



## Research article

## Analysis of success factors in crowdfunding projects based on rewards: A way to obtain financing for socially committed projects

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## ABSTRACT

This paper examines the determinants that influence crowdfunding success. In particular, this study focuses on reward-based crowdfunding, in which funders receive a reward for supporting a project.

By studying hand-collected data from 335 reward-based crowdfunding projects and 33,036 investment decisions from the Spanish Goteo platform and using the ordinary least squares regression, the negative binomial, the logit and the Cox proportional hazard models, we highlight the factors that explain the success of a project.

We find statistically significant results for crowdfunding project success for the following variables: location, experience, human capital and gender. Thus, the success of crowdfunding campaigns depends on the experience of the project members since it lends credibility to the project.

Furthermore, the geographic location variable indicates that crowdfunding success is higher in projects located in Spain than in those located outside of Spain. Our results also suggest that crowdfunding related to the support of social impact initiatives that involve the ecological typology does not perform well.

## 1. Introduction

During the last decade, with the rise of new communications technologies, the financing practice known as crowdfunding has become popular and has attracted increased academic interest over the past few years (Ma and Liu, 2017). Thus, crowdfunding “refers to the efforts by entrepreneurial individuals and groups – cultural, social, and for-profit – to fund their ventures by drawing on relatively small contributions from a relatively large number of individuals using the Internet, without standard financial intermediaries” (Mollick, 2014). According to Schwienbacher and Larralde (2010), crowdfunding is “an open call, essentially through the Internet, for the provision of financial resources either in the form of donation or in exchange for some form of reward and/or voting rights in order to support initiatives for specific purposes”.

The use of media in the crowdfunding context is important for start-ups since they help to communicate what their project is about, the need it meets, the stage of the project, and the outcome (Courtney et al., 2016).

The increase in studies on this new concept is because this practice allows us to take advantage of great business opportunities. This,

together with technological advances and its social significance, have given crowdfunding its own profile, which has resulted in it becoming firmly established in society.

Crowdfunding allows companies and individuals to obtain financing in an alternative and more effective way than traditional sources. With the freezing of credit after the financial and economic crisis, the amount of available credit was lower in subsequent years, accelerating the search for alternative forms of financing.

This practice is not fully developed and is a subject that baffles many entrepreneurs when they want to secure financial resources to implement innovative ideas (Kortum and Lerner, 2000; Metrick and Yasuda, 2010).

The literature on crowdfunding also extends to the study of platforms, as is the case in the study we present. The financing possibilities mainly use platforms that put people or organizations in contact. In this context, a new technological framework emerges that offers great opportunities and represents a big challenge to the problem of financing since crowdfunding cannot be understood without understanding the expansion of the Internet and new technologies.

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Framed in this context, after a progressive decrease in credit from banks and within a market economy that has progressively evolved towards globalization, crowdfunding is linked with the phenomenon of people who make appeals through social networks to receive money (Davies, 2014) or other resources to finance a project within a certain period of time (Sajardo et al., 2017), creating a collective desire to carry out projects and to obtain financing from a mass of committed small contributors.

We can state, as authors such as Previati et al. (2015) endorse, that crowdfunding is a very recent financial phenomenon throughout the world. In Spain, this concept began to be gradually used around 1997 in reference to collective cooperation to obtain resources to carry out projects with innovative ideas in the market (Ordanini et al., 2011).

However, in Spain, there is a regulation for crowdfunding platforms dedicated to equity crowdfunding and crowdlending (Law 5/2015 of April 27 on the promotion of business financing). This law does not favour the homogeneity of data when working with platforms that are not regulated, as is the case with crowdfunding platforms based on rewards or donations.

Crowdfunding represents a phenomenon that is advancing rapidly that, as in all scenarios where money flows between individuals, requires appropriate regulation and monitoring.

The evidence from this research clearly suggests that crowdfunding platforms should be required to rigorously ensure due diligence, which could be achieved if, for example, policy makers would set certain standards (Cumming et al. 2019a).

The evolution of new technologies has allowed organizations and individuals to establish business relationships around the world through virtual platforms. Therefore, these platforms have become necessary and useful tools to motivate new entrepreneurs to carry out their ideas, providing solutions to the problems of traditional financial means.

The choice of using one type of platform or another will depend on a number of factors that the promoter of the idea considers necessary for the project, and we highlight the following:

- Crowdfunding type. For this type of alternative financing, according to Sajardo (2016), we can distinguish four types depending on the returns expected by the participants. In our case, the selected platform fits reward-based crowdfunding; however, there are three additional types: Donation-based Crowdfunding, Crowdlending and Equity Crowdfunding.
- Time horizon of the campaign: This is the anticipated time that a campaign might last to obtain the expected funding. In the case of the selected platform, we have the opportunity to perform two rounds of 40 days each.
- Financing objective: It is important to know that there is a minimum and a maximum amount to be financed. In the "all or nothing" model, which is the one followed by the platform under study, it is important that the campaign does not fail and that the minimum amount is reached. The owner/s of the idea can then receive the money from the campaign. Otherwise, they will not receive anything (Lukkarinen et al., 2016).
- Platform payment system. It is very important that funders have a secure payment system and that they are informed about the campaign's progress at all times.
- Attractiveness of the Web: It helps to efficiently disseminate the initiative, making the project as attractive as possible.
- Possibility of accessing complementary funds (called match-funding). This is a great innovation by selected platforms. Match-funding is a financing model in which public or private institutions that want to participate in the project can augment the donations that

crowdfunders make to socially committed projects, fostering and strengthening these projects.

