Playing Both Sides of the Market:

Success and Reciprocity on Crowdfunding Platforms

Introduction

Crowdfunding, the process of directly financing projects and ventures over the internet, is gaining momentum. Industry reports estimate that sums raised on crowdfunding platforms have nearly doubled in 2012, totaling close to US$3.0B.[1] Initially, crowdfunding was performed using social media such as mailing lists or social networks. The maturity of Web 2.0 technologies enabled and inspired the establishment of dedicated crowdfunding *platforms*. These platforms create a microenvironment where long term social interaction and accumulated information influence the success of crowdfunding projects.

Crowdfunding platforms serve as two sided markets (Eisenmann et al. 2006) which facilitate information flow and transactions between project owners and potential project backers. In some respects many of these platforms, such as Kickstarter and Indiegogo are similar to commercial two sided markets such as Ebay or the iPhone Appstore where the platform facilitates the purchase (or pre-purchase in the case of crowdfunding) of an assortment of goods and services. Playing both sides of the market (i.e. creating projects and backing other projects) is not only possible on crowdfunding platforms but also very visible. The public profile of a project owner on many of the crowdfunding platforms includes both a summary and a detailed record of the user's creation and backing history. This dual role may support strategic interaction as well as community interactions. In this paper we study the effect of such on-platform actions and interactions on successfully funding a crowdfunding project.

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[1] http://business.time.com/2012/10/22/how-to-crowdfund-your-creative-project (visited April 27 2013)

We show that project owners who play both sides of the market form a sub community of backers which exhibits network dynamics which are different from the general backing population. Our comprehensive data set includes a total of 78,061 projects, covering more than 90% of the projects created on Kickstarter.com (ending before March 2013). These projects received 6,812,159 pledges by 3,273,893 users. From an information systems perspective, the virtualization of the physical funding process (Overby et al. 2010) has allowed exposure of information which was less accessible in the "real world" of fund raising.

Our results indicate that backing other projects, prior to- or during the creation of one's current project significantly increases the funding success of the project. The probability that a project achieves its targeted goal (above which the project materializes) increases in the number of active backing actions; Furthermore the total sum raised is significantly higher for those projects where the project owner is also a backer of others.

These results may be explained using a combination of a few dynamics. Several studies have discussed the role of learning by doing in a similar setting (e.g., (Hsu 2007)). In this sense the described results may be the outcome of a learning process by which the owners of future projects learn the ins and outs of the platform by participating in platform actions and are thereby able to create or position projects which are better candidates for funding success (Gompers et al. 2010). As we shall show, some of our results suggest that learning by doing does not capture the full story. One of the most effective ways to learn about project creation is creating multiple projects. Our results show that having a history of projects per-se does not increase the likelihood of financing. Furthermore when evaluating creation history together with backing actions we find that the latter dominates.

Social capital and network effect are additional dynamic forces that could be in play, as was described by (Aldrich & Zimmer 1986, Dimov et al. 2007, Hoang & Antoncic 2003). When project owners increase their social stock by performing network actions (Alexy et al. 2012, Zhang 2011), they increase their network visibility (Lawton & Marom 2010), network embeddedness (Wasko & Faraj 2005), and consequently, credibility, which could eventually lead to higher funding rates for projects initiated by such owners.

We also show that the community of backers which are also owners is not only much more active in backing projects but also exhibits specific reciprocity dynamics. We find that both *direct* and *indirect reciprocity* is apparent (Quan-Haase et al. 2002). The relative number of backers which reciprocate on one's backing actions is increasing in the number of backing actions. The proportion of project backers which have been backed by the owner out of the total project backers is increasing in the number of owner's backing actions. This is also true for the proportion of members of the backer-owner community out of the total project backers, a phenomenon we categorize as *indirect reciprocity*. These increasing proportions are documented in spite of the fact that the total number of project backers is also increasing in the number of backing actions performed by the owner. In economic terms we show that on average, owners who are also backers achieve a higher financing ratio and raise significantly larger amounts per project.

Another attractive feature of our evaluation is the fact that we are able to decouple between the project information aspect and the platform actions undertaken by the owner. When evaluating in-project actions (such as post, videos or project updates), studies have shown (Chen et al. 2009, Mollick 2012) that these actions have a significant impact on the funding dynamics and funding success rate of crowdfunding projects. One may note that when such actions are evaluated it is difficult to distinguish between two channels: the first is the additional content or information added to the project data; and the second is the owner action itself. In our evaluation we analyze visible actions by the project owner, however such actions do not directly provide any additional direct information pertaining to the current project. Thus this method efficiently decouples between the project specific informational action and the platform action allowing a better understanding of the impact of the platform actions and network interaction per-se. From an information systems perspective, the decision of which information should be highlighted by platform designers affects the evolutionary dynamics of the platforms (Tiwana et al. 2010). Moreover, as a crowdfunding platform, Kickstarter offers more than mere facilitation of the funding process. Nowadays, project owners benefit from the community of potential backers, open to the crowdfunding idea, and willing to support additional projects.

