NATIONAL WOMEN'S BUSINESS COUNCIL

ADVISORS TO THE PRESIDENT, CONGRESS, AND THE SBA

Crowdfunding as a **Capital Source** for Women Entrepreneurs:

Case Study of Kickstarter, a Reward-Based Crowdfunding Platform

A Report Prepared by the A2F Consulting under solicitation number:
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Kickstarter Report

Research on Crowdfunding as a Capital Source

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Executive Summary

Crowdfunding is a novel method for entrepreneurs to fund for-profit, cultural, or even community projects. Projects can vary widely both in terms of goal amounts and scopes. Despite fast growth, the crowdfunding market is still in a nascent stage of development, where future policies and regulations will be shaped by the behavior and experiences of investors (backers) and entrepreneurs (project creators). Existing research notes that crowdfunding can increase gender equality in capital markets by opening access to a broader variety of investors and allowing female entrepreneurs to participate in such markets more fully and actively.

Academic literature suggests that a social network can play an important role in helping project creators, particularly women, to succeed in crowdfunding. This stems from the fact that women, in general, are found to be more likely to have larger and closer social networks. Social networking provides entrepreneurs interested in crowdfunding with a unique opportunity to share their projects and ideas with their networks, interact with them, receive their feedback, and most importantly leverage their networks to promote their projects. To date, because of data constraints, as well as the novelty of the topic, very little is known about the role of social networking in facilitating success on crowdfunding platforms.

The study attempts to investigate, from a gender perspective, the role of a project creator's online social network in contributing to the success of fundraising campaigns in reward-based crowdfunding. It also tries to provide a deeper insight into successful crowdfunding dynamics. Using a novel dataset received from Kickstarter (i.e. the largest reward crowdfunding platform in the U.S.) for the period between 2009 (its inception) and 2017, a series of logistic and linear regression analyses were conducted. These analyses were combined by comprehensive descriptive analysis and extensive visuals to better illustrate and explain the gender dynamics, as well as the relationship between women's success and crowdfunding variables on Kickstarter.

The dataset contained two important variables pertaining to online social networks, which provide a relatively comprehensive picture regarding online social networking activities in crowdfunding. The first variable is the 'number of Facebook followers' on a project creator's business or personal page. This variable is used as a proxy for the size of a project creator's social network. The second variable is the total number of times that a project has been shared on Facebook by viewers of the project or the 'number of Facebook shares'. This variable is considered as a proxy to measure promotional activities.

Women's participation rate on Kickstarter is around 30%; however, this rate varies across project categories. Compared to men, women, on average, set lower goals, but they also consistently show higher success rates (9% higher, on average). The higher success rates are robust across project categories and even after controlling for their funding goals and projects' characteristics. The majority of both female and male project creators on Kickstarter currently do not link their Facebook accounts to their Kickstarter project profiles, which might be due to personal preferences or because they do not have presence on Facebook. Nevertheless, among those with Facebook accounts, women had slightly larger online networks than men.

Key findings of this research include:

- **The impact of online social networks (network size and promotional activities) on crowdfunding success does not depend on gender**: Results show that male and female entrepreneurs on Kickstarter were able to benefit from their network, both in terms of size and promotional activities, to a similar extent. In other words, the effect of social networking on a campaigns' final outcomes is independent of the gender of the project creator.
- **The number of times that a Kickstarter project is shared on Facebook can be a game changer in terms of fundraising success.** On average, those projects that have been shared on Facebook at least 8 times are 34% more likely to succeed compared to those that have been shared on Facebook 4 times or less. Similarly,

projects that were shared at least 21 times on Facebook are 64% more likely to have been successfully funded compared to projects that have been shared only 4 times.

- **Project creators do not need massive numbers of followers for success.** While project creators with larger number of Facebook followers in general are found to be more likely to get successfully funded, project creators do not necessarily need an extremely large number of followers to succeed. Results showed that project creators whose number of Facebook followers fall between the 400-800 range are on average 5% more likely to succeed compared to those with less than 400 followers. Those with a number of followers in the range of 800-1600 are 6% more likely to succeed compared to the previous category (i.e. 400-800 followers). Having more than 1600 followers was found to increase the chance of success only by 1% compared to those with between 800-1600 followers.
- **Network size matters, but how it is leveraged is more important:** Findings show that both variables of the number of Facebook shares and number of Facebook followers are predictors of success on Kickstarter. However, the effect of the former is notably larger (0.78 vs 0.16). Furthermore, investigation of the relationship between the number of followers and the number of shares on Facebook shows that an increase in the number of followers leads to a small change in the number of shares. These findings together reinforce the importance of project creators' social media and networking skills and their ability to leverage their existing network optimally, at any size.
- **The first 30 days of campaigns matter the most:** On Kickstarter, as a fundraising campaign gets closer to its end, and especially after the first 30 days from the inception of the fundraising campaign, the probability of success decreases significantly. This points out the importance of the early days of a crowdfunding campaign for the final fundraising results. This finding could have important implications for women, as they plan to launch their promotional campaigns and engage with their online networks.

- **Including a visual pitch for success is critical**: On average a campaign with a video was 12% more likely to succeed compared to a campaign without it. The vast majority, 79% of the sample, incorporated a visual pitch in their project profile, of which 88% were successful in raising the target amount. It seems including visual elements in crowdfunding pitches has become the norm among crowdfunding projects.
- **Offering limited rewards brings momentum to the campaigns:** Results suggest that offering limited rewards will increase the chance of success by 3% on Kickstarter. Quantity limits can create excitement around limited rewards making them more exclusive and special (e.g. signed copies of products, etc.). This will attract early backers and help build momentum during the project's early days. This is regardless of the quality of reward or type of reward, which can be difficult to account for in econometric models. Overall, our findings support the idea that backers on Kickstarter, first and foremost, are interested in supporting the idea and being a part of the community.

While women entrepreneurs on Kickstarter set lower funding goals at the inception of their campaigns, they have been better able to raise funds in excess of their original funding goals, even in categories that are male-dominated, such as technology. Overall, crowdfunding shows potential to increase flows of capital to female-led projects. Women should be inspired by the positive findings of this research to realize their potential and fuel their confidence and should understand the opportunities that crowdfunding presents to them. To this end, education programs and awareness-raising campaigns to provide training to aspiring female entrepreneurs, particularly in underserved regions, could be instrumental to improve their pitching skills, media engagement planning, and internet marketing. Future research should utilize qualitative methods to provide deeper understanding of specific entrepreneurial activities and processes including ways in which entrepreneurs can fully leverage their social networking abilities in their favor.

1. Introduction

Crowdfunding is an alternative finance solution through which a venture raises small amounts of money from many contributors, usually on online platforms. Particularly for women-led businesses and startups, crowdfunding could be an alternative financing solution, as female entrepreneurs have reportedly been underserved by traditional capital sources (Sohl 2014; Brush et al. 2014; (Coleman and Robb 2009). Academic literature argues that the internet reduces potential individual biases towards women and enables them to access larger numbers of investors than normally possible with geographically or socially constrained searches (Catalini, and Goldfarb, 2011; Greensberg 2015, slade 2013). Four main crowdfunding models have emerged: donation-based, reward-based, lending-based, and equity-based. All models are facilitated through online platforms, where ordinary people, interest groups, entrepreneurs, and businesses can publish their projects and raise funds.

However, very little is known about the predictors of success for women on these platforms due to the novelty of the topic and limited data availability. Previous efforts have explored several factors as predictors of success, such as funding goal amounts (high or low), social networks, campaign duration, geographical location, project categories, and the provision of high quality details about the project. Research suggests that further investigation of similar topics, using updated and reliable data sources across different types of crowdfunding platforms, will contribute significantly to the existing literature and yield valuable insights for policy makers and female entrepreneurs.

The social network is among the major factors identified in the literature as a potential contributor to women's success on crowdfunding platforms. Generally, the literature indicates two channels through which a social network could help project creators succeed. The first channel is the so called 'herding effect'. Herding occurs when individuals' private information is overwhelmed by the influence of public information about the decisions of a group. Herzenstein et al. (2010) estimate that a 1% increase in

previous 'bids' on Prosper (a lending-based platform) leads to a 15% increase in the probability of an additional bid, which suggests lenders are more likely to bid on auctions with more bids. Similarly, Agrawal et al. (2013) and Colombo et al. (2016) find that initial funding (from family and online/offline friends) has a catalyzing effect on later or future funding, because it helps establish a herding effect.

The second channel is the 'signaling effect'. Signaling effect refers to the ways entrepreneurs signal their ventures' values. Normally, founders (borrowers/entrepreneurs) are assumed to be better informed about a venture's true value than the potential investors (Moritz and Block 2016). As a result, funders utilize a variety of signals to mitigate adverse selection. Crowdfunding helps funders quantify 'soft information'[1] and transform it into quality signals and ultimately improve the process of decision making (Lin et al. 2012). Previous studies found that in crowdfunding, funders utilize a variety of signals to optimize their decision (Agrawal 2013; Mollick 2014) examples of which include the size of social capital the project creators possess (e.g. number of project creators' Facebook or Twitter followers), initial funding, quality of textual pitch, etc.

This study aims to generate a deeper understanding of success predictors for women entrepreneurs in crowdfunding. To do this, we use recent data from Kickstarter (a public-benefit lending-based platform) and perform a descriptive and econometric analysis on the relationship between social networks and the probability of success in crowdfunding from a gender perspective. Additional to social networking, the role of other potential factors in increasing the likelihood of women's success on Kiva such as textual pitch, goal amount, location, race, etc. will be explored.

The emphasis of this report is on Kickstarter, a reward-based crowdfunding platform. Kickstarter's focus on for profit-projects will ensure that the research provides valuable insights on early-stage financing (usually even before resorting to traditional sources of

[1] Soft information is non-standard information about borrowers.

capital). The Kickstarter dataset[2] used in this study covers 7 years of full data and provides a very clear definition of success and failure. The dataset also contains gender attributes of project creators along with other important explanatory variables, such as location (city and state), the availability of a reward, the visual and textual pitch, the number of backers, the duration of the fundraising, and, most importantly, social networking information. **The report is organized as follows;** Section 2 provides a brief review of the lending-based crowdfunding. The research methodology is explained in Section 3, describing the research questions and the methodology to answer the questions, data used, and results from the analysis. Section 4 provides a descriptive analysis on gender dynamics. Section 5 presents the empirical findings from the analysis of social networks as a predictor of success as well as other predictors of success in crowdfunding and an overview of study limitations. The key findings from the study are summarized in Section 6. Finally, policy suggestions derived from the research are presented in Section 7.

[2] Original Kickstarter data was provided to A2F Consulting by Kickstarter through an agreement facilitated by the National Women's Business Council (NWBC).

2. Brief Review of Reward-Based Crowdfunding

Reward-based crowdfunding allows businesses or individuals to raise capital through online crowdfunding platforms. This type of financing has been considered amenable to startups, particularly those in creative fields, which may not qualify for traditional small-business loans but have compelling projects and innovations or are looking to test a market. Anyone can contribute to a reward-based crowdfunding campaign. Individual donations are normally given in small amounts (e.g. $10, $25, $50, $100, etc.); therefore, entrepreneurs, who are also referred to as project creators or founders in reward-based platforms, attempt to persuade as many people as possible to contribute or join their backers' community.

Backers will receive rewards for their contributions to the projects, usually depending on their amounts and timing of contributions. A painter might reward everyone who contributes $10 or more with a notarized letter of authenticity including donor names and locations. Whereas an inventor of solar-powered lawn mowers might reward funders at the $1,000 level with a lawn mower. Rewards do not have to be substantial. Project creators typically structure their crowdfunding rewards in different tiers, depending on contribution amounts. Very often contributions of $10 or less will get a personalized thank you by email or postal mail, whereas contributions between $10 and $25 may get a digital version of the work or an invitation to a special event, a dinner, etc.

The 'All or Nothing' (AON), and 'Keep It All' (KIA) strategies are two business models applied in reward-based crowdfunding platforms. Kickstarter applies the AON rule, in which donations are returned to backers if a project does not meet its goal. Other reward-based platforms, such as Indiegogo, apply KIA, where a creator has the option to keep all the money even if the campaign does not reach its goal. No collateral is needed, and there is no need to provide personal or business financial information. Instead, the ability to pitch an idea or product convincingly is paramount. Founders thus try to reach

out to their offline and online networks for support and produce persuasive visual and textual pitches to promote their ideas and products.

3. Study Methodology

3.1. Research Question & Approach

The main purpose of this study is to investigate the relationship between online social networks and the success of women in crowdfunding platforms. Specifically, this study intends to determine whether a larger social network will increase the likelihood of women's success in crowdfunding when compared to their male counterparts. Therefore, the primary research question is formulated accordingly:

> ***Primary research question:*** *What is the role of a female entrepreneur's social network in promoting her success in crowdfunding?*

From a methodological perspective, this study will investigate the extent to which the size of online social networks is a predictor of success for women in crowdfunding. Following Marom et al. (2016), Marom and Sade (2013), and Mollick (2014), the number of Facebook followers on a project creator's Facebook page will be used as a proxy for the size of a social network. The study will also examine whether social networks have a differential impact on success (i.e. campaign outcomes) for women compared to men. Furthermore, the research will explore whether the size of social networks has an incremental effect on the likelihood of women's success in crowdfunding. If such an incremental effect does exist, an attempt to determine the threshold that triggers the higher success for women in crowdfunding platforms will be performed.

Alongside social networks, this research also explores the role of other important variables as potential predictors of success in crowdfunding platforms. These variables are the funding goal amount, the loan pitch quality (i.e. projects' descriptions), the duration of a crowdfunding campaign, location (i.e. state level), and the industry category (i.e. technology, dance, games, fashion, music, etc.). The secondary research question therefore is formulated accordingly:

Secondary research question: *What are the other predictors of female entrepreneurs' success in crowdfunding?*

To this end, the study will utilize in-depth descriptive and empirical analysis. Descriptive analysis will help in analyzing and visualizing the dynamics of the crowdfunding campaign. It will provide a deeper understanding of the variables, trends, and relationships (e.g. correlations) between variables. Empirical analysis entails logistic regression and will help answer specific research questions set forth in this study by allowing the control of other explanatory variables and isolating the relationships among variables that will lay a methodological foundation for drawing conclusions. Given the data driven nature of the crowdfunding research, concurrent use of both quantitative and descriptive analysis is paramount.

