

Article

# The Role of Equity Crowdfunding in the Brazilian Entrepreneurial Ecosystem: An Empirical Analysis

Ronnie Figueiredo <sup>1,2,\*</sup>  and Flavia Bendelá <sup>2,3</sup>

<sup>1</sup> Centre of Applied Research in Management and Economics (CARME), School of Technology and Management (ESTG), Polytechnic of Leiria, 2411-901 Leiria, Portugal

<sup>2</sup> Spinner Innovation Centre, 1600-237 Lisbon, Portugal; flaviabendela@gmail.com

<sup>3</sup> Department of Finance and Accounting, Rennes School of Business, 35065 Rennes, France

\* Correspondence: ronnie.figueiredo@ipleiria.pt

**Abstract:** This research provides the first deep and empirical look into Brazil's increasing equity crowdfunding, or crowdfund, market, and examines its peculiarities. It is a pioneering work dedicated to understanding which characteristics most impact the success of offers in the country, and whether there is any representative movement pointing to the inclusion of gender, firm age, and location or participation of small investors. We employ descriptive and quantitative research techniques and analyses all the offerings derived through this mechanism from 1 January 2017 to 31 December 2020—totaling 234 operations, considering successful offers (the ones that received investment) and unsuccessful offers (those that failed in raising funds), registered by 24 platforms in the country according to CVM (Comissão de Valores Mobiliários), the Brazilian SEC, under regulation Instruction 588. Furthermore, we use empirical and publicly available data from several sources. The findings reveal that mutual offers are more attractive to investors than those of equity, impacting the dependent variable of success. Besides this, firm location is the only inclusion aspect with representativeness among the independent variables tested. The main contributions of the research lie in providing the first empirical study that (1) consolidates a consistent database of the equity crowdfunding industry in Brazil, (2) reveals the role of crowdfund in Brazil, related to bank credit to SMEs, and (3) provides recommendations to the main stakeholders that can improve the whole ecosystem.

**Keywords:** equity crowdfunding; crowdfund; entrepreneurship; innovation funding; venture capital; entrepreneurial ecosystem; investors profile; offerings; SMEs



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## 1. Introduction

The crowdfunding phenomenon has spread worldwide as an alternative instrument to raise funding. In 2020, it generated USD 114 billion (Statista 2021b); however, it is expected to grow much more in the coming years. The global crowdfunding market is projected to reach a compound annual growth rate (CAGR)—the annualized average rate of revenue growth between two given years—of 11.2% from 2021 to 2027 (GlobeNewswire 2020). Crowdfunding is considered by many authors to be a powerful tool able to open market fundraising possibilities (Harriet et al. 2017; Hornuf and Schwiendbacher 2017; Bruton et al. 2015; Bessière et al. 2020; Borst et al. 2018; Vulkan et al. 2016; Belleflamme et al. 2014; Drover et al. 2017; Mollick 2014; Mochkabadi and Volkmann 2020; Bradley and Luong 2014; Turan 2015). Furthermore, it incorporates numerous modalities of operations through platforms from donation, reward-based, and support for social causes, to equity and lending crowdfunding, showing its complexity concerning the entrepreneurial ecosystem.

Equity crowdfunding, also known as crowdfund, is a crowdfunding modality focused on entrepreneurial ventures, as it allows investors to invest in new and small businesses without intermediaries. Potenza and Diniz de Oliveira (2016) state that it is a

disruptive instrument because it breaks the existing rules of business financing, especially those related to public offerings. Equity crowdfunding implies investments of higher risk levels, which builds a different relationship between investors and entrepreneurs. In 2020, the global volume of funds raised through crowdfund reached USD 4.41 billion (Statista 2021b). Even under COVID-19, this funding mechanism showed a strong trend (Arora and Forbes Agency Council 2021).

Crowdfund is considered a tool of democratization for innovation and entrepreneurial investments, as it reaches a diversity of potential investors (Cumming et al. 2021; Mollick and Robb 2016; Stieger et al. 2012; Gleasure and Feller 2016; Kim and Viswanathan 2013, 2019; Criado et al. 2013; Brem et al. 2017; Joly 2017). For example, Cumming et al. (2021) used the term “democratization” to explain social inclusion through the platforms. They investigated entrepreneurs’ diversity, such as gender, geography, and ethnicity, to understand if there is some bias or preference in investing through platforms. From another point of view, Jain (2016) highlighted that crowdfund creates social and environmental value as the economic value, helping to democratize finance, and enabling small investors to become venture capitalists.

In Brazil, equity crowdfunding emerged in 2014, and rapidly caught the attention of entrepreneurs and investors. As the interest in this fundraising modality was growing, the Comissão de Valores Mobiliários (CVM), the Brazilian SEC (US Securities and Exchange Commission), launched Instruction 588 on 13 July 2017 to regulate the market. This regulatory framework conferred responsibilities on the platforms and created a more transparent environment, intending to protect investors. One peculiarity of Instruction 588 is the possibility of offering companies three different types of operation finalization: mutual offers (loan model), equity offers (direct sale of shares), and debt convertible to shares (credit with share option) (CVM 2019).

Instruction 588 standardized the rules for transactions and stated that platforms should be registered in the CVM to operate and earn a success rate levied on start-ups (Siqueira and Diniz 2020). Thus, a new phase in this market began. The regulation brought legitimacy to operations enabled negotiation on the platforms. The number of platforms registered in Brazil increased from five in 2017 to thirty-four in 2020, fundraising more than BRL 185 million in the period. However, the Brazilian entrepreneurial ecosystem presents peculiarities, such as the lack of a venture investment culture. Furthermore, as in every emergent economy, entrepreneurs face many difficulties, such as a fragile supporting infrastructure for entrepreneurship, low levels of venture capital, a severe shortage of funding, regulation limits, few innovation-drivers for entrepreneurship, the cultural rejection of risk investment, etc. (Mendonça and Machado 2015; Nascimento and Querette 2013; Rocha and Andreassi 2020).

Previous research has examined the innovative aspects of equity crowdfunding, its potential to raise funds in comparison to venture capital, IPOs, and angel money, and themes such as disintermediation, asymmetries, and democratization. There is, however, a shortage of research on untested entrepreneurial ecosystems such as the Brazilian one, mainly employing empirical data. The current literature is concentrated in developed countries, and leaves gaps in understanding related to how emergent ones deal with questions such as the characteristics of offerings impacting the success of operations and democratization or social inclusion. The rationale behind this study is to provide insights into the role of equity crowdfunding in the Brazilian entrepreneurial ecosystem and identify its capacity to promote venture investment (share options of SMEs). Therefore, the research questions are: (i) “What are the determinants that impact the success of an offer through the platforms?”; and (ii) “What are the inclusion perspectives represented in the Brazilian crowdfund market?”.

This is the first empirical study to carry out a detailed investigation of all the operations—investments through crowdfund platforms—registered in the country from 2017 to 2020. We take an in-depth look at the evolution of equity crowdfunding in Brazil, providing consistent data to support our analysis of the offers’ aspects, and intending to understand

the operations' success. Our research provides statistical proof, for the first time, that, in Brazil, crowdfund performs similarly to a credit bank, which is a type of investment bank focused on SMEs and venture capital. By employing logistic regression, we show that "mutual offer" is associated with an increase in the chances of success in equity crowdfunding by approximately 239%, while "equity offer" is associated with a reduced chance of approximately 56%. Another finding regarding the topic of inclusion was that firms with a remote location have a positive significant chance of success.

On the other hand, small investors (the crowd), when tested by Mann–Whitney (U) as a variable present only for successful offers, did not appear to be as relevant as the variable of "expert" (professional) investors. Our findings indicate that, specifically in Brazil, crowdfund is a financial mechanism for venture capitalists, and is not used to enable the crowd to finance earlier-stage companies. We make some recommendations for stakeholders, such as regulatory changes, and democratizing and social inclusion processes, that we believe may improve the Brazilian entrepreneurial ecosystem.

## 2. Literature Review

### 2.1. Equity Crowdfunding Background

Equity crowdfunding, or crowdfund, emerged from the will and innovation of the economic agents themselves. It began in the United States in 2009, and has already spread across the whole globe (Potenza and Diniz de Oliveira 2016). In Brazil, it became an option to enable entrepreneurs to raise funds in 2014, and was regulated in 2017 by the CVM, the Brazilian SEC (CVM 2019).

Gleasure and Feller (2016) stated that it is extremely important to understand the constructs that explain the different forms of crowdfunding and their respective approach, owing to the volume of studies on each one. The most evident construct is lending, representing 39% of the research on the theme. In this modality of funding, platforms create pressure on financial service institutions and funders act as both customers and financial benefactors. The second most common type of crowdfunding studies is those on equity and charity, occupying 22% of the total. Charity platforms stimulate financial markets in new domains and areas that permit funders to benefit from self-image or empathy-related rewards. On the other hand, equity crowdfunding funders can learn of new sectors and develop an interesting investment portfolio, while the platforms represent an alternative finance option for SMEs. Lastly, the patronage approach represents 17% of studies. Funders benefit through interaction with vicarious accomplishment platforms, allowing new forms of relationship-building with consumers.

The authors highlight equity and lending-based crowdfunding as the possibilities for investors to pay for financial benefit. The lending platforms allow individuals or organizations to request small to medium loans for projects, while equity ones offer less predictable returns. Crowdlending and crowdfund are significant areas of interest to researchers because, in terms of the market, they are increasing fast and being incorporated into a new outlook, which attracts risk capital investors.

Borello and De Crescenzo (2015) pointed out that, in Europe, equity crowdfunding has evolved from P2P (Peer-to-Peer) to P2B (Person to Business) and B2B (Business-to-Business) fundraising. This means that there is already a secondary market established, as a backstop against liquidity risk, although few platforms (3 out of 21) offer their investors the opportunity to sell shares previously bought on the portal. In Brazil, crowdfund platforms encompass both equity and lending modalities, and are responsible for informing potential investors in the campaign if the operation will be finalized as mutual (lending), debt convertible to shares, or direct equity (CVM 2017).

