

Key Success-Determinants of Crowdfunded Projects: An Exploratory Analysis

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Abstract Crowdfunding, a process with which enterprises or individuals seek to secure project funding, has received much attention recently, not only from the media. The boon in visibility provided to crowdfunding by Internet platforms has made securing project funding, by soliciting pledges from potential donors, simpler than ever. A popular way of allocating funding, and thus bypassing traditional venture capital providers, is by setting a reserve pledge-sum. If this pledge-sum is achieved, the promised pledges are collected from the project supporters. Upon project completion, these pledgers receive a compensation, which is usually non-monetary and based on the magnitude of their contribution. Projects funded in this way include a wide topic variety, ranging from hardware manufacturing to fine arts and even disaster relief. This study investigates possible key success factors for attaining the reserve pledge-sum. To this end, data on 45,400 crowdfunding campaigns was collected and key success factors were analyzed using the results of a logistic-regression. The results indicate that communications and professionalism have a high impact on funding success, and that such communication measures as having a unique website set a minimum standard. Further conclusions allow practitioners to positively influence the campaign outcome and researchers to build upon the results of this study.

1 Introduction

Innovators struggle to secure adequate funding for their projects. Traditionally, this funding is provided by venture capitalists, banks, share-holders, or philanthropists. However, securing these funds remains difficult, because the aforementioned groups are constituted of few people. A possible alternative, for innovators, is to directly ask prospective buyers for project funding. Crowdfunding (CF), a financing scheme utilizing this decentralized approach, has received much attention in recent years due to the important benefits it offers. These benefits include independence from

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said venture capitalists, early tests for market demand, and the possibility to build a close relationship with prospective clients.

CF, which is used in different commercial and noncommercial domains, enables innovators to reduce the risks linked to the development and market introduction of an innovation. Successful project financing no longer hinges on engaging a few, powerful intermediaries, but on engaging many people who can directly support projects with small amounts of money. Furthermore, project initiators will receive direct feedback from the crowd, and may hence better estimate their idea's market potential. CF dynamics, as well as geographic crowd dispersion, enables project initiators to overcome financing barriers and utilize globalization for successful financing. For instance, since its inception in 2009, more than 988 million dollars have been pledged, for more than 130,000 projects in 13 different categories from more than 5.5 million people, on the current market leader of CF platforms, kickstarter.com (Kickstarter 2013).

Even though CF has existed for several years, little attention has been paid in literature to quantitative key success factors. The investigation of these factors has been neglected in favor of studies utilizing qualitative methods (cf. Ordanini et al. 2011) or formulating conceptual models (cf. Belleflamme et al. 2011). To ameliorate this neglect, this study investigates the impact of certain factors on CF project success. A common definition of CF and an overview of existing studies, which focus on CF, is presented in Sect. 2. Section 3 details the exploratory analysis performed on a collected sample of 45,400 projects, while Sect. 4 presents not only insights and actionable recommendations, but also an outlook for further investigations that could be preformed on similar data sets.

2 Crowdfunding Projects

The following subsections give an overview of research on CF to date. In Sect. 2.1 a comprehensive definition for CF is derived from literature, while Sect. 2.2 details potential success factors and the guiding research question developed from further literature and the definition.

2.1 *Definition of Crowdfunding*

Identifying factors influential on CF project success, not only requires processing available data, but also theoretical considerations, which are greatly facilitated by the availability of a common definition for CF. A comprehensive CF definition will result in a well-defined research object.

The two definitions of CF available in literature are given by Ley and Weaven (2011) and Belleflamme et al. (2011). Ley and Weaven (2011, p. 86) consider CF from a venture capital perspective and define it as a "(...) source of start-up equity capital pooled via small contributions from supporting individuals collaborating through social media." Viewing CF from this perspective necessarily constrains the spectrum of the definition. Nonetheless, the crowd in any CF context is neither limited to individuals, nor are these individuals limited to collaboration through social media. While word-of-mouth does play an important role in advertising CF projects, collaboration between supporters is not in any way a prerequisite for funding a project. These shortcomings are ameliorated by the more general definition of Belleflamme et al. (2011, pp. 5–6). They consider CF "(...) an open call, essentially through the internet, for the provision of financial resources either in form of a donation or in exchange for some form of reward and/or voting rights." However, this definition also falls short in some of CFs key aspects.

