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Financial-Return Crowdfunding for Energy and Sustainability in the German-Speaking Realm

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Abstract: The transformation of the energy system is among the most relevant topics of the current public debate in the German-speaking realm. Crowdfunding is suitable for promoting sustainable development, such as financing renewable energies. We investigate success determinants of financial-return crowdfunding to understand how this financing technique can contribute to realizing sustainable development, such as the energy transition. We conduct a cross-platform study and consider sustainably oriented campaigns to answer two research questions: First, what determinants influence financial-return crowdfunding success? Second, how does a sustainable orientation affect these success determinants? We rely on signaling theory to investigate the effect of quality signals. We consider four meta-platforms that aggregate campaigns with sustainable and other funding purposes, obtaining a dataset of 434 financial-return crowdfunding campaigns, mainly from Austria and Germany. We use hierarchical linear regression models for our statistical analysis. Our findings indicate that sustainable orientation alone does not significantly affect crowdfunding success. Entrepreneurs can increase their chances of campaign success by raising the interest rate unless their campaign has a sustainable orientation. In sustainably oriented campaigns, the effect of the interest rate is compensated. Finally, we find no significant evidence suggesting that the campaign duration affects sustainable or non-sustainable crowdfunding success.

Keywords: crowdfunding; crowdinvesting; crowdlending; sustainability; sustainability financing; financial return; cross-platform analysis; signaling theory

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Citation: Siebeneicher, S.; Yenice, I.; Bock, C. Financial-Return Crowdfunding for Energy and Sustainability in the German-Speaking Realm. *Sustainability* **2022**, *14*, 12239. https://doi.org/10.3390/su141912239

Academic Editor: Luigi Aldieri

Received: 17 August 2022
Accepted: 21 September 2022
Published: 27 September 2022

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1. Introduction

The volume invested in the German crowdfunding (CF) market has been growing steadily in recent years. According to the CF market report by "crowdinvest.de" [1], the real estate sector is the largest sector, followed by general corporate finance and the energy sector. This growth is observable across platforms, which differ in terms of their orientation (e.g., towards real estate or energy and sustainability) [2]. Many scholars expect CF to have the potential to contribute significantly to sustainable development [2–7]. Therefore, CF is suitable for promoting sustainable innovation [2,5,8] or financing renewable energies [6,9,10].

In the European Union, which includes Austria and Germany, the "Green Deal" is a flagship initiative to facilitate sustainable transformation [11]. In particular, Germany claims a leadership role in the global energy transition process towards a complete provision of energy from sustainable sources. If CF is to make a relevant contribution to this transition process, it is important to better understand the CF market in the German-speaking realm and especially CF with a sustainable orientation.

Research has identified four types of CF, which fundamentally all combine investments from a group of people via the internet [12]. These types can be classified into non-financial-return (e.g., donation- and reward-based CF) and financial-return CF (e.g., lending- and equity-based CF) [12,13]. However, while non-financial-return CF might be more applicable

to promote cultural ventures [14], grass-rout initiatives, and product innovations, financial-return CF might be more applicable to support relatively higher investments in established sustainable technologies [15]. In this study, we focus on the capabilities and constraints of the financial-return CF market in the German-speaking realm and aim to investigate how CF can contribute to realizing sustainable development such as the energy transition [5,10].

In the context of our study, we identify various research gaps in the literature. First, the CF literature reveals an imbalance between non-financial-return and financial-return CF, as most literature deals with non-financial-return CF [2,16,17]. Hence, observations in the context of non-financial-return CF may not be transferable to financial-return CF. Furthermore, in terms of the investment volume, financial-return CF makes up the largest portion of the market in the German-speaking realm [1]. However, this is not reflected by the number of academic publications [2,18]. In this study, we aim to shed light on financial-return CF to contribute to resolving the aforementioned imbalance. Second, following Angerer et al. [19], the determinants of CF success in the German-speaking realm are under-researched regarding financial-return CF. Therefore, our objective is to explore success determinants and to present an overview of the CF market in the German-speaking realm. Third, CF platforms take on the task of gatekeepers by pre-selecting ventures to ensure a certain level of campaign quality [20]. Hence, campaign data that are available on CF platforms might be somewhat biased due to this initial due diligence process. Since this preselection process differs in nuances for different platforms, scholars recommend conducting cross-platform studies that help compensate for potential biases [17]. To provide reliable research results, we aim to conduct a cross-platform analysis. Our first research question arises from these research gaps: What determinants influence financial-return CF success?

The literature also exposes that the effect of sustainability on CF success is unclear and ambiguous, as is the effect of sustainability on the relation between quality signals and CF success. Adding to this ambiguity is the fact that most investigations on the effect of sustainability are in the context of non-financial-return CF [2]. For example, Feng et al. [21] find indications regarding different effects of return on CF success depending on the type of CF (meaning non-financial-return vs. financial-return). Therefore, our goal is to analyze the effect of sustainability orientation on financial-return CF success and how sustainability relates to the ambiguous effects of quality signals. This ambiguity leads to our second research question: How does a sustainable orientation in financial-return CF campaigns affect CF success and the determinants of success?

Due to our research questions, our study blends into the stream of CF success research since most prior research devotes great attention to the factors facilitating campaign success [2,16,17,22,23]. Research about success factors is crucial because it can increase the efficiency of crowd-based financing, inform about innovative approaches in a complex and changing environment (e.g., information asymmetries in multi-sided markets or changing regulations), and influence the development of new CF systems [16].

Signaling theory is adequate for investigating the effect of success determinants in financial-return CF [24,25]. Signaling theory assumes an information asymmetry between CF investors and campaign-initiating entrepreneurs [26]. Investors look for appropriate signals that signal the trustworthiness and quality of interesting campaigns [25,27]. Therefore, we investigate how sustainably oriented campaigns relate to CF success and how sustainable orientation affects the relation between quality signals and campaign success.

In our study, we consider four different meta-platforms where CF campaigns with varying funding purposes and platforms are aggregated and presented. Our final dataset consists of 434 financial-return CF campaigns, mainly from Austria and Germany, and a representative percentage of campaigns from the energy and sustainability sector (14%).

We contribute to the literature on CF in general and, more particularly, to research sustainable financial-return CF. First, we provide a cross-platform overview of the German-speaking financial-return CF market, highlighting the sector of investments in energy and sustainability. Second, we contribute by confirming the findings of Vismara [3] since our

results imply no significant effect on the probability of CF success if a campaign is sustainably oriented. Campaigns with a sustainability orientation are neither more successful than conventional campaigns nor less successful. Third, entrepreneurs can increase the likelihood of success by raising the interest rate, but if a campaign has a sustainable orientation, this compensates for the effectiveness of increasing interest rates. Regarding the effect of the campaign duration, we find no significant effect and the campaigns' sustainable orientation has no significant mitigating effect on the campaign duration. Finally, from a practical perspective, we contribute that the implicit effect of sustainability enables the financing of sustainable ventures with more economic efficiency.

2. Theory and Background

2.1. Crowdfunding and Financial Return

In the beginning, CF was mainly attractive to entrepreneurs and small businesses because it helped to fulfill their capital needs, which the regular market did not provide [15,28]. Today, ventures across many industries and sizes use CF [29,30] to finance innovations [31] and interact with their audiences [32]. CF draws inspiration from microfinance (or microlending), thereby expanding access to capital for those who previously had no means of financing [33]. A key distinction of CF, compared to earlier means of financing, is that the internet has significantly facilitated the way of reaching and convincing many people and processing high volumes of investment transactions.