Mochkabadi and Volkmann (2020) pointed out that it is essential to differentiate crowdfund from other crowdfunding forms, as it requires high-risk investment decisions based on the prospect of a potential return on investment. Based on this thinking, the authors have here contributed a systematic review of the equity crowdfunding literature since the first published seminal works in 2011. They realized the number of studies on

this theme increased by 620% from 2012 to 2017. Although the search was limited to papers published in English or German, it identified 3285 exciting studies, which, after the review process, resulted in 113 relevant contributions. It shows that equity crowdfunding is gaining more and more significance as a viable source for financing new ventures worldwide, despite a holistic overview of the field being needed.

The data from this study reflect the relevance of equity crowdfunding as an exciting theme for study. They also reveal that it is still a novel area of knowledge, in which there is much to be explored and studied, mainly in emergent markets such as Brazil. According to [Mochkabadi and Volkmann \(2020\)](#), it is imperative for researchers, before investigating the theme, to identify the following five perspectives correlated with the equity crowdfunding ecosystem: capital market, entrepreneur, institutional, investor and platform.

### 2.1.1. Capital Market Perspective

Most studies in the area shed light on the point that, although equity crowdfunding is expected to be a solution for start-ups and other small- and medium-sized firms, its practices can lead to different results depending on: the country-specific regulations; whether the implementation of a secondary market is viable; the possibilities of mitigating financial risks; and finally, the investors' perceptions, profile, and willingness to take on risk ([Borello and De Crescenzo 2015](#); [Hornuf and Schwienbacher 2017](#); [Kumar et al. 2015](#); [Short et al. 2017](#); [Turan 2015](#)). On the other hand, [Drover et al. \(2017\)](#) stated that some barriers must be analyzed, such as the different solutions to commercializing and regulating the invested equities and the start-ups' due diligence, evaluation, and governance structure.

[Nascimento and Querette \(2013\)](#) argued that equity crowdfunding could promote businesses in Brazil by mitigating financial constraints and its application to Brazilian entrepreneurs. The country is seen as occupying the highest share of this alternative financing sector in Latin America. In 2018, for example, the Brazilian alternative finance market was valued at USD 673.2 million, followed by Chile, whose market value in this segment amounted to USD 289.3 million ([Statista 2021a](#)).

The emergence of this type of investment faces resistance from both institutional investors and regulators. This happens because there is a conflict between the traditional culture of the capital market and the transforming effect of the internet, whereby they act to restrain competition in public offers via vehicles of deregulated transformation that would be able to provide innovative agents with access to the cost-financing of lower-level transactions. Venture capital funds and angel investors generally have no interest in investing in fledgling companies with little chance of effective return. However, angel investors are limited in time and resources, and the accelerators, whose advent in emerging countries only occurred recently, do not necessarily become accessible to all entrepreneurs, since the birth rate of innovative technology companies is higher than the qualification rate of those who supervise it ([Potenza and Diniz de Oliveira 2016](#)).

### 2.1.2. Entrepreneur Perspective

One aspect of equity crowdfunding that concerns entrepreneur perception is ownership dispersion. By intending to replace a handful of more prominent outside investors with a multitude of many smaller ones, equity crowdfunding empowers entrepreneurs, which sheds light on the trade-offs of ownership dispersion in a variety of organizational settings, such as access to a broader pool of investors but with higher agency costs ([Drover et al. 2017](#)).

Entrepreneurship has steadily been assuming more relevance to economic development, so the range of approaches to studying the entrepreneurial movement is growing, focused on understanding its impacts and relationships in the social environment. [Simpoh \(2011\)](#), for example, investigated the theme, and presented a broader view of the economic market scene in his study, approaching the main entrepreneurship theories, including the economic, the psychological, the sociological, the anthropological, the opportunity-based, and the resource-based.

On the other hand, [Maeyer and Bonne \(2015\)](#) point out the importance of a democratic and collaborative environment to bring a new entrepreneurship status into effect, Entrepreneurship 3.0—whereby the innovation of the business model is crucial for the success of the new firm. These entrepreneurs must be able to deploy resources and manage risk relationships in pursuit of profit opportunities, which must provide sustainability and capacity for fundraising.

Furthermore, to turn innovation benefits into a commercially viable product, they must carry out a multi-stage process, which depends on a complete set of resources ([Teece et al. 2016](#)), such as capabilities, organizational processes, corporate attributes, information, and knowledge. In addition, it will be necessary to have a sustainable competitive advantage to survive in the long-term market, make alliances with large firms, and access venture capital ([Paradkar et al. 2015](#)).

Owing to this, [Corona-Treviño \(2016\)](#) calls attention to the fact that digital technology transfer has increased entrepreneurship challenges and vulnerability at the same time, as a result of which the business validation period is known as “the valley of death”. Associação Brasileira de Startups—Abstartups (Brazilian Association of Startups)—states that only one in four start-ups survives the first five years. However, the ones that survive have a considerable impact, as the economy is increasingly linked to the ability to innovate. Start-ups can point the way to the future, being strategically focused on a replicable and scalable business model that can reach exponential growth quickly ([Abstartups 2020](#)).

### 2.1.3. Institutional Perspective

[Mochkabadi and Volkmann \(2020\)](#) brought together many studies carried out worldwide to identify the benefits and contradictions of regulating the equity crowdfunding market. It can be concluded that, despite platforms’ anxiety to increase possible offers and legal policies in place to protect investors, the kind of contract, operation finalization or modality offered (credit, debit convertible or equity), and ownership dilution are determinants of the ability to attract crowdfunders’ interest. Another aspect approached is the players’ participation in the concept of regulation.

The active participation and influence of the association of platforms in the regulatory framework in Brazil is public and incentivized by the ecosystem. The Brazilian Association of Equity Crowdfunding (CROWDINVEST), founded in August 2014, has expressed great concern about the irregular practices of companies that carry out fundraising without complying with CVM Instruction 588 regulations ([Crowdinvest 2021](#)). The regulation leaves some autonomy for operation finalization in the hands of the platforms. On the other hand, it increases platforms’ responsibility due to technological capacity, and ensures that all information and flow provided are regulated ([CVM 2017](#)).

### 2.1.4. Investor Perspective

[Mochkabadi and Volkmann \(2020\)](#) call attention in their research to the fact that equity crowdfunded ventures present a proportionally better performance than venture capital ones. Moreover, although equity crowdfunding investors are supposed to be less experienced, researchers state that they also represent a good option for professionals (qualified) and sophisticated investors (the group of expert investors) to diversify their asset portfolio. [Hornuf and Schwiembacher \(2016\)](#) took an in-depth approach to the question and concluded that crowd investors fill funding gaps or even participate in the same round with professional investors. The limits of this participation will depend on countries’ regulation aspects and market peculiarities, according to [Landström and Mason \(2016\)](#).

Of course, crowd investors have to face significant information asymmetries when evaluating new businesses, but they can be superseded. However, these investors use different kinds of evaluation based on the due diligence processes; these are essential aspects of thorough evaluation associated with the invested amount ([Guenther et al. 2018](#)). [Wallmeroth \(2019\)](#), in an analysis of individual investors on one of Germany’s largest

equity crowdfunding platforms, called attention to the importance of understanding that the crowd is not a homogenous community.

Ahlers et al. (2015) investigated the importance of some aspects influencing investor decisions in equity crowdfunding, such as the level of uncertainty, the amount of equity offered vs. whether financial projections are provided, and human capital. The findings suggest that retaining equity, providing more detailed information about risks, internal governance (such as more highly qualified board members), and credible signals can be attractive to investors and increase the speed of raising capital. However, intellectual capital (as measured by patents) and social capital (alliance) showed no significant impact on funding success.

Guenther et al. (2018) stated that one difference is that they have access to entrepreneurs on equity crowdfunding platforms, which enables potential investors to obtain relevant information for the investment decision. The study, nevertheless, indicates that equity crowdfunding home investors are sensitive to geographic distance. Nevertheless, in contrast, overseas investors are not. The author observed three types of investors: casual investors (focused on the financial returns of their investment), crowd enthusiasts (motivated by prosocial factors), and sophisticated investors (who are more experienced and pledge higher amounts).

In Brazil, for example, although any investor can participate in equity crowdfunding offerings, there are some limits established by CVM Instruction 588, which depend on the investor's income or equity profile. As a rule, in each offer, it is possible to delimit the following investment compositions (CVM 2019):

- Small investors up to BRL 10,000.00—investors that can invest a minimum of BRL 500.00 and a maximum of BRL 10,000.00 per calendar year;
- Retail investors above BRL 10,000.00—whether the investor's annual gross income or the amount of their financial investments exceeds BRL 100,000.00, this limit can be increased by up to 10% of the higher of these two values, also considering the calendar year;
- Qualified or sophisticated investors—according to the CVM regulation, this is the case for investors who have financial investments in amounts more significant than BRL 1,000,000.00 (one million reais). There are no limits on those investors, or the lead investors in the case of a union of investors.

According to CVM (2019), the regulation provides that platforms can support the functioning of investment syndicates, a group of investors gathered by a leading investor to invest together with them in one or more endeavors. The lead investor must have experience in leadership of initial funding rounds for companies, and the essential function of the syndicate is to present the lead's investment thesis, offering justifications to assist investors in the investment decision-making process.

The lead investor can also work with the start-up, applying their knowledge, experience, and relationship network in order to increase the society's chances of success. They must invest their resources in the offer, representing at least 5% of the minimum target fund, under the same terms as other supporting investors. Investors may also remunerate the lead through a performance fee calculated based on the return of the securities acquired by investors supporting the union (CVM 2019).

#### 2.1.5. Platform Perspective

During recent decades, many innovative business models have been launched by companies in the global market, and have been consolidating the disintermediation strategy. Fintech, an increasing market, surfed this wave, especially as it relates to historical funding operations. One of these cases that created most impact on fundraising alternatives was equity crowdfunding, or crowdfund, on electronic platforms. First, it is crucial to understand platforms considered as fintech, which involves making consistent changes in the Brazilian financial sector, highlighting the country's participation in the Latin America movement (CBInsights 2021).

Equity crowdfunding has been increasing in popularity as a viable funding alternative, as platforms connect investors to entrepreneurs in such a way that assumes many responsibilities, according to [Mochkabadi and Volkmann \(2020\)](#), such as the organization of transactions, the contractual framework, and the preselection of promising ventures, which is a significant feature to be studied. Another aspect explored by the authors is determinants predicting post-campaign success, as equity crowdfunding can represent the beginning of building a sustainable business.