Quite correctly, Belleflamme et al. (2011) state that pledgers either donate their support or receive material or non-material rewards (e.g., voting rights) in return for their support. However, this support must not be of financial nature. Especially projects requiring community involvement seek supporters to pledge their time or other non-monetary resources, such as access to land or machinery (cf. Cellan-Jones 2013).

Just as the support offered by pledgers may be non-monetary in nature, the primary motivation of project initiators may not be to secure funding. While CF does suggest that funding acquisition is of primary interest, contextual objectives of project initiators may be different. CF may be utilized to assess an idea's market potential and to build customer relationships. The former may be determined through the amount and size of pledges, even if they are not sufficient to fund the project, and the latter may be achieved through the communication forum offered by the project. This possibility for feedback may be used to establish customer relationships and reputation, not only at a project, but also at product level.

A further shortcoming of the Belleflamme et al. (2011) definition is that it constrains the concept of CF to an online context. Admittedly, considering the whole internet, not only social media, broadens Ley's and Weaven's (2011) view of CF, but also a CF campaign may also be conducted offline without substantially changing the nature of the project. The Internet simply facilitates communication and thus should not constrain the definition of CF.

Beyond these shortcomings, the current definitions also fail to broach two essential subjects. First, while the call for CF is open, it is not open-ended. The time frame for promoting a project and raising resources may be set freely by the project initiators, but must be constrained. Second, the chosen payout scheme for the pledged resources is an important aspect of any CF project. Whether a "threshold pledge model" (Hemer 2011) is chosen, pledges are always payed-out or stretch goals are defined, the chosen payout scheme influences project initiator and pledger behavior.

Considering all aforementioned elements of CF, including those of definitions by Ley and Weaven (2011) and Belleflamme et al. (2011), the following definition of CF may be formulated:

Crowdfunding is a process where commercial or non-commercial projects are initiated in a public announcement by organizations or individuals to receive funding, assess the market potential, and build customer relationships. Pledgers may then contribute individual amounts of monetary or non-monetary resources, during a specified time-frame, using offline or online campaign platforms that utilize different payout schemes, in exchange for a product specific or unspecific, material or immaterial reward.

2.2 Potential Success Factors

Despite its growing importance for innovators, consumers and researchers alike, the topic of CF remains relatively unexplored in literature to date. Rather than examining CF based on empirical data, the vast majority of past work has focused on conceptual models describing CF from a qualitative perspective, to provide a theoretical background. These literature streams concentrate either on the financial aspects, donation features or innovation economic facets of CF.

Pope (2011) offers insight into the legal problems accompanying the financial funding process. The legal problems stem from the fact that small offerings, below \$1,000, are “over-regulated” by the SEC to prevent fraud. Ley and Weaven (2011) discuss CF from a venture capitalist perspective. They address agency dynamics at work and its associated problems in CF. Further, mechanisms such as project screening, to adequately manage prospective CF projects, are identified. Wojciechowski (2009) investigates how online platforms could support calls for donations. He considers the “threshold pledge model” (Hemer 2011, p. 15) payout scheme, which only pays out if a certain threshold is exceeded, a key benefit for social, donation driven projects. Belleflamme et al. (2011) shed light on the CF phenomenon from a micro-economic standpoint. Based on a theoretical model and assumptions, they deduce managerial implications and recommend “equity-share” style CF for larger projects and “pre-order” style CF for smaller projects.