In this case, we focused on Goteo, one of the main specialized reward-based crowdfunding platforms because we find it to be quite complete in terms of data. This study takes a new approach since the literature lacks research studying projects on this platform. In addition, this platform is a great step forward in the use of the concept of match-funding.

Currently, carrying out a crowdfunding campaign is an opportunity for social economy projects. In most cases, with the Goteo platform, these opportunities increase since the platform has a team of advisers who help, motivate and accompany the promoters of ideas throughout the process, providing all kinds of information necessary for a successful campaign. This process is important because it helps to efficiently disseminate the initiative of the promoter, to build bridges with other projects and to improve the organization and management of the team.

According to the platform under study, the projects selected by Goteo are carried out under what they call ethical and participative criteria. Goteo has a team of people who understand the economy and society in a different way and therefore build and support initiatives with high social commitment and an important component of social innovation. Since 2011, this platform has become a key tool for promoting third sector projects.

One of the features of the platform itself is that it is a non-profit foundation; therefore, the contributions made through it offer tax advantages and are tax-deductible, which is a unique feature among crowdfunding platforms in Spain. This situation also offers the opportunity to create expanded objectives by establishing two levels of financing: a minimum and an optimum.

This platform uses the reward crowdfunding model in which users contribute to financing a project in exchange for an incentive, a "reward", that is not necessarily economic. In some cases, participation in the project is the only reward. Sometimes this type of crowdfunding allows funders to obtain advantages, including discounts, the opportunity to meet the founders of the project or to test a product before it goes on the market, etc. In this crowdfunding model, entrepreneurs are characterized as "creators" or "founders of the project" and project supporters represent clients or co-creators instead of investors (Mollick, 2014).

In this regard, this paper provides new evidence on the determinants that influence crowdfunding success based on rewards in Spain, the concrete effects of some project members' experiences in similar crowdfunding projects, the proximity to crowdfunders, and the funding goal of the campaign.

This study pioneers the research focused on the determinants that influence crowdfunding success based on rewards in Spain. This study is also innovative because it has been conducted by applying a methodology that has not been applied much in the field of crowdfunding. In addition, the data used in this research are unique because they have been manually collected from the Spanish Goteo platform, which no other researcher has previously analysed in relation to the probability of project success.

In our study, we use the literature on reward-based and equity crowdfunding because, according to Petitjean (2018), the success factors for reward and equity-based crowdfunding projects appear to be similar.

The structure of the remainder of this paper is as follows. Section 2 presents the data and discusses the methodology of log-linear regression and duration models. Section 3 presents the results. Finally, Section 4 states the main conclusions reached in this study.

## 2. Research design

### 2.1. Data collection

The data collected for the purpose of this paper come from Goteo, which is a collaboration and collective financing (crowdfunding) platform for socially committed projects. Goteo is based on a system that generates both individual rewards and shared returns. We hand collected data from 335 projects, and we were able to analyse 33,036 investment decisions. We believe that the analysed sample is representative because it comprises all the projects on the Goteo platform from January 2017 to October 2018.

There are two crowdfunding rounds of 40 days each. The first is an "all or nothing" round for the minimum essential budget, and the second is for an optimum sum to carry out additional improvements. These are therefore fixed campaigns. The project promoters of fixed campaigns identify a specific target and establish clear objectives that must be accomplished within a previously defined period of time. This is an all or nothing model: if the target amount is not raised, the campaign is considered unsuccessful and the funders recover their investment (Lagazio and Querci, 2018).

The platform's campaign pages, which are used by capital-seeking companies to promote their businesses and convince potential funders, were our main source of information. The platform transfers the funding amount to the companies if the funders invested at least the funding threshold. However, if the amount raised is below the investment threshold, then the campaign is unsuccessful and the funders keep their investments. According to our data, the pre-announced funding threshold was exceeded in eight out of ten campaigns launched (81%, see Table 1 for the descriptive statistics). The average funding amount increased by 5.52% in 2018 compared with that in 2017 (Table 1).

Table 2 shows the variables used in this study. The model includes the gender variable (GENDERUM) to evaluate whether there are significant differences in project success when the platform shows that the project is carried out only by women.