The broad target, nevertheless, does not characterize the platforms within a retail market approach, as there are some peculiarities, such as institutional environment, i.e., the regulatory framework of the country and the selection of investors based on the personal assets of individuals. Furthermore, investors' different profiles lead to opposing behaviors, such as venture capitalists' expert contributions in evaluating, monitoring, and managing risk, and smaller return and low decision-making power that fit the crowdfunding investor ([K. Kim and Viswanathan 2013](#)).

Because of the regulatory framework, equity crowdfunding platforms in Brazil must be registered in CVM and are obliged to publish annual reports with all operations listed and detailed, even the unsuccessful ones. This research, therefore, further analyses empirical data from those and all other platforms operating in Brazil to enable a discussion of diagnosis and suggestions ([CVM 2017](#)).

## 2.2. Brazilian Entrepreneurial Ecosystem

Equity crowdfunding has developed in every country; it is a popular, specific ecosystem involving new kinds of investors, and has been studied by many authors ([D. J. Cumming and Johan 2013](#); [D. Cumming and Zhang 2016](#); [D. Cumming et al. 2021](#); [T. Kim et al. 2017](#); [Nascimento and Querette 2013](#); [Rossi and Vismara 2018](#); [Drover et al. 2017](#); [Pahnke et al. 2015](#); [Herciu 2017](#); [Arruda 2019](#)). It involves entrepreneurs and consumers, seed capitalists, small capital risk investors to angels, and professional venture investors.

In Brazil, despite a less experienced entrepreneurial ecosystem and difficulties in regulatory issues, [Nascimento and Querette \(2013\)](#) argued that equity crowdfunding can emerge as an alternative fundraising modality, mainly because of its collaborative way of funding projects. Another two aspects that can be noted in the country are the trend to promote technology-based firms and social engagement, resulting in stimulating entrepreneurship through the support of a local "community" or "network". Moreover, they have already warned that Brazil presents a fragile supporting infrastructure for entrepreneurship, low levels of venture capital and severe funding shortages. Moreover, the entrepreneurs are the experts, and are responsible for achieving venture success.

Nevertheless, the entrepreneurial ecosystem in Brazil is very incipient, according to [Rocha and Andreassi \(2020\)](#), which reveals that Brazilian society's perception of entrepreneurial activity is not as optimistic as in the developed countries, and that bureaucracy and labor laws imply many obstacles. Another point concerns [Arruda's \(2019\)](#) finding that, in Brazil, although most equity crowdfunding growth took place after CVM regulation, and even though it is considered by entrepreneurs as an option related to financing decisions, their main objective still lies in the search for an investment fund.

Otherwise, in the [Abstartups and Accenture \(2017\)](#) collaborative study, it was revealed that the Brazilian ecosystem has already proven itself. This vision refers to the fact that 73% of the start-ups in the research concentrate on the ten most prominent and structured "communities" (local start-up ecosystems). However, "regulation environment" and "access to capital"—two fundamental aspects of a sustainable innovation ecosystem, as pointed out by [Maeyer and Bonne \(2015\)](#)—were indicated as the most challenging issues in the Brazilian ecosystem compared to other items such as "support for startups", "market demand" and "talents offer".

[Abstartups and Accenture \(2017\)](#) also revealed that, despite 46% of the companies participating in incubators or acceleration programs, the great majority (76.22%) of the entrepreneurs used their own capital to start their business. Moreover, the data show that

all formal mechanisms together are responsible for 19.77% of the raised capital, even considering its diversity—angel investment (9.28%), subvention (4.58%), accelerators (4.29%), venture capital (1.39%), and crowdsourcing (0.35%).

The last rate presented above is very significant to this work, as it permits the perception of crowdfunding representativeness in Brazil since its origin, interpreted as “collective financing” (Mendonça and Machado 2015).

**Proposition 1.** *There is a relationship between the characteristic of equity crowdfunding offers and the success of the offer.*

### 2.3. Democratization and Inclusion

As previously presented, many authors consider equity crowdfunding a tool for the democratization of entrepreneurship (Cumming et al. 2021; Mollick and Robb 2016; Stieger et al. 2012; Gleasure and Feller 2016; Kim and Viswanathan 2013, 2019; Criado et al. 2013; Brem et al. 2017; Joly 2017). Furthermore, Mans and Sawada (2016) recognize that equity crowdfunding intends to democratize access to capital, fragmenting investments and reaching different types of investors. They identify that it also benefits from the direct contact between entrepreneur and potential consumer, which strengthens the learning process for customers and hastens market development, increasing the idea’s chances of thriving.

Mollick and Robb (2016), in accordance, stated that equity crowdfunding platforms contribute to the democratization process of commercializing innovation and raising capital, creating opportunities for new businesses and innovations with a new wave of investors. Their work approached interesting aspects by comparing venture capital and the crowd’s decisions to invest in start-ups. Furthermore, the authors directed their research towards inclusion aspects such as geography and gender bias. As a result, they found that, although venture capital investments are concentrated in a few areas, crowdfunding has a wider approach. In addition, it shows that the platforms yield better results on geographic breadth and gender aspects of inclusion. Even though it is constrained to start-up networks or clusters, equity crowdfunding permits a more democratically distributed investment. As regards gender, the findings confirm previous studies that stated the preferences of female entrepreneurs to open their businesses in sectors that demand less capital investment, stipulating a type of female-related category on the platform. On the other hand, the female presence on the investing side is also rare.

A recent report by Babson College relayed that firms selected by venture capitalists are founded by males; only 2.7% of invested start-ups had a female CEO and a “tiny fraction” were founded by African Americans (another bias to be investigated). Furthermore, angel investors, who represent a big source of financing for entrepreneurs, are predominantly white males. Owing to this it can be inferred that the equity crowdfunding ecosystem does not have significant diversity. These data mean that it tends to be both a complement to and a substitute for angel and venture capitalists, mainly because of the following evidence: the crowd innovation, assessment and decision-making processes are similar to those of experts (Mollick and Robb 2016).

Adding to those issues, the study presented by K. Kim and Viswanathan (2019) stated that crowdfund reduces the costs and bureaucracy involved in innovation, as resources, expertise, and signals are not spread in the same proportion in all transactions or offer operations. The proposal is to evaluate the situations in order to understand whether it is the case that individuals are enabled with the required resources/capital, but not necessarily the expertise (democratization of resources), or with the required expertise but not with quality signals (democratization of expertise). It is also possible to share information digitally and even in real-time, which can influence other participants’ decision-making.

Furthermore, Mochkabadi and Volkmann (2020) called attention to gender issues in research on equity crowdfunding platforms. Despite not being widely explored, Vismara’s (2016) findings show that access to funding for female entrepreneurship has limitations.

Another interesting finding was that the company decision team (TMT size) is positively related to the campaign’s outcome. Finally, the target amount of capital does not affect the capacity to raise funds, as it is related to the number of investors needed to raise more capital.

Owing to all this, [Cumming et al. \(2021\)](#) contribute to research into the potential of equity crowdfunding for democratization in the UK, observing the significance of determinant variables linked to the issue of inclusion—such as gender, ethnicity, firm age, geography, kind of investors—to the dependent variable of the success of offers. Moreover, the authors compared the performance between crowdfund and the alternative investment market (AIM), which serves as a sub-segment of the London Stock Exchange.

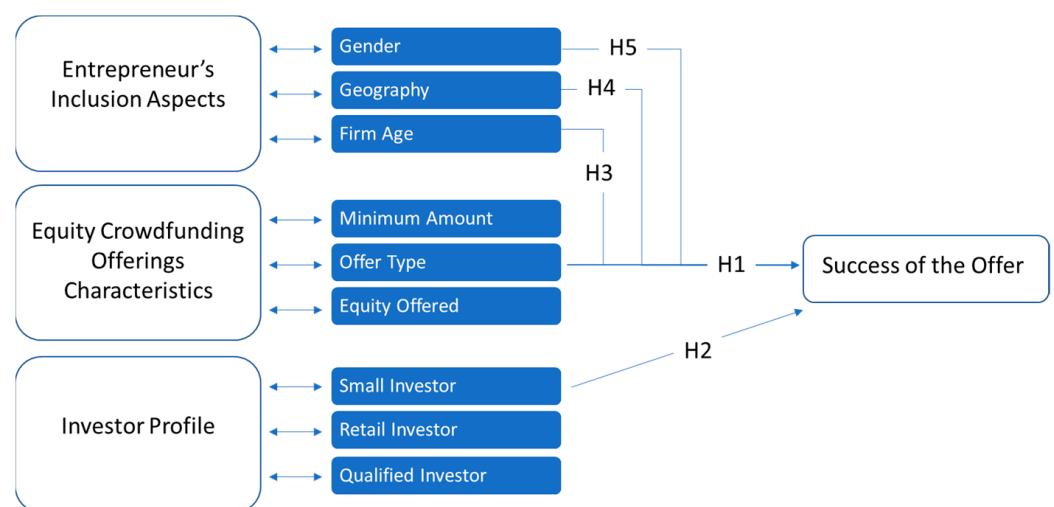
**Proposition 2.** *Crowdfund in Brazil produces a favorable environment to democratize the entrepreneurial ecosystem, and promotes inclusion from both the entrepreneur and investor sides.*

### 3. Conceptual Model and Research Hypotheses

The purpose of this research is to understand the role of equity crowdfunding in Brazil as an alternative democratic funding mechanism. This will be done first by identifying what determinants most impact the success of the offerings—a successful offer is the one that, at the end of the equity crowdfunding operation, received investment, and an unsuccessful offer is that which failed in raising funds. This is followed by analyzing the relation between the “inclusive” variables of firm age, female leadership (gender), remotely located companies (geography) and small investors. We designed and developed a research model given the constructs and research hypotheses presented in the previous table. This is supported by the literature, such as that by [Cumming et al. \(2021\)](#), who investigated the democratization potential of equity crowdfunding in the UK.

