# Crowdfunding for green projects in Europe: success factors and effects on the local environmental performance and wellbeing

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**Abstract**

Crowdfunding is a new mean to finance sustainability-oriented projects, as an alternative to traditional sources like equity capital provided by professional investors and bank loans. Several crowdfunding platforms, specialized in green and renewable energy projects, rose in European countries allowing sponsors to collect finance and retail investors to contribute to the reduction of carbon emissions.

We study the determinants of the success of 423 'green' projects published in 27 specialized crowdfunding platforms in Europe and we aim to test if the growth of 'green' crowdfunding contributed to the increase of environmental performance and wellbeing at the local level.

We find that, coherently with the hypothesis that pledgers are moved by both financial and intrinsic objectives, projects delivering some monetary or tangible benefit to the local community and equity-based projects are more likely to reach the funding target. The level of social freedom, trust in institutions and quality of public services as well as the intensity of pollution and incumbent production of renewable energy at the local level are powerful explanatory variables, too. Finally we find a significantly positive effects of green crowdfunding activity on two different indexes of environmental performance and wellbeing at the local level (EPI and SSI).

Keywords: crowdfunding; renewable energy; sustainability

# 1. Introduction

The role of alternative finance in supporting 'green' energy projects (i.e. investments aimed at reducing carbon dioxide emissions through the production of renewable energy, larger energy efficiency and innovation in green technologies, namely 'cleantech') to overcome the initial finance gap is described by the literature as a primary research goal for the future (Nielsen and Reisch, 2016; Bonzanini et al. 2016; Krupa & Harvey, 2017; Lam & Law, 2016; Mazzucato & Semieniuk, 2017; Vasileiadou et al. 2016). Environmental resources are 'public goods' (Baumol & Oates, 1988) and consequently investors are generally poorly inclined to invest for green projects as they can appropriate just a limited part of the benefits. This is the reason why on one side public authorities typically grant incentives and special tariffs to the producers of green energy and on the other side impose anti-pollution regulation. Yet the budget troubles and the capital shortage experienced by central governments and local authorities, especially in Europe, create a serious threat to the development of green projects. According to the Global Investment Alliance[1], in 2015 sustainability-themed investments fell in Europe to the lowest level in the decade and in 2016 the fall regarded all world-wide investments. National governments in the EU are alleged to have created a booming cycle by initially granting strong support for renewables then rapidly rowing back as they feared about excessive expenses for subsidies and increase in the price of electricity for industries[2]. The low price of oil also contributed to the reduced appeal of renewables.

Crowdfunding has emerged as an alternative and appealing finance source for both entrepreneurial and no-profit projects, as the volume of investments around the world boom from virtually zero before 2010 to $ 34.4 billion in 2015 (source: Crowdsourcing.org). According to Gerber et al. (2012) a number of benefits are expected by initiators of a crowdfunding campaign: fundraising, establishing relationships,

[1] Source: Global Sustainable Investment Review 2016, available at: http://www.gsi-alliance.org/members-resources/trends-report-2016/

[2] https://www.theguardian.com/environment/2016/mar/23/european-clean-tech-industry-falls-into-rapid-decline

receiving legitimacy, replicating successful experiences, increasing awareness about crowdfunders' work through social media. A better access to customers, more press coverage, and greater interest from potential employees and outside funders are other expected benefits (Mollick & Kuppuswamy, 2014). All of these characteristics make crowdfunding a very valuable financing option for initiators of green projects; indeed, a number of platforms specialized in green projects has emerged alongside generalist and well-known crowdfunding platforms like Kickstarter, Indiegogo, Crowdcube, Lending Club and Funding Circle.

In this work we aim at analyzing the determinants of the funding success of a sample of 423 green projects published in 27 specialized crowdfunding platforms, that rose in Europe during the last decade. We also aim at exploring if the green crowdfunding activity contributed to the improvement of environmental awareness, performance and wellbeing at the local level, thus moving towards a sustainable society.

The topic analyzed in this work is relevant because of three main reasons. First, understanding the critical success factors of fundraising for green projects is important to address environmental and economic policies around Europe in order to favor the achievement of the national and EU goals[3]. Second, crowdfunding is becoming more and more relevant as a source of capital, especially for small and financially constrained activities, and this urges for more academic research in this field. Third, crowdfunding is not only a mean to finance a project, but also a way to enact a more inclusive and democratized society. This aspect is particularly important for green projects: increasing the local awareness, and creating a consensus in order to overcome opposition and distrust about the local impact of renewable energy and green infrastructures, may speed up investments and avoid the 'not-in-my-backyard' syndrome.

[3] The EU Seventh Environment Action Programme (EAP) identifies three key policy objectives: (i) to protect, conserve and enhance the Union's natural capital, (ii) to turn the Union into a resource-efficient, green, and competitive low-carbon economy, (iii), to safeguard the Union's citizens from environment-related pressures and risks to health and wellbeing.

We find that projects delivering some monetary or tangible benefit to the local community and equity-based projects are more likely to reach the funding target, suggesting that pledgers are moved by both profitability expectations and altruistic motivations: they appreciate to become 'owners' and controllers of the project. The level of social freedom, trust in institutions and quality of public services as well as the intensity of pollution and incumbent production of renewable energy at the local level are powerful explanatory variables, too, revealing that localized factors matter in the success of crowdfunding campaigns. Finally we find a significantly positive effects of green crowdfunding activity on two different indexes of environmental performance and wellbeing at the local level (the Environmental Performance Index and the Social Sustainability Index) suggesting that green crowdfunding plays a relevant role in moving towards a sustainable and environmentally-friendly society.

We contribute to the existing literature in a number of ways. Preliminarily, our work is the first to study a comprehensive dataset of green crowdfunding projects published on specialized platforms[4]. Then, to our knowledge we are the first to document the positive effect of crowdfunding on standard measures of environmental performance and wellbeing at the local level. Finally, we add to the nascent literature facing the relationship between 'local' factors and crowdfunding outcome (Agrawal et al., 2011; Giudici et al., 2017a), considering for the first time the level of social freedom, trust in institutions and quality of public services as well as the pollution magnitude.

The remainder of this work is organized as follows. Section 2 reviews the existing literature on crowdfunding, focusing on the crowdfunding for sustainable and 'green' projects. Section 3 described the research objectives and the methodology issues. Section 4 contains the empirical analysis and finally Section 5 concludes.

[4] Bonzanini et al. (2016) study a limited sample of only 84 green projects posted from December 2013 to June 2014 on 13 crowdfunding specialized platforms.