Background

Using the "The wisdom of the crowd" (Surowiecki 2005) for producing or supporting a product has become widespread; one such form is *Crowdfunding* (Belleflamme et al. 2010), the process of directly financing projects and ventures over the internet.

Recent studies (Gerber et al. 2012, Ward & Ramachandran 2010) are looking into social and community aspects of crowdfunding platforms. Ward and Ramachandran analyzed social data of the Sellaband crowdfunding platform and suggest that peer effects, and not network externalities, influence consumption. Gerber et al. find that crowdfunding platforms are gradually adopting social networks attributes, and funders are looking for social interactions in those platforms. Zooming in on the "crowd" one is able to identify different groups of users which have their own behavioral patterns. These groups are formed via using the information exposed by the platform, and via the social interaction mechanism available on the platform and outside of it (Hsu 2007, Mollick 2012, Shane & Cable 2002).

Our work draws on and adds to the literature examining social and community aspects of online Web 2.0 platforms.

From Fundraising to Crowdfunding Platforms

Literature regarding "physical" fundraising (not online) suggests that exposing potential backers to the information regarding already received contributions ('announcement strategy') may be optimal because it helps reveal the project's quality (Vesterlund 2003). Also, positive entrepreneur reputation serves as a positive signal to potential investors that there is a higher chance of success (Packalen 2007). Researches in the area of peer-to-peer lending platforms, have found that the social capital of the borrower can serve as a trustworthiness signal to the potential lenders (Krumme & Herrero 2009, Lin et al. 2013).

Hsu (Hsu 2007) shows that serial entrepreneurs are more likely to obtain venture finance, as well as obtain better valuations. Firm-founding experience increases entrepreneur's skills and social connections (Zhang 2011). Such skills and social connections could give experienced founders some advantage in the process of raising venture capital. Compared with novice entrepreneurs, entrepreneurs with venture-backed founding experience tend to raise more venture capital at an early round of financing. Gompers et al. (Gompers et al. 2010) show that entrepreneurs with a track record of success are much more likely to succeed than first-time entrepreneurs and those who have previously failed. These entrepreneurs exhibit persistence in selecting the right industry and time to start new ventures.

Crowdfunding can be seen as a virtualization of the fundraising process (Overby et al. 2010). It is considered a phenomenon that has passed the embryonic stage and is now rapidly moving towards the growth stage (Giudici et al. 2012). It owes its great popularity and success mainly to the maturity of Web 2.0 technologies, the global financial crisis (and the difficulties in raising funds for entrepreneurial projects), and the success of crowdsourcing (Giudici et al. 2012, Kleemann et al. 2008).

Crowdfunding can be divided into different types according to the method of raising money from the crowd: equity purchase; loan; donation; or pre-ordering / reward-based (Ahlers et al. 2012, Belleflamme et al. 2010). The latter method follows the "all or nothing" business model (Hemer 2011), where a minimum project financing goal is set and a limited period is given for achieving said goal. The sum is transferred to the project owner only if the targeted amount is pledged within the given period. Otherwise the project is cancelled and the backers (funders) pay nothing. Pledging a payment entitles the project backer to receive a specific reward, typically this reward shall be one or more products, developed as part of the project, participation in an event or a special credit / thank-you gesture.

A new and developing research stream on crowdfunding is currently emerging. It involves multiple disciplines: finance, economics and management, sociology, and information systems (Giudici et al. 2012). The main research interests in this area include the motivation to participate in crowdfunding – both from the initiator and the funders sides (Belleflamme et al. 2010, Schwienbacher & Larralde 2010), the decision-making process of potential funders whether to support a project (Agrawal et al. 2011, Burtch et al. 2012, Kuppuswamy & Bayus 2013), the key success factors of a crowdfunding project (Mollick 2012), and the social attributes of crowdfunding platforms (Ward & Ramachandran 2010).

Recent results by Marom and Sade (Marom & Sade 2013) investigate success factors of projects on Kickstarter. They show that experience from previous projects is only somewhat correlated with success in future projects, however having previous successes increases future success chances from 51% for novice entrepreneurs to 80% for entrepreneurs having more than 3 previous successful projects.

Social and Network Mechanisms

A recent study (Oestreicher-Singer & Zalmanson 2013) shows that there is a correlation between the user's willingness to pay and using social features on Web 2.0 websites. They suggest that users, who are more socially involved in the community built around the site, have a tendency to pay for premium content. As they increased their engagement with the site, they develop a deeper sense of commitment to the website (Bateman et al. 2011) and perceived ownership (Preece & Shneiderman 2009). This also conforms to our findings, where project backing is a manifestation of a (paid) community activity.