Moreover, we were inspired by previous works, such as [Cumming et al. \(2021\)](#), [Mochkabadi and Volkmann \(2020\)](#), [Vismara’s \(2016\)](#), [Mollick and Robb \(2016\)](#), [Hornuf and Schwienbacher \(2016\)](#), and [Landström and Mason \(2016\)](#), to consider the determinants of efficiency that they tested, as presented in the literature section. Based on these works, we consolidated these determinants and identified how to employ them into hypotheses, considering the Brazilian market.

The conceptual model shown in [Figure 1](#) thus permits us to look deeply into the differences and peculiarities of the Brazilian equity crowdfunding ecosystem.



**Figure 1.** Model design.

Then, as outlined in [Table 1](#), we present the research hypotheses that the literature review helped identify.

**Table 1.** Research hypotheses.

Research Hypotheses	Description
H1	The type of operation finalization (offer type) predicts the success of the offer
H2	Small investors are more likely to determine the success of the offer
H3	Earlier stage companies are more likely to launch mutual equity crowdfunding offerings
H4	Remotely located companies are more likely to launch mutual equity crowdfunding offerings
H5	Female-led companies are more likely to launch mutual equity crowdfunding offerings

## 4. Results

### 4.1. Statistical Analysis

First, it is important to recall that data were analyzed in two groups of variables, one using the logistic regression method and another the Mann–Whitney test; plus, the Spearman correlation is used to address some of the hypotheses evaluated in the model.

To begin with, logistic regression requires the independent variables not to have multicollinearity. So, in order to evaluate the multicollinearity between the independent variables, the following procedures were performed: (i) Spearman's correlation analysis (indicated for variables that are not normally distributed) and (ii) measurement of the variance inflation factor (VIF).

According to Spearman's correlation (Table 2) and VIF (Table 3), it was observed that the independent variables do not have multicollinearity. Then, each independent variable was used individually in the logistic regression, with the objective of predicting the success of equity crowdfunding. The results are shown in Table 4.

After performing the logistic regression with each independent variable, the ones with most significance in the prediction of equity crowdfunding success were identified: metropolitan area, equity offer, and mutual offer. Thus, another logistic regression was carried out combining these variables, as shown in Tables 5 and 6.

As a result of logistic regression, the following equation was obtained to predict success in equity crowdfunding:

$$2.69 - 1.79\text{Metropolitan Area} - 0.82\text{Equity} + 1.22\text{Mutual} = \text{EquityCrowdfunding Success}$$

The binary logistic regression model shows that:

1. The location of the company in the metropolitan area is a predictor for success in equity crowdfunding ( $z = -2.370$ ;  $p < 0.05$ ). However, surprisingly, it was found that companies belonging to the "yes" category are associated with a reduced chance of belonging to the "yes" category for success in equity crowdfunding of approximately 83% (OR =  $-83.35$ );
2. Performing equity offer is a predictor for equity crowdfunding success ( $z = -2.138$ ;  $p < 0.05$ ). However, via data analysis, the research statistically proved that equity offer is associated with a reduced chance of success in equity crowdfunding operations of approximately 56% (OR =  $-56.09$ ).
3. Performing mutual operation is a predictor for equity crowdfunding success ( $z = 2.550$ ;  $p < 0.05$ ). In the sample under study, belonging to the "yes" category in relation to performing mutual offers is associated with an increase in the chances of success in equity crowdfunding of approximately 239% (OR =  $239.15$ ).

Table 2. Spearman correlation.

ID	Variable Name	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	Firm age	1														
2	Real State	0.06	1													
3	Metropolitan Area	0.27 **	−0.16 **	1												
4	Female Presence	0.03	0.15 **	−0.03	1											
5	Female Leadership	−0.08	0.11 *	−0.07	0.69 ***	1										
6	Equity Offered	−0.06 *	0.05 *	−0.04	−0.02	−0.02	1									
7	Total Target Maximum	0.02	−0.04	−0.02	−0.08	−0.05	0.21 ***	1								
8	Unit Price	−0.09	−0.05 *	0.04 **	−0.11	−0.07	−0.06 ***	0.29 ***	1							
9	Equity	−0.01	0.05	−0.25 ***	0.06	0.1	−0.04 **	−0.03	−0.12 **	1						
10	Debt Convertible to Shares	−0.16	0.03	−0.45 ***	−0.04	−0.06	−0.03	0.07	0.03 **	−0.41 ***	1					
11	NA	−0.06	0.1	−0.1	−0.01	−0.04	0.18 ***	−0.01	0.15 **	−0.15 **	−0.28 ***	1				
12	Mutual	0.21 *	−0.13 **	0.76 ***	0.0	0.01	−0.04	−0.05	−0.03 ***	−0.3 ***	−0.57 ***	−0.2 ***	1			
13	Population City	−0.02	0.36 ***	−0.13 **	0.1	0.06	−0.04	0.01	0.06	0.03	0.14	−0.12	−0.11	1		
14	City GDP per Capita	−0.07	0.12 **	−0.23 ***	−0.01	−0.02	−0.06	0.05	0.04	0.09	0.14 ***	0.03	−0.25 ***	0.14 ***	1	
15	Region	−0.07	0.05	0.13	0.01	0.13	0.1 **	−0.02	−0.08 **	−0.05	−0.12	0.04	0.14	−0.39 ***	−0.25 ***	1

\* Correlation is significant at the 0.1 level.; \*\* Correlation is significant at the 0.05 level.; \*\*\* Correlation is significant at the 0.01 level.

**Table 3.** Variance inflation factor (VIF).

Feature	VIF
Metropolitan Area	1.584734
Equity offer	1.255577
Mutual offer	1.329157

If VIF > 5, the variable has multicollinearity.

**Table 4.** Logistic regression result of independent variables.

Regression Number	Variable	Coef	Std Error	z	$p >  z $	0.025	0.975
1	Intercept	1.2088	0.185	6.517	0.000	0.845	1.572
	Firm Age	−0.0129	0.023	−0.572	0.567	−0.057	0.031
2	Intercept	2.8622	0.727	3.937	0.000	1.437	4.287
	Metropolitan Area	−1.8954	0.744	−2.546	0.011 *	−3.354	−0.436
3	Intercept	1.0428	0.177	5.880	0.000	0.695	1.390
	Real State	0.3996	0.356	1.123	0.261	−0.298	1.097
4	Intercept	1.1692	0.179	6.540	0.000	0.819	1.520
	Female Presence	−0.0706	0.348	−0.203	0.839	−0.752	0.611
5	Intercept	1.0986	0.163	6.728	0.000	0.779	1.419
	Female Leadership	0.4055	0.480	0.845	0.398	−0.535	1.346
6	Intercept	1.0972	0.158	6.955	0.000	0.788	1.406
	Equity Offered	$3.37 \times 10^{-6}$	$3.39 \times 10^{-6}$	0.997	0.319	$-3.26 \times 10^{-6}$	$1.0 \times 10^{-5}$
7	Intercept	1.2577	0.246	5.122	0.000	0.776	1.739
	Total Target Maximum	$-8.94 \times 10^{-8}$	$1.58 \times 10^{-7}$	−0.567	0.571	$-3.98 \times 10^{-7}$	$2.2 \times 10^{-7}$
8	Intercept	1.0681	0.174	6.128	0.000	0.726	1.410
	Unit Price	$3.59 \times 10^{-5}$	$4.0 \times 10^{-5}$	0.898	0.369	$-4.24 \times 10^{-5}$	0.000
9	Intercept	1.3994	0.181	7.726	0.000	1.044	1.754
	Equity	−1.1542	0.363	−3.179	0.001 *	−1.866	1.754
10	Intercept	1.3486	0.216	6.244	0.000	0.925	1.772
	Debt Convertible to Shares	−0.4254	0.308	−1.381	0.167	−1.029	0.178
11	Intercept	1.0986	0.159	6.926	0.000	0.788	1.409
	NA	0.6931	0.643	1.077	0.281	−0.568	1.954
12	Intercept	0.8242	0.170	4.859	0.000	0.492	1.157
	Mutual	1.5272	0.460	3.322	0.001 *	0.626	2.428
13	Intercept	0.9684	0.199	4.876	0.000	0.579	1.358
	Population City	$4.49 \times 10^{-8}$	$3.32 \times 10^{-8}$	1.352	0.176	$-2.02 \times 10^{-8}$	$1.1 \times 10^{-8}$
14	Intercept	0.9885	0.408	2.420	0.016	0.188	1.789
	City GDP per capita	$3.08 \times 10^{-6}$	$7.24 \times 10^{-6}$	0.425	0.671	$-1.11 \times 10^{-5}$	$1.73 \times 10^{-5}$
15	Intercept	1.4059	0.322	4.364	0.000	0.774	2.037
	Region	−0.1613	0.176	−0.917	0.359	−0.506	0.184

\*  $p$ -value < 0.05.

**Table 5.** Logistic regression results of independent variables combined.

Variable	Coef	Std Error	z	p >  z	0.025	0.975
Intercept	2.6903	0.755	3.565	0.000	1.211	4.169
Metropolitan Area	−1.7928	0.756	−2.370	0.018 *	−3.275	−0.310
Equity	−0.8231	0.385	−2.138	0.033 *	−1.578	−0.068
Mutual	1.2213	0.479	2.550	0.011 *	0.282	2.160

\* p-value < 0.05.

**Table 6.** Odds ratio of independent variables.

Variable	Odds Ratio
Metropolitan Area	−83.35
Equity	−56.09
Mutual	239.15

This means success in equity crowdfunding is more likely for companies that present an offer in remote locations and with the mutual type of operation finalization.

On the other hand, in the case of failure, it was not possible to obtain the values for the variables of qualified investors, small investors, retail investors, NA investors, total investors, syndicates, and leading investors. Thus, considering only successful cases, the Mann–Whitney test was performed to compare whether the values of the total target (maximum) had a statistically significant difference in their median.

To analyze the variables of small investor, retail investor, and qualified investor, the variables qualified investor and retail investor were summed, because they are the ones who can invest above BRL 10,000.00, creating a new variable: the “experts”. In this way, the proportion of those variables related to the determinant variable of total investors was calculated. Then, a dummy variable was created to perform the Mann–Whitney test, based on different simulated proportions, between the variable created and the small investors, as shown in Table 7.