# 2. Literature Review

Crowdfunding can be defined as the "collective effort by consumers who network and pool their money together, usually via the Internet, in order to invest in and support efforts initiated by other people or organizations" (Ordanini et al., 2011). Agrawal et al. (2011) identify three factors for the success of crowdfunding as a phenomenon. Firstly, the shortage of capital that resulted from the latest financial crisis has left many entrepreneurs starving for funding, and thus enthusiastic about any alternative financing model that could serve their needs. Secondly, the evolution of the Web 2.0 technologies has aided the development of better and more effective intermediation platforms. And, finally, the preexistent success of the crowdsourcing phenomenon has paved the way for the acceptance and spreading of the next step in user contributions to companies and projects, namely crowdfunding.

The rise of the crowdfunding activity around the world, in recent years, caught the attention of scholars, investigating on several features of the fundraising process and analyzing three group of actors which make a crowdfunding campaign possible: capital seekers (or project initiators), capital providers (or crowdfunders) and intermediaries (namely, the crowdfunding portals). All the possible research questions in the field of crowdfunding can be organized along the three dimensions identified by these three actors, their role, motivations and practices (Moritz & Block, 2016).

Through crowdfunding, project initiators do not only meet their vital financing needs but also find, or build, a channel through which they contact potential partners and obtain feedbacks on their project (Bogers et al., 2017). The joint interactions of Internet users overcome the simple sharing and knowledge creation of small groups of people, creating a much more efficient system of resource building and sharing.

On the other side of the spectrum, crowdfunders (who are either investors or donors, based on the platform's business model) can obtain a wide range of different or complementary benefits: social returns, products or services, financial returns or refunds. They are very likely to act similar to

conventional investors and evaluate basic venture capital metrics such as quality of product, strength of the entrepreneurial team, and the likelihood of success of the business plan when contributing to projects (Mollick, 2014; Moss et al., 2015). So far the literature provides evidence that crowdfunding campaigns are more likely to succeed when the funding amount or the duration of the campaign are lower, the size of project initiators' social capital is larger, or the project is located nearer to the capital providers (Frydrych et al., 2014; Mollick, 2014; Giudici et al., 2017a). The disclosure of pictures, videos, and lengthier texts also contributes to the success of crowdfunding campaigns, since they reduce information asymmetries when properly communicated, (Ahlers et al., 2015; Cumming et al., 2014; Mollick, 2014).

Crowdfunding platforms intermediate between initiators searching funds for their projects and people keen on providing money, and while taking care of the promotion of the campaigns and the modality of contact between different parties, they become the selectors and enablers of a different form of financing flow. The tasks above are carried out in exchange for a fee (usually between 2.5% and 10%). Overall, the contribution of crowdfunding platforms relies in the reduction of information asymmetries and, therefore, of the risks involved for contributors (Allen & Santomero, 1997; Berger & Gleisner, 2010; Elsner, 2013; Haas et al., 2014).

There are different business models in the crowdfunding world, each with their own dedicated web portals and each catering to certain needs of the startup or project initiator (Mollick, 2014). These models are: 1) donation-based, which creates a donor contract without existential rewards, typically adopted to finance a specific project in the social, charitable or cultural field (for collective or personal purposes); 2) reward-based, which determines a tangible gift or pre-selling contract for some type of product or service, perceived as a valuable token of appreciation from the promoters to the supporting investors; 3) lending-based, which creates an actual credit contract committing the borrower to repay the credit plus the interest, based on a rating assessment; and 4) equity-based, which takes the form of

a shareholding contract entailing ownership and profit-sharing with the company for the investor and, sometimes, voting rights. While donation, reward and pre-purchase models of crowdfunding are generally admitted in every country, lending and equity crowdfunding must comply with national rules.

Academic research has shown that social return is present within crowdfunders in all types of contributions, also when the financial component may seem dominant (Allison et al., 2015; Lin et al., 2014). Social return can be defined as the intrinsic motivation of the contributor that wants to see the project realized. In this instance, the reward is the completion and success of the project in itself, making this driver the core motive of donation-based crowdfunding. Crowdfunders are typically innovative-oriented and want to be active in the social network created by the campaign (Gerber et al., 2012; Ordanini et al., 2011). Whether the degree of social goodwill created by a project contributes to the success of a campaign has been a focal point of crowdfunding research. Eventually, Belleflamme et al. (2013) provide empirical evidence that companies or projects with a social or non-profit oriented background have a higher probability of receiving financing from the crowd, especially because of the higher credibility that non-profit organizations have in fulfilling the expectation of the project's realization.

For the reasons above, crowdfunding is the ideal source of finance for 'green' projects aimed at reducing global greenhouse (GHG) emissions through investments in renewable energy plants and technologies (Bonzanini et al., 2016). There is a growing awareness about the dangers of climate change (Pernick & Wilder, 2007) and the protection of the environment is mobilizing people, policymakers and investors around the world (Giudici et al., 2017b). Kunze & Becker (2014) identify crowdfunding as a powerful tool of communication and aggregation that can foster and amplify the already ongoing processes of democratization and participation in the energy sector. This, in turn, increases societal support for green projects and forces measures to address climate change through political pressure (Vasileiadou et al., 2016; von Ritter & Black-Layne, 2013). Moreover, in a decentralized energy generation system,

crowdfunding can contribute to reduce the NIMBY ("Not In My Back Yard") syndrome, maximizing local returns on the investment, fostering local participatory processes and empowering people (Candelise, 2015).

Traditional source of finance might also fail in supporting green projects, because of risk and uncertainty (Hart & Milstein, 1999; Frankfurt School-UNEP, 2017). Since the latest financial crisis, a significant gap resulted between supply and demand of financial resources for renewable energy projects across many countries as both governmental funding and bank financing shrank (Creutzig et al., 2014; Eleftheriadis & Anagnostopoulou, 2015; Luthra et al., 2015).

Despite the scientific relevance of the topic, academic research on green crowdfunding is still limited (Nielsen and Reisch, 2016) and empirical evidence is mixed. Cumming et al. (2017) focus on the crowdfunding of cleantech projects and highlight that it is more common in countries with low levels of individualism (and high long-term orientation) and more common when oil prices are rising. Moreover, with comparison to other projects, success of cleantech campaigns is more economically sensitive to the campaign's goal size, being not-for-profit, and having a video pitch. Dilger et al. (2017) study German energy cooperatives and find that most have a rather positive attitude towards crowdfunding, with acquisition of capital being the prime advantage they pursued. Calic & Mosakowski (2016) find that sustainability-oriented projects more easily raise money from the crowd, while Hörisch (2015) find no particular correlation between the green positioning and the success rate.