Bouncken et al. [34] and Jovanovic [8] provide a review of prominent definitions of CF. We rely on the definition proposed by Belleflamme et al. [12] (p. 588): "Crowdfunding involves an open call, mostly through the internet, for the provision of financial resources either in the form of donation or in exchange for the future product or some form of reward to support initiatives for specific purposes." This definition encompasses all four CF types: donation-, reward-, lending-, and equity-based CF. Essentially, the difference between these types lies in the compensation that investors receive for their investment. So-called donation-based and reward-based CF can be classified as non-financial-return CF since investors receive either an immaterial or non-monetary material return [35,36]. However, in this study, we focus on types of CF that can be classified as financial-return CF, such as lending-based and equity-based CF [6,36]. In the case of lending-based CF (also called debt-based CF or crowdlending [35,36]), just like with bank loans, investors provide capital and receive interest payments in return [15,21,37]. Lastly, equity-based CF (also called crowdinvesting [38]) refers to the concept of investors receiving actual stakes of the respective venture in exchange for equity capital [19,20,39].

All four CF types vary in terms of their complexity and risk and can be arranged in the following order, starting with the lowest complexity and risk: donation-, reward-, lending- and eventually equity-based CF as the most complex and risky type [40]. Considerations of complexity and risk play a special role since CF investors can often be considered laypersons who usually lack investment experiences and capabilities of investment assessment [41]. Intending to protect individuals from the risks associated with participating in early-stage ventures (with diverse uncertainties), it is hardly surprising that regulations are announced in the financial-return CF sector [42]. In contrast, non-financial-return CF is comparatively unregulated [43]. Nevertheless, entrepreneurs also pressure lawmakers for clear regulation since CF is beneficial for the ventures [18] and a clear legal framework facilitates sending quality signals.

In general, the CF market is two-sided [44]. Dedicated CF platforms match entrepreneurs with investors [45]. To realize the matching function, according to Younkin and Kashkooli [46], CF platforms offer solutions to four core problems, including (1) the coordination of the CF process (e.g., legal groundwork), (2) processing investment transactions, (3) gatekeeping, and (4) transferring information between entrepreneurs and investors. Regarding the fourth condition, platforms standardize the CF process and allow information to flow between the two groups [34]. Free-flowing information is essential to reducing

information asymmetries [26]. Hence, entrepreneurs provide textual descriptions, among other media, to present information and signal quality [22].

2.2. Information Asymmetries in Crowdfunding

It is recognizable that CF campaigns potentially bear high information asymmetries between entrepreneurs and investors [22,24,41,47,48]. Since the CF market is two-sided, entrepreneurs and investors have different knowledge. Wherever two parties have different knowledge, the danger of hazardous information asymmetries arises [27]. Investors have significantly less knowledge about the investment opportunities and their risks than the initiating entrepreneurs. This condition causes two problems for the crowd [49,50]: First, campaign-initiating entrepreneurs might exploit their advanced knowledge opportunistically and distort the ventures' quality. At the same time, investors can hardly assess the actual quality ("moral hazard") [26]. Second, since investors have difficulties assessing the campaigns' true quality, this may cause them to overestimate low-quality campaigns or underestimate high-quality campaigns ("adverse selection") [26]. The resulting imperfection holds the threat of causing the CF market to fail [25,26]. These threats increase the need for entrepreneurs to learn how to best communicate quality to better delineate their high-quality ventures from low-quality ventures.

Challenges resulting from information asymmetries concern both sides of CF and are especially common in financial-return CF, where complexity and risks are high [15]. On CF platforms, often inexperienced entrepreneurs have to convince investors that their products and venture have high quality and are trustworthy [49]. At the same time, most investors are inexperienced too and lack the resources to conduct extensive due diligence reinforcing the problem of adverse selection [51].

To overcome information asymmetries, entrepreneurs must disclose appropriate signals which express the actual quality of a venture or campaign. To explain and predict the effect of signals in financial-return CF, we rely on signaling theory [25]. Effective signals must be observable, fit the quality they express, be sent frequently, and be consistent with other signals [27]. While the notion of quality can have a variety of meanings, in this study, we follow Connelly et al. [27] (p. 43), who refer to quality signals as "the underlying, unobservable ability of the [entrepreneur] to fulfill the needs or demands of an [investor] observing the signal." Therefore, entrepreneurs must provide sufficient and trustworthy signals of quality [39], such as balance sheet data, patent information, human capital, venture characteristics (e.g., geographic location), etc. [52]. According to the CF literature, quality signals can be communicated in the campaigns' documentation [39], the number of social media likes [53], or the campaigns' description texts [22]. For example, the campaigns' description texts are a crucial source of information and are analyzable regarding campaign quality and the entrepreneurs' attitudes.

2.3. Financial-Return Crowdfunding in the German-Speaking Realm

In Germany and Austria, ventures typically rely on mezzanine capital when designing and running an equity-based CF campaign [54]. Hornuf and Schwienbacher [54] (p. 558), therefore, coin the term "quasi-equity" CF to describe how ventures are not solely financed through equity-based CF. Until the COVID-19 pandemic started in 2020, the German CF market had been on an exponential growth trajectory for several years [1]. The CF market report for 2020 by the meta-platforms "crowdinvest.de" [1] shows that in 2020, 292 financial-return campaigns were realized through 45 platforms, resulting in a total volume of EUR 327.8 million. In 2019, before the pandemic, the total investments had even reached a volume of EUR 417.7 million. The real estate sector makes up the largest share (EUR 254.9 million), followed by general corporate finance (EUR 54.5 million) and, in third place, the energy sector (EUR 13.4 million). Most sustainable CF campaigns are assignable to the renewable energy sector (e.g., solar power, wind energy, and heat pumps). However, the modest proportion of this segment shows that the topic of sustainability in financial-return CF is still in its infancy, which further motivates this study.

German and Austrian CF platforms generally follow the "all-or-nothing" principle with a first-come, first-serve logic [32,38] (see Section 2.5 for further details). This principle means that entrepreneurs set minimum funding goals, or minimum thresholds respectively, that they believe to achieve, enabling them to keep the raised capital. Additionally, entrepreneurs usually also define a maximum funding goal (or maximum threshold). Entrepreneurs stop accepting further investments if the total investment reaches the maximum threshold before the pre-defined funding period ends.

In Germany, CF entrepreneurs are bound by the Small Investor Protection Act (in German: Kleinanlegerschutzgesetz), which was first adopted in 2015 and last revised in 2017. Consequently, entrepreneurs must disclose certain information and follow a dedicated disclosure protocol [55]. The disclosed information encompasses the funding goal and the legally restricted maximum investment per private investor [56]. Furthermore, platforms are required to advise investors regarding potential risks and their investors' rights. As compensation for the aforementioned obligations, entrepreneurs are exempt from conducting professional due diligence to prepare a prospectus.

CF is market-oriented and competitive [32,57]. The causes of the competition are twofold. First, campaigns take place in parallel and compete against each other. Second, multiple platforms compete in the market. Platforms use different marketing activities to ensure that entrepreneurs reach the crowd [58]. A prominent example is so-called affiliate marketing. This marking method includes the CF platforms' cooperation with meta-platforms that aggregate current campaigns from diverse CF platforms and provide affiliate links to these campaigns for potential investors. Therefore, in the German-speaking realm, multiple meta-platforms exist to date, such as (1) investmentecheck.de [59], (2) kritische-anleger.de [60], (3) crowdfunding.de [61], and (4) crowdinvest.de [62]. These platforms aggregate and reference campaigns and their respective platforms. In this study, we utilize the aggregated information from these meta-platforms to conduct our analysis.

2.4. Financial-Return Crowdfunding for Sustainability

CF might have the potential to promote sustainable development and innovation [2,7,8], such as financing renewable energies [6,9]. In general, sustainable actions require considering future generations to ensure that todays' actions do not compromise the actions of future generations [63]. These considerations imply that besides generating economic gains, sustainable ventures also need to create noneconomic gains [64]. Accordingly, the prominent concept of the "Triple Bottom Line" states that sustainability is achievable by creating social justice, environmental quality, and financial prosperity simultaneously. [65,66]. In addition, the sustainable development goals (SDGs) encompass the preservation of nature, life support systems, and communities [63,67,68].