The few empirical investigations, available in literature, focus on heterogeneous topics. For example, Agrawal et al. (2011) show that the local and distant crowd differ in terms of when they decide to fund the project. Ordanini et al. (2011) reveal that behavior patterns of the crowd differ, depending on the project category. Kuppuswamy and Bayus (2013) also investigate pledgers and project initiator behavior. They show that potential pledgers feel responsible to contribute to a project that has not received much support and stipulate that update-frequency, from the project initiators, increases towards the end of a funding period. Factors influencing funding success have, so far, been neglected in the context of CF, and may thus be of interest to researchers and practitioners alike.

On the basis of the CF definition and the preceding discussion, research questions may be readily generated by considering aspects of the research object. As is clear, from the definition, an archetype CF project's success is not only driven by the requested funding. The ability to build customer relationships and how much competition is on the campaign platform are also deciding factors. Further, the rewards offered for pledging, how long pledging may be performed, and how active the campaign platform is during this time differentiate one CF project from another. Thus, the research question driving the analysis is as follows:

How do the aforementioned factors, of an archetype CF project, influence the funding success probability?

3 Empirical Study

The following subsections detail the exploratory analysis performed on the collected data to answer the previously defined research question. Sections 3.1 and 3.2, respectively, describe the sample and the analysis performed. The final Sect. 3.3 discusses the results of the logistic-regression-model.

3.1 Sample Description

The current market leader in online CF campaign platforms, kickstarter.com, was selected as a data source to answer the research question. Data on a total of 45,400 projects were collected between May 16th and 19th 2013. This publicly available data on kickstarter.com was extracted by a custom web crawler. Variables collected included the requested and pledged funding amount, the funding period length in days, the associated project website, the number of updates performed by the project initiators, the amount of comments made by the contributors, the levels at which contributors could pledge, and the funding period start date. Upon completion, necessary data transformation was performed to yield variables suitable for statistical analyses. For example, by comparing requested and pledged funding amounts, it was inferred whether or not the project is funded successfully. Other transformations included inferring whether or not a given project website is unique among all websites in the data and how many other projects were initiated on the same day and category.

After data collection and transformation, it was deemed necessary to constrain the analysis to projects initiated in the past 14 months (cf. Fig. 1). This constraint was implemented due to the increased attention CF received at that time, which resulted in a structural change in the market. Based on this constrained data

Fig. 1 Funding periods initiated

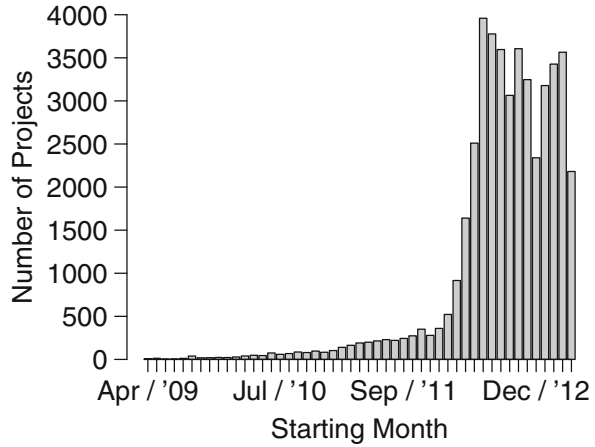
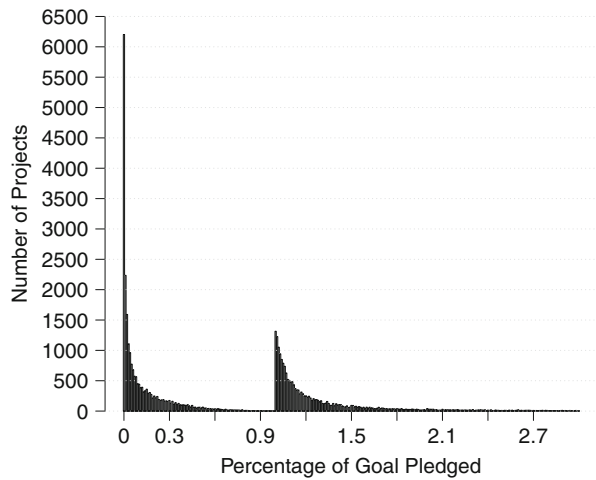