Donation-based and reward-based crowdfunding have been found to be more suitable for small-scale renewable and sustainable energy and green innovation projects during their inception and prototype stages, which are supported by concerned parties or investors who find a channel for expressing their non-financial, altruistic interest (Lam & Law, 2016). While equity- and lending-based platforms are surely more adapt to entrepreneurial endeavors that have overcome the proof-of-concept phase and can forecast (almost) imminent profitability, there are still many open questions and pitfalls related to

possible frauds, valuation issues and lack of a secondary market (Giudici, 2015). Crowdfunders, generally being unsophisticated investors, are unable to replicate screening processes and due diligence carried out by professional investors. Moreover, public market authorities have generally no power to examine any offering memorandum. Valanciene & Jegeleviciute (2013) highlight that among the most significant weaknesses of crowdfunding there are administrative and accounting challenges for the funded companies, and lower investor protection for the funders. Moreover, there is some evidence of 'herding' behavior by the crowd of unsophisticated investors backing online campaigns (Vismara, 2017). This makes them potentially unable to efficiently select crowdfunding projects.

## 3. Research questions

The research objective of our work is twofold. First, we aim at analyzing the specific determinants of the success of green crowdfunding projects, focusing also on social, cultural and institutional variables at the local (NUTS2) level, controlling for the single project and platform characteristics. Then, we aim at investigating if the success rate of crowdfunding campaigns at the regional level may contribute to the increase of collective awareness on sustainability and environmental issues, and more generally whether "green" and renewable energy crowdfunding has had a significant impact in local fights against climate change.

Characteristics of the single campaign and of the platform are pointed out by the literature as important determinants of the funding outcome in any crowdfunding process (Frydrych et al., 2014; Mollick, 2014; Ahlers et al., 2015). Dealing with renewable energy projects, we expect a particular sensitivity of pledgers to projects where a part of the benefits is shared with the local community (Bonzanini et al., 2016) as a 'compensation' for allowing the exploitation of renewable resources available at the local level through energy plants:

*H1: Green projects delivering an economic benefit to the local community are more likely to reach the target funding.*

As highlighted by the literature, crowdfunders are motivated by both financial and intrinsic objectives (Allison et al., 2015; Gerber et al., 2012; Lin et al., 2014; Ordanini et al., 2011). We posit that in green campaigns the value attributed to being an *owner* of the project is relevant, compared to simply contributing with finance. Therefore, pledgers should be happier to contribute when equity shares of the project are offered:

*H2: Equity-based green projects are more likely to reach the target funding, compared to other models of financing.*

Social norms at the local level do matter in crowdfunding processes (Giudici et al., 2017a), contributing to green projects should be perceived as more urgent in local territories where the level of social freedom, trust in institutions and quality of public service is larger. For instance, faith in policy measures has a significant effect in investment decisions regarding renewable energy (Masini & Menichetti, 2013), and institutional innovation factors (such as policy support and public-private cooperation) have been shown to have significant effects in the reduction of the barriers to eco-innovation (Polzin, von Flotow, & Klerkx, 2016):

*H3: Green projects are more likely to reach the target funding, in territories where the level of social freedom, trust in institutions and quality of public services is larger.*

Early contributors of a crowdfunding project are typically resident in the same area of the initiator (Mollick, 2014). At the local level, potential pledgers should be more willing to invest in a green project if the level of pollution is larger, and if there is a larger awareness about the benefits of renewable energy. Local communities might, thus, be in a better position to assess their current environmental risk and be more perceptive to the benefits of renewable energy projects, especially if the region of interest has

already had notable experience of clean energy production, since proven performance record of a technology has been shown to have direct effect on investment decisions regarding renewables (Masini & Menichetti, 2013). These local, early investors have a very powerful impact on campaign success (Colombo et al. 2015) and their willingness to invest might be channeled into green crowdfunding due to the pressure of local environmental factors:

*H4: Green projects are more likely to reach the target funding, in territories where the pollution rate is larger, and where a larger fraction of the energy produced is obtained from renewable sources.*

Finally, our objective is to explore the effects of the green crowdfunding process on the improvement of the life quality at the local level in terms of improvement of environmental indicators such as air quality, biodiversity and habitat, water and sanitation. Following Gerber & Hui (2013), Goodman & Polycarpou (2013) and Bartenberger & Leitner (2013) we hypothesize that mobilizing the crowd to join a 'green' crowdfunding campaign has a positive effect on the people general awareness towards environment and sustainability. The engagement concerns both pledgers (that represent a minority of the population but have become owners or financers of a green project and will be proud to contribute to the reduction of GHG emissions) and non-pledgers. The latter will be influenced by the information released during the campaign on the Internet and through the word-of-mouth effect and will be sensitized in favor of green instances. This effect is not existing when investments are financed through venture capital or bank loans, because all the information are confidential and not released to the crowd:

*H5: The number of green crowdfunding campaigns and the funds raised are positively correlated with the follow-up increase of the local awareness towards environment.*

# 4. Empirical analysis

We build a sample of 423 crowdfunding campaigns in the renewable energy sector, published on 27 European crowdfunding portals specialized in 'green' projects from 2011 to 2017. We identify the specialized platforms from their home page on the Internet, checking if the target to 'green' or 'sustainable' projects is explicitly mentioned. All the platforms have also been contacted through email for further clarification about both criteria for project posting on their websites and missing variable information. We select the single projects if they are primarily related to the production of energy from renewable sources (i.e. photovoltaics, wind, water, biomass) or to any innovative technology or project to improve the efficiency of a renewable energy plant. We focus on European platforms as they are the trend generators in the race towards financing and intermediating clean energy projects, especially given the EU's steady commitment to the Paris Climate agreement of 2015. North America and Asia have, at this stage, very few portals specialized in cleantech and clean energy.

Table 1 reports basic statistics on the campaigns. First, we highlight the technology adopted by the process. The great majority of the projects (56.7%) refers to solar energy, then we have wind mills (21.0%) followed by biomass plants (5.2%) and hybrid plants (i.e. plants combining two or more different technologies). Hydropower projects and mixed technologies require generally more funding. The success rate (i.e. the ratio between the capital raised and the initial target published on the web site) is larger for wind turbines and other green projects different from those mentioned before.