A successful community depends on the participation and contributions of its members (Butler 2001). Kim and Srivastava (Kim & Srivastava 2007) find that Web-based social communities drive the volume of traffic to retail sites and become a starting point for Web shoppers, Wasko and Faraj (Wasko & Faraj 2005) find that people tend to contribute (their knowledge) when they are structurally embedded in the network. Surprisingly, contributions occur without regard to expectations of reciprocity from others or high levels of commitment to the network. Online participation maybe rationalized via several mechanisms, including the following: increased recognition (Kollock 1999, Rheingold 1993), reciprocity (Wasko & Faraj 2005),Shin & Hall 2013), sense of community (Quan-Haase et al. 2002) and altruism (Lakhani & Von Hippel 2003).

In our study we indeed find evidence of community behavior. We find evidence for both direct and indirect reciprocity. Users who had previously created a project invest in projects created by their backers. We also find evidence of indirect reciprocity – Backer-Owners tend to back projects created by frequent Kickstarter backers. This tendency increases as the owner has backed more projects.

Kim (Kim 2006) differentiates among several participation roles in online communities: visitor, novice, regular and leader. In the context of our work this may be mapped to Kickstarter visitors without an account, users who have created an account but have not backed a project, backers, project owners and users who are both backers and owners. Li and Bernoff (Li & Bernoff 2011) develop a ladder-type graph known as 'social technographics profiling', which uses findings from large-scale surveys to create profiles of online behavior. Preece and Schneiderman (Preece & Shneiderman 2009) propose a 'Reader to Leader' framework with emphasis on different needs and values at different levels of participation. The different approaches were summarized by Oestreicher-Singer and Zalmanson (Oestreicher-Singer & Zalmanson 2013). Our research identifies three user groups based on their participation patterns: backers, owners & backer-owners. Backer-owners are more active on the platform than other user types: they fund and create more projects than other backers and non-backers respectively .

Bateman et al. (Bateman et al. 2011) show that users' behavior on content sites is directly linked to their commitment levels, as defined by the organizational commitment theory (Meyer & Allen 1991). Community participation is derived from *affective commitment*, whereas community leadership was shown to be correlated with *normative commitment* (Bateman et al. 2011). Leaders of online communities have been shown to be the most active (Cassell et al. 2006, Yoo & Alavi 2004). These results also conform to our findings: many of Kickstarter backers, which can be considered as *community participants*, indeed back multiple projects (1.88 on average), demonstrating affective commitment. Backers who are also project owners, whom can be seen as *community leaders*, are very active in the community (about 2.5 times their proportion of the population, backing 4.87 projects on average).

In the marketing literature it is widely accepted that propagation of trends in a network relies on the existence of few mavericks, mavens and social connectors (Gladwell 2006). Although they are relatively few, they often serve as *likely adopters* and increase the success chances of a product (Hill et al. 2006). In the context of our research we find that backer-owners may be regarded as mavens as the projects they create draw more backers and have a higher likelihood of financing success. They may also be considered as social connectors and opinion leaders (Iyengar et al. 2011) as their proportion in projects is higher than their proportion in the overall population.

Hypothesis and Methodology

Next, we form a number of hypotheses to be tested using the project backing and creation actions of owners of 68,057 Kickstarter projects. We categorize success as a project achieving its goal and raising at least the targeted goal amount.

We classify all owners based on their actions prior to or during their currently offered project and evaluate the impact of their backing and creating actions on the success of their current project.

We hypothesize that the success rate of funding new projects increases if the project owner had previously backed other projects. We expect that this success will also be manifested in the number of backers supporting the current project:

- *H1(a): Projects initiated by owners who have **backed other projects** will have a higher likelihood of **succeeding** in raising the stated goal.*
- *H1(b): Projects initiated by owners who have backed more projects will have a higher likelihood of succeeding in raising the stated goal. The rate of **success** will be **increasing in the number of backing actions**.*
- *H1(c): Projects initiated by owners who have backed other projects will have a **higher number of backers**. The number of project backers will increase with the number of owner backing actions.*

Although we formulate H1 with social reciprocity dynamics in mind, backing project of others may also be related to learning dynamics - the more actions a user do the more the user learns about the platform and becomes better in creating successful projects. Another source of learning is the creation of previous projects, either successful or not:

*H2(a): Projects initiated by owners who **have a history** of creating other projects will have a higher likelihood of **succeeding** in raising the stated goal.*

*H2(b): Projects initiated by owners who have created more projects will have a higher likelihood of succeeding in raising the stated goal. The rate of **success** will be increasing in the **number of previous projects created**.*

*H2(c): Projects initiated by owners who have a **history of succeeding** in previous projects will have a higher likelihood of successfully raising the stated goal of a subsequent project.*

*H2(d): Projects initiated by owners who have attempted to create projects but **have not been able to succeed** will have a lower likelihood of successfully raising the stated goal of a subsequent project.*

We note that having previous successes or failures not only creates learning, but also serves as a quality signal for potential backers, which in turn affects project success.