Fig. 2 Funding in % of goal



set, further data cleaning was performed. First, four projects with missing data, namely missing funding period length, were eliminated from the sample. Further, projects deemed outliers, i.e., those not representative of normal projects, were detected and eliminated. Projects eliminated included those with excessive funding wishes and excessive amounts of comments. Additionally, projects having no updates, comments, and pledged amounts are considered orphaned projects, and thus removed. Application of these criteria yielded 37,726 projects for analysis, of which 48.3 % are successfully funded (cf. Fig. 2).

3.2 Analysis

Answering the chosen research question requires determining how the independent variables influence the probability of successful project funding. This was performed via logistic-regression-analysis.

Regressors are chosen as follows: the number of comments made by pledgers (x_1) represents how active the campaign is; the number of different levels at which contributors may pledge (x_2) are the rewards offered for pledging; the number of updates made by the project initiators (x_3) represents the efforts made in customer relationship building; the amount of funds requested by the project initiators (in thousand USD, x_4) indicate the funding request; how many other projects were initiated on the same day in the same category (x_5) is used as a measure of competition on the platform; whether the named project website is unique (x_6) also represents efforts in building customer relationships; how long the funding period was set (x_7) is indicative of the influence that the chosen time frame has. The rationale for the regressor selection is threefold. First and foremost, these variables are in line with the arguments set forth in Sect. 2.2. Second, all variates may readily be influenced by project initiators, thus, any recommendations made upon the results will be actionable by practitioners. Finally, further regressors were not retrievable given the technical constraints imposed by kickstarter.com.

As with any regression analysis, multicollinearity may pose a serious challenge for coefficient estimation in logistic-regression. Literature on the subject suggests calculating the tolerance for each independent variable and investigating the Pearson correlation between the independent variables (Menard 1995). For the tolerance, 0.2 is the threshold below which multicollinearity is a cause for concern; the Pearson correlations must not be too large. Since tolerances for all independent variables are well above the threshold of 0.2 and the Pearson correlations are all “small,” as shown in Table 1, problems associated with multicollinearity should not be an issue for coefficient estimation.

Table 1 Pearson correlations and tolerances for the independent variables

	x_1	x_2	x_3	x_4	x_5	x_6	x_7	Tol
x_1 ~comments	1	0.211	0.466	0.112	-0.118	0.011	0.038	0.763
x_2 ~pledge levels		1	0.346	0.131	0.000	0.088	0.071	0.855
x_3 ~updates			1	0.011	-0.077	0.045	0.039	0.713
x_4 ~goal				1	-0.020	0.046	0.115	0.956
x_5 ~uniqueness on start day					1	-0.062	-0.002	0.980
x_6 ~unique website						1	0.010	0.987
x_7 ~funding period length							1	0.983

3.3 Results

Interpreting logistic-regression results involves a three-step approach. After the assessment of coefficient significance and model fit, coefficients must further be interpreted. The relationship between the independent and dependent variables is nonlinear in the logistic-regression-model.

The parameter estimation results, given in Table 2, indicate that the effects of all chosen variables on the expected success probability are highly significant ($p \approx 0$). These results hold when using either the Wald z -statistic or testing the deviance from the null-model for each parameter, using a chi-squared test.

Model fit, in the context of logistic-regression, is considered based on deviance to the null-model. Various measures of model fit exist, prominent among them are McFadden's (1973) and Nagelkerke's (1991) R^2 statistics. McFadden (1978, p. 307) states that a pseudo- R^2 of more than 0.2 indicates a good fit and over 0.4 indicates an excellent fit. Nagelkerke's R^2 is standardized to between zero and one and thus rules of thumb for regular regression analysis may be applied. McFadden's and Nagelkerke's R^2 for the model are 0.336 and 0.496, respectively, indicating a very good model fit. These measures are complimented by a predictive accuracy of about 79.7%, indicating that further explanatory variables with significant influence may exist.