The platforms with more projects in our sample are Lendosphere (France, 14,9%) and ZonnepanelenDelen (The Netherlands). The projects published by Abundance (UK) are generally larger, while the Dutch GreenCrowd and the German GreenXMoney exhibit lower mean and median values. Interestingly, none of the platforms adopt the donation or reward based model, meaning that the target are clearly investors. This is interesting because it allows us to explore how expected profitability relates with the objective to reduce GHG emissions. Equity-type campaigns account for 6.6% of the project

sample; junior debt is issued in 15.1% of the cases while senior debt is the most common security (75.7%). Hybrid financing (i.e. convertible debt, or preferred shares) accounts for 2.6%. Equity projects are characterized by the largest success rate (this is a first qualitative proof of Hypothesis H2) while hybrid-type campaigns see the largest amount raised.

The campaigns have been published quite recently. More than one third of the projects have been raising money in 2016, and only 13.7% of the projects in the years from 2011 to 2014. The average amount of the capital raised seems to be lower from 2015 to 2017 compared to the previous period. The geographical dispersion of the projects is quite high: no single region is associated to more than 6% of the sample. Poitou-Charentes (France) and Gelderland (The Netherlands) account for 25 and 24 projects respectively.

The total money raised by the 423 projects is equal to € 191.40 million (mean value € 452,491 and median value € 111,000). The average success rate is equal to 125%. Upon request, 75% of the platforms highlighted that they never registered an unsuccessful project. Overall, 90% of the projects were successful and raised the minimum funding goal[5], which is consistent with what previously found for other peer samples (e.g. Candelise, 2016).

[5] Usually a crowdfunding campaign in the renewable energy sector sets a minimum capital threshold to be raised. If the collected funds are lower than the minimum threshold, the offer is withdrawn and money is paid back to contributors. Sometimes there is also a maximum amount of money that can be collected, especially in equity crowdfunding campaigns, according to the maximum issue size approved by shareholders. The majority of the sample projects are proposed by energy service companies (50% of the sample), then private companies (37%), public entities (6%), cooperative companies (6%) and individuals (1%).

Table 1. Basic statistics on the sampled crowdfunding campaigns. Mean values of the capital raised and success rate (ratio between capital raised and initial target capital) are reported. Median values of the capital raised in parentheses.

| | Number | Capital raised (€ '000) | Funding success rate |
|---|---|---|---|
| Project type: | | | |
| Solar energy | 240 (56.7%) | 216.26 (75.00) | 115% |
| Wind energy | 89 (21.0%) | 485.20 (179.00) | 139% |
| Biomass plants | 22 (5.2%) | 488.36 (109.00) | 98% |
| Mix of different renewables | 22 (5.2%) | 3,419.43 (435.00) | 119% |
| Hydro energy | 5 (1.2%) | 542.64 (683.00) | 96% |
| Other green technologies | 45 (10.6%) | 169.63 (136.00) | 168% |
| Platform: | | | |
| Lendosphere (France) | 63 (14.9%) | 278.22 (125.00) | 166% |
| ZonnepanelenDelen (The Netherlands) | 41 (9.7%) | 110.72 (74.00) | 102% |
| Durzaam Investeren (The Netherlands) | 32 (7.6%) | 588.50 (433.00) | 100% |
| Lumo (France) | 32 (7.6%) | 111.90 (30.00) | 86% |
| GreenCrowd (The Netherlands) | 29 (6.9%) | 80.32 (45.00) | 92% |
| GreenXmoney (Germany) | 26 (6.1%) | 29.79 (27.00) | 95% |
| Abundance (UK) | 24 (5.7%) | 1,836.94 (1,100.00) | 173% |
| Others | 176 (41.7%) | 566.66 (139.00) | 129% |
| Security type: | | | |
| Equity | 28 (6.6%) | 1,513.44 (129.00) | 183% |
| Hybrid equity/debt | 11 (2.6%) | 1,538.75 (570.00) | 139% |
| Junior debt | 64 (15.1%) | 705.33 (361.00) | 163% |
| Senior debt | 320 (75.7%) | 270.20 (86.00) | 112% |
| Year: | | | |
| 2011-2014 | 58 (13.7%) | 1,352.47 (129.00) | 108% |
| 2015 | 101 (23.9%) | 279.57 (80.00) | 126% |
| 2016 | 143 (33.8%) | 392.83 (112.00) | 121% |
| 2017 | 121 (28.6%) | 235.94 (145.00) | 127% |
| Geographical origin (NUTS2) | | | |
| Poitou-Charentes (France) | 25 (5.9%) | 62.66 (19.00) | 86% |
| Gelderland (The Netherlands) | 24 (5.7%) | 135.77 (53.00) | 96% |
| Catalonia (Spain) | 15 (3.5%) | 46.40 (30.00) | 100% |
| Pays de la Loire (France) | 12 (2.8%) | 188.84 (93.00) | 145% |
| Noord-Holland (The Netherlands) | 10 (2.4%) | 98.42 (60.00) | 104% |
| Midi-Pyrénées (France) | 10 (2.4%) | 170.68 (111.00) | 139% |
| Others | 327 (77.3%) | 553.29 (142.00) | 141% |
| Total | 423 (100.0%) | 452.49 (111.00) | 125% |

Given the dataset of projects that we built, two series of multivariate regression analyses are proposed. The first set is meant to test the determinants of campaign success for our green projects (Hypotheses H1 to H4), with the unit of analysis being the individual project. The second series of regression is meant to capture the effects of green crowdfunding campaigns on local environmental performance and wellbeing (H5), and the unit of analysis are the single regions in which the sample projects would have been implemented.

### *4.1 The determinants of the fundraising success*

In order to analyze the determinants of the campaign success, our dependent variable (*Success*) is the ratio between the capital raised by the project at the end of the campaign to the campaign's funding target level. This variable captures the degree to which a campaign was able to attract funds above the minimum target financing required.

We run a regression analysis introducing a set of independent variables. The project related variables are extracted directly from the platforms' websites, sometimes complemented by news articles (publicly available on the Internet) about the deal. The first variable is the percentage expected return for investors (*Exp_return*), which is either stated in the case of lending-based projects or computed as the expected return on investment for equity-based campaigns, i.e. ratio between the expected cash flows from the company for the year after the campaign conclusion and the initial valuation of the venture (post-money valuation). For some portals (e.g. Lendosphere in France) a base interest rate is offered to general investors and a larger return is delivered to local investors. In such cases, the floor interest rate is chosen as representative for the deal. For some other deals, there is an upward sloping yield curve and in such cases the average interest rate is used. We expect the success rate of the project to increase together with the offered expected return.