In order to isolate the effect of reciprocity dynamics from the other dynamics mentioned above, we identify a sub-community of Kickstarter users, which we call Backer-Owners (BO), and compute several *reciprocity ratios* listed in List 1. We conjecture that backers who are also owners may be more sensitive to the backings of other owners, thus in such a case they may have a higher propensity to back a certain project when the project owner is also a backer. If this reaction increases with the number of backing actions, this will further support the notion of a reciprocity or community reward mechanism.

Note that if *H1(c)* is supported then the number of project backers increases with number of owner's backing actions. In the absence of other dynamics this would indicate that the above described ratios should decrease with the number of backing actions. If we find that these ratios increase with the number of backings it would support the presence of a *communal reciprocity* mechanism. Thus we formulate the following hypothesis:

H3: Projects initiated by owners who have backed more projects will have higher reciprocity ratios. These ratios will be increasing in the number of backing actions.

Estimation Methodology

We estimate a logistic model for the successful financing of a new project. In our estimation we control for project characteristics as well as project specific design feature and integrate the variables which characterize the out-of-project platform actions of the owner, specifically those describing backing of other projects as well as the creation of previous projects.

The predicted variable, *V(isSuccessful)* has the value of 1 if a project achieved this target, hence the conditional probability that a project succeeds in raising its stated goal is thus: $\frac{e^V}{1+e^V}$. The formal model is depicted in List 2.

Data Collection

We use data extracted from Kickstarter (www.kickstarter.com) the largest crowdfunding platform. Since its launch in 2009 more than 42.000 projects were successfully funded on this platform, raising an aggregate amount of over 500 Million US$. Kickstarter reports a success rate of over 40%.

Data was collected utilizing a dedicated crawler using a recursive BFS algorithm which traversed the project-user & user-project links. Kickstarter does not support a public API nor does it provide access to an organized directory of past projects and users. Its web interface does not allow for exhaustive searches. Crawling was started using a publically available seed consisting of 45,000 projects (Pi 2012). Recursive iterations from projects to backers and back to projects were performed until the number of newly discovered projects per iteration converged. Figure 1 shows a typical screen capture describing the landing page of a project. This project screen contains details and a link to all previous projects created or backed by the project owner.

The following data presented by Kickstarter was collected by the crawler:

- **Project data**: project owner, financing goal, financing duration, project creator profile, profiles of all backers (funders), detailed reward levels and reward selections, the use of a video, amount of money pledged, comments, updates, location, category, sub-category.
- **User data**:
  - Personal data: name, location, date account was opened, number of FB friends
  - Owner related data: Number of and links to all projects created by Owner
  - Backer related data: Number of and links to all projects backed by the user

Every Kickstarter user may be a project owner, a backer, or both.

Our final dataset consists of 68,057 projects, created by 60,680 different owners. These projects received a total of 5,647,547 pledges from 3,001,417 different backers. To the best of our knowledge, this is the largest and most comprehensive Kickstarter data that was analyzed for research.

In addition to the project attributes, Kickstarter provides its users with information about the project creator (owner). As can be seen in Figure 1, information about the creator's backing and project creating history is presented, along with additional personal information. The personal profile of the project owner includes details of all projects previously created or backed. Descriptive statistics of the projects attributes used in our models are presented in Table 1.

Among all projects in our dataset, the owners of 6,780 projects (10% of all projects) had creation experience prior to initiating their current project. Backing history of an owner has much higher rates - 28,588 projects (42%) were created by owners who backed other projects before creating their subsequent project. Table 2 includes a crosstabulation of *HadBacked x HadCreated*

Focusing on the sub-population of owners who had backed other projects (before, during or after creating their own project) yields a new type of user – "Backer-Owner" (BO). Among 3,001,417 unique backers in our dataset, the BO sub-population comprised of 34,275 backer-owners (1.14%). Comparing the total backings of all backers and of backer-owners suggests that backer-owners have different patterns of backing. While the average number of backing by a non owner is 1.88, the average number of backing actions by a backer-owner is much higher – 4.87 backings.

Table 3 describes differences between owners who have not backed other projects, and backer-owners. BOs create more projects than non-backer owners and their projects are significantly more successful in achieving the targeted financing goal. Table 4 describes differences between projects based on the backing history of the owner at the time of the project. It is evident that these two subpopulations on the Kickstarter platform behave differently and achieve their goals with very different probabilities. We will revisit these specific characteristics of the BO community when we discuss the results.