**Table 7.** Mann–Whitney test results.

Qualified and Retail Investors Proportion	Small Investors Proportion	U Statistic	Mann–Whitney Test p-Value	Qualified and Retail Investors Total Target Median (R\$)	Small Investors Median (R\$)
<0.05	≥0.95	783.5	0.0010 *	1,725,000.00	750,000.00
<0.10	≥0.90	1542.5	0.0017 *	1,200,000.00	750,000.00
<0.15	≥0.85	1902.0	0.0006 *	1,200,000.00	750,000.00
<0.20	≥0.80	1944.5	6.2806 × 10 <sup>−5</sup> *	1,200,000.00	725,000.00
<0.25	≥0.75	2076.5	0.0001 *	1,200,000.00	700,000.00
<0.30	≥0.70	2223.0	0.0003 *	1,200,000.00	700,000.00
<0.35	≥0.65	2310.5	0.0008 *	1,200,000.00	725,000.00
<0.40	≥0.60	2260.0	0.0004 *	1,200,000.00	700,000.00
<0.45	≥0.55	2403.0	0.0023 *	1,150,000.00	700,000.00
<0.50	≥0.50	2666.5	0.0416 *	1,000,000.00	725,000.00
<0.55	≥0.45	2724.0	0.1182	1,000,000.00	750,000.00
<0.60	≥0.40	2642.5	0.0837	1,000,000.00	700,000.00
<0.65	≥0.35	2407.5	0.0884	900,000.00	725,000.00
<0.70	≥0.30	2168.5	0.0411 *	950,000.00	700,000.00
<0.75	≥0.25	1889.5	0.0193 *	1,000,000.00	672,000.00
<0.80	≥0.20	1819.0	0.0889	900,000.00	700,000.00
<0.85	≥0.15	1569.5	0.4749	875,000.00	750,000.00
<0.90	≥0.10	1013.5	0.5812	875,000.00	700,000.00
<0.95	≥0.05	171.0	0.1157	850,000.00	445,000.00

\* p-value < 0.05.

The result of the Mann–Whitney test, considering just successful operations, does not identify a proportion of small investors that collected higher amounts through equity crowdfunding. Nonetheless, if the offer achieves up to a maximum of 50% of the sum of the qualified investors with the retail investors, the median values of the variable total target maximum are statistically significantly higher.

This means that the platforms cannot ignore qualified investors and retail investors, which still maintain great importance in equity crowdfunding offers. Thus, the adoption of strategies to strengthen the participation of small investors in crowdfunding operations is recommended.

To understand the effectiveness of equity crowdfunding offerings in Brazil, we employed logistic regression and the Mann–Whitney test to analyze data from offerings registered between 2017 and 2020. Logistic regression and the Mann–Whitney test provided additional information: 1. logistic regression allowed us to quantitatively analyze the influence of independent variables on the success of offers, and we identified the importance of geographic location and type of offer. 2. The Mann–Whitney test grounded a detailed analysis of differences between investor groups, and confirmed the importance of qualified and retail investors to the success of the offerings.

Owing to the statistical findings presented, we can state that our model supports H1, but H2 is not confirmed. Overall, for a more in-depth analysis and to better test hypotheses H3, H4 and H5, we also applied Spearman’s correlation and descriptive analysis. So, from now on, findings are presented and discussed to offer a broader approach to the determinant variables considered as part of the movement for inclusion in equity crowdfunding. Here, we detail the results and compare the different methods used to provide a more in-depth understanding.

#### 4.2. Offer Type: Equity vs. Mutual Offers

The logistic regression results show that mutual offers are significantly more effective than equity offers. Mutual offers were proven to increase the chances of success by approximately 239%. In contrast, equity offerings reduced the chances of success by about 56%. We can infer that mutual offers are preferred by investors due to the lower perceived risk, resulting in a higher success rate. In a mutual offer, the return is more predictable and guaranteed, unlike a share offer, where the return depends on the company’s future performance, which is uncertain. Besides this, in the Brazilian context, regulation can favor mutual offers, providing a clearer and more robust structure that inspires confidence in investors.

#### 4.3. Investor Profile: “Expert” Investors vs. Small Investors

The Mann–Whitney test was applied to compare the success of offers based on the participation of different types of investors, considering the total target value of the offers. The findings reveal that qualified investors are very important to the success of the offerings as they play a vital role in achieving higher financing goals. However, this does not diminish the importance of retail investors, as offerings that managed to attract a higher proportion of qualified and retail investors achieved significantly higher total target values.

Qualified and retail investors (experts) play a critical role in the success of the offerings. Their substantial holdings correlate with higher funding targets. This highlights that a balanced mix of different types of investors can maximize the success of the offering; cultural barriers to risk investments must be extinguished to increase the participation of small investors.

#### 4.4. Geography: Metropolitan Area vs. Remotely Located

The geography aspect is undoubtedly very significant to the economic inclusion process. Brazil, for example, as already seen in this work, has serious problems of asset distribution, and small cities are almost abandoned by government policies. Although

the big centers are the most representative, in line with the trends of innovation and entrepreneurial movement, our findings shed light on the issue.

By performing logistic regression, metropolitan area was revealed to be statistically and negatively significantly related to success. Companies located in metropolitan areas had an 83% reduced chance of success compared to those in remote areas. This means that a remote location for companies, on the contrary, is extremely significant in predicting success in equity crowdfunding.

This can be explained by the fact that companies in remote areas often face less competition and can more easily attract the interest of investors seeking geographic diversification. Companies located in metropolitan areas are less likely to be successful in equity crowdfunding, probably due to the greater competition and lower perception of novelty by investors. The results of the analysis also imply great opportunities for entrepreneurs that face difficulties in attracting investors because of a lack of access to them.

However, from the descriptive analysis, we see that most of the remotely located firms in the sample are from São Paulo, a state where the capacity for business is higher than in other places in the country. This leads us to infer, by observing the massive presence of companies located in the metropolitan area, as shown in Figure 2, that those offers (the successful ones from remote locations) represent good businesses.



**Figure 2.** Percentage of total successful offers by geography.

To test H4, however, descriptive analysis is the most appropriate approach, as we have all operation data for this sample (remotely located companies). According to this, as presented in Figure 3, H4 is supported by descriptive analysis. We can thus see how mutual offers are meaningful to remotely located companies. This indicates that this type of offer is meaningful to entrepreneurs that seek funding in those regions, being followed by the most similar type to it, debt convertible to shares.

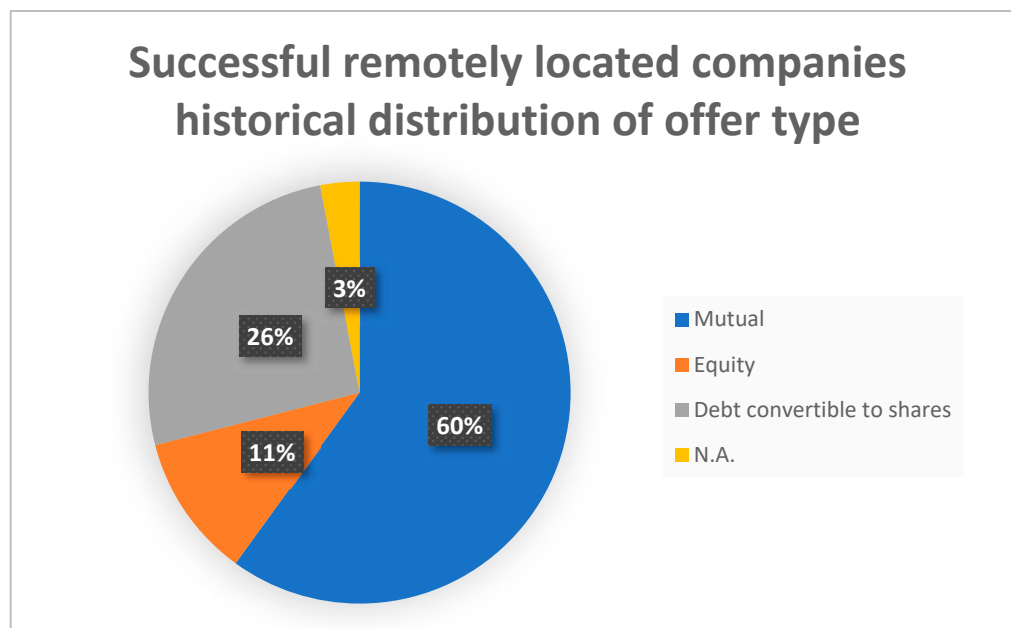


Figure 3. Comparison between types of offers performance in remotely located companies.

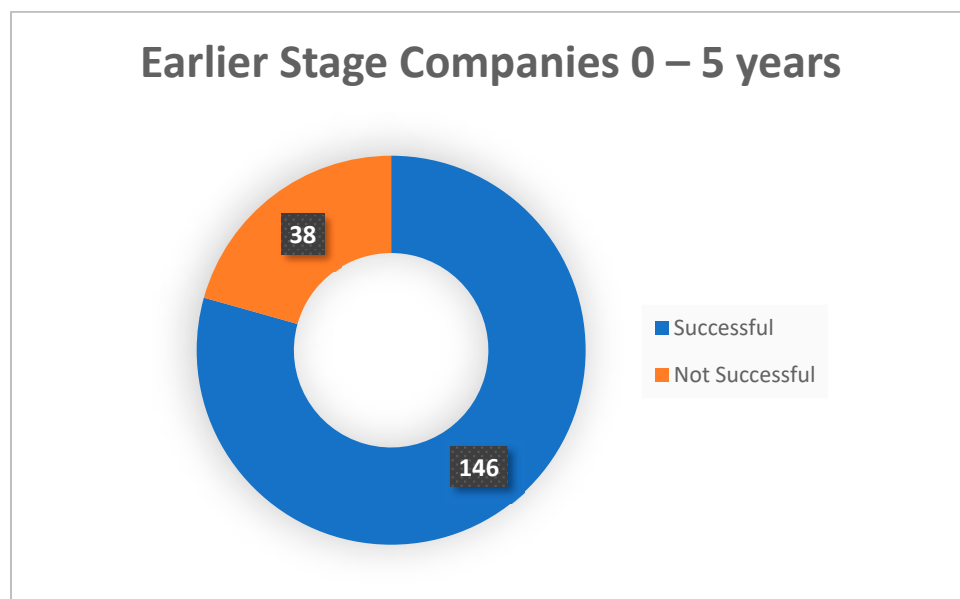
4.5. Firm Age: Measuring the Earlier Stage Inclusion

We intended to test the influence of earlier-stage companies on equity crowdfunding offerings. Moreover, for this study, we considered the term “earlier stage” as referring to firms founded up to five years before the offer date, according to the national research “O Momento da Startup Brasileira e o Futuro do Ecossistema de Inovação” (Abstartups and Accenture 2017). According to the literature review, this is the most vulnerable period for a start-up, and is related to the high rate of failure for these companies. It is also important to mention that they represent the majority of the operations registered in Brazil (184 out of 234 offers).