The second independent variable is the tenure of the investments (*Tenure*) in years, which sometimes proxies the duration of the project but in most cases just represent the investment horizon to which backers adhere. The presence of any benefit (other than the return to investors) from the project to the local community is captured by a 4-level ordinal variable (*Benefit*). This variable takes the maximum value of 3 for projects that not only generate a valuable service but also share the profits of the project, at least in part, with the local community, a value of 2 if they only share economic benefits, a value of 1 if they aim to deliver valuable services that are usable by the members of the local community, and a value of zero if the project provides none of such additional benefits. Under Hypothesis H1, we expect a positive and significant correlation with the dependent variable.

A series of dummy variables capture other features of the campaign such as the presence of bonuses (e.g. early bird or local resident yield bonuses) for investors (*Bonus*), the existence of an industrial partner (*Partner*) as co-sponsor, the commitment of financing by partners other than the crowd (*Commitment*), and the presence of a video in the campaign pitch (*Video*). When such features are existing, the dummy variables are equal to 1. We control for the size of the project introducing the natural log of the target funding amount (*Ln_target*). We also control for the minimum investment size allowed in the campaign (*Minimum_chip*), in euro.

The type of security offered in each project is also an information that is captured by a categorical variable distributed in the regression through three dummy variables (*Equity, Hybrid, Junior_debt*), in decreasing order of risk. Under Hypothesis H2 we expect that equity-based campaigns are significantly correlated with a larger success rate.

On the project promoter side, according to Giudici et al. (2017a) the social capital of the initiator is captured as the sum of Facebook likes, LinkedIn connections and Twitter followers (*Social*). We expect that the higher the level of social capital of the project proponent, the higher the likelihood of success.

A continuous variable captures the reputation of the platform through the count of its previously concluded campaigns (*Reputation*). Finally, a dummy variable is associated with the presence of additional valuable services offered by the platforms (*Extra_services*) such as the publication of credit scoring analyses by third parties or the existence of secondary marketplaces for the trading of the issued securities.

For each project, the NUTS-2 region in which the project is located or will be developed is recorded, thus mapping the whole sample in terms of the EU regions set by Eurostat. A Principal Component Analysis (PCA) has been conducted in order to create a factor capturing the quality of the regional socio-political environment in term of social freedom, trust in institutions and quality of public services (*Institutional_factor*) starting from three metrics and able to capture 91.9% of the total variance[6]. Under Hypothesis H3 we expect a significant positive correlation between this factor and the project success rate.

Our focus covariates for Hypothesis H4 are the PM10 air pollution rate in the project area (*Air_pollution*), the five-year average CO2 emission rate in the region (*Emission*)[7], the share of regional energy produced out of renewable energy sources (*Renewable*). The latter variables are obtained from Eurostat data, while the air pollution rate is obtained from the regional indexes published by the Social Progress Imperative research project. According to our research focus, we expect the coefficients of all three of these independent variables to be positive and significant.

Table 2 reports monovariate statistics about the regression variables. As highlighted in Table 1, the mean percentage success rate is 125%. The presence of extras in the campaign (benefits, bonuses or external commitment) is relatively not frequent, while on the contrary the presence of a sponsoring

[6] The three metrics are: 'personal freedom and choice', 'quality and accountability of government services' and 'trust in the political system'; they are measured at the regional level and are all extracted from the Social Progress Imperative research project (www.socialprogressimperative.org). The estimations of the factor analysis are available from the authors upon request.

[7] The pollution and emission indexes are obtained from the 'Kyoto basket' statistics by Eurostat.

external partner is detected in more than 50% of the cases. The mean (median) expected financial return is 5.3% (5.0%). The minimum investments accepted in the campaigns is considerably variable, from € 5 to € 20,000; yet the mean (€ 420.2) and median (€ 50) values are low enough to attract the crowd of investors allowing them to be part of the project with a very small disbursement.

Table 3 reports the correlation matrix[8], while Table 4 describes the results of the VIF test of multicollinearity. Both the tables highlight the absence of relevant issues of multicollinearity for the main covariates of the regressions pertinent to the testing of Hypotheses H1 to H4, especially given that the VIF statistics is well below the conventional threshold equal to 5.

[8] The correlation matrix does not include the variables *Junior_debt* and *Hybrid* because they are negatively correlated (by definition) with *Equity*.

Table 2. Monovariate analysis. The dependent variable is the ratio between the capital effectively raised in the campaign and the initial target amount (*Success*). All other independent variables are defined in the text. Sample size: 423 green projects published by 27 European platforms from 2011 to 2017.

| Variable | Median | Mean | Std. Dev. | Min | Max |
|---|---|---|---|---|---|
| Success | 1 | 1.25 | 0.88 | 0 | 9.99 |
| Air_pollution | 20.4 | 20.7 | 3.92 | 8 | 27 |
| Benefit | 0.0 | 0.5 | 0.89 | 0 | 3 |
| Bonus | 0.0 | 0.2 | 0.43 | 0 | 1 |
| Commitment | 0.0 | 0.2 | 0.37 | 0 | 1 |
| Emission | 86.7 | 86.3 | 14.1 | 62.9 | 125.9 |
| Equity | 0.0 | 0.1 | 0.25 | 0 | 1 |
| Exp_return | 5.0 | 5.3 | 2.66 | 0 | 41 |
| Extra_services | 0.0 | 0.2 | 0.39 | 0 | 1 |
| Hybrid | 0.0 | 0.03 | 0.16 | 0 | 1 |
| Institutional_factor | -0.2 | -0.1 | 0.90 | -3 | 2 |
| Junior_debt | 0.0 | 0.15 | 0.36 | 0 | 1 |
| Ln_target | 11.5 | 11.6 | 1.44 | 8 | 17 |
| Minimum_chip | 50.0 | 420.2 | 2,288.05 | 5 | 25,000 |
| Partner | 1.0 | 0.5 | 0.50 | 0 | 1 |
| Renewable | 12.95 | 12.96 | 9.54 | 4.89 | 51.64 |
| Reputation | 13.0 | 17.0 | 15.02 | 0 | 80 |
| Social | 297.0 | 3,306.8 | 8,433.69 | 0 | 83,331 |
| Tenure | 7.0 | 9.0 | 7.54 | 1 | 30 |
| Video | 0.0 | 0.3 | 0.45 | 0 | 1 |

