

Success Determinants of Initial Coin Offerings (ICOs)

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PhD in Management, specialization of Strategy and Entrepreneurship

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Resumo

As empresas fintech surgiram tomando partido dos atuais desenvolvimentos tecnológicos tendo desafiado os atuais atores do mercado. Projetos disruptivos financiados nomeadamente por cripto moedas são um dos tópicos relacionados com o desenvolvimento tecnológico e capazes de eliminar a necessidade para o envolvimento de terceiros na mediação financeira reduzindo assim o hiato entre investidores e promotores. O propósito desta tese é o de identificar os principais impactos que as empresas fintech têm nos modelos de negócio das empresas financeiras já estabelecidos no mercado. Terá um foco especial nos fatores de sucesso dos projetos baseados na blockchain denominados *Initial Coin Offerings* (ICOs), em particular, os fatores relacionados com o capital humano. Assim, a tese está dividida em três estudos principais com focos diferentes. A metodologia usada nesta tese é de métodos mistos: uma metodologia qualitativa foi usada na revisão sistemática da literatura; e uma metodologia quantitativa foi usada na construção e estimação de modelos econométricos, tendo por base microdados de 428 projetos de ICOs do setor bancário. Esta tese conclui que as fintechs não podem ser ainda consideradas substitutos dos serviços financeiros tradicionais. Contudo, estas colocam desafios e expõem as fraquezas dos modelos de negócio tradicionais. A indústria financeira necessita de adaptar urgentemente os seus modelos de negócio para se manter competitiva. Este desafio já foi aceite por várias empresas. Os ICOs causam disrupção e são um grande passo para a democratização dos investimentos financeiros. Este estudo identificou um conjunto alargado de fatores de sucesso que influenciam o resultado final destes projetos. Os fatores podem agrupar-se em categorias: (i) projeto; (ii) campanha; (iii) redes sociais; (iv) capital humano. Os fatores que esta tese comprovou contribuir para o sucesso de um projeto são os seguintes: pré-existência de limites de financiamento; a qualidade do *whitepaper*; a existência de um mercado secundário e esquema de bonificações; o preço dos *tokens*; o preço das cripto moedas; a boa gestão de redes sociais; a localização geográfica e a rede de contactos dos promotores; o tamanho das equipas; ratings externos atribuídos ao projeto e à equipa. No que diz respeito às contribuições teóricas, esta tese contribuiu para a escassa literatura no tema dos ICOs e para duas teorias, nomeadamente a *signaling theory* e *Human Capital Theory* (HCT). As contribuições práticas deste estudo relacionam-se com a avaliação da qualidade do projeto e a necessidade premente dos reguladores tomarem medidas nestes mercados.

Palavras-chave: *Initial Coin Offerings, bancos, instituições financeiras, capital humano, blockchain, fatores de sucesso, cripto moedas.*

JEL Codes: *M13 - New Firms • Startups; O32 - Management of Technological Innovation and R&D*

Abstract

Fintech companies have been surging taking advantage of the current technological developments and have been challenging traditional incumbents. Disruptive ventures financed by cryptocurrencies are one of the main topics related to technological developments, capable of completely eliminating the need for a third-party intervenient and reducing the gap between investors and promoters. The purpose of this thesis is to identify the main impacts that fintech companies have on the business models of traditional banking/financial institutions and to focus on the success factors of disruptive and highly technological Initial Coin Offerings (ICO) projects, particularly, on the human capital factors. In order to do that, the thesis is divided into three main studies, each one of them focused on a particular topic. The methods used in this thesis are mixed as a qualitative approach was adopted through a systematic literature review, and a quantitative approach was performed by building several econometric models.

This thesis concludes that fintechs cannot be considered complete substitutes to the traditional services yet. Nevertheless, they are posing incumbents challenges and exposing the weaknesses of their business models. The banking/financial institutions need to urgently adapt their business models in order to remain competitive, and most of them already accepted this challenge. The ICO projects also present a disruption and a step forward in the democratization of the financial investments. This study identified a wide range of success factors influencing the outcome of an ICO project. The success factors might be divided into categories according to their scope: (i) project; (ii) campaign; (iii) social networks; (iv) human capital. It is concluded that several factors have a real impact in the outcome of the projects, such as, the existence of financing thresholds, the quality of the whitepaper, the existence of a secondary market and bonus schemes, the price of the tokens, the price of cryptocurrencies, the good management of social networks, the promoters' geographic location, their networks, the size of the teams, external ratings attributed to the project and to the team.