Observing the Spearman correlation table, it can be inferred that there is a positive correlation between mutual offers and earlier-stage companies, providing evidence to confirm H3. However, light can be shed on the participation of those companies in the Brazilian crowdfund scenario, owing to all the information extracted from databases in descriptive analysis. Earlier-stage companies represent 80% of successful offers, with the volume invested totaling BRL 147,831,529.00 and a medium ticket value of BRL 1,012,545.00 (Figure 4). The transaction details in Table 8 show the potential of earlier-stage firms to raise funds through equity crowdfunding.

Table 8. Earlier-stage start-ups: successful operation details per firm age.

Firm Age (Years)	Total Offers	%	Successful Offers	%	Medium Ticket	Total Raised	% of Success
0	27	14.7	24	16.4	1,474,916.67	35,398,000.00	88.9
1	40	21.7	30	20.5	775,050.00	23,251,500.00	75.0
2	51	27.7	39	26.7	1,051,555.37	41,010,659.58	76.5
3	35	19.0	26	17.8	1,017,748.04	26,461,449.00	74.3
4	20	10.9	18	12.3	892,318.89	16,061,740.00	90.0
5	11	6.0	9	6.2	627,575.56	5,648,180.00	81.8
Total	184	100	146	100	1,012,544.72	147,831,528.58	



**Figure 4.** Earlier-stage start-up offers through equity crowdfunding in Brazil.

Separated per firm age, each group of these start-ups was analyzed considering the volume of participation, capacity of successful campaigns, value raised and percentage of influence in the total of those offers. It is curious that enterprises with less than one year of existence (0) had a success rate of 88.9% in fundraising, and, surprisingly, presented the greatest medium ticket value of BRL 1,474,916.67. Nevertheless, the great concentration of offers occurred in those created between one and three years previously, numbering 126 offers in total, which explains why the average age of those firms is 2.07 years, while for total offers it is 4.35 years.

#### 4.6. Female Leadership

The participation of women in equity crowdfunding in Brazil is still very limited, following in the steps of other fundraising mechanisms—start-ups led by women received only 0.04% out of the more than USD 3.5 billion invested in the market in 2020, according to a joint survey by Distrito, Endeavor and B2Mamy (Distrito et al. 2021). So, it was not a surprise to find that the female leadership variable, as shown by our model, does not statistically impact the success of equity crowdfunding offerings. In fact, there are no statistical data to support H5 once the Spearman test is performed, as seen in Table 3. It can be observed that there is no significant correlation between female leadership and mutual offers.

This result reinforces the Brazilian female entrepreneurship situation. However, although very few female-led firms in Brazil, historically 14%, used equity crowdfunding platforms to raise funds, a descriptive analysis of the data in Figures 5 and 6 shows a slight conquest over the years, as in 2017, when offers started to be registered, there were no female-led firms.

Moreover, comparing the number of Brazilian start-ups that were founded exclusively by women—4.7% according to Female Founders Report (Distrito et al. 2021)—with female-led start-ups in Brazilian Equity Crowdfunding, the data show that women represent 16% of the successful offers on platforms. Besides this, female-led firms showed no significant growth in number of offers in the period, as shown in Figure 6. It seems there is still a long way to go in minimizing this distance between genders in terms of participation, not only in innovation funding but also in the equity crowdfunding ecosystem.

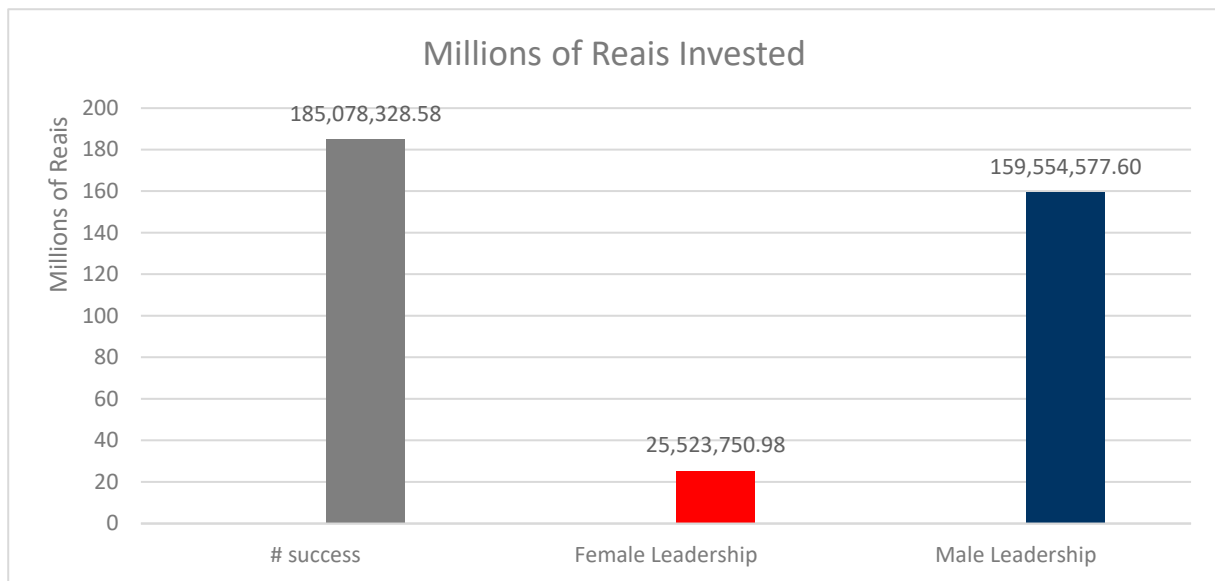


Figure 5. Funds raised in equity crowdfunding platforms from 2017 to 2020.

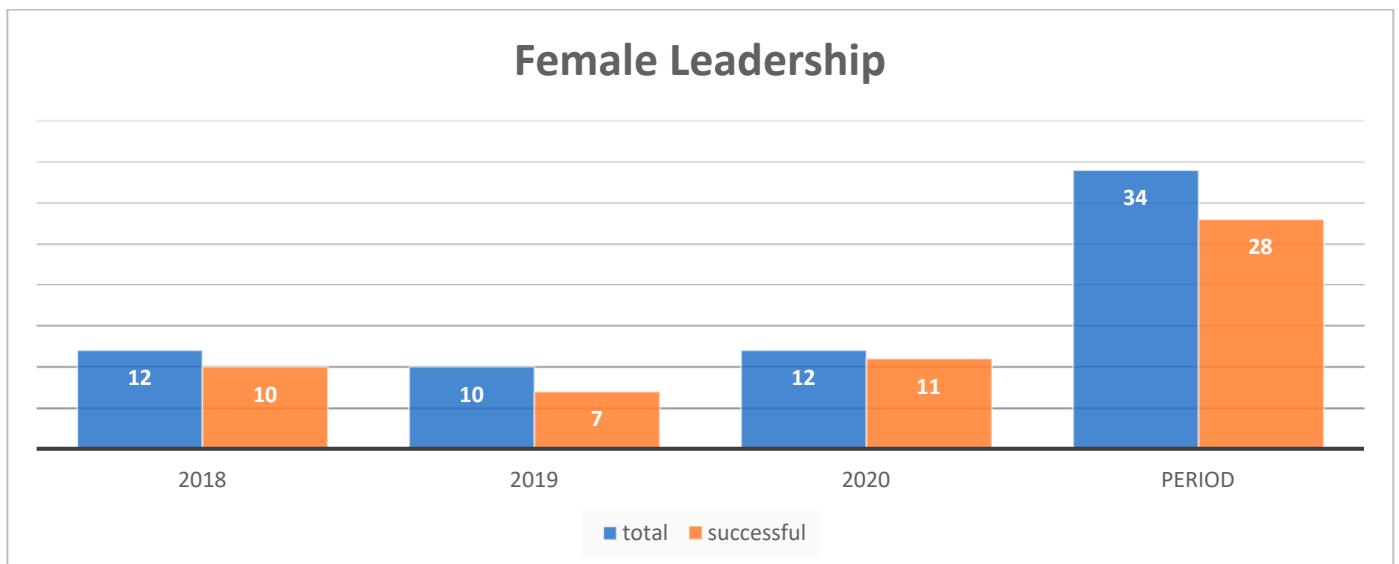


Figure 6. Historic successful female-led offers.

#### 4.7. Result Key Findings

We can see from the results that the crowdfund scenario in Brazil is still consolidating. It is clear from the logistic regression that the principal determinant that impacts the “success of the offer” is the type of operation finalization (offer type). Furthermore, it was possible to measure that while mutual offers attract the investor (+239% chance of success), equity offers repeal them (−56% chance of success).

Besides this, it was also statistically possible to prove that remotely located firms have more chances to succeed. Moreover, using the Mann–Whitney (U) test, we could observe that small investors are not so capable of guaranteeing the offers of funding as the expert ones (retail and qualified investors together). Finally, the Spearman correlation table shows that, although there is a positive correlation between mutual offers and the variable earlier-stage companies, the same is not seen with the variable female leadership.

## 5. Methodology

Our work is the first to take an in-depth approach, based on empirical analysis, to equity crowdfunding in Brazil. It encompasses descriptive and quantitative research, and uses statistical methods, as described below.

### 5.1. Dataset

Unprecedentedly, we manually consolidated a consistent empirical database comprehending all equity crowdfunding offers registered by the CVM from 2017 to 2020. These are public data taken from the platforms' annual reports, and include all the offer characteristics, such as year, success of the offer (indicates if the offer is successful or not), platform name, firm name, equity offered, target, volume invested, unit price, number of investors, investor profile, syndicate presence, leading investor presence, and type of offer (equity or mutual, debit convertible to shares).