CF complies well with the above-mentioned requirements of sustainability creation and development. Financial-return CF enables realizing sustainable ventures, such as renewable energy infrastructure, while being publicly accessible on dedicated platforms with low entry barriers and distributing financial compensations among all participants. As a result, CF enables the creation of ventures that may contribute to increasing environmental quality while democratizing investments and, therefore, increase social justice and the distribution of financial prosperity.

Nevertheless, many conventional ventures fail to incorporate sustainable actions, for example, due to market imperfections, such as information asymmetries [69]. Therefore, with this study, we aim to understand how sustainable orientation affects quality signals that reduce information asymmetries.

Given the use case of renewable energies, CF is a favorable means to win support from individuals and to increase the acceptance and legitimacy of renewable energy infrastructure [6,9,10]. CF campaigns for renewable energies are typically realized as financial-return CF. Thus, they are sustainable because of the venture that is financed and because the public has the opportunity to participate and additionally profit financially. Hence, when commu-

nities or societies undergo a transformative process like the renewable energy transition, participation via CF can be an effective method to foster acceptance among people [70].

Investors may not only participate because of financial returns. By investing in renewable energies, investors can make a positive contribution to the environment and society. Such an investment could also satisfy the interest and motivation of investors to do something good for others, the public, or the environment [71].

2.5. Scales of Crowdfunding Campaign Success

In CF, success can be measured on multiple scales, depending on the aims and intentions of entrepreneurs. The selection of scales depends on the perspective of the entrepreneurs who seek capital and on the type of CF. While some entrepreneurs might be primarily interested in raising financial capital for their venture, others might be more interested in raising social capital [72–75], such as attention [4], social networks, and community [74,75], or co-creative feedback [76–78]. In summary, campaign success can be measured, first, on financial scales and, second, on scales of participation and awareness, or a mixture of both.

These scales are also reflected in the literature. For example, Shneor and Vik [16] identify four measures of success: speed of funding, social media shares, binary success, and pledge-to-goal-ratio. Especially the last measure is typical for non-financial-return CF, where investors receive a non-monetary pledge as compensation for their participation. Liang et al. [22] present a comprehensive overview of typical success measures. They list alternative success measures such as the number of investors [74] or absolute and relative capital raised.

Measuring success through a binary measure [16] is mainly used in the study of platforms that operate according to the "all-or-nothing" principle in a non-financial-return CF context (e.g., [32]). Platforms either follow the all-or-nothing or the "keep-it-all" principle [32,79]. All-or-nothing means that ventures will only receive the invested capital if the pre-defined funding goal has been reached. If the campaign does not achieve the goal, investors receive a refund and entrepreneurs leave empty-handed. Therefore, entrepreneurs are either successful in terms of reaching at least their funding goal or receive nothing, which follows the logic of a binary success variable. In campaigns that follow the keep-it-all principle, entrepreneurs receive all the money collected, regardless of whether the funding goal has been reached.

An alternative would be to operationalize the relative or absolute funding amount (e.g., [80]). Success measures that are related to the funding goal are common [48,80–82]. However, especially in the financial-return context, campaign initiators often define a funding interval, and campaigns are declared successful if the capital raised is within the intervals' minimum and maximum threshold. Since setting the range of such intervals does not follow any particular rule, measuring success based on the funding amount is not ideal.

After all, entrepreneurs choose CF not only to raise capital but also to benefit from marketing and community effects [19]. Marketing effects refer to entrepreneurs who use the attention and the publicity they gain via CF platforms to promote their campaigns [83]. Similarly, CF enables to develop communities of investors and other stakeholders [19]. Through a process of co-creation, the crowd can influence the venture and introduce innovative ideas or provide valuable feedback to entrepreneurs [24,77,78]. Moreover, campaigns can prove legitimacy because the crowd not only enables the investors' approval but also attracts potential customers [84]. The success in marketing and communal co-creation depends on the number of participating investors. Therefore, the number of investors might be a reasonable alternative measure of success.

3. Hypotheses

According to signaling theory [25], particularly in the CF context [39], signals are essential to overcome information asymmetries and to gain trust between entrepreneurs and investors. Typical signals of quality, such as videos [32], descriptions [22], reviews [53],

or team information [85] have proven to affect CF success significantly. Albeit, we point out that some of the above-mentioned quality signals are much more commonly investigated in non-financial-return CF contexts. In their literature review about success factors, Shneor and Vik [16] find differences regarding the utilization of variables depending on the type (financial-return vs. non-financial-return).

Multiple studies imply a positive effect of sustainable orientation in a non-financial-return CF context [2]. However, in general, knowledge about determinants of success for financial-return CF helps entrepreneurs deliberately mitigate information asymmetries and thus increase the likelihood of CF success [39]. In a financial-return CF context, investments and risks are higher compared to non-financial-return CF [15]. Investors may have reservations regarding the reconciliation between the campaigns' economic and sustainable orientation [86,87] and, therefore, assess campaigns with a sustainable orientation more cautiously [88]. Therefore, in a financial-return CF context, even if investors value campaigns with a sustainable orientation, such campaigns may be relatively less successful compared to campaigns with more common orientations, such as real estate [89]. Thereby, by relative success, we mean that sustainable campaigns may still be successful in terms of achieving their funding goal, yet investors may invest more conservatively.

Yet again, since investors generally appreciate sustainable purposes, they may evaluate signals of quality in campaigns with a sustainable orientation more mildly than in conventional campaigns. Therefore, if a campaign has a sustainable orientation, this may compensate for the effect of quality signals. The literature provides implications to support our claim. For instance, Chan et al. [90] find that sustainable orientation compensates for the negative effect of money salience. In Figure 1 we display our research framework.

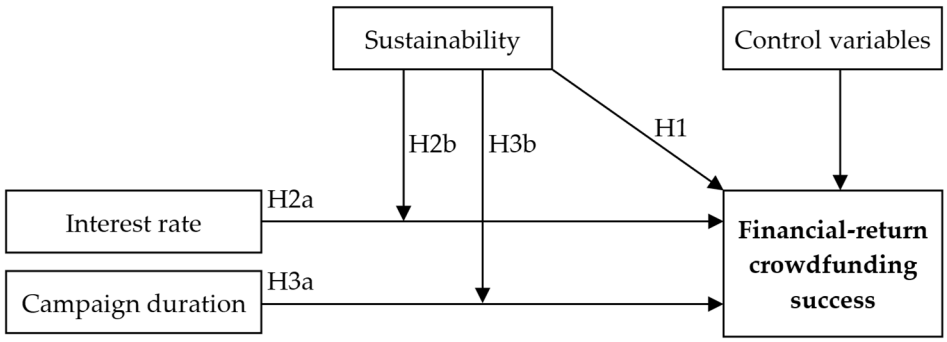


Figure 1. Research framework.

3.1. How Sustainability Affects Crowdfunding Success

We propose that despite investors generally appreciating CF campaigns with a sustainable orientation, investors are more cautious about investing in such campaigns. Therefore, sustainable CF campaigns have a relatively smaller likelihood of success compared to non-sustainable campaigns. From a signaling theory perspective, disclosing information about the intentions of a campaign, such as sustainable orientation, should positively affect CF success. However, sustainable ventures are known to have more difficulties in attaining capital than conventional ventures [88]. Although, for example, Shepherd and Patzelt [64] state that CF is capable of helping sustainable entrepreneurs to overcome financing gaps, CF investors might consider such campaigns with more reservations than conventional ones [88,91]. In this sense, if entrepreneurs signal a sustainable orientation, they may also raise preconceptions related to sustainable ventures.

