong in Vietnam. Due to this fact, probably people have not paid much attention and recognized updates as an indicator of underlying quality and do use it as a basis for their investment decisions.

It then seems rational to remove Update from the composition of Project quality index. When re-estimating the model with the new Project quality index and comparing it with our main full model (Model 4 in Table 9), I find little improvement in model fit statistics. Given the theoretical and empirical role of frequent and quick updates in predicting project success (Mollick, 2014), it is highly likely that once updating becomes a common practice among the crowdfunding community, this variable will gain some significance in predicting funding success.

Table 17. Success factors: Disaggregating the Project quality index

Variables	(A)	(B)	(C)	(D)	(E)	(F)
Video	3.78 ***					3.69 **
	(8.40)					(5.40)
Product demo		7.33 ***				8.15 ***
		(13.69)				(10.49)
Update			1.23			0.66
			(0.10)			(0.31)
Spelling mistake free				4.24 ***		4.20 **
				(8.13)		(6.37)
Project website/page					2.77 **	1.23
					(5.02)	(0.14)
Founder information	2.61 **	3.21 **	2.68 **	3.18 **	2.61 **	3.95 **
	(4.16)	(5.44)	(4.72)	(5.84)	(4.38)	(5.97)
Ln(Funding goal)	0.55 ***	0.58 ***	0.59 ***	0.60 ***	0.59 ***	0.53 ***
	(10.62)	(9.00)	(9.11)	(7.98)	(8.86)	(8.96)
Ln(Minimum pledge)	1.13	1.37	1.29	1.28	1.24	1.18
	(0.34)	(2.24)	(1.59)	(1.56)	(1.23)	(0.51)
Number of pledge levels	1.16	1.29	1.28	1.29	1.36 *	1.18
	(0.70)	(1.88)	(1.93)	(2.18)	(2.93)	(0.78)
Constant	1983.09 *	12.57	87.37	46.70	71.00	160.58
	(3.35)	(0.40)	(1.31)	(0.99)	(1.20)	(1.29)
Observations	121	121	121	121	121	121
Omnibus χ^2	14.12	21.67	5.09	14.01	10.34	37.19
p-value (Omnibus)	0.00	0.00	0.08	0.00	0.01	0.00
-2 Log likelihood	139.89 [a]	132.35 [a]	148.93 [b]	140.00 [b]	143.68 [b]	116.82 [a]
Cox & Snell R^2	0.20	0.25	0.14	0.20	0.18	0.34
Nagelkerke R^2	0.27	0.34	0.19	0.27	0.24	0.46
Percentage correct	69.4 [c]	69.4 [c]	65.3 [c]	69.4 [c]	61.2 [c]	76.9 [c]
Hosmer & Lemeshow χ^2	3.05	12.20	9.65	10.78	10.93	8.54
p-value (H & L)	0.93	0.14	0.29	0.21	0.21	0.38

Note:

Coefficients are reported in exponentiated form, with Wald statistics in parentheses.

* Significant at the 0.1 level

** Significant at the 0.05 level

*** Significant at the 0.01 level

[a] Estimation terminated at iteration number 5 because parameter estimates changed by less than 0.001

[b] Estimation terminated at iteration number 5 because parameter estimates changed by less than 0.001

[c] The cut value is 0.500

VII. SUMMARY AND CONCLUSIONS

Crowdfunding has been emerging in Vietnam as a novel and plausible financing method for entrepreneurs in various areas. Given its growth in recent years, there lacks academic research about the underlying success factors of crowdfunding in the country, as the majority of relevant literature is based on settings of developed economies. This study provides an analytical understanding of crowdfunding in Vietnam by reviewing and testing the role of project and founder quality signals in predicting funding success in the context of a developing country.

A Vietnamese crowdfunding project is usually small in total size and the amount of each investment. However, there are significant differences between a reward-based project and an equity-based one. The latter, on average, is larger and has fewer investors but the average funding per investor is much higher. Generally both failures and successes happen by large margins.

Three factors are found to drive successful fundraising, in which a higher project quality index and the provision of additional founder information are associated with a higher probability of success, whereas setting a high target decreases the chance. These findings confirm the role of quality signals in predicting project outcomes. With the presence of more project and founder quality indicators, the information asymmetry problem becomes less severe and investors have more trust to invest in a project. However, the results about founder quality signals do not hold for reward-based crowdfunding, which is probably due to the low-risk nature of this crowdfunding type and the fact that product is the main concern in reward-based projects. Nevertheless, in general the economic significance of quality signals is so considerable that it is worth for entrepreneurs to invest sufficient time and effort in developing a comprehensive and well-prepared project description to attract potential investors.

Since this is among the first studies to investigate crowdfunding in Vietnam, it has a number of limitations. First, the analysis mostly builds on reward-based and equity-based projects, without patronage and lending-based models. The motivations of backers who act as philanthropists and lenders may be different from those of customers and equity holders, leading to the emergence of different success factors. Future regulations regarding crowdfunding are also likely to have great impacts on how entrepreneurs and backers make decisions as well as the operations of crowdfunding sites. It is believed that crowdfunding will grow in importance in the next years and provide many avenues for new research.