All the data above were manually compiled in an Excell sheet, building a very complete database of the equity crowdfunding operations. Then, we added a large amount of complementary data to the database, related to the participant firms, extracted from several public sources, such as the participants firms' detailed information from the official government companies' registers (CNPJs) and the geographic and economic information from IBGE (Instituto Brasileiro de Geografia e Estatística) (government institution that produces data about regions, cities, and their populations and economic activities). These data concern firm age (foundation date), sector, location (city, metropolitan area or remote location, state unemployment rate), team size (partners), quantity of female partners, and female leadership.

The aim of the study was to verify the outcomes of equity crowdfunding operations in Brazil, so our research focused on testing the impacts of inclusion aspects on the success of the crowdfund operation. First, the identification of variables was carried out in order to detect the most appropriate statistical model to answering the research question. Owing to this, we selected the success of the offer as the dependent variable, and independent variables related to inclusion and Brazilian operations characteristics. The dependent variable is that which is tested or measured in a scientific experiment, and can be modified according to changes in the independent variables. The independent variables, those that are changed to test the effects on the dependent variable (Hosmer Jr. et al. 2013), were very numerous in our model, totaling fifteen, as seen in Table 9.

**Table 9.** Identification of the types of variables investigated.

Variable Name	Variable Type	Variable in the Statistical Model
Success	Qualitative (or categorical) nominal	Dependent
Firm age	Discrete continuous quantitative	Independent
Real State	Qualitative (or categorical) nominal	Independent
Metropolitan Area	Qualitative (or categorical) nominal	Independent
Female Presence	Qualitative (or categorical) nominal	Independent
Female Leadership	Qualitative (or categorical) nominal	Independent
Equity Offered	Qualitative (or categorical) nominal	Independent
Total Target Maximum	Discrete continuous quantitative	Independent
Unit Price	Discrete continuous quantitative	Independent
Equity	Qualitative (or categorical) nominal	Independent
Debt Convertible to Shares	Qualitative (or categorical) nominal	Independent
NA	Qualitative (or categorical) nominal	Independent
Mutual	Qualitative (or categorical) nominal	Independent
Population City	Discrete continuous quantitative	Independent
City GDP per Capita	Discrete continuous quantitative	Independent
Region	Qualitative (or categorical) nominal	Independent

## 5.2. Note

To begin with, we selected all the determinants we consolidated in our dataset. As they reflect real information about the equity crowdfunding offers registered in the period analyzed and improved by economic data collected, we intended to test their efficiency as variables in our model. Here, we do not exclude any possibility of employing them all in the model, although the hypotheses proposed were focused on the inclusion perspective.

Then, our variables were evaluated in terms of their distribution using the Shapiro–Wilk normality test, which showed that they were not normally distributed. Given the nature of our model, we intended to first examine equity crowdfunding operations, with success as the main dependent variable. Success is a binary variable, and to test it, we employed logistic regression as the statistical method. Logistic regression is a technique recommended for use in situations in which the dependent variable is dichotomous or binary in nature. So, only the independent variables that present data both for failure and success cases must be considered. Because of that, the investors' data could not be included in this test, and they needed to be tested by the Mann–Whitney test, as is soon explained. This first test thus permitted us to ascertain the variables offer type, female leadership, firm age, and metropolitan area, intending to address the proposed hypotheses H1, H3, H4 and H5. The last three hypotheses to be completely answered had to also be subjected to the Spearman correlation test.

The logistic regression test could thus be applied to variables that proved to be very significant to the offer's success, confirming that it is a good method for testing the model. Logistic regression allows the probability associated with the occurrence of a certain event to be estimated in view of a set of explanatory variables. It seeks to estimate the probability of the dependent variable taking a certain value as a function of the known values of other variables (Hosmer Jr. et al. 2013). The method of logistic regression was chosen because it is very capable of dealing with independent variables, presents results in terms of numerical probability or odds ratios, facilitates the classification of individuals, does not require the data to have a normal distribution, and has a high degree of reliability and a small number of assumptions: (i) the absence of multicollinearity between the independent variables; (ii) a dichotomous dependent variable (mutually exclusive categories); (iii) independence of observations (no repeated measures); and (iv) the absence of outliers.

In the logistic regression model, the response variable  $y$  is dichotomous and has values 1 or 0. The probability that  $y_i = 1$  is represented as  $\pi_i$ , and the probability that  $y_i = 0$  is  $1 - \pi_i$ , according to Hosmer Jr. et al. (2013). Logistic regression analysis includes estimating the probability of occurrence of an event (the dichotomous response variable with values of 0 and 1) as a function of the values of independent variable. We consider  $y_u$  as the response variable and a collection of  $p$  independent variables expressed by the vector  $x' = (x_1, x_2, \dots, x_p)$ . The specific form of the logistic model with  $p$  predictor variables is represented by

$$\pi = \pi(x) = P(y = 1|x) = \frac{e^{x'\beta}}{1 + e^{x''\beta}}$$

which represents the conditional probability that event  $y = 1$  occurs given the occurrence of a set of variables  $x$  (probability of success). A transformation of  $\pi(x)$  that is fundamental in logistic regression is the logit one. This transformation is defined in terms of  $\pi(x)$ , such as

$$g(x) = \ln \left[ \frac{\pi(x)}{1 - \pi(x)} \right] = \beta_0 + \beta_1 x_1 + \dots + \beta_p x_p$$

where  $\beta_0$  are the constants and  $\beta_i$  are the coefficients of the model's predictors. The importance of this transformation is that  $g(x)$  has many of the desirable properties of a linear regression model. The logit function is linear in its parameters and can be continuous, as well as ranging from  $-\infty$  to  $+\infty$ , depending on the range of  $x$ . So, the logistic model can be expressed in terms of event occurrence (ODDS). This ratio is defined as the ratio between the probability of the event occurring and the probability of the event not occurring.

Thus, we have:

$$\frac{\pi(x)}{1-\pi(x)} = \text{Likelihood that the event will occur}$$

$$1 - \pi(x) = \text{Likelihood that the event will not occur}$$

The logistic regression model expresses the results of the estimators in logarithmic form. However, a more enriched interpretation of the relationship between the dependent variable and the independent variables requires the transformation of this coefficient, that is, the exponentiation of the variable(s) of the regression is carried out. Thus, the odds ratio (OR) for the independent variables is obtained, facilitating the interpretation of the results.

The determination of the confidence interval of the proposed model is relevant when analyzing the estimate of the prediction interval of the coefficient of the independent variable, at a confidence level of 95%. Thus, in 95% of cases, the coefficient parameter will be within this range. Nevertheless, to be complete and answer H2, our model has to explore the investors' variables, which are exclusively linked to the possibility of success. This is why we considered going deeper and applying a second test to follow the whole model. So, to treat the investors' data, we employed the Mann–Whitney test. In cases when there is a small sample available and the numerical variable does not have a normal distribution, or when there is no homogeneity of variances, the *t* test is not appropriate.

To exemplify a situation wherein the *t* test would falsely show a statistically significant association, imagine that a very discrepant value (outlier) is observed in one of the two groups. Due to this single value being much larger than the others, the group to which it belongs will present a high mean, which will increase the *t*-test statistic, with a consequently small associated *p*-value. In this situation, the non-parametric Mann–Whitney test can be used (Hosmer Jr. et al. 2013).

The Mann–Whitney test was first developed by F. Wilcoxon in 1945 to compare the central tendencies of two independent samples of equal size. In 1947, H.B. Mann and D.R. Whitney generalized the technique to samples of different sizes. The Mann–Whitney test is indicated for use in comparing two unpaired groups to ascertain whether or not they belong to the same population, and in cases where the requirements for the application of the Student's *t* test are not met (Hosmer Jr. et al. 2013).

In fact, this is verified if there is evidence to believe that values of group A are superior to those of group B. The U test can be considered the non-parametric version of the *t* test, for independent samples. Unlike the *t* test, which tests the equality of the means, the Mann–Whitney (U) test tests the equality of the medians. The U values calculated by the test assess the degree of intertwining of the data in the two groups after sorting. The greater separation of the data as a whole indicates that the samples are distinct, disproving the hypothesis of equality of the medians (Hosmer Jr. et al. 2013).

The logic of the test, according to the authors, is the same as that of the *t* test: a certain test statistic is calculated and the *p*-value is obtained from the sample distribution of this statistic under H0. The difference is that instead of building this statistic with original data, they are previously converted into ranks (orders). The advantage is that the assumptions of normality and homogeneity of variances are thereby not necessary, allowing more generality in the results. Also notice that the outlier loses its influence in this approach, as it is only the largest value in the sample. Another advantage of this test is that it can be applied to a variable that is ordinal, whereas the *t* test requires at least an interval scale.

To finish, in order to address all the hypotheses proposed in our model, the analysis required a vision of the correlation between the independent variables. This is very important, because without a correlation approach between the determinant variables, the model would not be meaningful. So, we employed Spearman correlation to verify the majority of the hypotheses proposed, H3 and H4. This test is the most appropriate for use in evaluating the multicollinearity between the independent variables when they are not normally distributed, as presented in this case (Hosmer Jr. et al. 2013).

## 6. Discussion, Conclusions, Limitations, Implications, and Future Research

### 6.1. Discussion of the Results

Among the research results presented in the previous section, there are many aspects to discuss. The evidence shows that equity crowdfunding has been received into the entrepreneurial ecosystem since its regulation in 2017. The data show that the investment made through the platforms increased from almost BRL 3 million in that year to more than BRL 84 million in 2020, totaling BRL 185 million in the period. Despite COVID-19 being a catastrophe for the world economy, it can be seen that crowdfunder's performance showed resilience and even growth in Brazil.

The first aspect from the results that we can discuss is the relevance of each characteristic of the offerings to the success of the operation. Our findings show that the main characteristic on which investors base their investment decision is the type of the negotiation finalization: mutual offer, debt convertible to shares, or equity offer. Via logistic regression, our model shows that mutual offers are determinants of the success of operations (239.15%). Furthermore, equity offers are more likely to threaten investors (−56.09%). It was statistically proven that investors are more comfortable with mutual offers and resistant to equity offers.