With the large dataset available, gender disaggregated regression equations (Model 1 and 2) will be estimated to explore the differences, if any, between male or female led campaigns in terms of determinants of success. It also helps in identifying not only the common predictors of success for both men and women but also in detecting and highlighting the exclusive factors contributing to women's success in crowdfunding campaigns when compared to men's. In addition to Model 1 and 2, a third model with the interaction variable between gender and social network size will also be estimated. This will encompass the entire sample and will be used to test the robustness of the results.

We estimate the three logistic regression models as follows:

Model 1**: Women** Campaign Outcome= β_0+ β_1 (Social network) + $\beta_n X_n$ + δ_t +μ_s + ξ

Model 2**: Men** Campaign Outcome = β_0+ β_1 (Social network) + $\beta_n X_n$ + δ_t +μ_s + ξ

Model 3**: Full Sample** Campaign Outcome= β_0+ β_1 (Social network) + β_2 (Gender) + β_3 (Gender X Social network) + $\beta_n X_n$ + δ_t +μ_s + ξ

Campaign outcome is a binary variable representing success or failure. X_n denotes the vector of control variables, and ξ denotes the model residuals or error terms. δ_t is the year fixed effect and represents common shocks to all campaigns in a particular year. μ_s is the state fixed effect which controls differences in the campaign outcomes due to the state specific effect. A broad set of control variables (e.g. project goal, project category, fundraising duration, business years in operation, length of project description, etc.) will be included in the models to isolate the effect of social networks to the maximum extent by removing other effects and increasing the efficiency of the final coefficients.

In all three models state fixed effects and time fixed effects were used to consider specific time and location differences. Academic literature documents various instances of such scenarios. A study by Lin and Viswananthan (2014) reports that contributors in lending platforms (Prosper) are more willing to support borrowers from the same state due to behavioral preferences (as opposed to economic preferences), which is also referred to as a 'home bias'. Moreover, Agrawal et al. (2013) found that there is a strong correlation between state level access to capital for follow-up financing and the likelihood of success in some categories, such as technology on Kickstarter. The time fixed effect also captures other seasonal and structural components (such as changes in platform policy, platform reputation, etc.) over time. Including state and time fixed effects will avoid results' biases arising from factors that might vary across states and over time.

3.2. Data

To answer the above research questions, original data received from Kickstarter is used. Kickstarter is one of the world's largest reward-based crowdfunding platforms. It is a U.S.-based (Brooklyn, New York) crowdfunding platform founded in 2009. The company's stated mission is to help bring creative projects to life. Therefore, the focus of the platform is on creativity and innovation. Kickstarter has reportedly received about

$3.2 billion in pledges from 13.3 million backers[3] and is the largest and most popular reward-based crowdfunding platform in the U.S. Table 1 presents the list of variables in the dataset as well as a brief description of them.

The study sample covers the entire population of the projects listed on the Kickstarter website in the U.S from April 2009 (its inception) to July 2017 (time of this study). It is comprised of 519,044 projects, which makes it the largest dataset used to date for the analysis of crowdfunding dynamics. While the majority of research on crowdfunding relies on web-scraping to access the required data, the data used in this report was provided directly by the Kickstarter platform[4]. Using the largest and most up-to-date data provides a unique opportunity to capture the most recent changes in gender dynamics for U.S. reward-based crowdfunding over time.

Gender attributes were assigned to all project creators based on their first names. Kickstarter 'sign-up' pages do not require project creators or backers to self-identify their gender attributes. Similar to Marom et al. (2016), API Genderize.io was used to assign gender attributes to the project creators using their first names. Genderize.io covers all languages, alphabets, countries, and regions of the world with a data set that includes hundreds of thousands of names. For each first name, the API provides a probability parameter. In more than 96% of all cases, the probability of assigning the right gender exceeded 90%, suggesting a high degree of accuracy.

Table 1: Variable Description

Variables	Description
Project Characteristics	
Project Category	Art, Comic, Crafts, Dance, Design, Fashion, Film & Video, Food, Games, Journalism, Music, Photography, Publishing, Technology, Theater
Funding Goal ($)	The amount founders seek to raise using crowdfunding
Amount Funded/Pledged ($)	The amount of loans funded (This amount is the actual amount that is raised during a crowdfunding campaign.)
Number of Backers	The total number of contributors to project campaigns

[3] https://www.kickstarter.com/help/stats

Status	Whether the campaign has succeeded or failed
Duration	The total number of days a project gets fully funded (Launch date –Finish date)
Founders' Location	The location of entrepreneurs, i.e. state, city, county
Gender and Social Attributes	
Gender	Male or Female
Reward Structure	
Reward	Whether a project creator offers a limited award
Discernible Quality	
Project Description Length	The number of characters used to describe a project
Video	Whether a project creator produced and uploaded a video onto his/her project profile
Online Social Network	
Number of Facebook followers	Total current number of project creators' Facebook followers on their personal or business pages (i.e. whichever that has been linked to the Kickstarter account) as of July 7th, 2017
Number of Facebook Shares	The total number that a project has been shared on Facebook by viewers

The raw dataset was further processed and cleaned before performing the descriptive data analysis. First, following Marom et al. (2016), a total of 36,010 observations, whose gender was either missing or unknown were dropped. Second, the dataset was limited to U.S. campaigns only, which covered 78% of the original data. Third, a total of 44,069 cancelled project campaigns were dropped from the sample. Also, all observations above $1,000,000 (1,071 campaigns) as well as observations below or equal to $100 (6,399 campaigns) were dropped from the sample[5].

Regarding the social network activities, the dataset contained two important variables. The first variable is the "number of Facebook followers" on a project creator's business or personal page. As also noted previously, this variable is used as a proxy for the size of a project creator's social network (Marom and Sade 2013; Mollick 2014). Logically, a creator with a larger social network is expected to also have a larger number of online followers. The second variable is the total number of times that a project has been shared on Facebook by viewers of the project, which hereafter is referred to as the "number of Facebook shares". Regardless of whether a project creator has linked

[5] Previous researchers also removed campaigns with extreme values, since such values most likely do not represent serious efforts to raise funds and distort the results (Mollick 2014; Thies et al. 2016).

his/her Kickstarter profile to his/her social media account, the project can be shared by viewers of the page. Following Ta-Lu et al. (2014), this variable will be considered as a proxy for measure of promotional activities.

Logarithmic scale was used for the number of Facebook followers, number of Facebook shares, goal amount, and length of project description in order to respond to the high dispersion[6] within these variables. As a logarithmic scale evaluates proportional differences, rather than absolute differences between variables, this large variance is captured but minimized for the sake of analysis. The number of Facebook followers range from low (1) to high (5,399) across the full sample, also the variable of the number of Facebook shares range from low (1) to high (8,783).

[6] A variable with high dispersion (variability) contain values considerably higher and lower than the mean value.

4. Gender Dynamics on Kickstarter: Descriptive Analysis

4.1. Participation Rate and Success Rate

Similar to other crowdfunding platforms, Kickstarter has been growing rapidly since its inception. The number of project creators has increased over time. There were 19,000 project creators in 2010, whereas in 2016 this number reached about 100,000 creators. The number of backers per project also shows a major upward trend increasing from an average of 49 backers per project in 2010 to 178 backers per project in 2016.

Table 2 shows summary statistics for funding goals, amounts pledged (raised), the number of project backers, duration of the fundraising campaign, number of Facebook followers, and number of Facebook shares disaggregated by the gender attributes of project creators. This included the total sample of 431,501 project campaigns covering the period between April 2009 and July 2017. Also, other summary statistics disaggregated by gender for different sub-samples such as successful and unsuccessful campaigns and campaigns with and without social media are provided in Appendix 1.

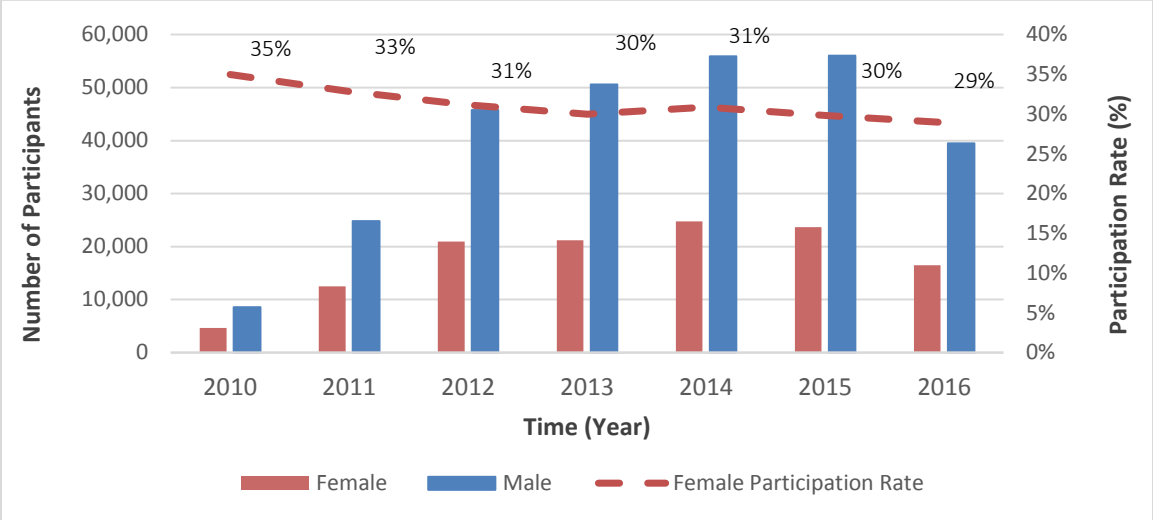
Table 2: Summary Statistics of the Key Variables

Gender	Female					Male				
Variables	**N**	**Mean**	**SD**	**Min**	**Max**	**N**	**Mean**	**SD**	**Min**	**Max**
Funding Goal ($)	132,458	14,552	46,998	101	1,000,000	299,050	20,296	64,405	101	1,000,000
Amount Raised ($)	123,190	8,791	40,835	0	3,327,757	271,991	14,666	136,414	0	20,300,000
Number of Backers	132,458	101	438	0	24,883	299,050	160	1,285	0	219,382
Duration	132,458	34	13	1	92	299,050	34	13	1	92
Number of FB Followers	59,081	1,265	1,228	0	5,399	130,553	1,223	1,232	0	5,291
Number of Shares	99,390	22	56	1	3,088	208,144	24	165	1	27,104

On average, women entrepreneurs on Kickstarter account for 31% of all entrepreneurs participating in the platform. While the number of both male and female-led campaigns has increased since Kickstarter's inception, the female participation rate has slightly declined from 35% in 2010 to 29% in 2016 (Figure 1). This is slightly lower than

entrepreneurship statistics from the general U.S. population. According to the National Women's Business Council (NWBC)[7], as of 2012, women-owned firms (51% or more) account for 36% of all privately held firms. However, similar to crowdfunding, participation rates typically vary by industry (U.S. Census Bureau 2012).

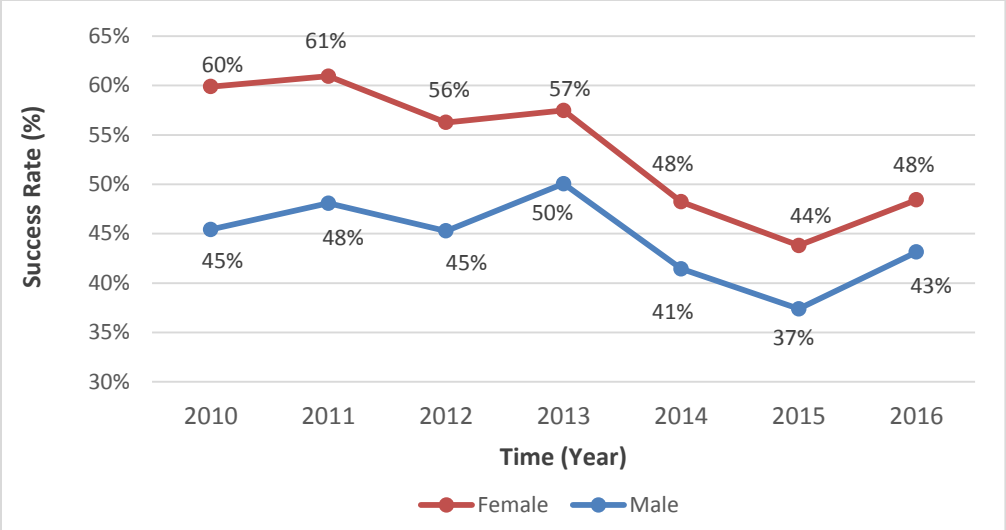
Figure 1: Number of Male and Female Project Creators Over Time



Female project creators were more successful in comparison to their male counterparts. Women on Kickstarter are on average 9% more successful than men. Moreover, female entrepreneurs have a greater success rate across every category except for the Game, where the difference is unsubstantial (50% vs 51%). Overall, women appear to be relatively more successful in both male dominated (categories with larger number of men) and female dominated (categories with larger number of women) categories.