In accordance with Cumming et al. (2019b), on equal terms, women are more likely to succeed in fundraising within reward-based crowdfunding campaigns than males. In this sense, Greenberg and Mollick (2015) and Marom et al. (2014) indicate that although male entrepreneurs have asked for greater funding for their projects and have collected more money than female entrepreneurs, businesswomen are more successful in financing their initiatives. On the other hand, Vismara (2016) found that foundresses have the same ability to bring in investors but raise less money.

Human capital (HUMANCAPITALDUM) is used because, according to the literature, start-up's human capital attracts the attention of funders and facilitates access to financing (Gompers et al., 2008). Moreover, the funders' crowdfunding experience represents the founder's ability to successfully undertake a project (Courtney et al., 2016). In this sense, the experience of the founder and the founding teams can influence investment decisions (Hsu, 2007).

Furthermore, if a founder has previous successful crowdfunding experience, the project is more credible (Courtney et al., 2016). Thus, this variable is measured in two ways: 1) the founder/s of the campaign possess a higher academic degree and 2) the founder/s of the campaign have previous experience in carrying out the activity or project to be performed/developed. The educational level/s of the founder/s and their

experience are related to organizational legitimacy, which allows us to explain why some business initiatives are successful and others are not (Suchman, 1995).

In addition, the ability to achieve entrepreneurial success is related to high human capital (Ahlers et al., 2015). As Brush et al. (2001) stated, human resources lead to the attraction of other resources, such as financial ones.

With respect to geography (GEOGRAPHYDUM), researchers have noted that crowdfunding has the potential to mitigate many of the effects of distance since the use of online platforms allows for the implementation of a project and for obtaining funds from anywhere in the world. In this sense, Cumming et al. (2019b) indicate that the companies that have traditionally suffered from this limitation should take advantage of this new form of financing.

However, it has sometimes been found that backers are more committed in regard to financing projects that are geographically closer. In this sense, Agrawal et al. (2010) state that funders' closeness is a key to raising funds. Additionally, in a later study, they argue that proximity increases social bonds, which may also explain why local projects obtain funding earlier than more distant projects (Agrawal et al., 2015).

The variable representing the product category (ECOLOGICALDUM) was included to evaluate the differences in project success with respect to the ecological typology. Thus, most reward-based crowdfunding platforms require developers to classify their own projects. These product categories are assimilated into the industry categories in which the entrepreneur falls in regard to raising funds. In this sense, some product categories could be more attractive and therefore entice more sponsors and raise more funds (Chan et al., 2018). Thus, each funder is attracted by different categories of projects (Weathers et al., 2007).

We used the number of funders in the study because it is considered to be a significant success factor. Crowdfunders seek to attract high numbers of sponsors (Vismara, 2016). Similarly, Greenberg et al. (2013) demonstrate that the number of funders in collective financing based on rewards enormously increases the chances of success.

For successful campaigns (those reaching their minimum targets), backers represent the number of funders who transferred funding to the project. For unsuccessful projects (those not reaching their minimal thresholds), backers represent the number of individuals who indicated their intention to invest, even though the transaction was not finalized.

The variable related to the funding sum or the amount raised represents the funds collected in successful campaigns, which are the funds invested in the project. In the case of failed projects, the collected sum is the amount that sponsors intended to invest (Lukkarinen et al., 2016).

Therefore, the funding goal is the lower end within the range of funding goals (in euros) that entrepreneurs set to raise. The low-end of the range is the most significant feature of the range target for financing and is an indicator that dictates whether a campaign is successful or not (Lukkarinen et al., 2016). Thus, Mollick (2014) and Zheng et al. (2014) show that greater funding objectives negatively impact success in reward-based crowdfunding. Moreover, the lowest funding targets are better in reward-based campaigns, and higher goals are better in collective equity financing (Belleflamme et al., 2014).

If crowdfunding platforms establish a certain minimum investment amount, minor shareholders will probably hesitate to make investments because of their limited funding sources (Rossi et al., 2019).

In addition, early funding in successful reward-based collective funding campaigns is strongly linked to early contributions (Colombo

**Table 1.** Descriptive statistics of reward crowdfunding campaigns in Spain (Goteo.org).

Campaign start year	Started campaigns	Successful campaigns (%)	Total amount raised (€)	Average amount per successful campaign (€)
2017	184	73.37	1,147,812	7,991
2018	151	90.73	1,176,222	8,432

**Source:** Elaborated by the authors. Data collected from the Goteo platform.

**Table 2.** Description of the variables.

Variable	Description
<b>Dependent variables</b>	
<i>FUNDINGLEVEL</i>	Funding sum in euros/investment threshold in euros*100
<i>FUNDERS</i>	Number of project funders
<i>FUNDINGAMOUNT</i>	Amount raised (in euros) during the campaign
<i>STATUSDUM</i>	= 1 if the project is successful; = 0 otherwise
<i>DAYSTOMINIMUM</i>	Days to raise the minimum essential budget
<b>Independent variables</b>	
<i>GENDERDUM</i>	= 1 if all project members are women; = 0 otherwise
<i>EXPERIENCEDUM</i>	= 1 if the members of the project have previous experience in similar projects; = 0 otherwise
<i>HUMANCAPITALDUM</i>	= 1 if the members of the project have university studies; = 0 otherwise
<i>GEOGRAPHYDUM</i>	= 1 if the project is located in Spain; = 0 otherwise
<i>ECOLOGICALDUM</i>	= 1 if the project type is ecological; = 0 otherwise

Source: Elaborated by the authors.