Results & Discussion

Table 5 reports the logistic regression estimation results. All models demonstrate that the successful funding of a project is significantly associated with the owners backing actions, supporting *H1(a)*. Backing other projects significantly increases likelihood of success with an odds ratio for *HadBacked* in the range of 1.966 to 2.004.

The estimation results of models 3 and 4 show that the odds of successfully financing the project increase by 1.07 for each additional backing action performed by the owner, Supporting *H1(b)*. As previously described, the mechanisms which associate previous backing actions with an increased probability for success can have roots in the dynamics of learning, social reciprocity or network effect. Alternatively the observed actions may correlate with some innate characteristics which are not observed but have a positive impact on the ability of the project owner to create successful projects. In what follows we shall attempt to show that at least some of these results are driven by reciprocity related forces.

The coefficients estimated for HadCreated as well as NumPrevCreated do not produce significant results. Hypothesis *H2(a) and H2(b),* which were based on the assumption that owners on-platform experience, as embodied in project creation, increases the chances for subsequent success, cannot be supported by the data.

The odds ratio for *HadCreatedAndSucceeded* is significantly above 1 (1.638) which supports *H2(c)*. Demonstrating previous success significantly increases the probability to achieve the goal set for subsequent projects. This result could be explained if potential backers use this information as a signal for the quality of the owner. It could also be explained by the fact that success is a separating mechanism which identifies better entrepreneurs which have a greater chance of succeeding, regardless of the signaling mechanism.

The odds ratio for *HadCreatedAndNeverSucceeded* is significantly below 1 (0.601) which supports *H2(d)*. Demonstrating that having only failures to show-for significantly decreases the probability to achieve the goal set for subsequent projects. This result could be explained by the same signaling or separating mechanism detailed for its positive counterpart.

We executed a linear regression with the dependent variable *NumBackers,* incorporating all of the variables listed in Model 4 of Table 5. The coefficient of the predictor *NumPrevBacked* was 3.913*** (.214) which supports H1(c). Backing actions of a project's owner significantly increase the number of project backers. Figure 2 shows the average number of backers per project based on the number of owner backing actions.

Backing actions not only increase the chances of success but also the number of backers. These combined results have a measurable economic impact on the financing outcome of projects initiated by Owners which are also active Backers.

Table 6 describes the success ratios and financial parameters comparing projects initiated by owners which were backers prior to or during their project, to projects initiated by non backing owners. The differences are significant. Projects initiated by BOs target a higher goal, achieve a higher financing rate and collect a much higher $ amount of pledges in their successful projects. Successful projects initiated by BOs raise, on average, almost twice as much money. It is worth noting that the success rate of BO initiated project is higher despite of the fact that on average they also set significantly higher goals which should have had a negative impact on the rate of success.

We now turn to compute the *reciprocity ratios* detailed. Note that we use the term reciprocity to identify both *direct and indirect reciprocity*. Direct reciprocity as embodied by the ratio $\frac{M}{B}$ is easily interpreted in this setting as M enumerates pairs of owners which have backed each other's project. Indirect reciprocity is best interpreted as some form of community response to the actions of the project owner or to the strength of owner's group affiliation (in this case the group of owners who are also backers). Recall that for this measure we evaluate the ratios $\frac{BO-M}{B}$ and $\frac{BOcurr-M}{B}$ which serve as an indication for the rate of backing by other BOs who have not received direct backing from the current project owner.

Note that we have shown that the number of project backers increases with number of owner's backing actions. In the absence of other dynamics we should expect these ratios to decrease with the number of backing actions. Figure 3 details the reciprocity ratios for projects based on the number of owner backing actions. All reciprocity ratios increase with the number of backing actions performed by the project owner.

Table 7 provides summary statistics as well as a comparison between average reciprocity ratios documented for projects initiated by BOs compared to projects initiated by owners who have never backed other projects. These results provide further support for *H3*.

Conclusion

In this paper we investigated reciprocal dynamics on the Kickstarter crowdfunding platform. Reciprocity, by definition, is carried by backer-owners (BOs), who, as we have shown, have a higher success rate, raise more money and secure pledges from a larger number of backers.

We demonstrated that the sub-community of backer-owners has distinct characteristics which set it apart from other owners as well as other backers. This sub-community is much more engaged in platform actions and provides additional community support to its members. These dynamics seem to further increase with the backing actions of a member of this community, and together with other dynamics improve the success rates of BO projects. This research is but a first step in evaluating these dynamics in such a context of online funding.