Coefficient interpretation for the current case is not only hampered by the nonlinear link function between the independent variables and the dependent variable but also by the mixture of metric and dichotomous variables. Thus, a comparison in change of success probability due to a marginal change in an independent variable offers valuable insight (Long 1997). To this end, changes in success probability due to a variation of factors are shown in Table 3. Median project values, changed by one marginal unit, ceteris paribus, are one comment, eight pledge levels, two updates, a goal of five thousand dollars, 16 projects initiated on the same day in the same category, the project website is unique, and a funding period length of 30 days having a predicted success probability of 46.54%.

Table 2 Logistic-regression results

	Coefficient	Wald z -statistic	Deviance statistic
(Intercept)	-0.336	-6.525***	-
x_1 ~comments	0.060	28.185***	2807.9***
x_2 ~pledge levels	0.018	5.836***	138.5***
x_3 ~updates	0.294	66.062***	7467.0***
x_4 ~goal	-0.092	-51.981***	6238.7***
x_5 ~uniqueness on start day	0.013	14.698***	177.4***
x_6 ~unique website	0.451	16.845***	285.2***
x_7 ~funding period length	-0.027	-20.763***	450.5***

Significance codes: *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$; $p < 1$

Table 3 Discrete change in the success probability for the logit-model (in ppts)

	Median case	-1	+1
$x_1 \sim$ comments	1	-1.50	1.51
$x_2 \sim$ pledge levels	8	-0.44	0.44
$x_3 \sim$ updates	2	-7.20	7.34
$x_4 \sim$ goal (in thousand USD)	5	2.30	-2.28
$x_5 \sim$ uniqueness on start day	16	-0.33	0.33
$x_6 \sim$ unique website	1	-10.86	-
$x_7 \sim$ funding period length	30	0.66	-0.66

Changes are computed with other values held constant

As the values indicate, changes in success probability are nearly linear around the median project. Changes in the success probability due to a change in the independent variables are substantially different. While adding one meaningful update increases success probability by about 7.3 percentage points (ppts) to 53.88 %, not providing a unique website for the project causes a reduction by about 11 ppts to 35.68 %. Other influential factors are the amount of comments elicited from pledgers and the set goal. Here, increasing the set goal by one thousand dollars reduces the success probability by 2.3 ppts, while one more comment will increase the probability of success by 1.5 ppts. The influence of the remaining factors is too small to substantially change the success probability.

4 Conclusions

The goal of this paper is to not only contribute theory to CF literature, which is scant to date, but also to provide empirical evidence of which factors are critical to CF success. These contributions are twofold. First, and most notably, this study offers a comprehensive definition of CF, including various dimensions neglected by previous definitions, from which it is built upon. Second, success factors are identified using logistic-regression-analysis.

The analysis shows that the most important success factors for the model fit are the number of performed updates, the set financing goal, and the number of comments. Less important, but nonetheless influential, are the chosen funding period length and the availability of a unique project website. The amount of competition on the launch date and the number of pledge levels offered are of least importance for the model fit. This ranking of success factors sheds light on which factors are of primary importance for project initiators.

First, it is of utmost importance for project creators to communicate with pledgers and potential pledgers. If sufficient content for the creation of additional updates is available, these should be performed. This could be planned prior to project initiation, in form of a communication strategy. Nonetheless, it cannot be advised

to simply perform an update as an end to itself. Even splitting an update cannot be guaranteed to increase the success probability.

Second, funding goals should be set realistically. Surely, reducing the required funds makes achieving financing easier, and thus financing goals should be set aggressively. Nevertheless, this recommendation must also be considered critically. Setting a project goal to low will hurt project plausibility. Thus, a point of inflection may exist for each project, where further reducing the project goal will reduce the success probability.