Figure 2: Male Vs. Female Success Rate

[7] Fact Sheet on Women-owned Businesses (2012); https://www.nwbc.gov/facts/fact-sheet-women-owned-businesses



However, the differences in success rates were more pronounced in female dominated categories. For instance, the gender differences were greatest in the comics (18% female vs 81% male), dance (71% female vs 28% male), games (12% female vs 88% male), design (22% female vs 78% male), and music categories (29% female vs 71% male). In the dance category where women had 71% of the projects, the female success premium (gender success rate difference) was 14%; whereas in design, the success premium was 1%. (see Appendix 2)

Greenberg and Mollick (2014) argue that women's success on Kickstarter and other platforms may be partly because they are so underrepresented on the supply side of capital in the traditional capital markets. Women comprise less than 20% of angel investors in the United States (Sohl, 2014) and less than 6% of partners at capital firms (Brush et al. 2014). Research shows that female entrepreneurs are more likely to apply for funding from angel networks with a high share of women investors, and, similarly, female investors are more likely to invest in companies with women in their team composition**.** They showed that female entrepreneurs on Kickstarter, particularly those involved in male dominated categories, will be supported largely by women investors,

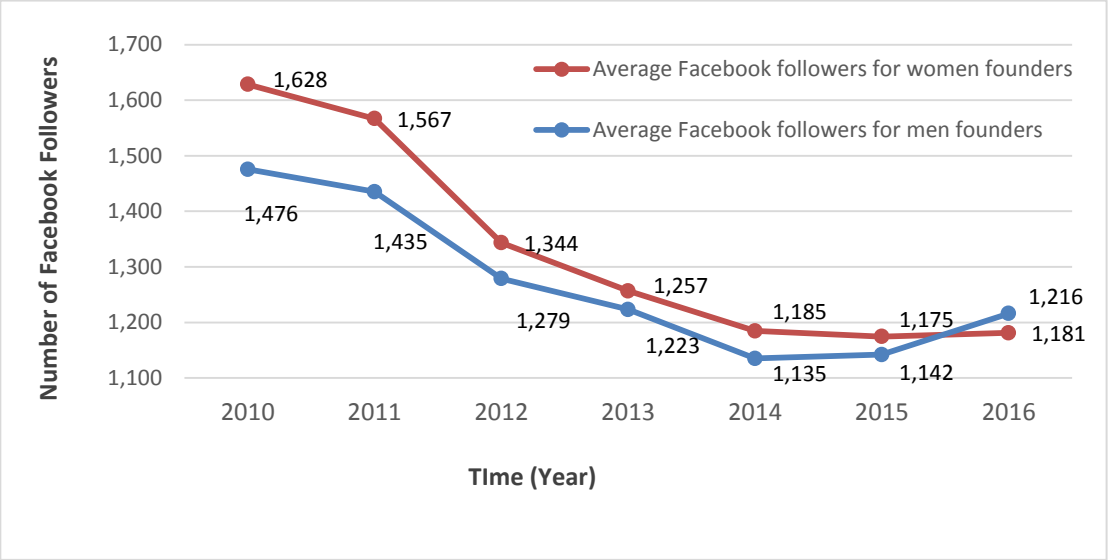
who want to reach out and help other women. In the crowdfunding literature, this is referred to as 'gender homophily'[8].

However, as is also evident from Figure 2, the overall success rates for both men and women entrepreneurs have been diminishing. The highest success rate for women was reported at 60% in 2010, and the lowest success rate was reported in 2015 at 44%. Previous studies argue that this is most likely a result of changing crowdfunding dynamics, particularly an increase in the number of project creators without an established backers' community or social network. Before crowdfunding became a mainstream funding option, the project creators and borrowers who engaged in crowdfunding oftentimes had an established offline or online network and backer community. However, the increasing popularity of crowdfunding as a viable funding option has led to the emergence of a more widespread and broader range of project creators, the majority of whom are without established communities.

To further investigate this matter, the average number of Facebook followers per borrower was plotted over time. In this context, the number of Facebook followers that a borrower's business or personal page has was considered as the proxy for the size of his/her online social network. As shown in Figure 3, despite an increasing number of project creators, the average number of Facebook followers per borrower has been declining over the years. The rate of decline has been similar for men and women entrepreneurs over time and shows that an average borrower on Kickstarter in 2016 has a much smaller network size than an average borrower had in 2012.

[8]Crowdfunding as a Capital Source for women entrepreneurs (May 2017), The National Women's Business Council, Retrieved from https://www.nwbc.gov/research/crowdfunding-capital-source-women-entrepreneurs

Figure 3: Average Number of Facebook Followers per Project Creator Over Time



4.2. Social Network and Number of Backers

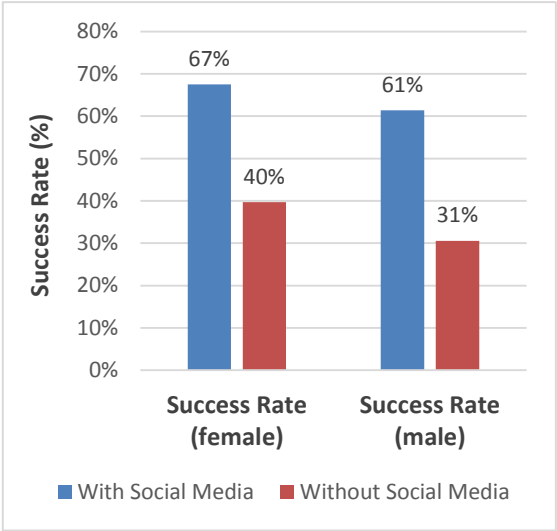
The average number of Facebook followers for female founders has been consistently higher than that of male borrowers, except in 2016. This is in general in line with research expectations that women have larger social networks. As Ajrouch et al. (2005) note, women tend to have larger and closer social networks but smaller professional networks than men. Nonetheless, the overall number of Facebook followers per project creator has been declining for both male and female project creators.

As noted previously, the dataset used in this study contains two critical variables regarding social networks. The first variable is the number of Facebook followers and the second variable is the number of project shares on Facebook. The number of Facebook followers that a project creator has on his/her Facebook page is used as an indicator of the popularity of the project creator as well as an indicator of the size of the project creator's social network. The number of times that a project has been shared by its viewers is used as an indicator of promotional activities.

The majority of project creators on Kickstarter do not link their Facebook account to their crowdfunding profile. This could be either due to personal preferences or simply because they do not have social media presence (i.e. they do not have a Facebook account). Less than half (44%) of the project creators linked their crowdfunding profile to their Facebook account. The proportion is slightly larger for females than for males (45% female vs 44% male).

The preliminary results from the data analysis show that the overall rate of success for founders with a Facebook account is substantially higher than for those without it (63% vs 33%). These results are also consistent across gender variables where female founders' success rates with Facebook accounts is 67%. Comparatively, the success rate for the same group without a Facebook account is 40%. Similarly, for male founders with Facebook accounts, the success rate is 61%, while for those without it is 30%.[9]

Figure 4 Success Rate With and Without Social Media (Male vs Female)

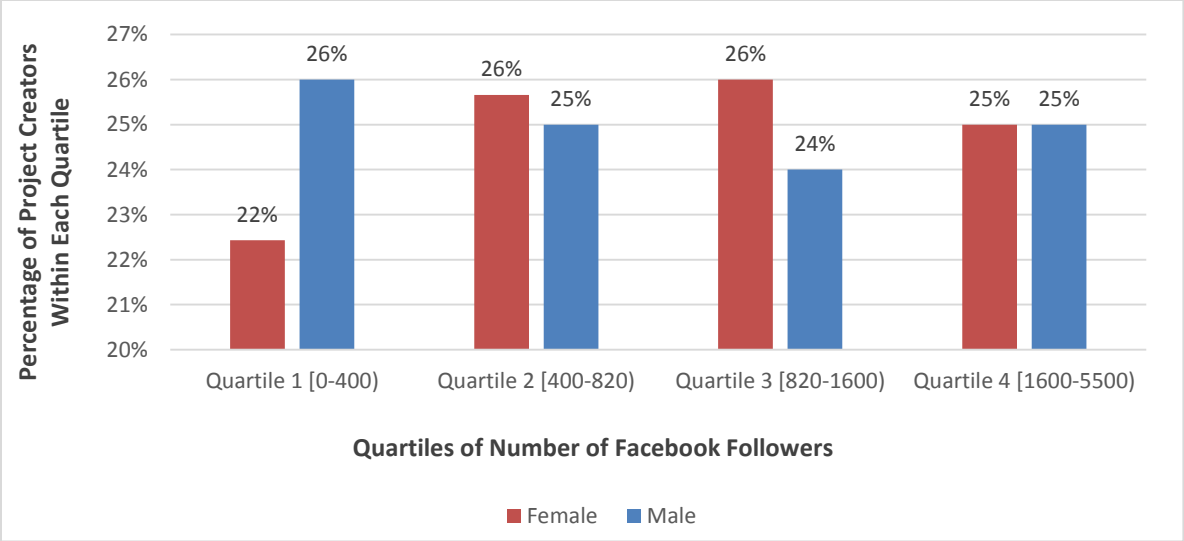


To further investigate the distribution and gender dynamics of project creators with respect to social network size, quartiles of the 'number of Facebook followers' were also calculated. The first quartile of this variable contains men and women borrowers, whose personal pages or business pages have less than or equal to 400 Facebook followers. The second quartile encompassed borrowers with Facebook followers between 400 and 820. The third quartile covered borrowers with a number of followers

[9] At the first glance, the effect of a social network may seem marginally greater for female entrepreneurs. However, the true effect should be investigated through a regression analysis framework, wherein confounding effects of other explanatory variables such as the goal amount, project category, and other projects' characteristics could be controlled.

between 820 and 1,600, and finally the top quartile covered those with more than 1,600 followers. As is shown in Figure 5, the number of followers for women are more concentrated in the second and third quartiles, which suggests that the majority of women entrepreneurs (52%) have Facebook followers between 400 to 1,600.

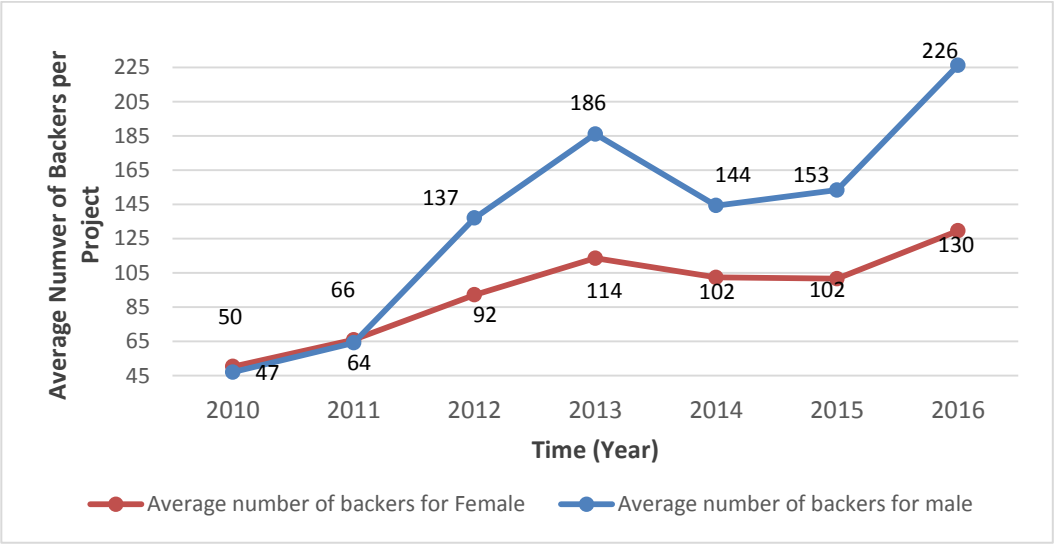
Figure 5: Distribution of Male and Female Project Creators (%) Across Quartiles of Number of Followers



Regarding projects backers, results show that the number of backers per project overall has increased. However, the number of projects without backers also has increased. In 2010, only 4% of campaigns did not receive any support, whereas in 2016 this number has tripled, reaching 12%. The increase in the number of projects without any support is likely related to the decrease of the project creators' offline or online social network as noted earlier. Thus, the decrease in success rates is likely to be the result of changing crowdfunding dynamics, leaving a larger proportion of projects unsupported.

On average, women founders attracted a smaller number of backers compared to their male counterparts. As shown in Figure 6, in 2010 and 2011 the average number of backers per campaign was slightly larger for female-led projects (50 vs 47); however, this number for male-led projects later exceeded that of women, reaching 226 backers per project for male-led projects versus 129 for female-led projects in 2016.

Figure 6: Average Number of Backers Over Time by Gender



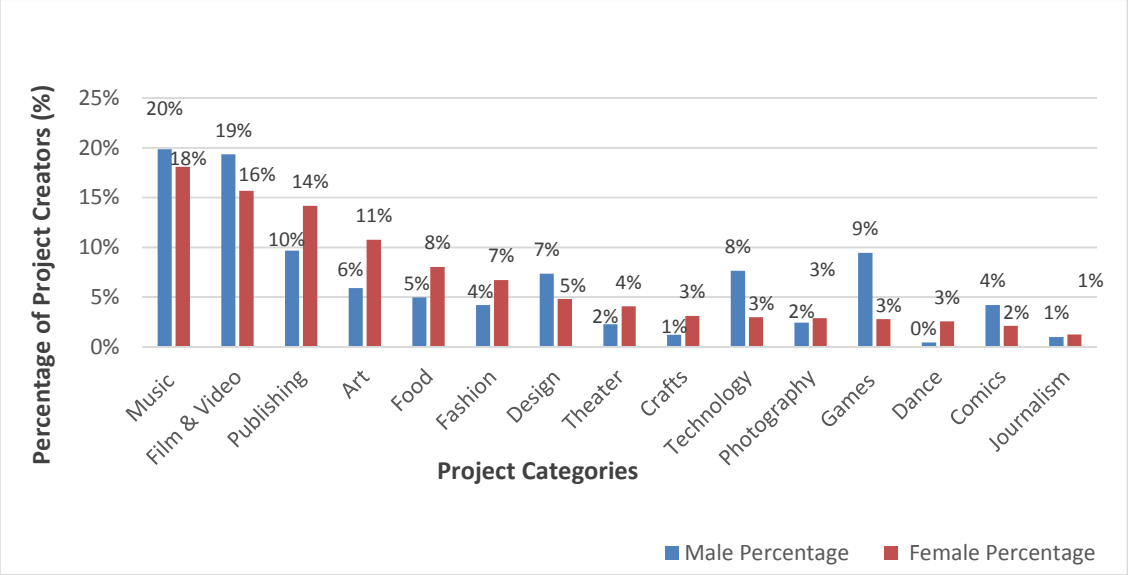
The number of backers was plotted against the two variables related to social networks: the number of followers and the number of shares. These plots show how many project backers are affected by (i) the number of project creators' Facebook followers and (ii) the number of projects' shares on Facebook. As illustrated in Figure 15 (see Appendix 7), a very strong correlation exists between the number of backers and the number of times that a project has been shared on Facebook; however, the relationship is much weaker between the number of followers and the number of backers.

This indicates that promotional activities (number of shares) have a much larger effect in attracting backers in comparison to the size of the founders' online network. While this issue will be investigated in more depth in the empirical analysis section, it is apparent that a more critical factor than individual social capital size (measured by the number of followers) is the way that a project is promoted (represented by the number of Facebook shares). Wojciechowski (2009) describes that promotional activities are a sign of public approval and send a strong signal of the project creator's credibility. But even more important than public approval might be the spread of information to key individuals and groups that is facilitated through sharing mechanisms provided by social media platforms (Bernstein et al 2010; Gilbert 2012).