Appendix A: Tables

Table 1. Descriptive Statistics – Project Attributes

Variable	Range	Mean /Probability	s.dev
Goal (USD)	100-21.4M	14,587.75	
Duration (days)	1-92	37.62	16.05
IsSuccessful (Goal Achieved)	1/0	0.54	
Level of Funding Achieved (Raised/Goal)	0 - 1,340.9	0.93	5.81
Num. of Backers	2 - 9,818	84.08	302.3
HasVideo	1/0	0.83	
Num. of Reward Levels	0-138	8.71	4.86
Limits on Number of Backers in one or more reward category	1/0	0.51	
Has FB Friends in profile	1/0	0.52	
Owner HadCreated Previous Projects	1/0	0.1	
Num. Projects Previously Created by the Project's Owner	0-74	0.19	1.45
Owner Had Succeeded	1/0	.0561	
Owned HadCreated Previous Projects but Never Succeeded	1/0	.0435	
Owner HadBacked Other Projects	1/0	0.42	
Num. Projects Previously Backed by the Project's Owner	0-433	1.52	5.28

Table 2 HadBacked x HadCreated Crosstab

		HadBacked		*Total*
		0	*1*	
HadCreated	*0*	*36,924*	*24,353*	*61,277*
	1	*2,545*	*4,235*	*6,780*
Total		*39,469*	*28,588*	*68,057*

Table 3. Comparing Backer Owners and Non-Backer Owners

Mean Values	*BO (56.46%)*	*Non-BO (43.56%)*	*t-test P Value*
Number of Projects Created	*1.15*	*1.08*	*0.00****
Success Rate (Reaching the finance goal)	*63.6%*	*41.4%*	*0.00****
Level of Funding Achieved over All Projects (% of goal)	*106%*	*65%*	*0.00****

*** - Significant at the 0.001 level

Table 4. Comparing Projects Started by Owners which were <u>Backers at Project Launch</u> to those Started by Non-Backers

Mean Values	*BO (42%)*	*Non-BO (58%)*	*t-test P Value*
Number of Backers	124.33	54.92	*0.00****
Success Rate (Reaching the finance goal)	*61.8%*	*48.6%*	*0.00****
Level of Funding Achieved over All Projects (% of goal)	*118%*	*76%*	*0.00****

*** - Significant at the 0.001 level

Table 5. Binary Logistic Regression Models
Predicting the successful funding of a Crowdfunding project on Kickstarter

	Model 1	Model 2	Model 3	Model 4
	Exp(B) (S.E.)	Exp(B) (S.E.)	Exp(B) (S.E.)	Exp(B) (S.E.)
LoggedGoal	0.202*** (0.02)	0.201*** (0.02)	0.207*** (0.02)	0.207*** (0.02)
Duration	0.99*** (0.001)	0.99*** (0.001)	0.99*** (0.001)	0.99*** (0.001)
HasVideo	1.877*** (0.024)	1.883*** (0.024)	1.938*** (0.024)	1.938*** (0.024)
NumRewardCategories	1.099*** (0.002)	1.098*** (0.002)	1.102*** (0.002)	1.102*** (0.002)
HasLimitedCategory	0.848*** (0.019)	0.85*** (0.019)	0.863*** (0.018)	0.863*** (0.018)
HasFBFriends	0.929*** (0.018)	0.936*** (0.018)	0.982 (0.017)	0.982 (0.017)
HadCreated	1.014 (0.03)		1.005 (0.03)	
HadCreated AndSucceeded		1.638*** (0.043)		
HadCreatedAnd NeverSucceeded		0.601*** (0.043)		
NumPrevCreated				0.994 (0.007)
HadBacked	2.004*** (0.019)	1.966*** (0.019)		
NumPrevBacked			1.07*** (0.003)	1.07*** (0.003)
Category Controls	Yes	Yes	Yes	Yes
Constant	85.238*** (0.083)	88.002*** (0.084)	89.303*** (0.083)	89.947*** (0.082)
Observations	68057	68057	68057	68057
Log likelihood:	79223.514	78921.75	80055.487	80054.925
Cox & Snell R-Square:	0.194	0.197	0.184	0.184
Nagelkerke R-Square:	0.259	0.264	0.246	0.246

- significant at the 0.05 level ; *- significant at the 0.01 level

Table 6. Comparing the financial average achieved by Backer Owners

Average Values		Projects of Owners with Backing History (BO) 28,588 projects	Projects of Owners without Backing History 39,469 projects	t-test P Value
Success Rate		62%	49%	0.00***
Number of Backers		124.33	54.92	0.00***
Goal		$16,968.4	$12,863.41	0.008**
Successful Projects Only	Goal	$7953.36	$5140.93	0.00***
	Money Raised	$13,551.98	$6927.93	0.00***