The literature on sustainable CF provides ambiguous findings regarding the effect of a sustainable orientation. According to the literature, in the non-financial-return CF context, for example, Hörisch [4] finds a negative effect of environmental orientation. Meanwhile, other publications indicate positive relations between sustainable orientation and campaign success since investors tend to focus on ideas and values rather than on collaterals and business plans [7,92]. Similarly, Pitschner and Pitschner-Finn [93] find a higher success

rate for non-profit donation-based campaigns. Additionally, Calic and Mosakowski [85] suggest a positive relation between sustainable orientation and reward-based CF success. In conclusion, Böckel et al. [2] find 20 publications that promote a positive relation between sustainable orientation and CF success.

In the financial-return context, research investigating the effect of sustainable orientation is still scarce. In his investigation, Vismara [3] finds no evidence that supports a significant relation between sustainable orientation and equity-based CF success. He argues that sustainably oriented campaigns might attract so-called "restricted investors", like non-professional investors, who follow a community logic rather than a pure market logic [3].

In conclusion, based on a general reluctance towards sustainable ventures and observations about sustainable CF in previous studies, we assert that sustainable CF campaigns are relatively less successful. By relative, we mean in comparison to the entire CF market. We offer the following hypothesis:

Hypothesis 1. *If a crowdfunding campaign has a sustainable orientation, this negatively affects crowdfunding success.*

Further, we claim that investors assess quality signals in sustainable campaigns more mildly than in non-sustainable campaigns. By more mildly, we mean that the effectiveness of some success determinants might be reduced in a sustainable context compared to a non-sustainable context. In other words: In the general CF market, which spans across multiple categories or industries, the fact that a CF campaign has a sustainable orientation may compensate for the effectiveness of some quality signals as determinants of CF success. We propose this claim based on observations that are especially reported in the field of non-financial-return CF (e.g., [90]). Additionally, for example, Iyer and Kashyap [94] conclude that investors mix financial and sustainable objectives, weigh them against each other, and occasionally prefer sustainable benefits to their own financial ones. Since sustainable and economic motivations compete with each other, it is reasonable for us to examine economic decision factors as signals of quality in the context of sustainable financial-return CF. Therefore, regarding the interaction with quality signals, we propose that sustainable orientation might compensate for signals that investors would assess more critically in conventional campaigns.

3.2. How Signals of Quality and Sustainable Orientation Relate to Crowdfunding Success

We assume that the interest rate has a positive effect on CF success. However, if a campaign has a sustainable orientation, this reduces the effect of the interest rate on CF success. We consider the interest rate of return as a signal of quality in the context of both conventional and sustainable campaigns.

In CF, the expected return, such as the interest rate, is a major incentive to participate in CF campaigns [35]. The higher the interest rate of return, the more beneficial an investment opportunity for investors. Signaling high interest rates, therefore, might convince investors to participate since the interest rate is a value signal indicating what investors can expect as a financial return for their investment [27].

The literature on lending-based CF distinguishes between peer-to-peer lending (P2P, e.g., consumer lending) and peer-to-business lending (P2B, e.g., lending to ventures), the latter referring to actual lending-based CF. One has to be cautious about transferring findings from the researched area of P2P lending to the less explored research area of P2B lending (or CF) [95]. For example, regarding P2P lending, the literature suggests that the interest rate could act as a quality signal [21,96]. According to a general rule, a higher risk is compensated with higher interest rates. Consequently, higher interest rates could also mitigate the investors' willingness to participate. Additionally, the interest rate is a bullet payment, meaning that its financial compensation is paid at the end of the term, which is why investors bear a higher risk when investing [61]. Expectedly, on P2P platforms, high

interest rates usually signal lower quality, creating an adverse selection problem and, more severely, decreasing the chances of funding success [97,98].

On the contrary, in financial-return CF, many alternative signals can serve as signals of quality for investors (e.g., videos, descriptions, reviews, or team information). Presumably, the intention and quality of a campaign are much more likely expressed through the visual impression or the communication during the campaign [32,99]. Therefore, the effect of the interest rate as a signal of quality and risk may be negligible compared to other quality signals. Moreover, evidence suggests that the effect reported in P2P lending is different in P2B lending (or lending-based CF), where investors prefer higher interest rates in search of greater profitability and compensation for their investment [95].

Especially in campaigns with a sustainable orientation, the positive effect of the interest rate could play a subordinate role compared to non-sustainable campaigns. Therefore, we claim that if a campaign has a sustainable orientation, in comparison to non-sustainable campaigns, the effectiveness of the interest rate is reduced since a sustainable orientation compensates for this success determinant. In sustainable campaigns, the intention may be of primary importance, and investors could be interested in such campaigns mainly because of their sustainable aim. Thus, sustainable orientation may reduce the investors' interest in economic profits. Instead, altruistic, social, and ecologic sustainability goals may become more decisive signals [35,100,101].

In summary, the interest rate has a positive effect on the probability of CF success, and sustainable orientation moderates this relation negatively. We propose the following hypotheses.

Hypothesis 2a. *The interest rate has a significantly positive effect on the probability of crowdfunding success.*

Hypothesis 2b. *Sustainable orientation has a significantly negative moderating effect on the relation between the interest rate and crowdfunding success.*

We expect that the campaign duration negatively affects CF success. However, if a campaign has a sustainable orientation, this positively affects the relation between the campaign duration and CF success. The campaign duration is a factor that is often considered in research on CF success [32,54,82,93,102]. The campaign duration sets the funding period during which investors can invest their capital. Like before, we consider the campaign duration as a signal of quality in the context of conventional and sustainable campaigns.

According to the literature, most scholars who consider the campaign duration in their analysis find a negative effect on CF success [32,93,102]. Mollick [32] reasons that longer campaign durations could express a lack of confidence in the campaign. In terms of signaling theory, investors might perceive relatively longer campaign durations as low-quality signals. Lukkarinen et al. [102] add that a shorter campaign duration would encourage potential investors to engage faster to not miss the chance to participate (fear of missing out). Therefore, we assume that campaigns with shorter durations are more likely to be successful, but longer campaign durations have a negative effect on success.

Following our argumentation from Section 3.1 and Hypothesis 2b, if a campaign is sustainably oriented, this may reduce the negative effect of the campaign duration on CF success. Again, we claim, in comparison to non-sustainable campaigns, the sustainable orientation of a campaign has a compensating effect on the negative relation between the campaign duration and CF success. In sustainable campaigns, the intention may be of primary importance. Rather than focusing on a quick realization of the campaigns' intention, in a sustainable context, "the journey is the reward". This means it is more important to enable the visibility of ventures or participation in campaigns and to spread the idea of sustainable development through mass participation via CF. Thus, investors do not deprecate long funding durations in sustainable campaigns as much as in conventional campaigns. Therefore, if a campaign is sustainably oriented, this positively affects the relation between campaign duration and CF success. In conclusion, the campaign duration

negatively affects the probability of CF success, and sustainable orientation moderates this relation positively. We propose the following hypotheses.

Hypothesis 3a. *The campaign duration has a significantly negative effect on the probability of crowdfunding success.*

Hypothesis 3b. *Sustainable orientation has a significantly positive moderating effect on the relation between the campaign duration and crowdfunding success.*

4. Data and Methodology

4.1. Dataset

We hand-collected data from four meta-platforms, which were all publicly available to compose the final dataset and perform our analyses. Our dataset primarily relies on the meta-platform investmentcheck.de, which provides a comprehensive list of CF campaigns. However, in some cases, where data was missing, we complemented the data by utilizing the meta-platforms crowdinvest.de, crowdfunding.de, and kritische-anleger.de. We exclude campaigns from the dataset if too much data is missing.

The meta-platforms focus on different topics and offer comparisons, ratings, investment reviews, experience reports, and discussion forums to the online community. The advantage for our study is that these meta-platforms aggregate and summarize campaign information in standardized variables, which are of general interest in CF research. With this approach, we are able to gather information from 40 distinct platforms (see Appendix A, Table A1 for a complete list), enabling a cross-platform analysis.