4.3. Project Category

Data show that women are highly represented in some project categories and very under-represented in others. In general, the number of men exceeds the number of women in all the categories, except dance and craft. For women entrepreneurs, the top categories were dance (72%), crafts (51%), art (45%), fashion (41%), and food (41%); whereas for men the top industries were games (88%), technology (85%), and comics (82%). Since male project creators constitute the majority of participants on Kickstarter, comparing the sheer number of participants within each category could be misleading. Therefore, in addition to absolute numbers (see Appendix 3), relative participation rates across project categories for each gender group were calculated and presented in Figure 7.

Figure 7: Distribution of Female and Male Project Creators Across Project Categories (%)



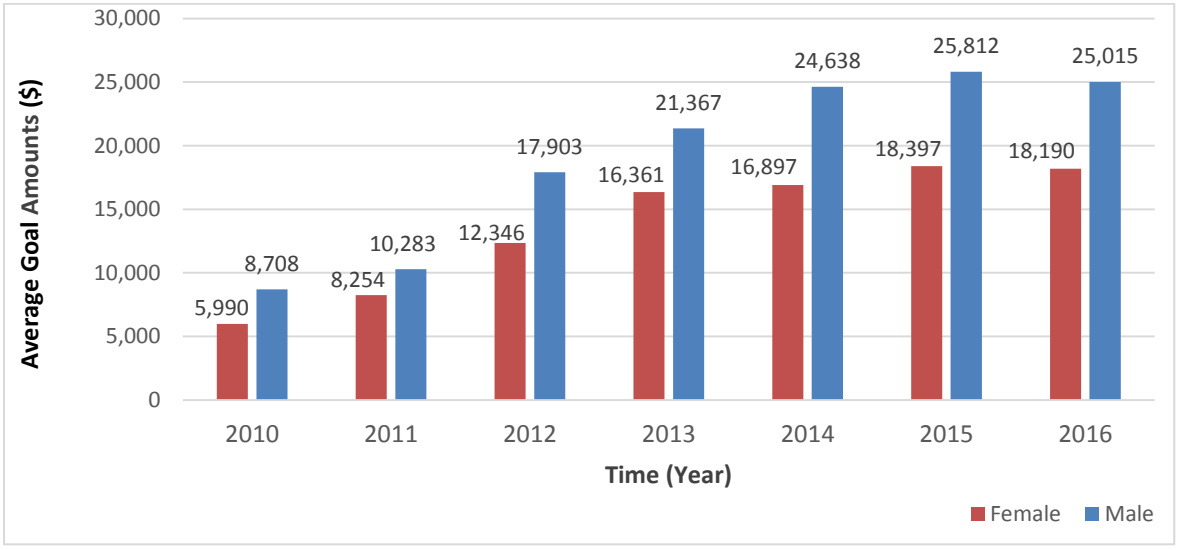
Gender variation across project categories on Kickstarter resembles gender differences seen in the general population of U.S. firms. Data from the U.S. Census Bureau indicates that firms owned by women are far more concentrated in health care and social assistance (54.5%), educational services (48.5%), other services (40.6%),

administrative and support services (37.6%), and retail (35.1%). While industry categories on Kickstarter are not directly comparable to industry categories of U.S. firms, Kickstarter data also indicates that female-led projects are highly underrepresented in categories of technology, games, and design.

4.4. Funding Goal, Pledge, and Raised Premium

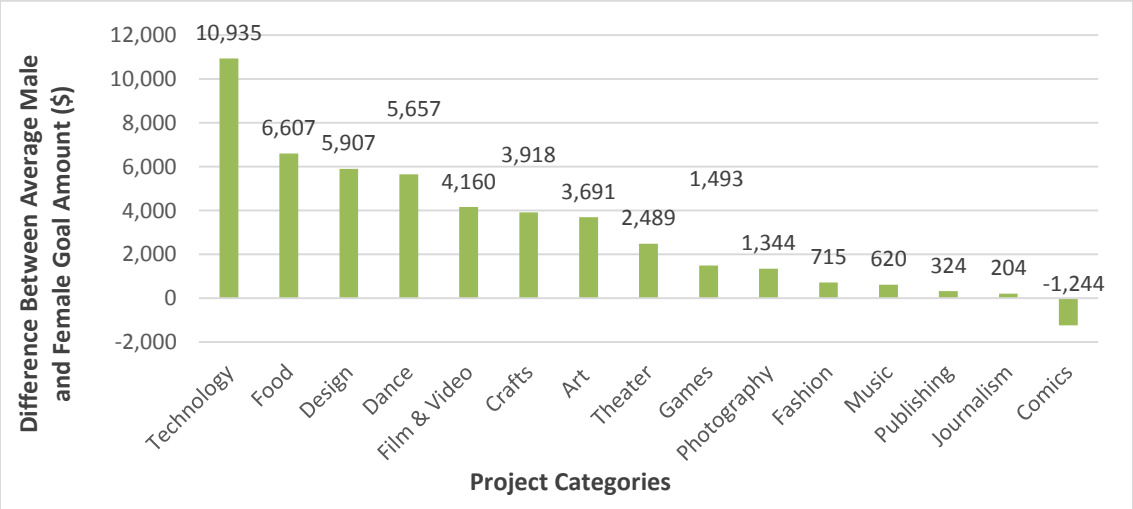
As is shown in Figure 8, women tend to set lower funding goals compared to their male counterparts. In examining the average financing goal by the gender of entrepreneurs, data indicates that females on average seek less funding than males ($14,552 vs. $20,282). Men not only seek higher levels of capital than women for their projects, they also raise more funds than women on average. This seems logical since they set larger goal amounts, and thus they raise larger amounts. The mean amount of funds raised by men was close to $14,490, compared to $8,791 for women. These differences are even larger when assessed within project categories. For women, average goals per category ranged from $6,014 in dance to nearly $37,612 in technology. Whereas for men, the average goal per category ranged from about $8,329 in comics to more than $48,547 in technology. (see Appendix 4)

Figure 8: Male Vs. Female Average Goal Over Time



One interesting aspect of this study is whether women in female dominated categories behave differently than women in categories that are male dominated. The average goal for female entrepreneurs only exceeded that of men in the category of comics, which is an interesting observation since women are the minority in this category (18% vs 82%) which is far below the share they had in general (31%). Gender differences in goal amounts were lowest for categories of journalism, publishing, and music. They were greatest in the categories of technology, food, and design (Figure 9).

Figure 9: Difference Between Male and Female Average Funding Goal Amounts ($)

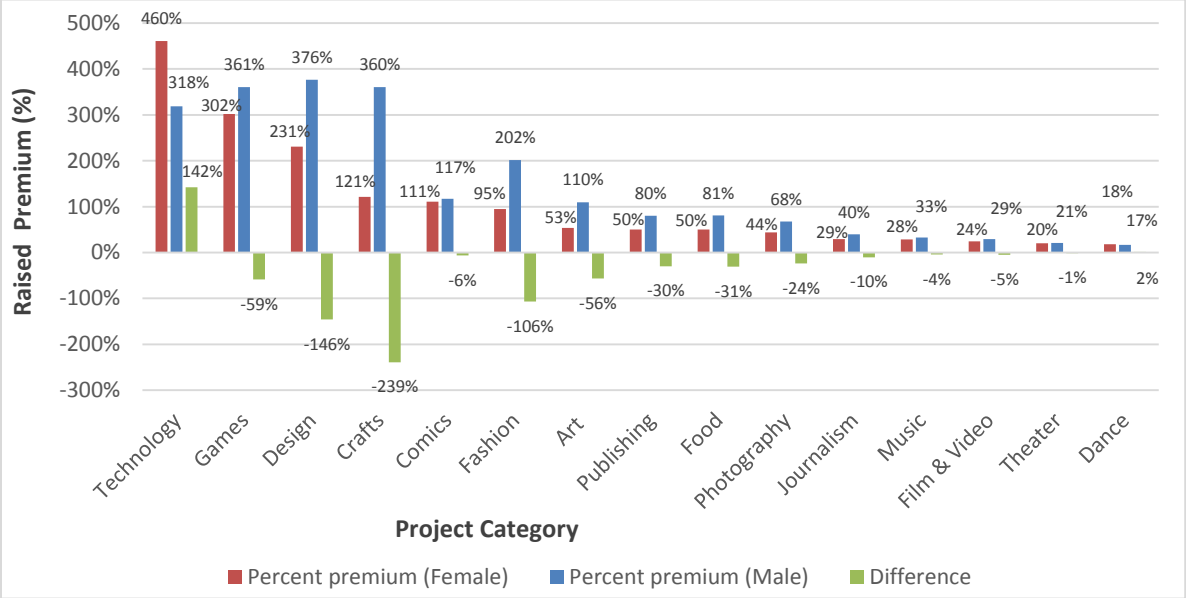


Kickstarter follows an 'All-or-Nothing' business model, but successful projects often raise more than the goal. The amount raised in excess of the original goal set by project creators at the outset of the campaign is referred to as the premium. Marom et al. (2016) argue that setting a lower goal could be due to cautionary reasons but it is mainly because project creators might not feel confident in their ability to raise the amount they need, or simply because they underestimate the demand for their products or prototypes.

Comparing successful projects on raised premiums demonstrates interesting differences with respect to gender. While the average premium amount raised by males was nearly twice as much as that of females (65% vs 132%), raised premiums and gender disparity varied drastically by project categories. Women's raised premiums

were largest in the categories of technology (460% more than their goal on average), wherein they also outperformed men in this category (460% vs 318%), followed by games (302% more than their average) and design (231% more than their average). Interestingly, not only none of these categories are specifically female dominated, but rather in all these categories they are very much in the minority.

Figure 10: Female and Male Raised Premium (%) Alongside Their Differences



However, it is important to note that these premiums are confounded by different amounts of funding goals, different project categories, offering limited rewards or incorporating visual pitches. In order to produce a cleaner comparison, as also noted previously, one should either examine a matched sample (Marom et al. 2016) or analyze the results within a regression framework, within which confounding effects of other variables such as goal, project category, and other project characteristics can be controlled. In this respect, this study adopted the latter strategy.

The results of the regression analysis confirm the findings from the descriptive analysis. By fitting a regression equation and controlling for the goal, project category, and other project characteristics (reward, video, location), the findings are clearer. The

results are presented in Appendix 5. Findings reveal that even after controlling the above factors within a multiple regression analysis framework, wherein the 'premium raised amount' is the independent variable, women still outperform men in male dominated categories such as games and technology, where they raised 18% and 99%, respectively, more than their male counterparts. Furthermore, in other sectors, where women have large participation rates, such as dance and fashion, they were also able to outperform men in terms of raised premiums.

Previously, similar findings had been reported by Marom et al. (2016) and Greenberg and Mollick (2014). Greenburg and Mollick (2014) argue that the success of female founders in crowdfunding in general, and in particular in Kickstarter, is because of a subpopulation of female backers that disproportionately supports women founders in areas where women have been historically underrepresented such as technology. They refer to this as 'activist choice homophily'. In other words, they note that the larger representation of women investors on crowdfunding platforms alone may not necessarily yield greater success for women, but activism along with representation will yield positive results for women.

Box 1: Active Choice Homophily

Gender homophily in general refers to the tendency to prefer one's own gender when making investments. In other words, a person may have a psychological bias in favor of lending to their own gender, which cannot be explained by the return on investment alone. This is also referred to as intrinsic gender homophily. However, active choice of homophily occurs when a person not only shows more tendency to invest in one's own gender but also actively and disproportionately invests in industries in which his/her gender is in the minority such as technology for females or fashion for males (Greenberg and Mollick 2014).

It seems that women are prone to set their funding goal lower than men at the outset of a campaign, especially in categories that are male dominated. However, upon conclusion of the campaign, on average, they raise more than their goals compared to men. According to the literature, women entrepreneurs might set their goals lower,

because they may be more risk averse (Gneezy and List 2013), they may underestimate the potential demand for their products or services more than men do, (Langowitz and Minniti 2007; Niederle and Vesterlund 2005) or they may feel there will be implicit biases against their level of competence, especially in male-dominated categories (Whittington 2007).

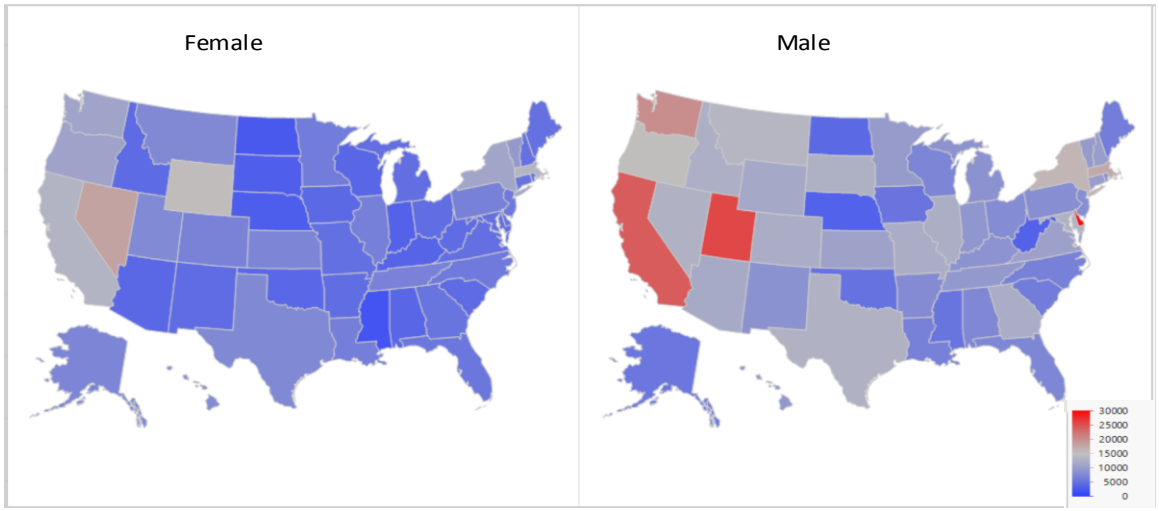
4.5. Location

An important difference in crowdfunding compared to traditional funding is the spatial allocation of capital. In crowdfunding platforms, transactions occur online and, thus, it is reasonable to assume that it increases access to financial capital in regions with disproportionately less access to traditional funding markets. The success of traditionally-funded entrepreneurial ventures is often highly constrained by geographical factors (Chen et al. 2009; Stuart and Sorenson 2008). Spillovers among successful startups, an investor's need for monitoring her/his investment, and industrial clustering are major contributing factors to these constraints (Owen-Smith and Powell, 2004).