**Table 3.** Descriptive statistics of the sample (projects).

Projects characteristics	Mean	Standard Deviation	Count	Percentage
<b>GENDERDUM</b>				
Women	-	-	45	13.43%
Men	-	-	290	86.57%
<b>EXPERIENCEDUM</b>				
Yes	-	-	268	81.71%
No	-	-	60	18.29%
<b>HUMANCAPITALDUM</b>				
University studies	-	-	215	65.00%
Other studies	-	-	114	35.00%
<b>GEOGRAPHYDUM</b>				
Spain	-	-	295	88.00%
Other	-	-	40	12.00%
<i>DAYSTOMINIMUM</i>	34.10	9.93	-	-
<b>ECOLOGICALDUM</b>				
Yes	-	-	48	14.33%
No	-	-	287	85.67%
<b>STATUSDUM</b>				
Successful project	-	-	272	81.19%
Unsuccessful project	-	-	63	18.81%
<i>FUNDERS</i>	98.61	168.62	-	-
<i>CAMPAIGN GOAL</i>	14,706.31	45,689.20	-	-
<i>FUNDINGAMOUNT</i>	6,937.42	9,363.30	-	-

Source: Elaborated by the authors. Data collected from the Goteo platform.

et al., 2015). Thus, Etter et al. (2013) prove that the money committed earlier to rewarded projects predicts campaign success.

Crowdfunding platforms provide contributors with a unique space to learn about other contributors' donations and to gain visibility by providing frequent updates on the progress towards the financial goal (Flanigan, 2016).

Table 3 shows the statistical variables included in this research.

## 2.2. Econometric approach

Empirical analysis of campaign success is carried out using the ordinary least squares (OLS) regression model for the dependent variables funding level (*FUNDINGLEVEL*) and funding amount (*FUNDINGAMOUNT*), the negative binomial model for the dependent variable

<sup>1</sup> We used a negative-binomial regression for the dependent variable number of funders because it is a count variable.

number of funders (*FUNDERS*), the logit model for the binary dependent variable project success (*STATUSDUM*) and the Cox regression model for the dependent variable days it takes to meet the minimum essential budget (*DAYSTOMINIMUM*)<sup>1</sup>.

Regarding the dependent variable funding level (*FUNDINGLEVEL*), the main reason for using this cardinal dependent variable is that the funding sum is directly related to the minimum necessary amount to ensure funding (Löher et al., 2018).

$$\text{funding level} = \frac{\text{funding sum in } \text{€}}{\text{investment threshold in } \text{€}} \cdot 100 \quad (1)$$

In the logit model, the statistical dependence relationship between the explanatory variables X, which are related to the characteristics of crowdfunding projects, and the probability that the binary dependent variable Y is equal to 1 is determined by estimation of the parameters. If the binary variable is equal to 1, then the project will reach the minimum established funding, i.e., it will be successful. This relationship is defined by the following expression:

$$p(Y = 1) = \frac{e^{\beta X}}{1 + e^{\beta X}} \quad (2)$$

where  $\beta_i$  is the coefficient or parameter of the explanatory variables and  $X$  is the matrix of explanatory variables included in the model. The sign of  $\beta_i$  indicates the direction of the change in the probability of variations in the explanatory variables  $X$ . That is, when  $\beta_i$  is positive, the probability of the project being successful increases; when the sign on  $\beta_i$  is negative, the success probability decreases.

Moreover, the exponent of the parameter associated with the variable  $X_i$ , which is known as the odds ratio, is the amount by which the response advantage  $Y = 1$  is multiplied when the value of  $X_i$  increases by one unit and the values of the rest of the explanatory variables do not change. The probability of the event occurring increases if there is a positive sign in the exponent. If the latter is negative, then the probability decreases. Finally, if the coefficient is near zero, then the resulting value will be close to the unit and will have little influence on the probability of the event.

Finally, we discuss the methodology of duration models to explain the time it takes for a crowdfunding project to reach its minimum essential budget. Therefore, these methods consider the evolution of the leaving risk and its factors over time. Hence, to process the censored data related to situations in which the response of interest (attainment of the minimum essential budget) has not yet occurred, and when we only know that the project has not reached the minimum essential budget at least for a given period of time  $t^2$ , analysis of the duration is appropriate.