Our final sample covers a total of N = 434 financial-return CF campaigns mostly from the German-speaking realm (74.42% Austria, 23.50% Germany, 1.84% others). Financial-return CF in Germany and Austria usually employs mezzanine financing instruments, which also applies to our sample. The two most prevalent configurations are subordinated loans and participation loans. However, unfortunately a conclusive distinction is not possible for our sample due to missing data.

The CF platforms provide information about the category to which a campaign is assignable. We illustrate the distribution of these categories in Figure 2. Real estate-related campaigns take up the largest share (55%), whereas energy and sustainability campaigns account for 14%, focusing mostly on campaigns associated with renewable energies (e.g., solar panels or wind turbines). This distribution is consistent with observations from past studies in the German financial-return CF context [47]. The category of miscellaneous campaigns (15%) covers areas, such as health, lifestyle, design, animals, botany, and charity, which we group in one category due to their small individual proportions.

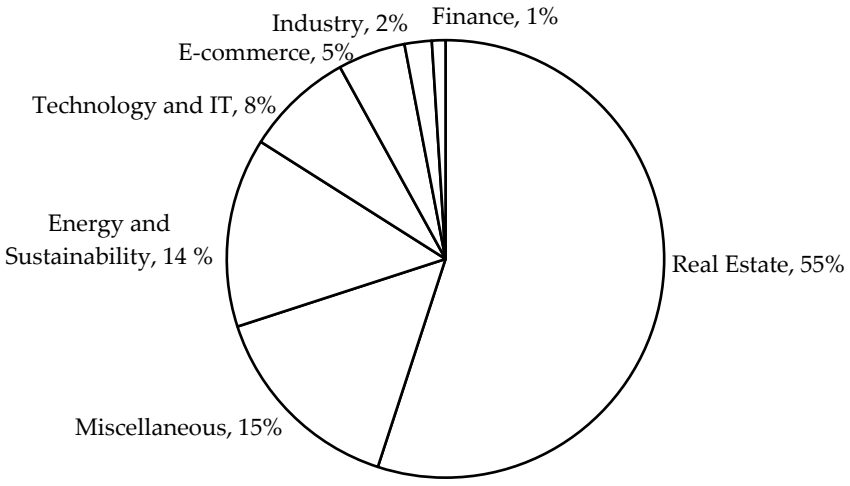


Figure 2. Campaign categories (N = 434) according to the respective CF platforms.

Regarding the campaign performance of the categories in our sample, real estate campaigns account for the highest funding volume (EUR 113.3 million), which is about six times greater than the volume of energy and sustainable campaigns (EUR 19.5 million). In comparison, the proportional difference in the number of investors is slightly smaller. The crowd is about four times larger for real estate campaigns than for energy and sustainability campaigns (see Table 1). This difference in sizes implies that the average funding per investor is generally smaller for campaigns from the energy and sustainability sector.

Table 1. Campaign performance of N = 434 CF campaigns for different categories.

Campaign Category	Raised Funds (EUR)	%	No. of Investors	%	Funding per Investor (EUR)	N	%
Real estate	113,384,725	60.8	89,340	55.9	1269.14	241	55.5
Miscellaneous	24,070,605	12.9	21,627	13.5	1112.99	64	14.7
Energy and sustainability	19,514,320	10.5	20,876	13.1	934.77	60	13.8
Technology and IT	16,565,710	8.9	14,754	9.2	1122.79	35	8.1
E-commerce	6,224,190	3.3	6783	4.2	917.62	20	4.6
Industry	5,557,400	3.0	4795	3.0	1159.00	10	2.3
Finance	1,207,170	0.6	1516	0.9	796.29	4	0.9
Total	186,524,120	100	159,691	100	1168.03	434	100
M	429,779.0		368.0				
SD	309,483.5		245.4				

Previous studies use category labels to classify CF campaigns as sustainable and non-sustainable [4]. In our dataset, we use the category energy and sustainability to represent all sustainable campaigns (14%); we classify the rest (86%) as non-sustainable. We emphasize that the campaigns have not been assigned to a particular category by the authors but by the meta-platforms that serve as a data source. We can therefore not rule out that some sustainable campaigns are assignable to other categories than the "energy and sustainability" category. However, the platform operators decide about the categorization based on certain campaign characteristics. Furthermore, most importantly, investors willing to invest sustainably would find such campaigns based on the platforms' or meta-platforms' categorization as sustainable campaigns. Consequently, we cannot influence the discriminatory power of these categorizations. Ultimately, we take a conservative approach by considering only sustainable campaigns that are explicitly identified as such by meta-platform operators.

The imbalance regarding the distribution of sustainably oriented campaigns is also reflected by the number of platforms with a respective focus. The number of platforms hosting non-sustainable campaigns is about six times greater than the number of platforms hosting sustainable campaigns. The following Table 2 shows the most prevalent ten platforms that are typically active in one of the two groups. Note that the total number of campaigns in Table 2 is greater than the number of observations in our sample because most campaigns are offered on more than one platform simultaneously.

While non-sustainable campaigns are widely hosted by larger financial-return CF platforms like dagobertinvest.de or companisto.com, sustainable campaigns tend to be offered on smaller and more specialized platforms.

Overall, our dataset comprises more non-sustainable CF campaigns than sustainable ones. The distribution of campaigns categorized as sustainable or non-sustainable roughly corresponds to the distribution of the CF market in Germany (Section 2.3) [1]. The uneven distribution could create the impression that non-sustainable campaigns are generally more successful. One argument for this impression could be that such campaigns reach more potential investors due to their broader coverage and therefore have better chances of raising capital. We account for this imbalance in our subsequent analysis.

Table 2. Top ten platforms in the sample, based on non-sustainable and sustainable campaigns.

Non-Sustainable Platforms		Sustainable Platforms	
dagobertinvest	143	bettervest	35
rocket	96	greenrocket	17
homerocket	71	green	10
home	69	rocket	10
companisto	67	conda	9
conda	42	econeers	8
greenrocket	34	financeads	4
partner	24	companisto	3
reval	24	wiwin	2
green	21	ecozins	1
Remaining	106	Remaining	12
Total	697	Total	111

4.2. Dependent Variable

We introduced multiple scales to measure campaign success in Section 2.5. In this study, we measure CF success based on the number of investors participating in a campaign [74]. Our dependent variable is a continuous success measure which is independent of the actual funding amount that a campaign raises. To account for the variable's skewness, we log-transform the number of investors variable.

According to Mäschle [103], maximizing the number of investors is one of four objectives to increase the chances of CF success. The number of investors goes beyond pure financial performance and includes community benefits that ventures can gain from large crowds [12].

Nevertheless, the amount of capital that campaigns seek can vary significantly. Campaigns with smaller funding goals offer fewer participation opportunities than more ambitious ones. Therefore, we control for the maximum threshold of funding, which limits participation opportunities and serves as an indicator for campaign size (see Section 4.4).

4.3. Independent Variables

To test Hypothesis 1, we introduce the binary variable sustainability. We operationalize sustainable orientation based on the campaign categories given by the platforms, according to which we group the campaigns in our dataset. Therefore, we code campaigns that we assign to the category energy and sustainability as one and zero if they belong to a different category.

We introduce the variable interest rate to test our Hypotheses 2a,b. Depending on the type of financial-return CF and campaign-specific peculiarities, the interest rate betokens either a fix or expected return. In any case, the interest rate is a continuous variable that signals what investors will receive in return for their investment.

As the final independent variable, to test our Hypotheses 3a,b, we introduce the variable campaign duration. The campaign duration is a continuous variable measuring the number of days from campaign start to finish, according to the dates provided by the platforms. We log-transform the campaign duration to account for the variable's skewed distribution. While studies which use the campaign duration as independent variable are scarce (e.g., [104,105]), utilizing the campaign duration as control variable is quite common in prior studies (e.g., [4,32,74,85,90]).