Researchers underline the role of crowdfunding in mitigating geographical constraints to raising capital. In a major empirical study, Kim and Hann (2015) conducted a series of regressions to examine the effect of housing prices on crowdfunding activities across various Metropolitan Statistical Areas (MSAs). They concluded that online crowdfunding could be a viable option for entrepreneurs in geographic areas facing difficulty accessing traditional offline channels of credit. They also suggested that although entrepreneurs from low and high socioeconomic regions have equal access to crowdfunding, entrepreneurs from regions with poor socioeconomic conditions may suffer due to limited access to supportive social networks. In a separate study of crowdfunding backers, Agrawal et al. (2010) found some evidence that crowdfunding relaxes geographic constraints among backers.

In terms of the geographic distribution of capital, Kickstarter demonstrates widespread, yet uneven geographic diffusion of capital. It seems that funds from crowdfunding disproportionately flow to the same regions as traditional sources of finance. 20% of project creators are from the state of California, followed by the states of New York (11%), Texas (6%), and Florida (5%), which account for about 46% of the total goal amount and 49% of the total goal amount for female-led projects.

Figure 11: Average Funded Amount Across the States by Gender (in $)



These findings support previous research on the topic. Agrawal et al. (2013) observed that there is a strong correlation between state level funding from the National Endowment for the Arts and funding for art related projects on Kickstarter. There is also a strong correlation between state-level venture-capital financing (MoneyTree Report, 2009-2012) and funding for technology projects on Kickstarter. They further discuss that this may be due to the location of human capital, complementary assets, and access to capital for follow-up financing. In this regard, Nanda and Rhodes-Kropf (2013) noted that in equity-based crowdfunding platforms these correlations are potentially even stronger due to the subsequent financing risks in regions with insufficient capital markets.

5. Empirical Analysis

5.1. Role of a Female Entrepreneur's Social Network in Promoting Her Success in Crowdfunding

To investigate the contribution of online social networks to women's success on Kickstarter, a series of logistic regression models were estimated following the three models proposed under section 2.1. Table 3 presents the results in terms of the marginal effects[10]. Column 1 presents results for the female sample only with control variables included. Column 2 presents results for the female sample only, with no control variable included in the model. Column 3 presents results for the male sample only with control variables included, and column 4 presents results for the full sample with an interaction variable of the 'number of Facebook followers and gender', as well as the 'number of Facebook shares and gender' as the main variables of interest.

Table 3: Predictors of Success on Kickstarter

Variables	Model 1: Female Sample	Model 2: Female Sample-No Controls	Model 3: Male Sample	Model 4 Full Sample
Log Facebook Followers	0.05*** (0.02)	0.02*** (0.02)	0.20*** (0.01)	0.16 *** (0.00)
Log Facebook Shares	0.70*** (0.02)	0.17*** (0.02)	0.81*** (0.01)	0.78*** (0.00)
Log goal Amount	-2.37*** (0.00)	-0.14*** (0.02)	-2.73*** (0.01)	-2.62 *** (0.00)
Gender (Female)	-	-	-	0.05*** (0.02)
Interaction Gender (Female) & Number of Facebook Followers	-	-	-	-0.0026 (0.00)
Interaction Gender (Female) & Number of Facebook Shares	-	-	-	0.00038 (0.00)

[10] The raw coefficients in logistic regressions are scaled in terms of log odds. Interpreting logistic results in terms of odds ratios is neither informative nor practical. Marginal coefficients on the other hand enable readers to interpret the results in terms of probability rather than an odd ratio which is more practical and easier to interpret.

Duration	-0.0023***	-0.0043***	-0.0024***	-0.0024 ***
	(0.00)	(0.00)	(0.00)	(0.00)
Log length of Project Description	0.03	0.003	0.0033	0.02
	(0.00)	(0.01)	(0.00)	(0.00)
Video (Yes)	0.09***	-	0.13***	0.12***
	(0.06)		(0.04)	(0.00)
Limited Reward (Yes)	0.02***	-	0.03***	0.03***
	(0.04)		(0.02)	(0.00)
Project Category Control	Yes	No	Yes	Yes
State Fixed Effect	Yes	No	Yes	Yes
Time Fixed Effect (year)	Yes	No	Yes	Yes
Number of Observations	22263	22263	49,286	71,549
Pseudo R^2	42.44%	29.41%	42.56%	42.36%

*** P <0.01, ** P <0.05, * P<0.1- Robust standard errors in parentheses

Models 2 (column 2) and 4 (column 4) are estimated to evaluate the robustness of the results. Robustness checks play an important role in the validity of the findings. When the findings from the gender-disaggregated data are in line with the findings from the full sample model, it suggests that results are robust and reliable. Furthermore, the results do not change notably with the exclusion of individual control variables (i.e. potential explanatory variables) such as project category, time and location variables (year and state), and quality (i.e. having video and providing limited reward), which also strengthens the indication of robust estimates.

Both Model 1 and 4 suggest that the number of Facebook followers is a predictor of success for both men and women entrepreneurs on Kickstarter. Estimations on both male and female samples find that there is a strong positive association between a project creator's online social network size and his or her likelihood of fundraising success on Kickstarter. The effect exists independently from the gender attributes of project founders, which can also be confirmed in the estimation using the full sample (Model 4), wherein the interaction variable of the number of Facebook followers and gender is not statistically significant. This indicates that there is no gender difference in the effect of social network size on the likelihood of success. This issue can also be shown visually by plotting the marginal effect of different levels of the number of

followers against the probability of success on Kickstarter over the gender variable.

Figure 12: Marginal Effect of Social Network Size on Likelihood of Success on Kickstarter by Gender

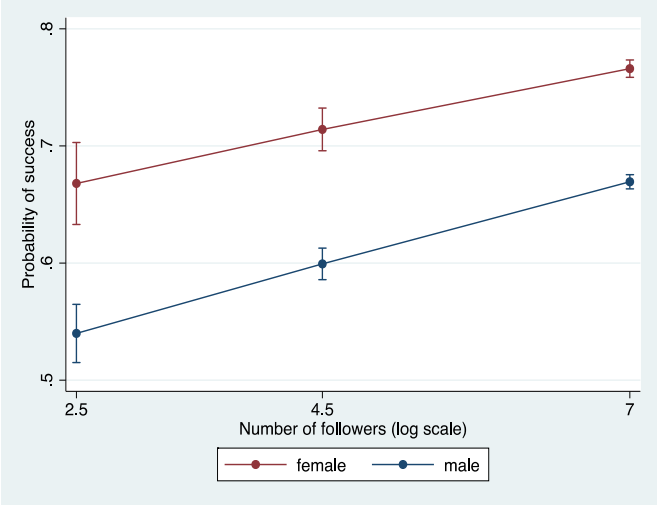


Figure 12 visually confirms that the effect of social network size itself is independent from the gender of the project creator. This is shown by observing parallel increases in the likelihood of success for both males and females. In other words, if the marginal effect of social network size was different for male and female-led projects, the increasing effect of it on the likelihood of success would have displayed different slopes for male and female entrepreneurs. As shown in Figure 12, while the likelihood of success increases as the number of followers increases for both male- and female-led projects, the increase rates are about the same for both male and female project creators. Also at each level of Facebook followers (e.g. log scale: 2.5, 4.5, and 7, which correspond to 10, 100, and 1000 number of Facebook followers), the probability of success is larger for women entrepreneurs than for men, attesting to women's better performance (higher success rate) on Kickstarter.

A more accurate way of interpreting the results is to use the results from Model 4, which takes advantage of the whole dataset. This is mainly because, from the statistical point of view, the effect of social network size on the outcomes of fundraising campaigns is independent from the gender attributes of project creators. Moreover, interpreting the results using Model 1 and Model 3 could be misleading in a sense that at first glance it may present a false notion that the effect of social networks is stronger for male-led projects compared to female-led projects, while statistically there is not a significant difference between the two.

According to the results from the full sample, on average, a 10% increase in the number of Facebook followers increases the likelihood of fundraising success on Kickstarter by 1.6 %. This is when all other variables are held constant at their mean, and considering only projects with Facebook accounts and a non-zero number of followers (42% of all projects). This effect is independent of the gender attributes of project creators.

Box 2: Interpretation of Log Transformed Independent Variables:

In log transformation, natural logs of the values of the variable, rather than the original values, are used in the model. Log transformation is one of the most commonly used transformations, as it de-emphasizes large values and brings such values to the center of the distribution, resulting overall with a more efficient estimation. In analysis of crowdfunding data with respect to social networks, log transformation is instrumental as the number of Facebook followers and the number of Facebook shares varies shows notable variation between projects. It is important to be cautious in interpreting the results when using log transformed variables. In case of logistic regression, after transformation of the odd ratio to the marginal effect, the interpretation is that a one percent change in the independent variable is approximately associated with ($\beta_1/100$) change in the dependent variable unit, holding all other variables constant at their means. In this research, because of the nature of the variable for Facebook follower, wherein a one unit increase or even 10% increase is considered relatively a small gain, interpretation using quartile analysis (i.e. section 1.5.6) will be more accessible and more practical for readers.

Previous studies on Kickstarter and Prosper also found that a larger social network is positively associated with the likelihood of positive campaign outcomes (Vismara 2016; Lin et al. 2012, Mollick 2016). However, none of them investigated the disaggregated effect based on gender. Moreover, this research takes advantage of much larger data compared to other similar efforts. Previously, Mollick (2016), using a sample of 48,526 projects, also examined the effect of social network size on fundraising outcomes on Kickstarter. He found that having a larger online social network can increase the chance of success in crowdfunding campaigns by as much as 28%. However, he limited his sample to projects with goal amounts greater than $5,000. This

may imply that effect of social network size on campaigns with higher goals is larger, which is a plausible assumption that will be investigated under section 5.1.1.

As previously noted, social network size is expected to affect the fundraising outcomes either through the signaling effect or through the herding effect. For instance, in lending-based platforms such as Prosper, Lin et al. (2012) argues that the number of friends is a signal of credit quality that lenders take into consideration in their investment decision. Mollick (2014) also argues that potential backers will consider a project creator's social network size as a sign of quality for a given project or sign of legitimacy of the campaign (Frydrych et al. 2014). Also, some studies indicate that larger social networks will generate herding effects through early support of family and online/offline friends bringing momentum to the crowdfunding campaigns (Agrawal, Catalini, and Goldfarb 2013).

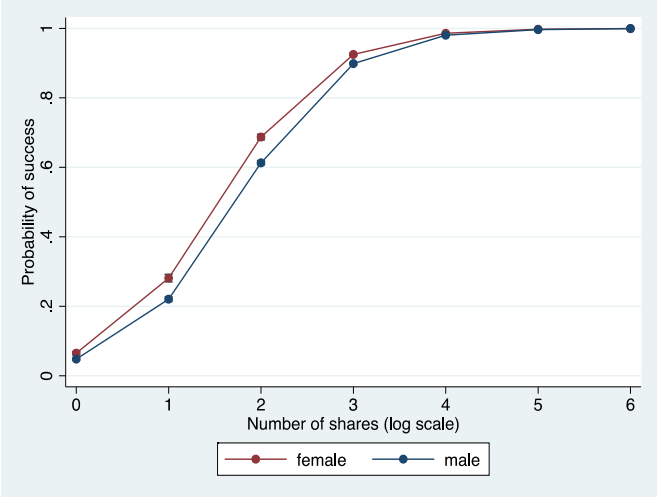
It seems, however, that the herding effect demonstrates different outcomes in different types of crowdfunding platforms. While it has been vastly discussed that previous support would lead to increased momentum for future support in most crowdfunding platforms, the Kuppusvamy and Bayus (2015) study of Kickstarter data from May 2009 to February 2012 found that the support of reward-based crowdfunding is negatively related with past funders' support. This implies that potential backers are influenced by how much of the goal has already been pledged, which is the opposite of typical herding effects observed in lending or equity-based platforms (Herzenstein et al. 2010; Agrawal et al. 2013). These findings support the idea that on reward-based platforms, such as Kickstarter, the herding effect might not be as important as the signaling effect.

Another important variable regarding social networks is the number of times a project has been shared on Facebook by its viewers. This variable justly and accurately represents the extent to which a project has been promoted by viewers on Facebook (Ta Lu et al. 2014). By including the number of Facebook shares in all the fitted models presented in Table 3, the effect of promotional activities as a predictor of success in

crowdfunding campaigns will be gaged. Naturally, the assumption is that promotional activities on social media have positive impacts on the fundraising outcomes, since the social promotion by promotors (i.e. project viewers who share the projects on Facebook) exposes the projects to a larger number of potential backers who might be interested in supporting the projects.

Results show that the number of Facebook shares is a strong predictor of success. Similar to the variable of "number of followers", the interaction between the number of Facebook shares with project creators' gender attributes is not statistically significant, which indicates that the effect is not different for male and female-led projects (Figure 13). Results indicate that 10% increase in number of Facebook shares, holding all other variables constant at their mean values, can increase the likelihood of success by as much as 7.8 %.

Figure 13: Marginal Effect of Promotional Activities on Likelihood of Success on Kickstarter by Gender



Findings clearly show that promotional activities on Kickstarter are a stronger predictor of success than social network size. Social dynamics are fundamental features in the crowdfunding environment. Crowdfunding, in essence, intends to leverage the "wisdom of crowds" (Surowiecki 2004). A large number of shares signals public approval, and it demonstrates public interest and a positive attitude towards a given project (Burtch et al. 2011), which ultimately will be translated into signals of a projects legitimacy for potential investors, hence, an increased likelihood of success (Frydrych et al. 2014). There is some evidence that offline social relationships and perceptions of trust may not be easy to entirely virtualize (Agrawal et al. 2011); however, promotional activities seem to play a critical role in increasing public trust on a given project.