Table 3. Covariates correlation matrix

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) | (14) | (15) | (16) | (17) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (1) Air_pollution | 1 | | | | | | | | | | | | | | | | |
| (2) Benefit | -0.25 | 1 | | | | | | | | | | | | | | | |
| (3) Bonus | -0.04 | 0.01 | 1 | | | | | | | | | | | | | | |
| (4) Commitment | -0.11 | 0.39 | 0.19 | 1 | | | | | | | | | | | | | |
| (5) Emission | -0.13 | 0.25 | 0.29 | 0.29 | 1 | | | | | | | | | | | | |
| (6) Equity | -0.11 | 0.46 | 0.13 | 0.22 | 0.10 | 1 | | | | | | | | | | | |
| (7) Exp_return | 0.21 | 0.21 | -0.16 | 0.10 | 0.14 | -0.20 | 1 | | | | | | | | | | |
| (8) Extra_services | 0.02 | -0.52 | -0.36 | -0.14 | -0.36 | -0.41 | 0.07 | 1 | | | | | | | | | |
| (9) Institutional_factor | 0.04 | -0.17 | 0.23 | 0.14 | 0.44 | -0.06 | -0.09 | -0.13 | 1 | | | | | | | | |
| (10) Ln_target | -0.10 | 0.27 | -0.25 | 0.07 | 0.09 | -0.04 | 0.19 | 0.05 | -0.48 | 1 | | | | | | | |
| (11) Minimum_chip | 0.03 | -0.22 | 0.10 | 0.10 | 0.09 | -0.38 | 0.09 | 0.13 | -0.13 | 0.00 | 1 | | | | | | |
| (12) Partner | -0.15 | 0.22 | 0.32 | 0.00 | 0.17 | 0.55 | -0.13 | -0.36 | -0.26 | 0.07 | -0.09 | 1 | | | | | |
| (13) Renewable | 0.61 | -0.75 | 0.07 | -0.33 | 0.06 | -0.56 | -0.01 | 0.24 | 0.39 | -0.24 | 0.22 | -0.36 | 1 | | | | |
| (14) Reputation | -0.03 | 0.39 | -0.08 | 0.35 | -0.33 | 0.10 | -0.14 | -0.03 | -0.19 | 0.20 | 0.11 | 0.01 | -0.30 | 1 | | | |
| (15) Social | -0.04 | -0.13 | -0.23 | 0.05 | -0.39 | -0.05 | -0.31 | 0.28 | -0.22 | -0.11 | 0.15 | -0.20 | -0.04 | 0.31 | 1 | | |
| (16) Tenure | 0.09 | -0.45 | -0.06 | -0.41 | -0.14 | -0.83 | 0.10 | 0.37 | -0.24 | 0.16 | 0.30 | -0.32 | 0.49 | -0.23 | 0.02 | 1 | |
| (17) Video | -0.02 | 0.15 | 0.25 | 0.02 | 0.03 | 0.45 | -0.26 | -0.35 | 0.02 | -0.34 | -0.23 | 0.48 | -0.30 | -0.06 | -0.06 | -0.38 | 1 |

Table 4. VIF Test for multicollinearity on the main covariates of the first set of regressions.

| Variable | VIF |
|---|---|
| Air_pollution | 2.43 |
| Benefit | 2.02 |
| Bonus | 1.19 |
| Commitment | 1.35 |
| Emission | 1.96 |
| Equity | 2.77 |
| Exp_return | 1.44 |
| Extra_services | 1.60 |
| Hybrid | 1.26 |
| Institutional_factor | 2.81 |
| Junior_debt | 1.60 |
| Ln_target | 1.58 |
| Minimum_chip | 1.75 |
| Partner | 1.43 |
| Renewable | 2.62 |
| Reputation | 1.30 |
| Social | 1.24 |
| Tenure | 2.14 |
| Video | 1.24 |
| Mean VIF | 1.83 |

Table 5. Determinants of the campaign success: OLS regression results (with robust standard errors). The dependent variable is the ratio between the capital effectively raised in the campaign and the initial target amount (*Success*). The independent variables are defined in the text. Standard errors in parentheses. Sample size: 423 green projects published by 27 European crowdfunding platforms from 2011 to 2017.
*, **, and *** = statistically different from zero at the 90%, 95%, and 99% levels, respectively.

| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| Air_pollution | - | - | - | - | 0.0187 * |
| | | | | | (0.011) |
| Benefit | - | - | 0.1590 *** | 0.1342 ** | 0.2014 ** |
| | | | (0.058) | (0.060) | (0.092) |
| Bonus | 0.2932 *** | 0.7463 ** | 0.7714 *** | 0.8146 *** | 1.0559 *** |
| | (0.107) | (0.2967) | (0.292) | (0.272) | (0.308) |
| Commitment | -0.0399 | -0.0390 | -0.1041 | -0.0007 | -0.0358 |
| | (0.112) | (0.113) | (0.099) | (0.094) | (0.106) |
| Emission | - | - | - | - | 0.0193 ** |
| | | | | | (0.008) |
| Equity | - | - | - | 0.3092 * | 0.534 ** |
| | | | | (0.175) | (0.242) |
| Exp_return | 0.0217 ** | 0.0292 ** | 0.0243 ** | 0.0131 * | 0.0281 * |
| | (0.010) | (0.013) | (0.011) | (0.007) | (0.017) |
| Extra_services | 0.0518 | 0.0514 | -0.1003 | -0.2008 ** | -0.2074 ** |
| | (0.087) | (0.087) | (0.096) | (0.096) | (0.095) |
| Hybrid | - | - | - | 0.4124* | -0.1512 |
| | | | | (0.226) | (0.268) |
| Institutional_factor | - | - | - | - | 0.4566 *** |
| | | | | | (0.167) |
| Junior_debt | - | - | - | 0.6821*** | 0.4966*** |
| | | | | (0.193) | (0.180) |
| Ln_target | -0.0104 | -0.0030 | 0.0010 | -0.0384 | -0.0537 ** |
| | (0.019) | (0.0192) | (0.019) | (0.024) | (0.026) |
| Minimum_chip | -16.0E-06 * | -8.98E-06 | -4.73E-06 | 0.175E-06 | -19.8E-06 ** |
| | (8.19E-06) | (7.32E-06) | (7.16E-06) | (6.57E-06) | (9.13E-06) |
| Partner | 0.0009 | 0.0144 | -0.0055 | 0.0772 | 0.1142 |
| | (0.075) | (0.078) | (0.077) | (0.083) | (0.094) |
| Renewable | - | - | - | - | 0.0432 *** |
| | | | | | (0.018) |
| Reputation | 0.0058 *** | 0.0054 ** | 0.0063 *** | 0.0065 *** | 0.0037 |
| | (0.002) | (0.002) | (0.002) | (0.002) | (0.003) |
| Social | -1.88E-06 | -3.09E-06 | -2.00E-06 | 3.42E-06 | 2.15E-06 |
| | (2.93E-06) | (3.17E-06) | (3.07E-06) | (2.47E-06) | (2.73E-06) |
| Tenure | -0.0047 | -0.0057 | -0.0067 * | -0.0143 ** | -0.0198 ** |
| | (0.004) | (0.004) | (0.004) | (0.006) | (0.009) |
| Video | 0.1480 | 0.1350 | 0.0966 | 0.0661 | 0.0540 |
| | (0.097) | (0.093) | (0.096) | (0.085) | (0.093) |
| Exp_return * Bonus | - | -0.0869 * | -0.0871 * | -0.0867 * | -0.1298 *** |
| | | (0.049) | (0.048) | (0.046) | (0.049) |
| Constant | 1.0441*** | 0.9307*** | 0.8793*** | 1.2751*** | 9.0646*** |
| | (0.237) | (0.242) | (0.244) | (0.285) | (2.509) |
| R2 (adjusted) | 4.55% | 5.39% | 8.13% | 16.49% | 22.67% |
| F-test | 3.67 *** | 3.95 *** | 4.35 *** | 4.46 *** | 3.62 *** |