In terms of theoretical contributions, this study added a contribution to the still scarce literature on ICO projects and to two theories, namely, the signaling theory and Human Capital Theory (HCT). The managerial implications concern mainly the assessment of the quality of a project by the investors and the need for regulation by supervisors.

Keywords: *Initial Coin Offerings, bank, financial institutions, human capital, blockchain, success factors, cryptocurrencies.*

JEL Codes: *M13 - New Firms • Startups; O32 - Management of Technological Innovation and R&D*

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Acronyms

HCT – Human Capital Theory
ICO – Initial Coin Offering
IPO – Initial Public Offering
M&A – Mergers and Acquisitions
UK – United Kingdom
USA – United States of America
VC – Venture Capital

1. Introduction

The world of traditional banking has recently suffered severe changes due to a revolution in technology, which allowed new entrants in the business and caused a rush to adopt the latest technological developments (KPMG, 2019a). The new entrants affected traditional players' profitability and urged them to adapt their business model (Cheng & Mevis, 2018). Simply put, the fintech companies might be defined as "new financial industry that applies technology to improve financial activities" (Schueffel, 2016, p. 15). The main impact these companies pose to traditional market players concern the intensive use of technology, which allows them to offer lower cost services and higher accessibility worldwide. Indeed, these solutions allowed a democratization of finance (Chen Y. , 2018) while the costly business model of banking institutions has revealed to be a burden (Gomber, Kauffman, Parker, & Weber, 2018). Despite the fact that fintechs allow access to financial services to a wide range of users, there are also some concerns of financial exclusion of certain populations which might have little digital literacy or poor telecommunications infrastructures (Meena, Sriram, & Sundaram, 2017). As fintechs are shaping the traditional banking business models (Roland Berger, 2018) the real impacts they have had are still not clear. This research tries to shed some light on this subject using a systematic literature review.

Leveraging on the appearance of fintech companies, technological developments and the growth of cryptocurrencies, the new concept of Initial Coin Offerings (ICO) has appeared (Mamonov & Malaga, 2020). ICOs are a disruptive way to obtain financing based on blockchain technology allowing investment in tokens issued by new ventures via cryptocurrencies (Chiu & Greene, 2019). According to Brochado (2018b) we could define ICOs as an alternative investment that offers the possibility of direct financing from worldwide investors and which contributes to the democratization of entrepreneurship and access to capital markets. Indeed, ICOs are a universal way of financing that can raise capital worldwide with low thresholds for investment (OECD, 2019) and have been compared to other forms of financing, namely, Initial Public Offerings (IPOs), Venture Capital (VC), and crowdfunding (Kranz, Nagel, & Yoo, 2019). Nevertheless, these different models have unique characteristics that make them distinct and worthwhile to study separately (OECD, 2019). ICO projects have been raising academic attention and some studies have been focusing on them (Jong, Roosenboom, & Kolk, 2018). The same happens with the factors determining their success (An, Duan, Hou, & Xu, 2019). Nevertheless, there are still several literature gaps to be fulfilled on this topic (Chen & Chen, 2020), namely, regarding the general success factors of projects and particularly to ascertain the importance of human capital variables (Fisch, 2019). The current

research studies ICO projects and in particular the factors impacting their success with a particular focus on human capital factors.

1.1. Structure of the thesis

This dissertation is organized in five chapters: the introduction, three essays on fintech and ICO, and a conclusion. The next chapter of the thesis is an extended literature review on the topic of fintech and particularly on ICOs. The impacts of fintech in traditional business models will be explored as well as the ICOs' concept and success factors. Two subsections are dedicated to highlighting the research gap found and fulfilled by this research as well as to summarizing the research performed providing insights on the three studies that compose this thesis. The subsequent three chapters include the studies performed.