Mollick (2014) and Signori and Vismara (2018) also apply duration analysis in their studies. Thus, whereas Mollick (2014) used a Cox proportional risk model to forecast the delay of Technology and Design projects, Signori and Vismara (2018) used the competing risks proportional hazard duration model.

The Kaplan–Meier estimator of the survival function  $S(t)$  (Kaplan and Meier, 1958), which represents the probability of reaching the minimum essential budget just before duration  $t$ , or, in general, the likelihood that the occurrence of the interest event did not happen in time  $t$ , is given by

$$\hat{S} = \prod_{t_i \leq t} \left(1 - \frac{d_i}{n_i}\right) \quad (3)$$

where  $n_i$  denotes the number of projects in the risk set at  $t_i$  and  $d_i$  is the number of projects that experienced the event in time  $t_i$ . The product is mainly represented by exit times lower or equal to  $t$ .

We examined how the explanatory variables influence the risk of experiencing an event, which, in our case, is the risk of the project achieving the minimum essential budget, by analysing several variables based on the semi-parametric Cox proportional model (Cox, 1972, 1975). In this model, the hazard function of a project can be represented as follows<sup>3</sup>:

$$h(t, x_i) = h_0(t)e^{\beta x_i} \quad (4)$$

where  $h(t)$  is the expected hazard to obtain the minimum essential budget at time  $t$  and  $h_0(t)$  is the baseline hazard. This hazard is represented by an arbitrary and non-negative function of time when all covariates are set to zero,  $x$  is a vector of covariates affecting the attainment of the minimum essential budget by the project, and  $\beta$  is a coefficient vector that must be estimated<sup>4</sup>.

<sup>2</sup> A comprehensive overview of duration analysis is provided by Kiefer (1988), Therneau and Grambsch (2001) and Klein and Moeschberger (2005), among others.

<sup>3</sup> We apply the Cox proportional model and parameter estimation using the Breslow (1974) partial likelihood framework.

<sup>4</sup> The Cox model is not a fully parametric model because it does not specify the form of  $h_0(t)$ .

Weak assumptions are made regarding the shape of the hazard function because the model is semi-parametric (Cordón et al., 2018). However, the proportional hazard assumption requires the hazard ratio to remain constant over time. In other words, the hazard of one project must be proportional to the hazard of another one. Thus, the test of Grambsch and Therneau (1994) is used to prove this proportional assumption<sup>5</sup>.

The interpretation of the estimates is based on the risk ratios. Thus, we should underline that risk ratios lower (higher) than one imply a decrease (increase) of the hazard rate and an increase (decrease) of the corresponding probability of achieving the minimum essential budget, ceteris paribus. For a dummy covariate, the hazard ratio can be assumed to be the overall risk increase or the achievement rate of the collective financing project when the dummy equals 1 while all other variables remain constant.

An assessment of the overall adequacy of the model is conducted using Cox-Snell residues (Cox and Snell, 1968; Collett, 1994). The Cox-Snell residues are derived from

$$r_{C_i} = e^{\beta x_i} \hat{H}_0(t_i) \quad (5)$$

where  $\hat{H}_0(t_i)$  is the estimated baseline cumulative hazard function.

Therefore, if the Cox regression model accurately fits the data, then the cumulative hazard function conditioned to the covariant vector has an exponential distribution with a hazard rate of one.

### 3. Results

Successful crowdfunding campaigns are analysed using different approaches. We use five dependent variables: the raised funding amount, funding level, number of funders, project success status and number of days until the minimum essential budget was reached.

All the explanatory variables are based on pre-campaign information to avoid endogeneity. Thus, it is important to note the robustness of the models, as well as the absence of multicollinearity among the explanatory variables included in it (Table 4).

In the first model (Table 5), we consider the logarithm of the variable *FUNDINGAMOUNT* as a dependent variable to measure project success because the main objective of crowdfunding campaigns is typically to raise funds (Hornuf and Schwiendbacher, 2014). We obtain statistically significant positive results for the amount of funding raised for the variables that represent location (*GEOGRAPHYDUM*), previous experience (*EXPERIENCEDUM*) and university studies (*HUMANCAPITALDUM*).

Regarding the second model, the logarithm of the funding level is taken as a dependent variable because the funding sum is directly related to the minimum threshold value required to achieve the total funding needed. Specifically, the exponentiated coefficient  $\exp(\beta)$  for the experience (*EXPERIENCEDUM*) variable indicates that the funding sum is 261.65% higher in projects in which their members have previous experience in similar projects. Furthermore, the geographic location (*GEOGRAPHYDUM*) variable indicates that the funding sum is 92.51% higher in projects located in Spain than in those located outside of Spain. Concentrating on reward-based Kickstarter projects, Mollick (2014) also finds that location is critical in the crowdfunding context, showing that the closer funders are to crowdfunders, the higher the possibility of fundraising success (Table 5).