-Significant at the 0.01 level * - Significant at the 0.001 level

Table 7. Comparing Reciprocity Ratios of Backer-Owners and Owners Projects

Mean Values (%)	All Projects (%)	Projects with Backing History (%)	Projects without Backing History (%)	t-test P Value
BO/B	4.62	5.19	4.2	0.00***
BOCurr/B	2.52	3.16	2.05	0.00***
M/B	-	1.12	-	
(BO-M)/B	-	4.08	-	
(BOcurr-M)/B	-	2.05	-	

*** - significant at the 0.01 level

Appendix B: Listings

List 1. Project Parameters and Reciprocity Ratios

B	Total number of project backers
$BOCurr$	Backers who were owners prior to backing this project
BO	Project backers who created a project at some time
M	Number of project backers who were backed by the owner of this Project
N	Number of previous backing actions by the project owner
$\frac{M}{B}$	*direct reciprocity*
$\frac{BO-M}{B}$ $\frac{BOcurr-M}{B}$	*indirect reciprocity*

List 2: A Formal Model for Estimating Project Success

$$
\begin{aligned}
V(isSuccesful) &= \alpha + \alpha_1 LogGoal + \alpha_2 Duration \\
&+ \sum_{j=1}^{J} \beta_j Project\ Category\ _j \\
&+ \sum_{j=1}^{K} \gamma_j ProjectAttributes_j + \ \alpha_3 HasFBFreinds \\
&+ \sum_{j=1}^{P} \delta\ _j Owners\ PastProject\ info_j + \eta\ OwnersProjBackinginfo \\
&+ \ \epsilon
\end{aligned}
$$

Where:

$\boldsymbol{Project\ Category_j}$ are binary dummy variables representing 12 out the 13 Kickstarter project categories (Games, Technology, Art ….).

$\boldsymbol{ProjectAttributes_j}$ include project structure attributes which describe the rewards structure as well as a dummy for the use of a video in the product description (*NumRewardCategories, HasLimitedCategory HasVideo*).

$\boldsymbol{Owners\ PastProject\ info_j}$ includes one or more of the variables which describe the previous project creation actions of the owner: *HadCreated* or *NumPrevCreated* or *HadCreatedAndSucceeded* alongside *HadCreatedAndNeverSucceeded*.

$\boldsymbol{OwnersProjBackinginfo}$ includes one of the variables which describe the project backing history of the project owner: *HadBacked or NumPrevBacked*.

Appendix C: Figures

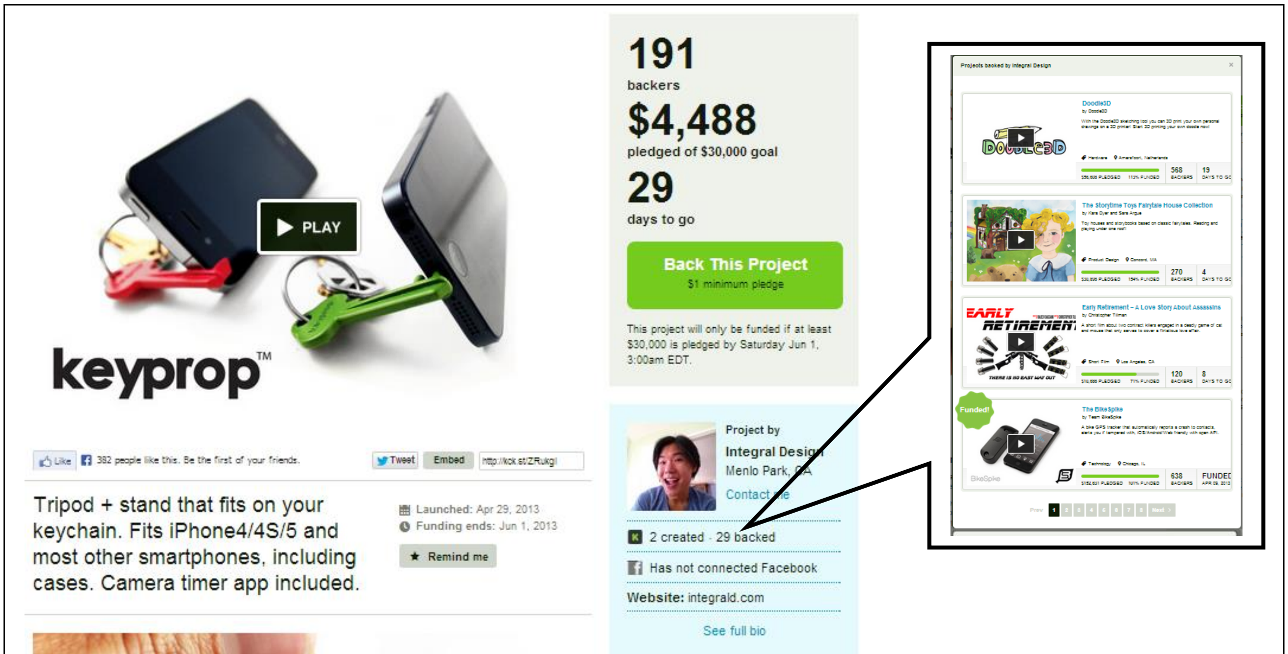

Figure 1. Screen capture of Kickstarter project.