Model 1 contains only the independent variables related to the project, platform and initiator characteristics; not surprisingly, we find that pledgers care about the expected return and the existence of bonuses, as well as they consider the platform reputation as a quality signal.

Model 2 introduces an interaction term between the expected return (*Exp_Return*) and the investor bonus (*Bonus*): the coefficient is weakly significant, indicating that the positive effect of an increase in expected return on project success is slightly moderated when there are other bonuses to entice investors.

Model 3 introduces the focus covariate capturing the level of benefits towards the local community (*Benefit*). According to Hypothesis H1, the estimated coefficient is significant and positive, confirming that benefits to the local community are important to crowdfunding backers.

In Model 4 we also test for Hypothesis H2, introducing the dummy variables related to the type of securities offered (junior debt, hybrid or equity-type): we observe that the adjusted R-square value increases significantly and we find that equity offerings are indeed more attractive to investors. The coefficient is positive and significant, indicating that on average the likelihood of success increases by 31 percentage points when equity is offered *vis-à-vis* straight senior debt, and this effect is after controlling for expected return or tenure differentials. Interestingly, we also observe that the issuance of junior debt is significantly and positively associated with the probability success if compared with senior debt, but also if compared with the other two security classes. This result is odd to some extent and should be more deeply investigated. On the other hand, there is no consistent significant effect for hybrid securities *vis-à-vis* senior debt. However, further tests show that hybrid securities are not perceived as having a differential attractiveness with respect to equity, at least in terms of favoring the funding goal.

Model 5 reports the estimation for the full-scale model, adding regional socio-economics controls and the focus covariates of the remaining two hypotheses related to the determination of the campaign success, namely the institutional characteristics and perceptions factor (H3), and regional air pollution,

emission amount and share of renewable electricity produced (H4). The model explains 22.7% of the variance of success rate (based on adjusted R-square coefficient). The coefficients of the focus covariates are all positive and statistically significant, confirming Hypotheses HP3 and HP4, and the significance of the other variables previously introduced seems to be robust, with the only exceptions of the *Reputation* variable and of the expected return (that becomes weakly significant): when controlling for other factors, the signaling effect of the reputation and expected profitability of the project seem to be less important in attracting investors. The effect of an increase in the level of the institutional characteristics and social perception factor *(Institutional_Factor*) has the most sizable impact on success rate, showing the fundamental importance that the preexisting social context has on overall campaign success for green and renewable energy projects. An increase in emission level or air pollution also causes improved chances of reaching (or over-reaching) the target funding. An even larger increase of the likelihood of success is caused by the increase of the rate of renewable electricity production in a region (*Renewable*). Despite a crowdfunding campaign taps contributors from any part of the world through the Internet, the literature shows that local pledgers are the most active contributors (Agrawal et al., 2011; Giudici et al. 2017a); accordingly, we posit that larger levels of pollution or emission cause more concern from local residents (those living in the region where the project is located or will be developed), and thus willingness to invest in clean energy and cleantech. Furthermore, the effect of a larger share of regional electricity being produced by renewables entices local investors through the robust proof of concept that existing similar technologies provide to potential local investors[9]. The pass-through to project success, as stressed in the hypothesis formulation, is due to the critical role that local

[9] In unreported robustness tests, alternatively we consider also the total amount of renewable energy produced in the region. We obtain no significant change in the results

and generally early investors have on the dynamics of pledging in a crowdfunding campaign (Colombo et al., 2015)[10].

*4.2 The effect of crowdfunding activity on the environmental performance and wellbeing*

The second part of the empirical analysis will test Hypothesis H5, predicting that 'green' crowdfunding activism in one local region has a positive impact on the collective environmental attitude and on the achievement of superior sustainability levels. Our dependent variables are the progress measures related to two different indexes of environmental awareness and green achievements, reported in the regional districts (NUTS2). The first measure is the Environmental Performance Index (*EPI*) developed every two years by the cooperation of various notable institutions[11]. The second dependent variable is the Social Sustainability Index (*SSI*) developed since 2006 by the Sustainable Society Foundation[12]. We measure the progress computing the difference between the log of the two indexes as at 2010 and 2016.

Then we introduce two different independent variables: the number of green and renewable energy crowdfunding campaigns in the same region (NUTS2) between 2009 and 2015 (namely *N_campaigns*) and the cumulated amount of money raised by such campaigns per region (*Funds_raised*). The sample size is made up by 84 local districts correlated with the campaigns above.

We chose four control variables, with data extracted from Eurostat and computed or adjusted at the regional level. These are the compounded annual growth rate (CAGR) from 2009 to 2015 of regional

[10] In unreported analyses for robustness tests we introduce other control variables in order to control for other possible factors: the five-year average natural gas price in the region, the regional rate of enrolment in secondary school and the rate of employment in the high-tech sector. None of these variables are found to be correlated and do change the significance of the results.