Moreover, due to limited data availability, I am not able to investigate some factors which are found to be significantly related to the likelihood of crowdfunding success by prior researchers. These include project duration and whether the project is featured on a platform's website. Founder quality signals are also proxied very simply by the dummy variable Founder information. This can probably explain its weaker significance compared to Project quality index. With richer data, more comprehensive measures of founder quality can be constructed and tested in subsequent studies. For example, in crowdfunding literature, founder quality has

been measured by the number of founding team members, their qualifications (Ahlers et al., 2015) or personal network size (Mollick, 2014).

As new data becomes available, it is possible to examine whether the effects found differ across platforms, and across industries. Since my sample only has 122 projects (58 events and 64 non-events), I must limit the number of independent variables. The majority of analyzed projects are technology-based (almost 50%), but as crowdfunding is expanded to other areas, the choice of industry may needs to be controlled, as well as the impact of platform's design and rules.

It may also be of interest for researchers to investigate the role of geography in crowdfunding in this setting. A prominent feature that distinguishes crowdfunding from traditional forms of finance is that it can relax geographic constraints (Agrawal et al., 2011). Additionally, the geographical location of a project can influence its likelihood of success (Mollick, 2014). When data about the geography of crowdfunding projects is available, further research to investigate whether crowdfunding platforms can actually eliminate distance-related frictions would contribute significantly to the understanding of crowdfunding.

In addition to signals of quality, the peripheral route factors as suggested by Bi et al. (2017) also influence the investment decisions of backers. Electronic word-of-mouth as represented by the number of reviews and "Likes" is an effective marketing tool and can deeply affect online behaviors of investors. Given the increasingly wide spreading of social networks, the relevance of this route is worth considering. By including both electronic word-of-mouth and internal quality signals, one can develop a comprehensive framework of success factors in crowdfunding.

Finally, this study has some implications for entrepreneurs, platforms and policy makers. For those who seek finance with crowdfunding, the most important lesson is that quality signals play a role in success. Investors actually value credible signals and use them to make funding decisions. Therefore, project owners should look for ways to convey project quality as well as their quality to potential funders by showing preparedness and completed information. Moreover, carefully choosing an appropriate goal also contributes to a higher chance of success.

In terms of intermediary and policy implications, it is suggested that crowdfunding platforms in Vietnam mark the information related to project quality and founder quality as required or at least recommended to provide in the project creation process. Since such types of information are very useful in evaluating an initiative, making them available to investors may help to reduce the rate of fraud and increase the rate of growth. Other data such as the start and end dates, backer's location, time and amount of funding should also be collected and displayed publicly. In order to boost the use of crowdfunding in Vietnam, related authorities should issue clear and detailed guidelines in the near future.

APPENDICES

APPENDIX A. VARIABLES

Name	Description	Unit	Values	Expected impact
SUCC	Success flag	n/a	0 = Unsuccessful, 1 = Successful	n/a
GOAL	Funding goal	million VND (USD)	The desired amount of funding set by founders	-
LGOAL	Ln(Funding goal)	n/a	Natural logarithm of Funding goal	-
AMT	Actual funding amount	million VND (USD)	The amount of money that is actually raised	n/a
LAMT	Ln(Actual funding amount+1)	n/a	Natural logarithm of (Actual funding amount + 1)	n/a
LVL	Actual funding level	%	The percentage of fund that is actually raised against goal	n/a
BACK	Number of backers	person	The number of funders contributing to the project	n/a
LBACK	Ln(Number of backers+1)	n/a	Natural logarithm of (Number of backer + 1)	n/a
AVGF	Average funding amount	million VND (USD)	The average amount of pledge per backer	n/a
MINP	Minimum pledge	million VND (USD)	The minimum amount of money that can be pledged	-
LMINP	Ln(Minimum pledge)	n/a	Natural logarithm of Minimum pledge	-
NPLV	Number of pledge levels	level	The number of funding options available	+
VID	Video	n/a	0 = No video, 1 = Video available	+
DEMO	Product demo	n/a	0 = No demo, 1 = Demo available	+
UPDT	Update	n/a	0 = No update, 1 = Update available	+

Name	Description	Unit	Values	Expected impact
SMF	Spelling mistake free	n/a	0 = Spelling mistake detected, 1 = No spelling mistakes	+
PWEB	Project website/page	n/a	0 = No project website/page, 1 = Project website/page available	+
QUAL	Project quality index	n/a	Overall quality score, calculated as the sum of Video, Update, Product demo, Spelling mistake free, and Project website/page	+
FINF	Founder information	n/a	0 = No personal website/page/introduction, 1 = Personal website/page/introduction available	+
TYPE	Type	n/a	Patronage, Lending-based, Reward-based, Equity-based	n/a
PLAT	Platform	n/a	Betado, Comicola, Firststep, Fundingvn, Fundstart	n/a
YEAR	Year	n/a	The year in which the crowdfunding campaign is initiated	n/a
CTGY	Category	n/a	Arts, Comics, Crafts, Dance, Design, Fashion, Film & Video, Food, Games, Journalism, Music, Photography, Publishing, Technology, Theater	n/a

APPENDIX B. CONSTRUCTION OF PROJECT QUALITY INDEX

The methodology used for constructing Project quality index is based on a guidance provided by OECD and the European Commission (2008) on constructing composite indicators.