This result reflects the difficulty of venture investments in Brazilian culture. Loans (mutual offers) provide more security to the investor as the entrepreneur can raise funds without changing the company's cap table. This clearly shows that this fundraising modality is being used by entrepreneurs to raise capital without being submitted to market exigencies. These observations have important implications for both theory and practice. From a theoretical perspective, our results provide the first evidence that the type of offer finalization is the most influential element in the success of the offer in crowdfunder operations.

The second point that our research has revealed, by applying the Mann–Whitney test, is that without the participation of expert investors (qualified and retail investors together), who are the ones that can, by CVM rules, invest in a higher-value ticket, crowdfunder operations would not prosper. So, despite small investors being numerous, they are not enough to warrant the success of offerings. This reinforces the fact that the main investors in equity crowdfunding are, in fact, professional investors, who are used to investing in the financial market, although (D. Cumming et al. 2021) stated that platforms' offerings attract small and professional investors alike. Our results show that, in Brazil, individuals who can invest up to BRL 10,000 have no representativeness in operational decisions.

Owing to this, our analysis thus identifies that the profile of crowdfunder investors, in Brazil, is not truly the crowd, but venture capitalists or angel investors. In other countries, as suggested by the works already mentioned throughout this research, such as D. Cumming et al. (2021), Hornuf and Schwiendbacher (2016) and Landström and Mason (2016), small investors follow expert investors in participating in the same rounds. Furthermore, the high tendency of equity crowdfunding to assume a secondary market profile is something that was not permitted in Brazil during the research period.

This also reflects the lack of financial education and a culture of venture investments in Brazil. Furthermore, it aligns with new movements made by professional investors in the period (2017–2020) looking for higher returns. At that time, GEM Brasil (2020) showed a gradual increase in consumption encouraged by low inflation, the reduction in the introductory interest rate (Selic), the use of money withdrawn from Length-of-Service Guarantee Fund (FGTS) accounts, the growth of investments in the stock market (with the Ibovespa hitting successive high records), the implementation of labor reform and the approval of the social security reform in 2019.

To collaborate with this vision, advances in tax and administrative reforms were expected at that time, in addition to the approval of the provisional measure of economic freedom to reduce bureaucracy and facilitate the opening of micro-sized and small companies. Among the changes are the removal of the requirement of a business license for low-risk activities, impacting most small businesses; the simplification of the digital book-

keeping system for tax, social security, and labor obligations; and the creation of the figure of regulatory abuse to prevent the public authorities from editing rules that affect the “exploitation of economic activity” or harm competition (GEM Brasil 2020).

These explanations can also account for the increase in this period in Brazil’s Total Early Stage Entrepreneurial Activity (TEA), which is the sum of two specific categories: the nascent entrepreneur and the new business owner. According to Mattos and Renzetti (2016), SMEs represent a significant and growing niche of the Brazilian economy, despite the unfavorable business environment these companies face. Although they represent the majority of employers in the country, despite the high turnover, the segment offers no guarantee of wealth, and presents high mortality rates in the early years (Nascimento and Querette 2013). According to GEM Brasil (2020), there are about a 53.4 million entrepreneurs in the country, of which 32.2 million are TEA entrepreneurs. In 2019, the initial entrepreneurship rate (23.3%) was higher than the regular entrepreneurship rate (16.2%), reaching the highest difference between both rates (7.1%) since 2002. The growth of initial entrepreneurship in Brazil was exclusively due to the increase of 6.4 percentage points in the nascent entrepreneur rate (8.1%), as already mentioned, in about 2018. Although the rate of new business ownership reduced by 0.6% in the same period, nascent entrepreneurship in 2019 reached the highest value in the historical series. Looking at this kind of entrepreneurship on the platforms, our analysis sheds light on the great participation of earlier-stage companies in equity crowdfunding. It was one of the three variables we explored to measure inclusion, or democratization, from the entrepreneurs’ side. The other independent variables we considered in the hypotheses proposed were metropolitan area (vs. remote located companies) and female leadership. These characteristics certainly represent the minority in Brazil in terms of economic access, as described in the Results section. Our findings reveal that, with regard to the logistic regression, the metropolitan area was the only one to negatively impact success. This means that, surprisingly, remotely located companies have an 83% rate of success in equity crowdfunding.

However, the results of the Spearman’s correlation show different behaviors for each of those “inclusion” variables, responding to H3, H4, and H5. In spite of mutual offers being a general tendency, when tested, this was not unanimous, which was surprising. Furthermore, like D. Cumming et al. (2021), we proved female entrepreneurs do not have a higher chance of raising funds in equity crowdfunding, with very low participation on platforms (14%).

Our findings show that regulatory efforts are still required to democratize equity crowdfunding in the country. Nevertheless, the public hearing launched by CVM in July 2021 made a movement to expand the opportunities for established companies and professional investors, despite the increase in lending offers. Exactly three years after the Instruction 588 regulation, the public hearing updated the perceptions of investment, promoting a few changes to be implemented from 2021. The first was to broaden the investment limit and increase the companies’ net values. In addition, it created incentives for campaigns, intending to improve attractiveness so as to facilitate the raising of capital. Based on this analysis, we consider that equity crowdfunding in Brazil is soon going to take on a more venture-capital-type profile, based on the quantity of investment and the reduced worries about the quantity of investors.

Our data analysis exposes the necessity of developing a more inclusive and innovative movement, mainly related to female-led firms, as they represent half of the total of Brazilian entrepreneurs and have very little capacity for raising funds.

## 6.2. Research Conclusions

This research was the first to prove that, in Brazil, equity crowdfunding acts as a credit bank niched to SMEs. We statistically proved, for the first time, that mutual offers are determinants of the success of operations (239.15%). Moreover, equity offers are more likely to threaten investors (−56.09%). It shows clearly that this fundraising modality is being used by entrepreneurs to raise capital without submitting to market exigences. These

observations have important implications for both theory and practice. From a theoretical perspective, our results first provide evidence that the type of offer finalization is the most influential element in the success of the offer in crowdfunding operations, constituting a new finding in the literature.

This study provides a rich discussion of the Brazilian economics and finance profile. In addition, there is a spirited debate regarding the role of each independent variable employed, considering the capacity of this fundraising modality to democratize and promote inclusion, such as female participation, type of offer finalization, investor profile, and metropolitan area. This last variable, nevertheless, was the only one that showed an inclusion bias in the results (−83.35%), as remotely located firms are not discriminated against by investing through the platforms. This result is in accordance with the findings of D. [Cumming et al. \(2021\)](#).

From a practical perspective, it becomes clear from the findings that the most influential aspects determining an offer's success are the type of operation finalization and its capacity to attract expert investors. On the other hand, concerning the independent variables that could be indicative of a minority or of inclusion—such as gender, firm age, geography, and small investor—it was proven by logistic regression that only presence in a metropolitan area impacts the dependent variable's success. Small investors, when tested by Mann–Whitney (U) as a variable present only for successful offers, did not appear so relevant as the “expert investors” variable.

So, interest from expert investors was proven to be essential to the operation's performance. This leads us to infer that most entrepreneurs that participate in equity crowdfunding have a good network with funders, and/or the platforms help them maintain the portfolios they had achieved, as venture capital used to do.

### 6.3. Implications and Limitations

This research provides the first in-depth look into the equity crowdfunding market in Brazil, with a basis in empirical data on offers. It is a pioneering work dedicated to understanding the peculiarities and perspectives of this fundraising modality in the country. Furthermore, it investigates crowdfunder's potential as a financial alternative to promote democratization for Brazilian entrepreneurship ventures.

In this study, a model inspired by D. [Cumming et al. \(2021\)](#) was proposed, wherein the explanatory variables completely fit the Brazilian scenario, considering all possible data available about equity crowdfunding offers since the regulation of the market by CVM in 2017. This contributes to the collection of empirical and publicly available data from several sources, constituting a consistent database within the sector for the first time, and developing a model that fits well with the Brazilian equity crowdfunding experience.

The limitations of the work concern the data used, as the platforms were responsible for publishing their annual reports on the CVM site. Although they constitute the official data, they could be incomplete, in which cases we stated “N.A.”.

### 6.4. Recommendations

Regulatory changes could help in this democratizing process, encouraging the participation of companies in small, remotely located cities, which is extremely important to a country the size of Brazil. Another suggestion is the creation of a female quota, which would help platforms in seeking women's presence on both the entrepreneur and investor sides. Furthermore, we recommend some changes that could increase the participation of small investors, and ensure that equity crowdfunding becomes an important tool in democratizing access to capital, including promoting economic growth in Brazil, as follows:

1. Incentives for small investors—Developing policies that encourage the participation of small investors, such as tax reductions or partial guarantees, can help increase financial inclusion and diversify the investor base;

2. Transparency and education—Improving the transparency of crowdfunding platforms and offering financial education programs can help investors better understand risks and benefits, increasing their trust and participation;
3. Flexible regulation—Implementing regulation that is flexible enough to adapt to market changes, but at the same time protects investors, can encourage more companies to seek financing through equity crowdfunding;
4. Support for minority entrepreneurs—Creating specific programs to support minority entrepreneurs can help diversify the entrepreneurial ecosystem, promoting a more equitable distribution of financing resources.
5. Infrastructure development—Investing in developing the infrastructure needed to support equity crowdfunding platforms, especially in remote areas, can help democratize access to finance for entrepreneurs in less developed regions.

#### 6.5. Future Research

Future research could further explore the profiles and behaviors of each investor category presented in this study, to help not only the platforms, but also regulations in becoming more precise, thus attracting small investors and fomenting the crowd spirit. Another field that must be explored by researchers is the type of offer. First, there is an enormous cultural aversion to equity negotiations that could be more deeply explored. Thus, it is necessary to investigate what market gaps mutual offers are supporting, and how these can be improved to benefit not only the equity crowdfunding movement, but also the Brazilian entrepreneurial scenario and, even better, the economic society.

Lastly, we suggest that the democratization/inclusion determinants could be studied by considering entrepreneurship performed via the platforms, and assessing the companies' performance and further participation in the market. In the case of gender, for example, important contributions could be made, as women represent the majority of Brazilian entrepreneurs.

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