[11] The Environmental Performance Index (EPI) ranks countries' and territories' performance on high-priority environmental issues in two areas: protection of human health and protection of ecosystems. It is developed jointly by the Yale Center for Environmental Law and Policy, Columbia University, the World Economic Forum and the Joint-Research Center of the European Commission. See http://epi.yale.edu.

[12] The SSI integrates human wellbeing and environmental wellbeing. See www.ssfindex.com.

GDP (*Gdp_cagr*), of population (*Population_cagr*), of enrolment in tertiary education (*Education_cagr*), and of government healthcare expenditure (*Health_cagr*).

Table 6 presents the descriptive statistics of the variables (the data from the 95 territories seem to be quite heterogeneous) while Tables 7 and 8 present the covariates' correlation matrix and VIF tests. Also in this instance, there is no issue of multicollinearity in the data nor any other anomaly that would prevent linear regression modeling.

The regression results of the second series of models is presented in Table 9.

Table 6. Summary statistics of the regression variables for the second set of multivariate analyses. The dependent variables (*EPI* and *SSI*) and the control variables are all in percentage points. The cumulative funds raised per region (*Funds_raised*) is in € million. Sample: 84 European regional districts.

| Variable | Mean | Median | Std. Dev. | Min | Max |
|---|---|---|---|---|---|
| EPI | 18.37 | 14.44 | 6.44 | 4 | 38 |
| SSI | -7.57 | -1.50 | 12.61 | -48 | 17 |
| Education_cagr | 2.50 | 2.10 | 2.39 | -2 | 11 |
| Funds_ raised | 1.82 | 0.52 | 8.68 | 0 | 91 |
| Gdp_cagr | 1.58 | 1.94 | 3.24 | -5 | 9 |
| Health_cagr | 3.86 | 4.28 | 2.28 | -1 | 9 |
| N_campaigns | 4.43 | 2 | 5.36 | 1 | 26 |
| Population_cagr | 0.32 | 0.28 | 0.44 | -1 | 1 |

Table 7. Correlation matrix for the covariates of the regional environmental awareness effect analysis.

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| (1) Education_cagr | 1 | | | | | |
| (2) Funds_raised | -0.01 | 1 | | | | |
| (3) Gdp_cagr | -0.18 | -0.41 | 1 | | | |
| (4) Health_cagr | 0.45 | -0.05 | -0.25 | 1 | | |
| (5) N_campaigns | 0.05 | -0.74 | 0.14 | 0.12 | 1 | |
| (6) Population_cagr | -0.47 | -0.06 | -0.33 | -0.14 | -0.11 | 1 |

Table 8. VIF statistics for the covariates of the regional environmental awareness effect analysis.

| Variable | VIF |
|---|---|
| Education_cagr | 1.53 |
| Funds_raised | 1.23 |
| Gdp_cagr | 1.21 |
| Health_cagr | 1.69 |
| N_campaigns | 1.23 |
| Population_cagr | 1.26 |
| Mean VIF | 1.36 |

Table 9. Regional environmental awareness and cleantech crowdfunding: results of the OLS regression estimation (with robust standard errors). The dependent variable are EPI (models 1 and 2) and SSI (models 3 and 4). *Funds_Raised* is measured in € million. Standard errors in parentheses. Sample: 84 European regional districts.

*, **, and *** = statistically different from zero at the 90%, 95%, and 99% levels, respectively.

| | (1)<br>EPI | (2)<br>EPI | (3)<br>SSI | (4)<br>SSI |
|---|---|---|---|---|
| Education_cagr | 0.3628 | -0.4158 | -0.7348 | -0.4676 |
| | (0.341 | (0.349) | (0.544) | (0.564) |
| Funds raised | 0.0778 *** | - | 0.1469 *** | - |
| | (0.020) | | (0.034) | |
| Gdp_cagr | 0.3343 | 0.3815 | -0.8643 | -0.958 * |
| | (0.242) | (0.234) | (0.551) | (0.522) |
| Health_cagr | 1.0960 *** | 1.1403 *** | 2.679 *** | 2.939 *** |
| | (0.371) | (0.382) | (0.958) | (0.953) |
| N_campaigns | - | -0.1493 | - | 0.7149 * |
| | | (0.154) | | (0.365) |
| Population_cagr | 1.3266 | 1.7458 | -0.4102 | -1.9715 |
| | (1.567) | (1.582) | (2.769) | (2.700) |
| Constant | 22.2126 *** | 22.951 *** | 15.0344 *** | 18.675 *** |
| | (1.875) | (2.166) | (5.056) | (5.6091) |
| R2 (adjusted) | 8.46% | 33.30% | 25.31% | 27.99% |
| F-test | 14.17 *** | 2.40 *** | 28.68 *** | 11.22 *** |

The regression results confirm our expectations related to Hypothesis H5, but only for the amount of money raised. The coefficient of the number of campaigns is positively but weakly correlated only with the SSI index. Not surprisingly, the performance indexes are also strongly correlated with the improvement of government healthcare spending.

# 5. Conclusions

In this work we provide new evidence on the determinants of green crowdfunding campaigns published in specialized platforms and on the effects of fundraising activism on the local level of environmental performance and wellbeing.

Our study confirms that crowdfunding is a viable alternative to financing green entrepreneurial projects and able to overcome the typical mismatch in terms of risk perception that exists between investors and entrepreneurs in most European countries (Polzin, et al., 2017). By investigating the determinants of the funding success we find that leaving some benefits to the local community helps to achieve the funding goal, that equity-like campaigns are favored by investors, that the level of social freedom, trust in institutions and quality of public services at the local level matter, as well as the pollution level and the incidence of green energy production on total consumption. We also find that the larger is the amount of money raised by green campaigns in a given territory, the larger is the increase in the environmental performance and wellbeing ratios.

We underline the relevance of such unprecedented results in the literature for policymakers, sponsors of green energy projects and investors. Policymakers should favor the investments on green crowdfunding platforms, given the benefits in terms of contributing to overcome the funding gap for green projects, increasing the democratization of financial markets and contributing to strengthen the local awareness and wellbeing towards sustainability. Sponsors of green projects should care about building an efficient crowdfunding campaign to attract investors, leaving some benefits to the local

community and involving the crowd in the ownership of the project. Pledgers should be aware that investing in green energy projects is a smart way to diversify their portfolio, and to contribute to the reduction of GHG emissions in two ways: providing cash resources to support investments but also improving the local awareness and sensibility towards environment and sustainability.

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