In the third model, we used the number of funders that participated in the campaign as a dependent variable. We obtain statistically significant positive results for the number of funders for the variables that represent the location (*GEOGRAPHYDUM*), previous experience (*EXPERIENCEDUM*) and university studies (*HUMANCAPITALDUM*). Regarding

<sup>5</sup> A more detailed description of the Cox model is included in Klein and Moeschberger (2005) and Hosmer and Lemeshow (1999).

**Table 4.** Correlation matrix and VIF scores.

Variable	1.	2.	3.	4.	5.	VIF	
1. HUMANCAPITALDUM	Pearson Correlation	1	0.3028*** (0.0000)	0.0482 (0.3835)	-0.0027 (0.9606)	-0.1043* (0.0588)	1.1316
2. EXPERIENCEDUM	Pearson Correlation	0.3028*** (0.0000)	1	-0.0405 (0.4644)	0.0317 (0.5668)	-0.0133 (0.8104)	1.1221
3. GENDERDUM	Pearson Correlation	0.0482 (0.3835)	-0.0405 (0.4644)	1	0.0979* (0.0735)	-0.0362 (0.5094)	1.0191
4. GEOGRAPHYDUM	Pearson Correlation	-0.0027 (0.9606)	0.0317 (0.5668)	0.0979* (0.0735)	1	0.0071 (0.8976)	1.0196
5. ECOLOGICALDUM	Pearson Correlation	-0.1043* (0.0588)	-0.0133 (0.8104)	-0.0362 (0.5094)	0.0071 (0.8976)	1	1.0124

Note. This table shows the Pearson correlation coefficients for the independent variables.

(\*), (\*\*), and (\*\*\*) : significance at the 10%, 5% and 1% levels, respectively. The p-values are given in parentheses below the coefficients.

Source: Elaborated by the authors. Data collected from the Goteo platform.

**Table 5.** Determinants of project success.

Variable	Model 1. LN(FUNDINGAMOUNT) (OLS)	Model 2. LN(FUNDING LEVEL) (OLS)	Model 3. FUNDERS (negative binomial)	Model 4. STATUSDUM (Logit)
EXPERIENCEDUM	0.7745*** (0.1675)	1.2855*** (0.1355)	0.5164*** (0.1526)	3.0870*** (0.4063)
GEOGRAPHYDUM	0.9732*** (0.1729)	0.6550*** (0.1585)	0.8406*** (0.1729)	2.0118*** (0.4369)
HUMANCAPITALDUM	0.2866** (0.1360)	0.1385 (0.1097)	0.2126* (0.1252)	0.0898 (0.3739)
GENDERDUM	-0.2546 (0.1777)	-0.0811 (0.1439)	-0.2927* (0.1670)	-0.2853 (0.4683)
ECOLOGICALDUM	-0.0599 (0.1773)	-0.1908 (0.1420)	-0.1547 (0.1617)	-0.5903 (0.4532)
CONSTANT	6.6562*** (0.2326)	3.0643*** (0.1963)	3.5773*** (0.2186)	-2.1880*** (0.5253)
R-square	0.1703	0.2624		
Pseudo R-square			0.0103	0.2917

Note (\*), (\*\*), and (\*\*\*) : significant at the 10%, 5% and 1% levels, respectively. The Standard deviation are given in parentheses below the coefficients.

Source: Elaborated by the authors. Data collected from the Goteo platform.

the variable related to gender (*GENDERDUM*), it has a significant negative effect on the number of funders (Table 5).

In the fourth model, we used the binary choice logit model with a dichotomous dependent variable, which allows us to classify projects according to whether the project was successful or not, that is, whether it reached or did not reach the minimum financing objective established. Thus, 80.7% of the observed cases turned out to be well classified based on our predictions. Therefore, the variables *EXPERIENCEDUM* and *GEOGRAPHYDUM* have positive effects on the occurrence probability of the event. The interpretation of the odds ratios shows how much the occurrence ratio of the event varies as a function of the change in the explanatory variables. In fact, the value of 21.91 for the *EXPERIENCEDUM* variable indicates that when project members have previous experience in similar projects, the crowdfunding project is 21.91 times more likely to successfully reach the minimum funding target than when project members have no previous experience. In addition, the value of 7.48 for the *GEOGRAPHYDUM* variable shows that when the project is located in Spain, the project is 7.48 times more likely to be successful than when the project is not located in Spain (Table 5)<sup>6</sup>.

Furthermore, the non-parametric and semiparametric techniques of the duration analysis reveal the following results. The interest variable is the time (in days) before the crowdfunding project achieves the minimum essential budget (complete observation) or before the round ends (right-censored observation).

In Figures 1 and 2, the survival curves are shown using the Kaplan and Meier (1958) estimator method. We can see that the 50% of the projects

<sup>6</sup> Based on the equality of means test, there were significant differences for the funding amount raised, the funding level and the number of funders (p-value <0.05) for the *EXPERIENCEDUM* and *GEOGRAPHYDUM* variables.

achieve the minimum essential budget in less than 39 days. Regarding the previous experience of the members of the project on similar projects, the results show that the 25% of the projects achieve the minimum essential budget in less than 30 days when the members have experience and in less than 38 days when the members have no experience.