Another channel through which promotional activities increases the chance of project success is by increasing its visibility and spreading information about the campaign. Crowdfunding platforms make projects equally visible where they either succeed or fail based only on merit (Greensburg 2015). Additionally, it is argued that the Internet brings a larger number of 'like-minded' individuals than is normally possible with geographically or socially constrained searches (Agrawal 2011). When a campaign is promoted by others, along with being a sign of public approval or public endorsement of the project, it also increases the chance of a project being viewed by a larger number of potentially interested supporters, which coincides with the true premise of crowdfunding.

Naturally, a follow up question could be to what extent social network size (number of Facebook followers) will facilitate the promotion of a project on Facebook. To answer this question, a simple linear regression using two variables, the number of Facebook shares (log scale) as the dependent variable, and the number of Facebook followers (log scale) as an independent variable, was estimated. Using log scales at both sides of the equation (log-log model) will yield unique insights into the relationship between social network size and promotional activities, as the coefficient will be the elasticity[11] of the 'number of Facebook shares' with respect to the 'number of Facebook followers' (see Results Table in Appendix 6).

Results indicate that a one percent change in the number of Facebook followers will result in a 0.23% change in the number of projects' shares on Facebook. The coefficient magnitude is less than one, which implies that while the two variables move in the same direction, a change in number of followers is associated with a much smaller change in the number of Facebook shares. In other words, having a larger network might not necessarily lead to larger promotional activities by followers. According to the results, it seems reasonable to hypothesize that the way and the extent, to which

[11] The coefficient is the estimated percent change in the dependent variable for a percent change in the independent variable.

project creators are able to leverage their networks in their favor is a more determinant factor in increasing their likelihood of success rather than having a large network alone.

Previous studies also underlined the importance of leveraging social connections in crowdfunding campaigns. For instance, research in network literacy has shown that people often have an incorrect mental model of their audience, which hinders their ability to leverage their network effectively (Litt 2012). Hui et al. (2014), in a study in which they interviewed 58 project creators on Kickstarter, explain how project creators often have difficulties in knowing how to ask for support and how to leverage their networks in a more effective way. They noted that first time creators, who targeted influential people in their networks and asked for their support directly, achieved much better results on Kickstarter compared to those who did not have any pre-planned strategy to leveraging their networks.

5.1.1. Marginal Analysis of Social Network

The main objective of this section is to investigate whether the effect of social networks on campaign outcomes vary at different levels of goal amounts. Marginal analysis aims to measure and demonstrate the incremental effects of additional number of Facebook followers or number of Facebook shares towards the likelihood of success at different levels of another explanatory variable (goal amount), holding everything else (all other variables) constant. Marginal analysis complements the results of the logistic regression and provides further insights into the dynamics of the social network effect as the goal amounts set by project creators increases.

Both variables are more effective at larger goal amounts. This is true for both male and female project creators. The marginal effect of the number of Facebook followers on the likelihood of success reaches a peak around goal amounts of $13,000 (log 9) and then declines for both male and female entrepreneurs. This pattern is also similar for number of Facebook shares. However, the effect reaches a peak at a much larger goal amount

(around $22,000, log 10.5). It is important to note that the effect still remains positive, yet it declines as the goal amounts set by project creators increase.

Figure 14: Marginal Effect of Number of Facebook Followers (Left) and Number of Shares on Facebook (Right) on Probability of Success at Various Levels of Goal Amount Set by Founders

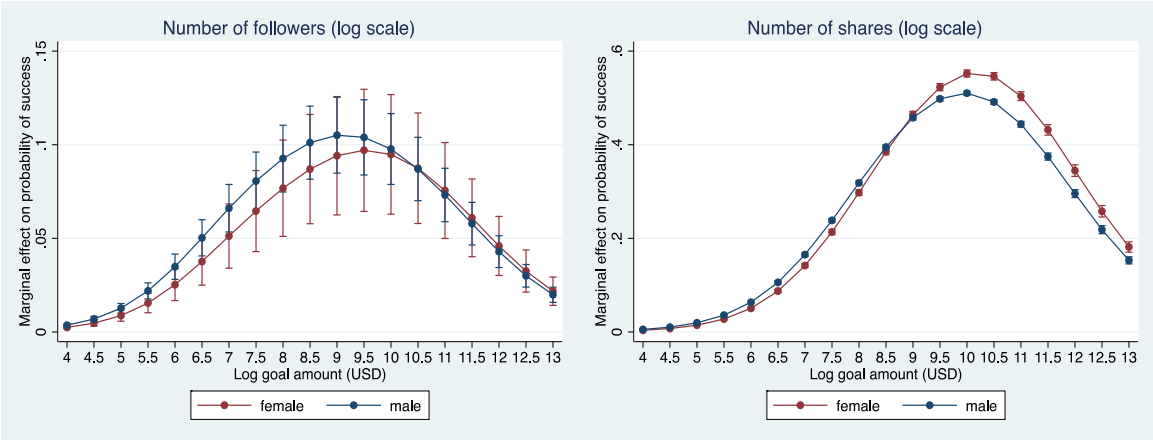


Figure 14 suggests that for larger projects (after the maximum points) other signals of quality and legitimacy beside social networks might gain more attention from backers. A few examples of such signals could be novelty of a project idea, reward structure and quality of rewards being offered to backers at different levels of support, inclusions of high quality videos, detailed descriptions of the project features, constant communication with backers, regular updates, as well as timely responses to their questions, etc. Larger projects (in terms of the funding goal amount) typically are more comparable to ventures seeking funding through more formal channels (e.g. angels and financial institutions) and are typically harder to fund through crowdfunding. Such projects, besides a well-thought-out idea, require a great deal of preparation and well-planned reward structure before initiation of the fundraising campaign.

5.1.2. Quartile Analysis of the Social Network and Its Impact on Success

To provide additional and more accessible insight into the relationship between number of followers and number of shares and the probability of success for women on Kickstarter, categorical variables corresponding to quartiles of the key variables

were created. Interpretation of categorical variables in logistic regression is more straightforward as it indicates the change in probability of each category in comparison with other categories. For number of followers and number of shares, each category corresponds to a quartile of the respective variable. These quartiles were constructed following the thresholds noted in section 3.2. For the number of Facebook followers, thresholds were 400, 820, and 1,600 respectively (see Figure 5) and for the variable of the number of Facebook shares, these thresholds were 4, 8, and 21.

A separate logistic regression was estimated using the full sample (both male and female-led projects included), in which these binary variables were incorporated. Since quartile dummy variables are intended to capture incremental effects of social networks, the variables of the 'log number of Facebook followers' or 'log number of Facebook shares' were not needed anymore and removed from the estimation. Furthermore, the interaction of each quartile with the gender variable was included in the model to capture gender exclusive effects (if any). In fact, this estimation provides an alternative measure of the importance of social networks.

As expected, all quartiles were statistically significant, and the marginal effect of each quartile incrementally increased compared to the previous one. Moreover, all the effects were independent from the gender attributes of project creators. According to the results, among project creators with Facebook accounts, those with the number of likes in the second quartiles (25-50 percentiles) were 5% more likely to succeed compared to those in the bottom quartile. Those in the third quartile were 6% more likely to succeed compared to those in the second quartile. The difference observed between the third and top quartile was smaller, around 1%.

Similar to the number of followers, all quartiles of the number of shares were significant and the effect increased substantially with each quartile increase. The results confirm our general findings and, at the same time, underline the importance of promotional activities. Comparing the quartiles, projects in the second quartile (shared between 4 to 8 times) are 34% more likely to succeed compared with the bottom

quartile. Similarly, projects in the third quartiles (shared 10 to 21 times) are 30% more likely to succeed in comparison with the previous quartile. Projects that are within the top quartile of the number of shares are about 16% more likely to get successfully funded in comparison to the third quartile[12].

5.2. Other Predictors of Women's Success on Kickstarter

5.2.1. Goal Amount and Campaign Duration

Campaigns with higher goal amounts are found to be less likely to succeed. This is consistent across male and female sub-samples, as well as for the full sample. Frydrych et al. (2014) notes that a high funding target implies that more effort is required by a project creator or an entrepreneur to reach the requested funding. Therefore, it is critical for project founders to be transparent and persuasive about the funding goal. In this sense, crowdfunding is also similar to traditional venture capital where a detailed, consistent, and market referencing business plan is required to justify its legitimacy as the target funding increases (Acheleitner et al. 2013 and Sievers 2013).

To further explore the distribution and gender dynamics of borrowers with respect to a variable of goal amount, quartiles of this variable were calculated. The first quartile of this variable contains men and women founders with a goal amount in the bottom quartile (less than $2,500), the second quartile covers founders with a funding goal between $2,500 and $5,500. The third quartile of this variable includes project creators whose funding goal amount is between $5,500 and $15,000, and finally the last quartile includes project creators with funding goals of more than $15,000.

A new series of logistic regressions were estimated using the female sample incorporating each of these dummy variables into the model. All quartiles were

[12] The table of results for analyses in this section, along with complementary graphs can be found in Appendix 7.

statistically significant, and the marginal effect increased as the goal amount increased confirming the reverse relationship between funding goal amounts and the probability of success. Findings indicate that women entrepreneurs whose funding goal amounts fall within the second quartile ($2,500 – $5,500) are 10% less likely to get successfully funded compared to the women with funding goal amounts of less than $2,500. Similarly, women entrepreneurs who set their funding targets between $5500 and $15,000 are 20% less likely to succeed compared to the second quartiles, while setting a funding goal above $15,000 could decrease the probability of success by another 30% (see Appendix 8).

Additional to the goal amount, the duration of fundraising campaigns also seems to have an impact on fundraising outcomes. Regardless of the gender attributes of project creators, successful campaigns were found to reach their funding goal earlier than their expiration date. Therefore, campaigns that have not reached their funding goal as they get closer to their expiration dates have less chance of reaching their goals. This suggests founders' early promotional efforts and their active engagements with their online or offline networks can have positive impacts on their fundraising outcomes and bring momentum to it. Previously, Frydrych et al (2014) had also discussed that lower fundraising duration on Kickstarter set a tone of confidence and helped motivate backers to join the campaign; whereas longer durations incite less urgency and encourage procrastination.

Overall It seems that a crowdfunding campaign with a shorter period is more effective. In general crowdfunding literature notes that a longer fundraising period might imply an uncertain narrative for the project. Similar to promotional activities, these findings again underline the importance of project momentum and reinforce the idea that a longer fundraising period might expose an uncertain narrative for the project. Ward and Ramachandran (2010) note that projects that have challenges to effectively build and maintain momentum for their fundraising take longer. In the same vein, Frydrych et al. (2014) also notes that in highly heterogonous and dynamic

communities such as crowdfunding platforms, attention to specific projects seems to diminish with time.

5.2.2. Pitch Quality and Reward Level Structure

The received dataset indicates (i) whether a project has a video (visual pitch) and (ii) the project description's length in the form of a number of characters. Kickstarter allows project founders to include a visual presentation. Most crowdfunding platforms try to take advantage of this feature and include a video recorded pitch. In our dataset of 339,448 projects, 79% of the sample incorporated a visual pitch in their project profile, of which 88% of these projects succeeded. Kickstarter strongly encouraged the project founders to include videos noting "a video is by far the best way to get a feel for the emotions, motivations, and character of a project. It is a demonstration of effort and a good predictor of success" (Kickstarter School 2014).

On average a campaign with a video is found to be 12% more likely to succeed compared to a campaign without it, holding everything else constant. The effect exists independently from the project founders' gender attributes. Mollick (2014) also found similar results regarding visual pitches, where he notes that the inclusion of a video is a signal of quality and increases the likelihood of success. However, Frydrych et al. (2014), using a limited sample from Kickstarter, argue that visual elements in crowdfunding pitches have developed into a norm among crowdfunding projects; therefore, its predictability power has decreased over time.

The findings support the idea that even though the inclusion of video in a crowdfunding campaign does not guarantee success; not having some sort of visual presentation will certainly negatively affect fundraising efforts. Similarly, Clarke (2011) highlights the importance of visual communication and the use of visual symbols to increase the organizational legitimacy and develop support for new ventures. However, as more projects make use of the power of visual pitches to buy-in the support of the

community and potential backers, the inclusion of it in crowdfunding campaigns has become a requirement while a lack of it would hurt a campaign's legitimacy.

In terms of textual pitch, this report will use the length of project descriptions as a proxy for the quality of textual pitches, assuming longer descriptions have taken more preparation effort by project creators. Within the successful projects, women on average used a relatively smaller number of characters to describe their loan profiles (2,557 characters) compared to that of men (2,611). In none of the estimations, this variable is found to be a predictor of success in fundraising attempts on Kickstarter for either women or men. However, it is important to note that this does not imply that textual presentation is not an important factor in crowdfunding campaign outcome. Measuring the quality of a textual pitch is inherently a difficult and time-consuming task, and in most cases it requires some level of familiarity with the respective field.

Some researchers previously used text mining tools to measure the quality of tone and wording of project descriptions. Marom and Sade (2013) found that the entrepreneurs in technology projects tend to focus more on the business idea, whereas the entrepreneurs of the artistic projects focus relatively more on themselves. They found that in artistic projects textual pitches with a higher frequency of the entrepreneurs' name had higher rates of success, controlling for other relevant variables. Similarly, Mitra and Gilbert (2014) using text-mining techniques offered a list of phrases that could perhaps contribute to the success of fundraising campaigns. Previously, Mollick (2014) looked at spelling errors in project descriptions as a quality measure of textual presentations of the campaigns. He argues that spelling errors will signal a lack of proper preparation by the project founder and lead to a reduced perception of the projects quality by potential backers. According to his findings, the chance of success for projects with spelling errors is 13% less than those without any error.

In terms of reward level structure, Kickstarter provides an itemization tool to itemize, or if one desires, to limit the available quantity of any reward tier to a certain number

of backers. The dataset used in this report contained a binary variable of whether a project has offered any limited reward (i.e. yes/no). Offering limited rewards is usually done because in most cases it is simply not feasible or even practical to offer a large quantity of unique handmade rewards. Quantity limits can also create excitement around 'special-edition' rewards or signed copies. Limited rewards typically are assigned to 'early-bird' backers (those who supported a campaign at its very early days), which according to Kickstarter has been a very effective approach in building momentum during the project's early days.