Third, the importance that the amount of generated comments holds indicates that a promising communication strategy must be in place for the project. The project must appear active and facilitate communication between backers in a visible forum, to be more successful. Fundamentally important is a certain degree of professionalism. This is especially apparent in that most projects have a unique project website. Projects not featuring their own website or one on a social media platform have a substantially lower success probability.

Interesting, in a different sense, is the minor influence that the amount of pledge levels have. In a sense, pledge levels offer means for price-discrimination or -differentiation. Economic theory dictates that price-differentiation has a positive influence on sales, and thus contributes positively to a project success. The role and strength of this factor may thus require further research.

However, some limitations are worth noting. First, the study did, due to space constraints, not consider whether project success factors behave differently between the project categories. Second, only one CF platform was regarded. Results again may differ for different online or offline forums. Third, only directly quantifiable variables were used. Other, not directly measurable, success factors, such as technical maturity, feasibility, and uniqueness of the idea itself and the initiators reputation, could be considered in further studies. Fourth, only funding success probability is investigated. Additionally, other measures of success, such as stretch goal achievement or over-funding, could be considered. Finally, in future work, other aspects of CF, such as whether a project is completed, on time or at all, could be investigated.

References

- Agrawal, A., Catalini, C., & Goldfarb, A. (2011). *The geography of crowdfunding*. Working Paper No. 10-08, NET Institute.
- Belleflamme, P., Lambert, T., & Schwienbacher, A. (2011). *Crowdfunding: Tapping the right crowd*. CORE Discussion Paper, 2011/32.
- Cellan-Jones, R. (2013). *Fast fibre: A community shows the way*. www.bbc.co.uk/news/technology-21442348. Accessed 28 July 2013.
- Hemer, J. (2011). *A snapshot on crowdfunding*. Working Papers Firms and Region No. R2/2011, Fraunhofer Institute for Systems and Innovation Research.
- Kickstarter (2013). *Kickstarter stats*. www.kickstarter/help/stats. Accessed 21 February 2014.

- Kuppuswamy, V., & Bayus, B. L. (2013). *Crowdfunding creative ideas: The dynamics of project backers in kickstarter*. Working Paper. [dx.doi.org/10.2139/ssrn.2234765](https://doi.org/10.2139/ssrn.2234765). Accessed 28 July 2013.
- Ley, A., & Weaven, S. (2011). Exploring agency dynamics of crowdfunding in start-up capital financing. *Academy of Entrepreneurship Journal*, 17, 85–110.
- Long, J. S. (1997). *Regression models for categorical and limited dependent variables*. Thousand Oaks: Sage.
- Mcfadden, D. (1973). Conditional logit analysis of qualitative choice behavior. In P. Zarembka (Ed.), *Frontiers in econometrics* (pp. 105–142). New York: Academic Press.
- Mcfadden, D. (1978). Quantitative methods for analyzing travel behaviour of individuals: Some recent developments. In D. Hensher & P. Stopher (Eds.), *Behavioural travel modelling* (pp. 279–318). London: Croom Helm London.
- Menard, S. W. (1995). *Applied logistic regression analysis*. Thousand Oaks: Sage.
- Nagelkerke, N. J. D. (1991). A note on a general definition of the coefficient of determination. *Biometrika*, 78, 691–693.
- Ordanini, A., Miceli, L., Pizzetti, M., & Parasuraman, A. (2011). Crowdfunding: Transforming customers into investors through innovative service platforms. *Journal of Service Management*, 22, 443–470.
- Pope, N. (2011). Crowdfunding microstartups: It's time for the securities and exchange commission to approve a small offering exemption. *Journal of Business Law*, 13, 101–129.
- Wojciechowski, A. (2009). Models of charity donations and project funding in social networks. *Computer Science*, 5872, 454–463.