Step 1: Theoretical framework

"Quality" is a multi-dimensional term and there are many factors that contribute to the overall quality of a project. The Project quality index aims to measure the perceived quality of a crowdfunding initiative by combining its score for different quality signals to get an aggregated index number.

Step 2: Data selection

As analyzed in Section III.2., the five following variables are considered indicators of high quality and will be included in index calculation:

- Video
- Product demo
- Update
- Spelling mistake free
- Project website/page

Step 3: Data treatment

All selected indicators are dummy variables with a value of 1 indicating the presence of a feature and 0 otherwise. In addition, all values are available and valid. Therefore, there is no need for imputation, normalization or scale adjustments.

Step 4: Multivariate analysis

Results of correlation analysis and Kaiser-Meyer-Olkin measure of sampling adequacy reveal that the selected indicators are unrelated and therefore reflect individually different facets of project quality.

- Correlation analysis

  Correlation matrix shows that there is no seriously high collinearity between any two indicators (all bivariate correlation coefficients are below 0.3).

  Table B1. Correlations (project indicators)

	(1)	(2)	(3)	(4)	(5)
Video (1)	1				
Product demo (2)	0.11	1			
Update (3)	0.04	0.24 ***	1		
Spelling mistake free (4)	0.10	0.08	-0.02	1	
Project website (5)	0.26 ***	0.24 ***	-0.11	0.05	1

*** Significant at the 0.01 level (2-tailed)

- Principal component analysis

The KMO measure of sampling adequacy is below 0.5, which indicates that no obvious underlying structure exists within the data to explain the correlations between pairs of variables (no "principal components) (Hair et al., 2014).

Table B2. KMO and Bartlett's Test (project indicators)

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.464
Bartlett's Test of Sphericity	Approx. Chi-Square	29.097
	df	10
	Sig.	.001

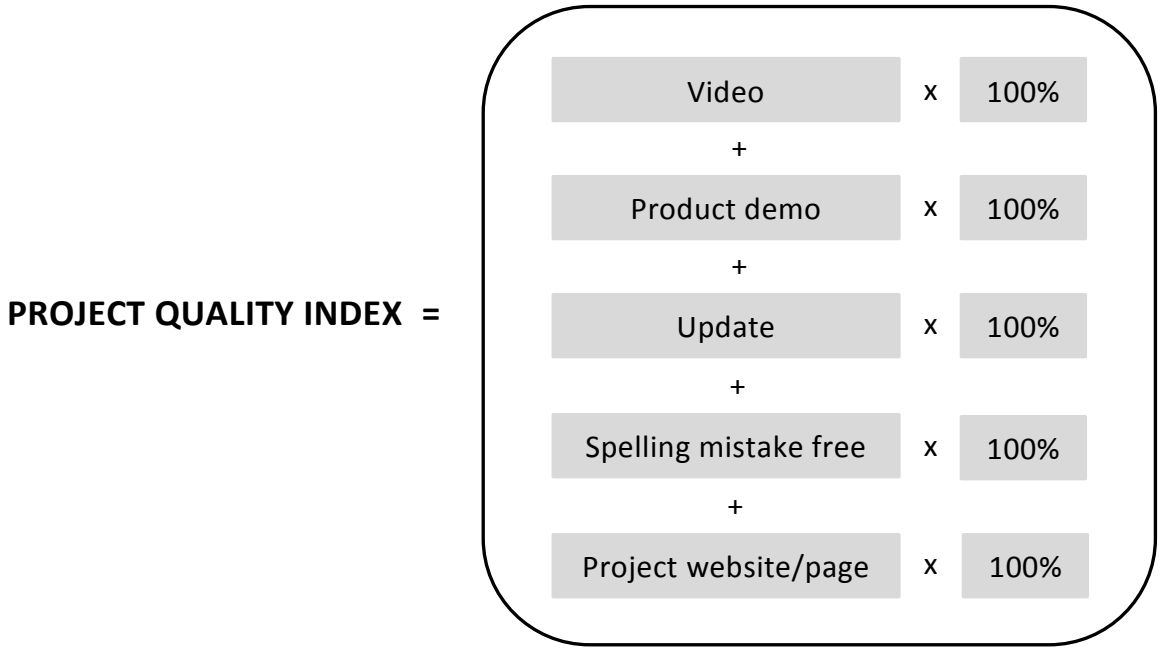
Step 5: Weighting and aggregation

Since there is no theoretical or empirical grounds specifying greater importance of any indicators over the others in signaling project quality, I will give the same weight (100%) to all variables. Equal weighting implies that the five indicators have an equal status and contribute comparably to the overall perception of project quality. In addition, multivariate analyses (Step 4) show that no indicators are highly correlated; hence double counting should not be a serious consideration.

Step 6: Visualizing the results

The final Project quality index is measured as the sum of five indicators: Video, Update, Product demo, Spelling mistake free, and Project website/page.

Figure B1. Construction of Project quality index



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