Offering limited rewards was found to increase the chance of success on Kickstarter by 3%. These findings reinforce the notion that backers on Kickstarter first and foremost want to support the idea of community. However, offering rewards in general, and limited rewards in particular, will give backers the feeling that they are part of the creation. Previously, a few studies highlighted the importance of understanding backers' (investors') motivations for capturing a full picture of the success determinants on crowdfunding platforms. For instance, Marom et al. (2016) conducted a survey of nearly 200 Kickstarter backers, through which they found that reward was a driving factor for less than 40% of their sample. However, more than 80% of backers contributed support to the person leading the campaign or to a cause. Overall, women have been less likely to contribute to campaigns of people not known to them (40.5% vs 65.4%) and more likely to contribute to someone who is known by a friend or family member (16.5% vs 8%).

6. Study Limitations

Due to a lack of data, measuring quality of a project's textual pitch was one of the main limitations of this study. This research used the length (i.e. number of characters) of a project's description as a proxy for quality of a project's textual pitch. In choosing this proxy, it is assumed that a longer written description of a project has taken more preparation. However, this is solely based on the quantitative measure, and it does not take into account the qualitative traits of a projects' description. Given the sample size used in this study, it could be very difficult to measure qualitative attributes of each and every projects' description such as the enticement of headlines or the clarity of content.

Measuring quality of rewards offered by projects' creators also proved to be challenging. In terms of reward structure, this study measures whether offering limited rewards will increase the likelihood of success in reward-based crowdfunding. While offering limited reward is an important factor in attracting early backers and bringing momentum to the fundraising campaigns, it may not capture the entire story. Similar to textual pitch, measuring quality of rewards can be very difficult and at the same time a subjective task. While this research has been data driven in nature, more qualitative research on a much smaller sample size is needed to measure the effect of reward quality and reward design on the likelihood of success in reward crowdfunding.

A lack of theoretical literature was also another limitation of this study. While a number of empirical and exploratory research on crowdfunding has been growing rapidly over the past few years, still very few theoretical research papers has been published mostly targeting equity crowdfunding (Belleflamme et al. 2014; Hakenes and Schlegel 2014). This is important as theoretical literature could pilot and facilitate conducting the empirical research. Well-developed theories will help researchers in framing the overall research framework including research questions, methods, and measurement tools. It will also help explain and interpret the findings.

Another general limitation of crowdfunding studies that rely on extracted data from crowdfunding websites is the potential presence of selection bias among founders. This means that researchers do not select men and women borrowers randomly, rather data is obtained on borrowers who have already chosen crowdfunding as a source of capital. Therefore, it could be that only men or women with certain unobservable traits (e.g. attitude toward entrepreneurship) or observable characteristics (e.g. age, education, professional experience) choose crowdfunding as a source of capital. This self-selection into crowdfunding can result in bias in final results of the study. While this issue could be more problematic in studies with limited sample sizes (small number of borrowers), using large datasets similar to the one used in this research (i.e. the entire population of the platform), could help to address this limitation to a great extent.

Finally, it is important to note that findings of this study only apply to reward-based crowdfunding, rather than equity or other forms of investment model crowdfunding. While there are many similarities between different types of crowdfunding (e.g. reward, lending and equity), academic literature argues that the incentives of contributors (backers) in reward-based crowdfunding is different than those (investors) in equity crowdfunding (Agrawal et al., 2010). The future regulation of equity crowdfunding, choice of design and business models made by crowdfunding platforms, as well as other developments also affect the future dynamics of crowdfunding and the interactions between entrepreneurs and investors.

7. Summary

The study aimed to investigate the role of social networks in the success of crowdfunding campaigns on Kickstarter through a gender lens. It also attempted to capture a complete picture of successful crowdfunding dynamics. To this end, using an original dataset received from Kickstarter for the period between 2009 (its inception) and 2017 (time of this study), a series of multiple logistic and linear regression analyses were conducted. These analyses were combined by comprehensive descriptive analysis and extensive visuals to better illustrate and explain the relationship between women's success and other crowdfunding variables (e.g. funding goal, amount raised, number of backers, etc.) on Kickstarter.

The female participation rate on Kickstarter is 31%, which is similar to female entrepreneurship rates among the U.S. population. However, rates of participation vary across project categories. This figure was higher in categories that historically are considered 'female dominated' such as dance, fashion, food, and craft compared to categories with higher concentration of men such as technology and games. Women were also found to be more successful on Kickstarter, even after controlling the goal amount, project category, time, and other campaign characteristics. The success rates were higher in both male and female dominated categories.

A majority of female entrepreneurs on Kickstarter currently do not link their Facebook accounts to their Kickstarter project profiles. This could be either due to personal reasons, or simply because they do not have one. Most of those with a linked Facebook account have between 400 to 1,600 Facebook followers. Overall, women on Kickstarter were found to have slightly larger online networks compared to men. A simple comparison of success rate among creators with and without social media account shows that the success rate for those female founders with Facebook accounts linked to their profiles is much greater in comparison than those without it. Overall, evidence presented in this report suggests that as Kickstarter is growing, the number of project

creators without established backer communities seems to increase which might be one of the reasons behind the overall decline of successful campaigns.

The first variable of interest with respect to social network was the number of Facebook followers that a project creator has on her Facebook page. This variable was considered as a proxy for a project creator's social network size. Findings show that social network size is a predictor of success on Kickstarter; however, the effect is the same for both female- and male-led projects. Academic literature often argues that women have a larger and closer social network, which may help them to have a better performance on crowdfunding platforms. Results of this research show that while women have on average slightly larger online networks, and in fact show better performance on Kickstarter, the size of social networks does not affect female campaign outcomes differently than those of men's.

The second variable in relation to social networks was the number of times that a project was shared on Facebook by its viewers. This variable was considered as a proxy for promotional activities (the extent to which a project has been promoted by its viewers). These promoters could be from a project creator's network or simply just random visitors who find the project interesting enough to share it on their Facebook pages. Results of this study found this variable a very strong predictor of success. Nevertheless, similar to the number of Facebook followers, the effect was independent from the project creators' gender attributes.

Two important findings emerge from this study. The first key finding is that social network impact on crowdfunding success is not gender exclusive on Kickstarter. In other words, both male and female entrepreneurs have been able to benefit from their networks, both in terms of size and promotional activities to the same extents. The second key finding is that the way a project is promoted (number of shares) has a much larger effect in attracting project backers than the size of the project creators' online networks. Findings of this research strongly support the idea that a more central factor than online network size of an individual is the extent to which a project is promoted.

Promotion of a project by others will simply spread information about the campaign and will send a strong signal of legitimacy to the public.

Following these findings, two questions come into mind. (i) How can an entrepreneur leverage her social network (Facebook followers) to boost her campaign's promotion? (ii) To what extent would an entrepreneur's existing social network increase the number of times that a project is being shared or promoted on Facebook?

While the first question requires further qualitative investigation, this study, using a linear multiple regression, sought to answer the second question. According to the results, the two variables (number of followers and number of shares) move in the same direction; however, a change in number of followers is associated with a much smaller change in the number of Facebook shares, which reinforces the importance of project creators' social media and networking skills and their ability in devising effective strategies enabling them to leverage their existing network optimally at any given size.

8. Policy Implications

Crowdfunding shows potential to increase flows of capital to female-led projects. Women were found to be more likely to set their funding goals lower at the outset of the fundraising campaigns. Academic literature to date argues several potential reasons for this, including lower risk tolerance, underestimating the potential demand for their products, or even a perception that there will be implicit biases against their level of competence, especially in male-dominated categories. However, on Kickstarter, very often women have been able to raise substantially more than they requested. These findings can have important policy implications for female entrepreneurs knowing that they can be more ambitious in setting their funding goals on crowdfunding platforms. It seems crowdfunding has been able to alleviate some gender barriers that women typically face in raising money through traditional sources of capital.

In this respect, crowdfunding can be particularly beneficial to women interested in science, technology, engineering, and math (STEM) fields. Findings show that even after controlling for goal amounts, women still outperform men in raising money in the technology and games categories, in which women are largely underrepresented. Regardless of the underlying reasons for this phenomenon, these results suggest that crowdfunding might present unique opportunities for women in the STEM fields. These findings are interesting from a policy point of view, as previous studies found that women in STEM fields are less likely to start their own businesses. Other research suggests that women have been less likely to commercialize their STEM research or develop and launch products in companies they own compared to men. While future research efforts will be needed to further investigate the potential impact of crowdfunding on women in STEM, the initial results are promising.

More qualitative research is needed to provide deeper understanding of specific entrepreneurial activities and processes, including ways in which entrepreneurs can fully leverage their social networks in their favors. Based on collective findings of this research, for an entrepreneur to succeed in crowdfunding having social networking and

social media skills is more important than having a large network. Hence, the next important question is what are effective methods for project creators to increase engagement of their networks in promoting their projects. This includes understanding network capabilities, activating network connections, and expanding network reach, which can start before a campaign launch.

Qualitative research could also capture a broader picture of the crowdfunding phenomena and allow for understanding connections between offline activities with online processes. It is important to unveil offline activities to understand online crowdfunding outcomes as the current understanding is mostly built on knowledge that originates from activities on online crowdfunding platforms. While the focus of this report was on specific variables that are captured from crowdfunding projects, further work is required to analyze more qualitative features of crowdfunding particularly as it relates to social network activities and other aspects of such projects' visual and textual pitches.

Another topic of future research is a further investigation of differences between reward-based platforms using different business models. Most of the reward-based crowdfunding platforms including Kickstarter use the AON approach. However, a few platforms use the KIA approach (e.g. Indiegogo). In this regard, the question is, which business model would be more beneficial to women entrepreneurs. Women on Kickstarter set lower funding goals, which could stem from their previous experience and facing more barriers in raising capital through traditional sources of capital. Therefore, it might be plausible to assume that using a keep-it-all funding approach will help women set more ambitious funding goal amounts, since they do not need to intentionally set lower funding targets to minimize their risk of fundraising. Previously, studies (Cumming et al. 2015) found that keep-it-all presents less risk but also smaller rates of success. However, it seems more gender-focused research efforts is needed to investigate the impact of business models adopted by platforms on women fundraising outcomes.

The extent to which traditional sources of capital could be leveraged in parallel to crowdfunding also merits further investigation. From a policy perception, it could be beneficial to explore methods that current traditional financing instruments could be leveraged to encourage women to turn to crowdfunding for their financing needs or vice versa. For instance, SBA might be able to leverage its current financing instruments in this regard. SBA might consider offering matching or complementing funds to those female entrepreneurs who use crowdfunding as a capital source, or it might consider designing new instruments that specifically help women entrepreneurs who use crowdfunding for sourcing capital.

Female entrepreneurs might benefit from awareness-raising and education campaigns around crowdfunding. Crowdfunding shows potential in eradicating traditional barriers to women financing, particularly from angel investors and venture capitalists. However, women's participation rates on most of the crowdfunding platforms, including Kickstarter, is far behind men. This is an important issue as crowdfunding seems to be a promising source of capital for female entrepreneurs. Therefore, creating awareness-raising campaigns around crowdfunding platforms is essential for the future of female-owned businesses particularly lower-income female entrepreneurs, who might have experienced even more difficulties in raising capital through traditional sources. Furthermore, recent research points to the importance of training and planning in crowdfunding success. Findings of this research could be used by policy makers and authorities in devising effective training programs for women pertaining to major determinants of success.

Both awareness-raising campaigns and education programs should make sure to particularly target underserved regions. Results show that crowdfunding funds on Kickstarter still flow disproportionately to the same regions as traditional sources of finance. Previously, researchers found that there is a strong correlation between state-level venture capital and raising capital in crowdfunding. Regardless of the underlying reasons, supportive policies and methods to help women in underserved regions might

be required from policy makers at the federal and state levels to fill this gap. In this respect, awareness campaigns and training programs specifically targeting small female entrepreneurs in these regions is paramount. It is however important for such programs to be customized, based on the crowdfunding types, as determinants of success and contributors' incentives vary in different crowdfunding types.

Finally, it is important for female entrepreneurs to be able to choose the type of crowdfunding that is best for them. Findings of this study coupled with existing research highlight the fundamental differences between the various types of crowdfunding. Project categories on reward based platforms, as well as their overall mission statements are more geared toward innovative ideas and startups, as opposed to established businesses. They provide unique opportunities for creators to not only raise their required capital but also to project their ideas, receive feedbacks, expand their network, and assess the potential needs for their ideas. On the other hand, lending- and equity-based platforms cover broader and more general industries and seem more suitable for established businesses. Such differences also exist on the funders' side. Therefore, it is very important for female entrepreneurs to choose a crowdfunding platform that coincides with their ultimate objectives and target audience while at the same time covering her sector.

9. Appendixes

9.1. Appendix 1

Table 4 presents a summary of the statistics for selected variables in the Kickstarter dataset. Summary statistics are shown for the full sample disaggregated by the gender attributes of project creators. Due to the aggregate nature of summary statistics, the years 2009 and 2017 were also included in the sample for producing the following statistics.