4.4. Control Variables

Mäschle [103] recommends that if platforms or entrepreneurs want to increase their campaigns' chances of success, they should encourage early investments. Following this recommendation, some platforms offer an early-bird bonus in the form of a slightly higher interest rate than the regular interest rate. To account for such early-bird bonuses, we

introduce the binary variable early-bird offering. The early-bird offering variable is coded as one if a campaign offers an early-bird bonus and zero if campaigns offer no bonus.

Some campaigns require a minimum investment. Reasons for a minimum investment might either be to improve the ratio of administration cost per investor to investors' individual investment; furthermore, a minimum investment helps to increase the total funding amount and decrease the chances of dubious participants. We measure the variable minimum investment as a continuous variable that captures the respective amount in euros. To account for the variable's skewness, we log-transform the variable minimum investment.

Since our goal is to provide a cross-platform analysis of financial-return CF, our dataset consists of campaigns from multiple platforms. Campaigns are not restricted to one platform, as one campaign can be hosted on multiple platforms simultaneously (see Table 2). The greater the number of platforms on which a campaign is visible, the higher the likelihood of success. We account for the number of platforms on which a particular campaign is hosted. For this purpose, we operationalize the number of platforms variable as a count variable.

For example, Moy et al. [106] and Liang et al. [22] control for the number of words in the campaigns' description texts. The signaling effect of campaign descriptions has been investigated in various prior studies (e.g., [22,80,90,107–110]). Text in descriptions can reveal information about the quality and intention of campaigns [22,27]. Longer descriptions generally are a sign of quality since they entail more information which potentially reduces information asymmetries. However, too-long descriptions can also have a negative effect [22,106]. We account for the description length by counting the number of words from the description strings.

Related to the description length is the lexical diversity. We introduce the variable lexical diversity because, for example, Gorbatai and Nelson [111] find a positive effect of lexical diversity on the amount raised. In addition, lexical diversity in the context of financial-return CF, where the stakes are high, could be used by entrepreneurs to signal quality and expertise through a broad vocabulary. We calculate lexical diversity by dividing the number of unique words by the total amount of words used in the campaign description. To obtain the number of unique words, we use the R-package tidytext [112]. The package allows obtaining unique words through a tokenizer that breaks down the text string into separate word elements (or tokens). Then the tokenizer makes all equal tokens comparable by format (e.g., all lowercase). Lastly, the tokenizer aggregates equal tokens.

In previous studies, the funding goal is a frequently used predictor variable. While few studies find a positive effect of the funding goal (e.g., [102]), most studies find that the funding goal has a negative effect on CF success [48,81,82]. One reasonable explanation could be that larger funding goals express unjustified and unrealistic expectations and are harder to realize. Since, in the context of financial-return CF, the funding goal is usually not a fixed amount but rather an interval between a minimum and maximum threshold, we utilize the maximum threshold as a substitute measure. The minimum threshold appears unsuitable because, in some cases, we suspect that the minimum threshold is set extra low to ensure that at least a certain amount of capital is raised. To account for the variable's skewness, we log-transform the variable threshold.

Finally, we include six dummy variables for the years 2016 to 2021, according to the years that our dataset covers. As relevant dates, we choose the year in which a campaign takes place. The campaign year has already been used in previous studies [7,14]. By considering the years, we control for the general increase in the popularity of CF or other historic events with economic implications. Moreover, more investors may have become concerned about sustainability-related topics. Lastly, by considering years, we also control economic developments and economic cycles.

4.5. Statistical Analysis

To describe our dataset, we show our descriptive statistics in Table 3 and correlations in Table A2 in Appendix B. We choose a hierarchical OLS regression to analyze all models.

We present the results for our regression analysis with interaction terms according to Table 4. We include extensive graphs to facilitate the interpretation of the interaction effects in Figure 3. To better illustrate the interaction effect of sustainability, with regard to our Hypotheses 2b and 3b, we draw interaction graphs. Figure 3 displays the interaction of sustainability and the relation between the interest rate (Figure 3a) and the campaign duration (Figure 3b).

Table 3. Descriptive statistics.

Variables	N	Mean	Median	Std. Dev.	Variance
log(Number of investors)	434	5.688	5.795	0.716	0.513
Sustainability [bin]	434	0.141	0.000	0.348	0.121
Interest rate	434	6.031	6.500	1.885	3.555
log(Duration)	434	3.851	4.025	0.930	0.864
Early-bird offering [bin]	434	0.194	0.000	0.396	0.156
log(Minimum investment)	434	5.225	5.521	0.730	0.533
Number of platforms	434	1.548	1.000	0.756	0.572
Description length	434	1331.300	1251.000	588.824	346,713.1
Lexical diversity	434	0.734	0.731	0.084	0.007
log(Threshold)	434	11.657	11.513	0.889	0.889
Years [bin]	434	2018.830	2019	1.28	1.638

Table 4. Results of the hierarchical OLS regression analysis on the number of investors are shown in Models 1 to 6.

	log(Number of Investors)					
	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
Independent variables						
Sustainability		0.067		0.753 *		−0.338
		(0.104)		(0.427)		(0.405)
Interest rate			0.111 ***	0.124 ***		
			(0.021)	(0.022)		
log(Duration)					−0.046	−0.065
					(0.036)	(0.040)
Interest rate × Sustainability				−0.128 *		
				(0.069)		
log(Duration) × Sustainability						0.102
						(0.096)
Control variables						
Early-bird offering	0.212 **	0.211 **	0.180 **	0.189 **	0.196 **	0.200 **
	(0.091)	(0.091)	(0.088)	(0.088)	(0.091)	(0.092)
log(Minimum investment)	−0.225 ***	−0.214 ***	−0.271 ***	−0.306 ***	−0.225 ***	−0.217 ***
	(0.046)	(0.049)	(0.046)	(0.052)	(0.046)	(0.049)
Number of platforms	0.107 **	0.108 **	0.245 ***	0.246 ***	0.124 ***	0.121 ***
	(0.044)	(0.044)	(0.050)	(0.050)	(0.046)	(0.046)
Description length	0.000	0.000	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Lexical diversity	0.256	0.268	0.145	0.200	0.215	0.248
	(0.560)	(0.560)	(0.543)	(0.543)	(0.560)	(0.561)
log(Threshold)	0.223 ***	0.228 ***	0.191 ***	0.200 ***	0.221 ***	0.223 ***
	(0.037)	(0.038)	(0.037)	(0.038)	(0.037)	(0.038)
Years	Yes	Yes	Yes	Yes	Yes	Yes
Constant	1.305	1.202	1.514 *	1.490	1.561	1.583
	(0.934)	(0.948)	(0.906)	(0.919)	(0.955)	(0.973)
Observations	434	434	434	434	434	434
R-square	0.201	0.201	0.251	0.257	0.204	0.207
Adjusted R-square	0.176	0.175	0.226	0.229	0.177	0.176
p-Value	0.000	0.000	0.000	0.000	0.000	0.000

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors are reported in parentheses.