Note that both funding and backing history of project owner are visible and accessible

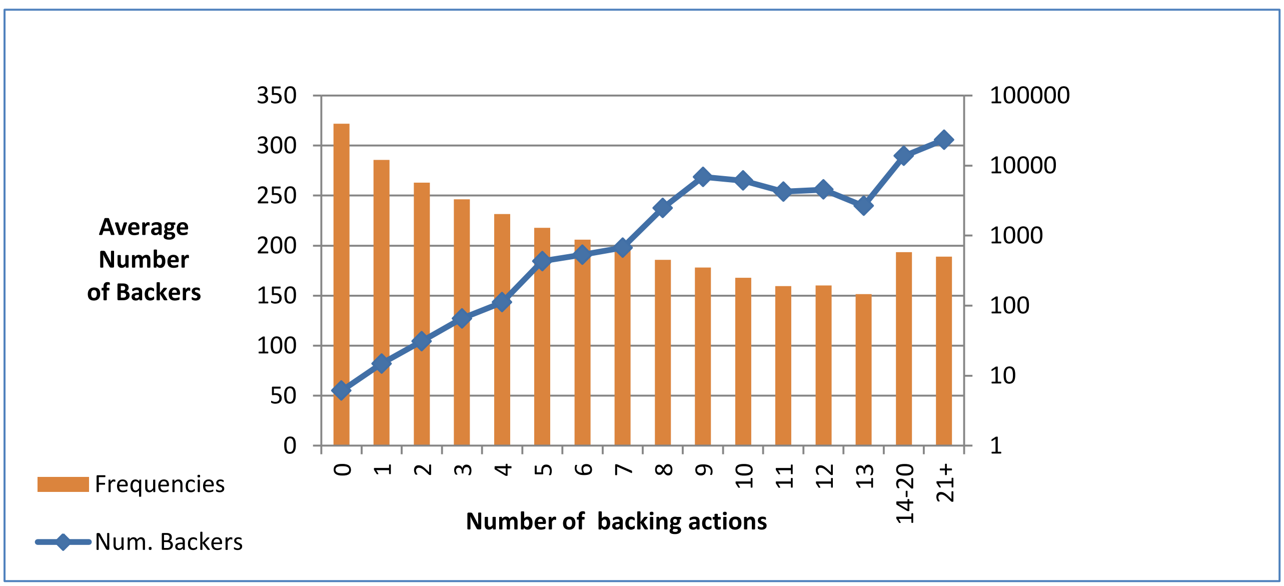

Figure 2. Number of project backers as a function of the number of owner backing actions.

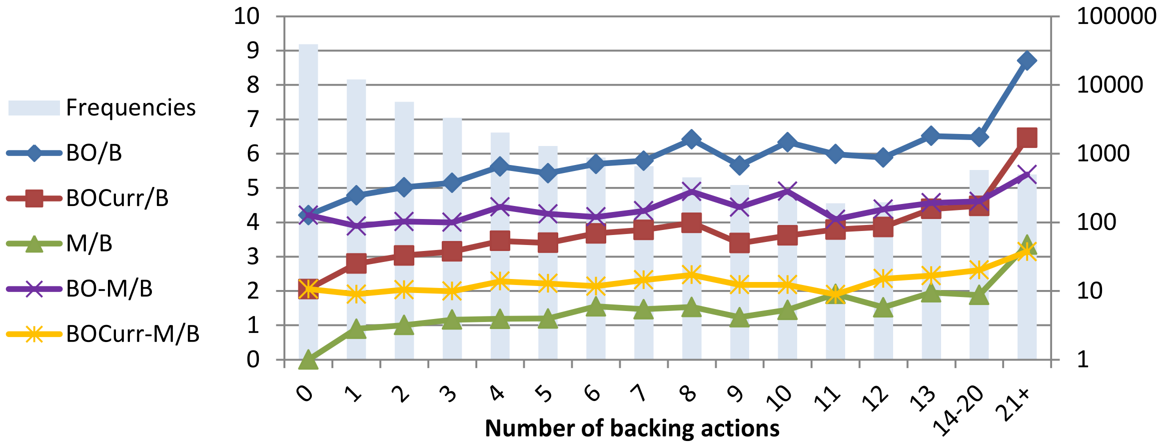

Figure 3. Reciprocity Ratios as a function of the number of owner backing actions.

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