Table 4: Summary Statistics for Full Samples Limited to Successful, Unsuccessful, With Social Media, and Without Social Media

Successful Sample										
Gender	**Female**					**Male**				
Variables	**N**	**Mean**	**SD**	**Min**	**Max**	**N**	**Mean**	**SD**	**Min**	**Max**
Goal Amount ($)	68,994	8,990.05	16,841.73	101	700,000	131,599	11,040.65	29,207.11	101	1,000,000
Raised Amount ($)	68,994	14,359.03	55,349.59	110	3,327,757	131,599	28,163.81	203,469.8	105	20,300,000
Number of Backers	68,994	177.74	617.14	1	24,883	131,599 131,599	338.82	2,022.83	1	219,382
Duration	68,994	32.51	11.96	1	92	131,599	32.25	11.31	1	92
Number of FB Followers	39,865	1,364.17	1,230.50	0	5,243	80,107	1,348.69	1,257.47	0	5,291
Number of Shares	66,215	28.27	68.74	1	3,088	125,644	34.21	218.99	1	27,104
Unsuccessful Sample										
Goal Amount ($)	74,688	21,894.87	62,508.64	105	1,000,000	200,296	29,553.56	78,593.33	101	1,000,000
Raised Amount ($)	62,412	1,843.32	64,72.39	0	302,836	164,617	2,255.33	9,562.09	0	607,628
Number of Backers	74,688	18.66	68.23	0	7,505	200,296	22.23	82.37	0	6,287
Duration	74,688	35.17	13.30	1	92	200,296	35.59	13.20	1	92
Number of FB Followers	74,688	1,061.5	1,200.17	0	5,399	58,598	1,021.36	1,171.23	0	5,281

Number of Shares	21,979	9.34	17.2437	1	433	97,777	8.99	17.79	1	957
Sample Limited to Borrowers with Social Media										
Goal Amount ($)	61,844	13,574.44	33,760.6	101	1,000,000	138,705	18,446.78	51,644.92	101	1,000,000
Raised Amount ($)	61,618	9,701.73	41,598.08	0	3,327,757	137,808	16,252.77	176,005.4	0	20,300,000
Number of Backers	61,618	121.78	441.29	0	23,626	138,705	196.90	1551.49	0	219,382
Duration	61,618	33.20	11.89	1	92	138,705	33.62	11.82	1	92
Number of FB Followers	61,618	1,256.60	1,228.37	0	5,399	138,705	1,210.40	1,232.43	0	5291
Number of Shares	61,618	19.69	43.84	1	2,229	138,705	21.10	124.41	1	19,479
Sample Limited to Borrowers with No Social Media										
Goal Amount ($)	81,838	17,303.04	54,870.42	105	1,000,000	193,190	24,917.12	72,066.87	101	1,000,000
Raised Amount ($)	69,788	7,278.20	40,114.37	0	2,485,506	158,408	11,601.91	88,537.2	0	6,225,354
Number of Backers	81,838	74.85	433.95	0	24,883	193,190	112.48	1,050.86	0	105,857
Duration	81,838	34.42	13.33	1	92	193,190	34.73	13.10	1	92
Number of Shares	84,716	23.65	70.67	1	3,088	0	26.55	215.74	1	27,104

9.2. Appendix 2

Table 5: Success Premium (Difference Between Female and Male Success Rate) by Project Category

Project Categories	Female Success Rate (%)	Male Success Rate (%)	Success Premium (%)
Art	55	46	10
Comics	72	61	11
Crafts	33	33	0
Dance	74	60	14
Design	46	45	1
Fashion	37	31	6
Film & Video	54	41	13
Food	39	33	6
Games	50	51	-1
Journalism	38	25	13
Music	68	55	13
Photography	45	35	9
Publishing	43	36	6
Technology	33	29	5
Theater	71	61	10

9.3. Appendix 3

Table 6: Distribution of Female and Male Project Creators Across Project Categories

Project Categories	Male Percentage	Female Percentage
Music	20	18
Film & Video	19	16
Publishing	10	14
Art	6	11
Food	5	8
Fashion	4	7
Design	7	5
Theater	2	4
Crafts	1	3
Technology	8	3
Photography	2	3
Games	9	3
Dance	0	3
Comics	4	2
Journalism	1	1

9.4. Appendix 4

Table 7:Average Goal Amount (in $) by Gender and Project Categories

Project Categories	Average Funding Goal (Female)	Average Funding Goal (Male)	Difference
Technology	37,611	48,547	-10,935
Food	22,899	29,506	-6,607
Design	21,473	27,380	-5,906
Dance	60,13	11,670	-5,656
Film & Video	22,266	26,426	-4,159
Crafts	61,43	10,061	-3,917
Art	8,608	12,298	-3,690
Theater	10,499	12,988	-2,489
Games	24,678	26,171	-1,493
Photography	8,684	10,027	-1,343
Fashion	13,938	14,652	-714
Music	8,770	9,390	-620
Publishing	10,530	10,855	-324
Journalism	17,857	18,061	-204
Comics	9,573	8,329	1,244

9.5. Appendix 5

Premium Raised Amount = Gender+ Project Categories+ Project Categories Interactions with Gender+ Goal+ Vector of Other Control Variables

Table 8: Results of the Linear Regression Analysis

VARIABLES	**Explanatory Variables**
Gender (Female)	-41.27***
	(-5.43)
2. Comics	-38.59***
	(-5.57)
3. Crafts	77.48***
	(-8.93)
4. Dance	-45.07***
	(-13.52)
5. Design	93.05***
	(-4.90)
6. Fashion	30.26***
	(-5.79)
7. Film & Video	-14.87***
	(-4.23)
8. Food	0.196
	(-5.45)
9. Games	74.41***
	(-4.66)
10. Journalism	-4.131
	(-10.06)
11. Music	-43.54***
	(-4.19)
12. Photography	-17.72***
	(-6.87)
13. Publishing	-16.58***
	(-4.68)
14. Technology	80.49***

	(-4.97)
15. Theater	-48.17***
	(-6.84)
gender#2.project_category	24.38**
	(-11.15)
gender#3.project_category	-53.78***
	(-12.46)
gender#4.project_category	27.80*
	(-16.23)
gender#5.project_category	-10.62
	(-8.65)
gender#6.project_category	11.36
	(-8.76)
gender#7.project_category	20.31***
	(-6.68)
gender#8.project_category	17.99**
	(-8.18)
gender#9.project_category	18.95*
	(-9.86)
gender#10.project_category	8.781
	(-16.42)
gender#11.project_category	25.67***
	(-6.55)
gender#13.project_category	20.72*
	(-11.16)
gender#14.project_category	22.35***
	(-7.12)
gender#15.project_category	99.31***
	(-10.03)
gender#16.project_category	31.32***
	(-10.2)
log_goal	-48.62***
	(-0.56)
Reward	+13.62***

	(-1.62)
Video	+42.78***
	(-2.05)
log_backers	77.57***
	(-0.45)
Constant	237.9***
	(-6.29)
Observations	393,898
R-squared	0.09

*** p<0.01, ** p<0.05, * p<0.1

Standard errors in parentheses.

9.6. Appendix 6

Log Number of Shares =Log Number of Facebook Followers +Vector of Control Variables

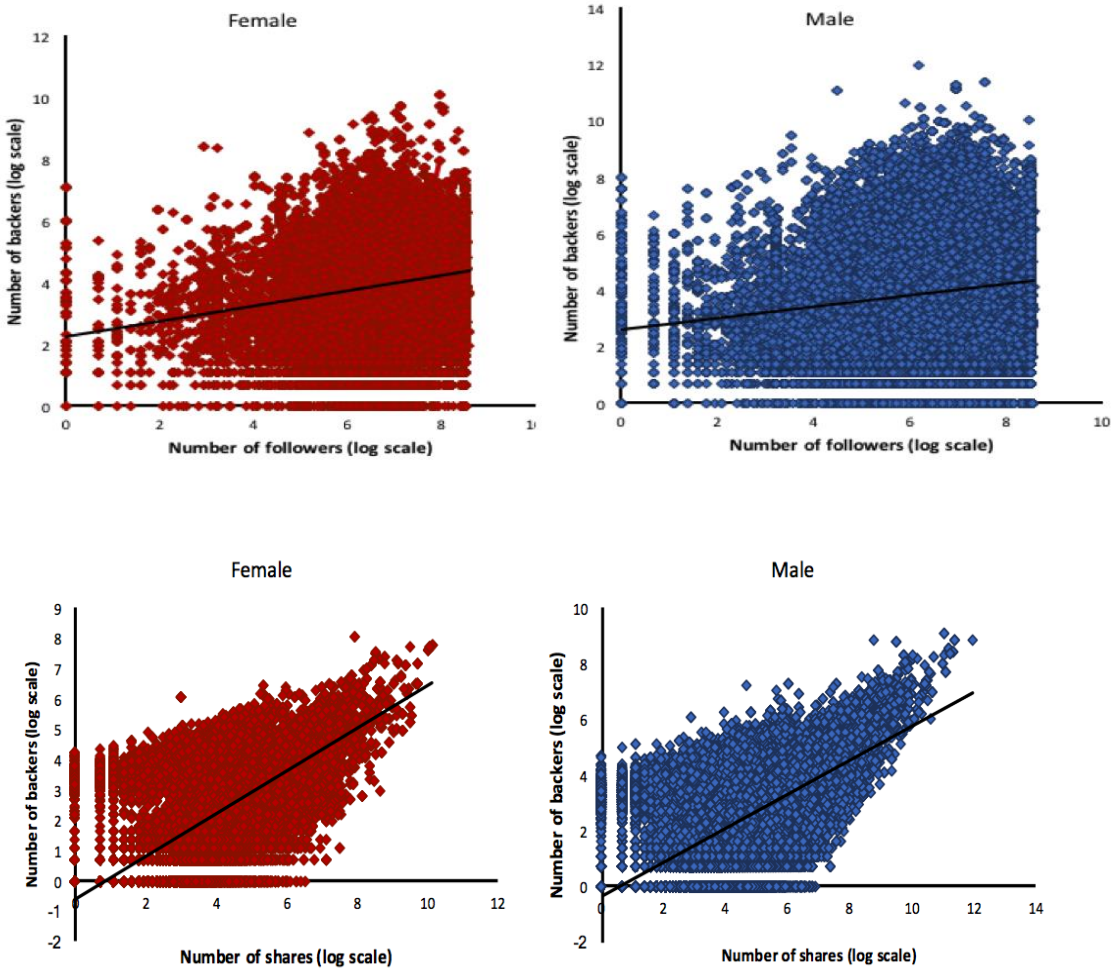
Table 9: Results of the Linear Regression Analysis

log_followers	0.23***
	-0.00
log_goal	0.30***
	-0.00
duration	-0.00***
	-0.00
Log description	0.00***
	-0.00
Reward	Yes
Video	Yes
Yes	
State	Yes
Year	Yes
Constant	-0.15**
	-0.06
Observations	71,549
R-squared	0.32

9.7. Appendix 7

Figure 15: Scatter Plots of Number of Backers Against Number of Followers (Top) and Number of Shares (Bottom)

Fitted lines in the scatter plots below show sign and direction of the relationship. As is seen, the slopes of fitted lines are positive in both graphs which indicate the general positive relationships that exist between number of project creators' followers on Facebook and number of backers, as well as between the number of times that a project has been shared on Facebook and the number project backers. However, the relationship is much stronger in the latter which can be measured by the slope of the fitted lines. Increase in number of Facebook follower is associated with a much smaller increase in the number of backers, in comparison with increase in number of Facebook shares.



9.8. Appendix 8

Table 10: Logistic Regression Results on Quartiles of "Number of Facebook Followers" and 'Number of Facebook Shares'

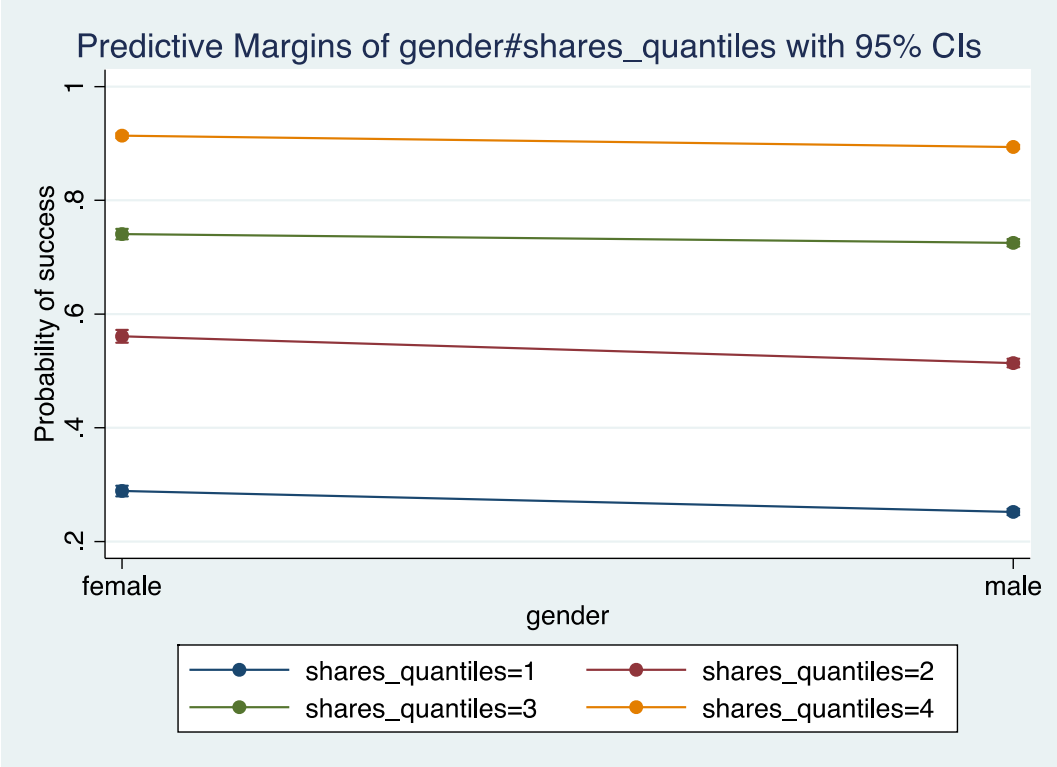
log goal	-.26***
	-0.01
Gender (female)	-0.31***
	-0.05
followers quantile (2)	.05 ***
	-0.05
followers quantile (3)	.10***
	-0.05
followers quantile (4)	.11 ***
	-0.05
Shares quantile (2)	.36 ***
	-0.05
Shares quantile (3)	.65 ***
	-0.05
Shares quantile (4)	.80 ***
	-0.06
Log length description	0.01**
	-0.00
duration	-0.01***
	-0.00
2.reward	Yes
2.video	Yes
project category	Yes
State	Yes
Time	Yes

Constant	4.74***
	-0.15
Observations	73,368

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < .01$

Figure 16: Interaction of Gender Variable with Quartiles of 'Number of Shares' and Their Marginal Effects on Probability of Success



9.9. Appendix 9

Marginal effects of the different funding goal thresholds on probability of success using female sample only.

Table 11:Logistic Regression Results on Quartiles of Goals

goal quantile (2)	-.10***
	.00
goal quantile (3)	-.31 ***
	.00
goal quantile (4)	-.67 ***
	.00
followers quantile (2)	.04 ***
	.01
followers quantile (3)	.06***
	.01
followers quantile (4)	.07 ***
	.01
Shares quantile (2)	. 37 ***
	.01
Shares quantile (3)	.64 ***
	.00
Shares quantile (4)	.76***
	.00
Log length description	.002 **
	-0.00
duration	-.002***
	-0.00
2.reward	Yes
2.video	Yes

project category	Yes
State	Yes
Time	Yes
Constant	4.74***
	-0.15
Observations	73,368

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