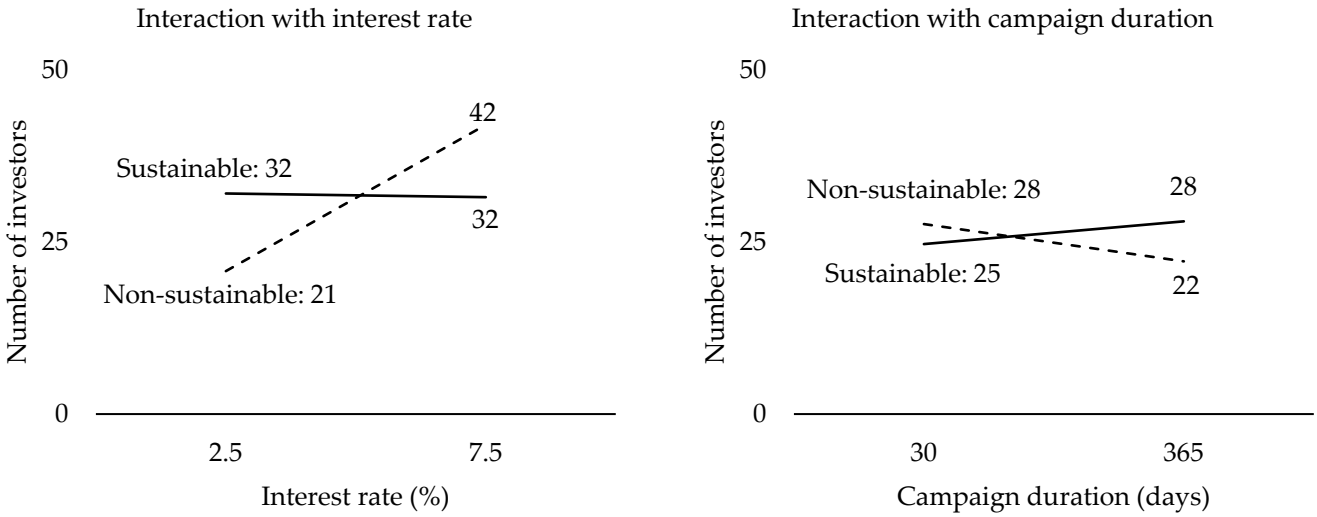


Figure 3. Graph of the interaction between sustainability and the interest rate (**a**) and the campaign duration (**b**). To ease the interpretation of scales, we reverse-transformed log-transformed variables.

5. Results

Table 4 displays the results of our regression analysis. Model 1 represents our control variables-only model. Models 2 to 6 show the regression models according to our hypotheses 1 to 3b. In Figure 3, we graph interactions in line with Models 4 and 6.

In Hypothesis 1, we claim that campaigns with a sustainable orientation are relatively less successful than conventional campaigns. We find no support for this hypothesis according to Model 2. On the contrary, we find a positive but insignificant effect of sustainability on CF success.

We propose that the interest rate positively affects CF success in Hypothesis 2a. In Model 3, we find support for our hypotheses. We find that a one unit increase in the interest rate raises the probability of CF success by ($e^{0.111} - 1 \approx$) 12% (Model 3, b = 0.111, $p < 0.01$). Hypothesis 2b predicts a negative moderating effect of sustainability on the relation between the interest rate and CF success. We find that if a campaign is sustainably oriented, an increase of the interest rate by one unit reduces the effect of the interest rate on the probability of success by $\left(e^{-0.128} - 1 \approx\right)$ −12%. Thus, according to Model 4 (b = − 0.128, $p < 0.1$), we find weak significant support for Hypothesis 2b. It is noteworthy that the reducing moderating effect of −12% almost compensates for the increasing direct effect of the interest rate of 13% (Model 4, b = $e^{0.124} - 1 \approx 0.13$, $p < 0.01$).

Figure 3a confirms the observations regarding the interaction from Models 3 and 4 in Table 4. The graph displays the interaction between sustainability and the interest rate and shows how in non-sustainable campaigns increasing interest rates raise the probability of CF success. However, Figure 3 also shows how in sustainable campaigns increasing interest rates have almost no effect on the probability of success. Thus, as much as increasing interest rates raise the probability of CF success, sustainable orientation compensates for this effect. Note that minor differences in terms of effect sizes are due to rounding.

In Hypothesis 3a, we claim that the campaign duration negatively affects CF success. We test this hypothesis in Model 5 and find no significantly negative effect. Therefore, we find no support for Hypothesis 3a.

Our Hypothesis 3b predicts that sustainability positively affects the relationship between the campaign duration and CF success. We test this prediction in Model 6. We find a positive yet not significant interaction effect. Thus, our results do not support Hypothesis 3b. Nevertheless, for the sake of completeness, we graph the interaction in Figure 3b. If the interaction effect was significant, Figure 3 had shown how the sustainable

orientation of campaigns compensates for the effect of campaign duration: While in non-sustainable campaigns, the campaign duration has a negative slope, indicating a negative effect of the campaign duration, the slope becomes positive in a sustainable context.

6. Discussion

We investigate determinants of financial-return CF success while taking sustainability into account. Based on a cross-platform approach, we analyze 434 campaigns that mainly originate between 2016 and 2021 in Austria and Germany. In our sample, about 14% of the campaigns can be categorized as energy or sustainability-related. Campaigns from the energy and sustainability category make up the third largest share in our sample, accounting for more than 10% of the total funding volume. However, more established real estate investments have a market share that is six times greater. The market shares of real estate and energy and sustainability investments may have a twofold implication: First, CF has been especially successful in raising capital for established investments such as real estate. Second, the market for future investments in energy and sustainability may still be in its infancy, especially considering the necessity for massive investments into renewable energy infrastructure. Although we do not conclude in our subsequent discussion that CF with a sustainable orientation is significantly more successful than CF for conventional campaigns, we nevertheless find that CF in sustainable campaigns offers some significant advantages.

Upon our analysis of sustainably oriented campaigns, we cannot find a significant difference in CF success between sustainable and non-sustainable campaigns. However, contrary to our prediction, we find a positive sign for the sustainability variables' coefficient in our regression analysis. We conclude that whether a campaign has a sustainable orientation may not make a difference regarding the probability of campaign success after all. Therefore, financial-return CF for sustainable campaigns, compared to non-sustainable campaigns, is competitive and presumably holds the potential for similar market performance. Our finding is in line with Vismara [3], who finds that sustainable orientation does not increase the chances of CF success.

Higher interest rates are usually associated with greater profitability for investors and, therefore, higher CF success [16]. Our findings confirm that the interest rate positively affects financial-return CF success. This observation implies that investors are generally motivated to invest because of expected financial returns. However, our findings further imply that the interest rate no longer affects CF success in campaigns with a sustainable orientation. In sustainable campaigns, CF success is almost independent of financial returns. Yet, our findings do not imply that sustainable campaigns do not require financial compensation. Instead, if a specific interest rate level is reached, entrepreneurs cannot increase the success of their campaigns through higher interest rates. The opportunity to do something good for others, such as the public, or the environment may compensate for the investors' personal expectations to make personal gains [71]. We conclude that since sustainable campaigns are not more successful than conventional ones, investors assess conventional financial indicators more mildly in a sustainability-related context. In other words: While the explicit effect of sustainable orientation is insignificant, sustainability has a significant implicit effect, at least in association with financial returns in the form of interest payments.

In terms of practical implications, our findings indicate that entrepreneurs initiating non-sustainable campaigns can increase their chances of success by increasing the interest rate. However, entrepreneurs of sustainable campaigns should not focus on attracting investors through financial interest but should convince them with other signals. Entrepreneurs benefit from this finding since they can offer lower financial obligations to achieve the same successful outcome. It remains unclear whether sustainability as a signal is an adequate alternative to convince investors.

From a theoretical perspective, our results imply that the interest rate might serve as a signal of high quality and value. Investors may not use the interest rate as an indicator

of low quality and risk [27]. In conjunction with sustainability, the interest rate loses its persuasive power. In a sustainable context, signals communicating how a campaign creates value may become more convincing and thus compensate for conventional signals of quality [92]. Additionally, information on sustainability may function as signals of quality or value by communicating how communities and the environment benefit.

Consistent with previous findings, such as by Mollick [32] and others [93,102,104], we find that longer campaign durations are negatively related to CF success. We would like to comply with the interpretation of previous scholars and argue based on signaling theory that longer campaign durations signal insecurity and thus create the impression of low quality. We test the effect of the campaigns' duration in Model 5 and Model 6. However, although the effect's direction remains consistent, we find only weak evidence supporting our claim. The campaign duration has a weak negative effect in Models 5 and 6 but is not significant. Therefore, we find no support for our Hypothesis 3a.