The results of the Cox regression model (Model 5) are provided in Table 6, which is a hazard proportional model in which the influence of a certain independent covariable on the risk rate can be easily seen through the coefficient estimates. Therefore, positive values mean higher risks and shorter periods. If the hazard rate is higher than 1, then the

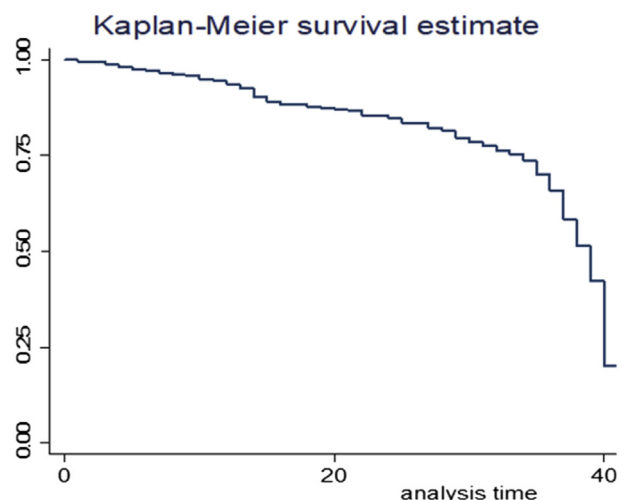
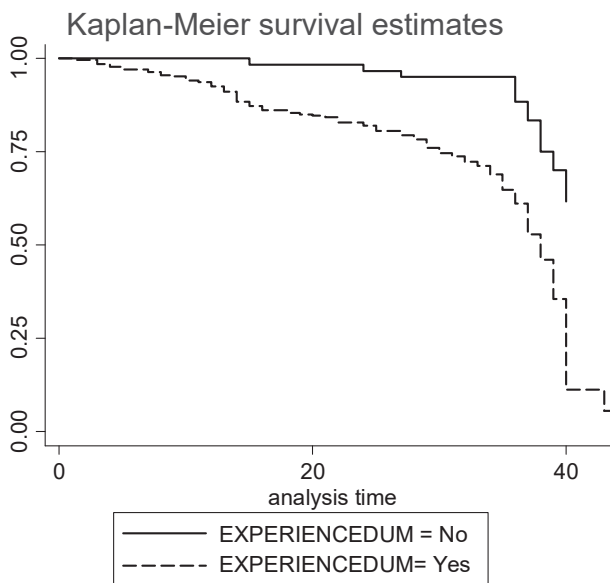


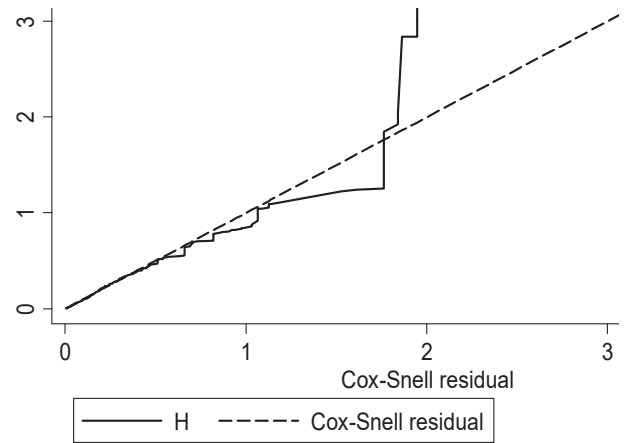
Figure 1. Survival curves obtained using the Kaplan-Meier estimator method.



**Figure 2.** Survival curves obtained using the Kaplan-Meier estimator method for the EXPERIENCEDUM variable.

covariable increases the probability that a project will raise the minimum essential budget. However, if the hazard rate is less than 1, it then the result is the opposite.

In the case that members of a project have previous experience, the hazard of obtaining the minimum essential budget is 3.61 times higher than that for those whose members do not have previous experience. Moreover, we observed that projects located in Spain also have a hazard for obtaining the minimum essential budget that is 1.71 times higher once the effects of the remaining variables in the model have been adjusted.



**Figure 3.** Cox-Snell residual plot for the Cox model.

To evaluate the relevance of each coefficient, both the partial likelihood ratio test and Wald’s test were conducted, whereas for the proportional hazard assumption, we chose visual log-log plots. We tested the assumption in two ways, both analytically and using the Schoenfeld residual values, using a non-zero slope test of the generic linear regression of the Schoenfeld residual values scaled as a function of time, which is the same as proving the proportional hazard assumption, that is, that the log hazard ratio remains constant over time. Therefore, as Grambsch and Therneau (1994) stated, a deviation from the proportional hazard assumption comes from rejecting the null hypothesis of a zero slope. Table 7 shows that there is no evidence of a violation of the proportional hazard assumption.