Moreover, investors participate to support a specific venture. With the purpose of the venture likely being highly important for investors, the length of the period between their investment transaction and the execution of the supported action might be negligible. Furthermore, since sustainable campaigns likely only deliver returns in the long run anyways, investors might not expect immediate actions right after their investment. Therefore, we predicted that investors would be milder about the duration of sustainable campaigns.

Nevertheless, contradictory to our hypotheses, we find no significantly mitigating effect on the campaign duration due to sustainable orientation. Our statistical analysis does, however, indicate that the direction of the moderating effect fits with our prediction (Figure 3). Yet we stress that we do not observe significant interaction effects concerning the relation with campaign duration.

7. Limitations and Future Research

The results of this study should be interpreted in light of its limitations, which provide indications for future studies. Our primary goal with this study is to investigate financial-return CF based on a cross-platform approach within the German-speaking realm. Unfortunately, this objective contradicts the approach of obtaining the most comprehensive dataset since the data-availability across different platforms is limited. For example, while we clearly focus on financial-return CF, our regression analysis does not distinguish between lending- and equity-based CF. Unfortunately, we could not derive a complete and considerable data basis for specific CF types due to limited data availability. Future research could further explore the differences between both types of financial-return CF. Furthermore, future research could also consider additional variables in the context of financial-return CF. In our study, we focus mainly on campaign characteristics, neglecting general signals of quality, such as variables related to the campaign creators (e.g., founder experience [3], team size [39,113]), the platforms (e.g., platform fee, platform experience [38]), and other potentially important aspects (e.g., professionalism [4], data on updates [109,114], social media coverage [32,102], creativity and aesthetics [85]). Moreover, more analytical depth is achievable by considering specific signals of quality that are related to the respective background of concern. For example, as we focus on sustainability, quality signals like CO_2 savings, the United Nations Sustainable Development Goals, the number of solar panels, or similar information signaling how sustainability is achievable could function as explanatory variables. Alternatively, for example, in the real estate business, the size of the living area, average rent per area, etc., are considerable factors. Future research, however, may be able to analyze such category-specific variables as success determinants. Since, in our study, we compare campaigns from different categories, no specific quality signal is available that all campaign categories have in common other than financial information.

Following previous research, we classify campaigns as sustainable and non-sustainable according to their categorization. In our sample, most sustainably oriented campaigns originate in the field of renewable energies. Yet, the majority of campaigns in our sample are associated with the real estate sector. Therefore, our dataset may be narrow, and the

distribution of campaigns may be out of balance. On the contrary, we emphasize that the distribution of campaign categories in our sample realistically represents the actual CF market [1]. To further develop our field of investigation, future research may draw on a more detailed dataset.

Like in previous studies on CF success, this study only addressed the pre-funding phase neglecting the post-funding phase. Arguably, the exclusive focus on the pre-funding phase oversimplifies the actual CF market [15]. In that regard, CF research typically focuses on funding success. Currently, we neglect the actual success of the funded ventures. Yet, the ventures post funding success could be analyzed from many angles, including the perspective of entrepreneurs, investors, the socio-economy, and the environment.

8. Conclusions

In this study, we explore the effect of the interest rate and campaign duration as determinants of financial-return CF success in the German-speaking realm. We base our analysis on 434 campaigns collected across 40 individual platforms. We explore how financial indicators affect CF success dependent on a conventional or sustainable orientation, with the most sustainable campaigns being in the field of renewable energy financing. To perform our cross-platform analysis with linear regression modeling, we aggregate campaigns from four meta-platforms.

Our findings imply that financial-return CF is equally well suited to finance non-sustainable campaigns, mainly in the real estate sector, and sustainable campaigns, such as renewable energy infrastructure. By equally well, we mean that we find no significant differences in terms of CF success for either of the two categories.

Further, our results imply that in a non-sustainable context, entrepreneurs can increase their campaigns' probability of success by raising the interest rate. In a sustainable context, however, investors assess the interest rate more mildly so that increasing interest rates do not affect CF success anymore. The campaigns' orientation and the prospect of doing something good may be more important. The interest rate may therefore be perceived as a signal of quality and value, which loses its effectiveness in a sustainable context. Regarding the effect of the campaign duration, we find that longer campaign durations do not affect CF success significantly and the orientation of the campaign has no significantly mitigating effect. Eventually, we assume that a greater focus on communicating campaign values might lead to more CF success in sustainable campaigns than non-sustainable ones.

We contribute to the literature on CF research by showing that energy and sustainability campaigns can be financed with CF just like conventional and more established ventures. Additionally, campaigns with a sustainable orientation have the advantage that entrepreneurs must not be convinced by financial incentives, such as the interest rate, increasing the overall economic efficiency of sustainable ventures.

Author Contributions: Conceptualization, S.S.; Data curation, I.Y.; Writing—original draft, S.S., I.Y. and C.B.; Writing—review & editing, S.S., I.Y. and C.B. All authors participated in the writing process equally. I.Y. undertook the literature review. All authors have read and agreed to the published version of the manuscript.

Funding: This work has been funded by the LOEWE initiative (Hesse, Germany) within the emergenCITY center.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: Data used in this study can be found at https://www.investmentcheck.de, last accessed on 31 August 2021, https://www.kritische-anleger.de, last accessed on 31 August 2021, https://www.crowdfunding.de, last accessed on 31 August 2021, and https://www.crowdinvest.de, last accessed on 31 August 2021.

Acknowledgments: The authors thank Stefan Loipfinger and the entire team from investmentcheck.de, who provided the foundation for the dataset used in this study with their comprehensive data collection. The authors are grateful for the valuable feedback from many colleagues, whose suggestions helped develop this manuscript. Finally, we thank three anonymous reviewers for their kind and constructive feedback.

Conflicts of Interest: The authors declare no conflict of interest.

Appendix A

Table A1. List of platforms in the dataset with numbers of campaigns. Note that some platforms may not exist anymore because they only had a project character, operating only for a limited period.

	Platform	No. of Campaigns		Platform	No. of Campaigns
1	dagobertinvest	143	21	beton	2
2	rocket	106	22	betongold	2
3	homerocket	71	23	gold	2
4	companisto	70	24	immofunding	2
5	home	69	25	zinsland	2
6	conda	51	26	2020	1
7	greenrocket	51	27	anlagehafen	1
8	bettervest	35	28	auditcapital	1
9	green	31	29	crowd	1
10	partner	25	30	dasertragreich	1
11	financeads	24	31	ecozins	1
12	reval	24	32	finnest	1
13	kapilendo	16	33	greenxmoney	1
14	aescuvest	12	34	grundag	1
15	lionrocket	12	35	invest	1
16	seedmatch	12	36	leihdeinerumweltgeld	1
17	econeers	11	37	medifundo	1
18	rendity	11	38	pizzapastaplease	1
19	lion	6	39	transvendo	1
20	wiwin	3	40	vr	1

Appendix B

Table A2. Correlation matrix.

		1	2	3	4	5	6	7	8	9	10
1	log(Number of investors)	1.00									
2	Interest rate	0.30 ***	1.00								
3	Early-bird offering	0.18 ***	−0.13 **	1.00							
4	log(Minimum investment)	−0.06	0.09	0.21 ***	1.00						
5	Number of platforms	0.07	−0.52 ***	0.29 ***	0.10 *	1.00					
6	log(Threshold)	0.36 ***	0.54 ***	−0.11 *	0.12 *	−0.33 ***	1.00				
7	Description length	−0.04	0.20 ***	−0.23 ***	−0.03	−0.30 ***	0.03	1.00			
8	Lexical diversity	0.06	−0.17 ***	0.21 ***	0.03	0.29 ***	−0.04	−0.81 ***	1.00		
9	log(Duration)	−0.13 **	−0.44 ***	−0.14 **	−0.12 **	0.31 ***	−0.26 ***	−0.06	0.04	1.00	
10	Sustainability	−0.01	−0.04	−0.06	−0.29 ***	−0.05	−0.18 ***	0.31 ***	−0.25 ***	0.12 *	1.00

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

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