The Cox-Snell residual graph for the Cox proportional hazard model is used to evaluate the overall fitting of the model. When the model accurately adjusts the data, the graph of the cumulative hazard compared to the residual of Cox-Snell should show an exponential

**Table 6.** Proportional hazard model estimation (model 5).

Variable	Coefficient	Hazard rate	p-values
EXPERIENCEDUM	1.2830*** (0.2248)	3.6075 (0.8108)	0.000
GEOGRAPHYDUM	-0.5364** (0.2206)	1.7099 (0.3772)	0.015
HUMANCAPITALDUM	-0.0553 (0.1390)	0.9462 (0.1316)	0.691
GENDERDUM	-0.1443 (0.1871)	0.8656 (0.1620)	0.440
ECOLOGICALDUM	0.0439 (0.1870)	1.0449 (0.1954)	0.814

Note (\*) (\*\*), and (\*\*\*) : significant at the 10%, 5% and 1% levels, respectively. The Standard deviation are given in parentheses below the coefficients. Log-likelihood -1345.4077.

Source: Elaborated by the authors. Data collected from the Goteo platform.

**Table 7.** Test results for proportional hazards.

Variable	Estimated $\rho$	$\chi^2$ statistic	g.l.	p-value
EXPERIENCEDUM	-0.0141	0.05	1	0.8229
GEOGRAPHYDUM	-0.0508	0.71	1	0.3996
HUMANCAPITALDUM	0.0598	0.91	1	0.3403
GENDERDUM	0.0454	0.54	1	0.4642
ECOLOGICALDUM	-0.0884	2.13	1	0.1442
Test global		5.22	5	0.3895

Source: Elaborated by the authors. Data collected from the Goteo platform.

distribution. For example, it should be a line straight from the origin with a slope of 1. Figure 3 shows that the Cox model properly fit the data.

#### 4. Conclusions

Crowdfunding is an alternative source of financing for many entrepreneurs. The opportunities that this source of financing provides should be exploited since it allows access to resources that otherwise could not be obtained or would have a significant cost. The rapid growth of this practice in recent years and the flows of money that this situation causes, require policymakers and intermediaries to get involved.

In this study, we focused on reward-based crowdfunding. This type of crowdfunding is usually related to socially committed projects, which are aimed at developing actions promoted by entities (foundations, associations, and NGOs, among others) that aim to favour certain groups. Nevertheless, nonprofit organizations cannot offer money as a reward to funders. Leaders of such organizations need to innovate and not only simply copy commercial strategies (Zhou and Ye, 2018).

In this sense, conducting this type of research seems necessary since it is important to analyse the factors that influence the success of campaigns aimed at social improvement. Thus, in regard to obtaining resources, the results obtained allow us to determine the relevance of variables, such as the experience of the promoters or the location of the project, among others.

Moreover, crowdfunding is an open window to the outside world, which allows us to visualize projects that are being promoted by entrepreneurs, entities, groups and individuals. We can become funders or founders from anywhere in the world since this practice is based on online platforms that are accessible to everyone. In this sense, Rossi and Vismara (2018) stated that reaching the global market would be crowdfunding platforms' next step since they are accessible worldwide through the Internet.

However, and despite the importance of this phenomenon, there are limitations when carrying out this type of research. The first is access to data. In Spain, unlike other countries, there is no database from which to extract the necessary information; therefore, data collection was manually performed and checked project by project, with the consequent investment of time that this requires.

In addition, like Short et al. (2017), we consider that the phenomenon of crowdfunding requires endeavours to continue creating knowledge about it. In this sense, this paper contributes to crowdfunding research because it is the first study that systematically analyses the behaviour of 335 reward-based crowdfunding projects that amount to 33,036 investment decisions using hand-collected data from the Spanish Goteo platform.

This research reveals that successful crowdfunding campaigns depend on the experience of the project members since experience increases the probability of achieving the minimum goal. Thus, this feature enhances the credibility of the project.

More notably, the geographic location variable indicates that project success is higher in projects located in Spain than in those located outside of Spain, which shows that backers are more committed to financing projects that are geographically closer to them.

Furthermore, our results suggest that crowdfunding related to the support of social impact initiatives involving the ecological typology do not perform well. Due to this factor, this kind of project is not significant in the model, suggesting this variable is not the most critical driver for crowdfunding campaign success.

We hope that the present study will provide useful knowledge to several professionals, such as business people, governments, platforms and funders. Moreover, we emphasize the importance of analysing the factors that influence crowdfunding project success due to the substantial investment decisions linked to this form of financing.

#### Declarations

##### Author contribution statement

Cinta Borrero-Domínguez, Encarnación Cordón-Lagares, Rocío Hernández-Garrido: Conceived and designed the experiments; Performed the experiments; Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data; Wrote the paper.

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The authors declare no conflict of interest.

##### Additional information

No additional information is available for this paper.

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