The first study is focused on the impacts of fintech companies in the business models of traditional banking/financial firms. The study starts with an overview of the fintech concept and the general impacts they have on traditional market players. It also explores the way traditional market players adapted to the new reality and the fintech threat. The contribution of this study was to perform a literature review on this topic by analyzing 100 relevant studies obtained through a search by keywords in Scopus. Several analyses were performed and translated into tables, for instance, the breakdown of the papers' year, papers' quartile according to Scimago Journal and Country Rank, or the most common keywords used. Then, a hybrid design comprising the systematic qualitative review methods and narrative, supplemented by semantic network analysis. This study also content-analyzed the papers' abstracts through Leximancer, a software program that automatically extracts semantic networks from qualitative data. The first essay aims at identifying the primary contributions of different researchers to the study of Fintech and ICOs, the main insights (i.e. themes) this literature offers, and what still needs to be investigated. The second study's focus is on the general success factors of ICO projects. This study builds on the signaling theory to state that there are information asymmetries between investors and promoters of a new project or venture. The promoters of the projects detain crucial information on their capabilities and the project's characteristics which the investors do not. Based on this, the study assumes that as more information the promoters provide to investors, the better their perception of the project's quality and the higher the likelihood of their investment. Therefore, the study uses the literature already existent to explore the success factors of a project which are identified as signals to investors. For instance, if a project obtains a better external rating the perception of the project's quality increases working as a signal of success and reducing the information asymmetry. The study performs an econometric model to

identify the relevant success factors, divided into categories, and their impact on the success of a project. The model is based on a microdata of 428 ICO projects in the banking/financial area, obtained from the ICObench website, using an Application Programming Interface (API). The database was complemented using public information extracted from Twitter and LinkedIn platforms.

The third study's focus is on the human capital factors influencing the success of a project. The study builds on the Human Capital Theory (HCT) to state that human capital characteristics influence the success of a venture or project, working also as signals of the project's quality. Using literature from HCT, crowdfunding, and ICOs, the study collects the relevant human capital characteristics considered to have an impact on the success of a project. Then, an econometric model was built based on a database of 340 projects and 5025 promoters' profiles. The database was complemented using public information from the LinkedIn platform allowing the creation of variables controlling the founders' education, degree type or professional experience. Several control variables related to the project and not directly with the team were included in the model.

The conclusions of the research are summarized in chapter 5. These conclusions are transversal to the three separate but interconnected studies. This chapter also provides the avenues for future research and the limitations of this study. The theoretical and managerial implications of this research are also highlighted on the final chapter.

1.2. Theoretical background

1.2.1. Fintech companies and traditional institutions

The fintech appearance of fintech companies was supported by several forces that drive innovation such as technology expansion and permissive regulation (Desai, V, V, & Jayakumar, 2019). Banks and financial institutions are urged to adapt to the challenges posed by new entrants in order to remain competitive (McKinsey&Company, 2018). There are further forces allowing fintech companies to thrive in a digital era according to Gomber et al. (2018) and KPMG (2019): (i) Technology Innovation: the pace of technological transformation is increasing very fast and technologies often interconnect with each other creating technological breakthroughs. As fintechs are based on IT structures, this technological improvement supports these companies; (ii) Process Disruption: the appearance of virtual currencies based in a blockchain process created a process disruption, making it the new model that should be adopted. Gomber et al. (2018) argued that "the entire financial services industry has been disrupted in fundamental ways" (p. 225); (iii) Services Transformation: a transformation in the

service provided by financial companies has been noticed due to consumers' pressure and technological developments. The fintechs' service has been putting pressure on traditional service transformation; (iv) Economies of scale in IT applications: according to Lacity & Willcocks (2001) an example of economies of scale in IT is the outsourcing of IT systems to service providers.

The general public is also more aware of the fintech concept. Using the tool Google Trends, increasing interest in the fintech topic can be confirmed, with a sharp increase since 2013, and a stable interest in the bank topic, with a stable tendency and interest below the previous topic (Google, 2020). The academy is also increasingly more interested in these topics (Campino, Brochado, & Rosa, 2020). Therefore, the consumer adoption of fintech products and services poses a threat to the market incumbents which could lead to a decrease in profitability. The adaptation from traditional institutions is needed in order to remain competitive but heavy traditional banking industry's legacy might be a burden posing a threat to a fast and successful adaptation to the new reality (Chiorazzo, D'Apice, DeYoung, & Morelli, 2018). Indeed, traditional banking is characterized by a costly model of branches (Gomber et al., 2018), traditional lending, relationship deposits and traditional sources of revenue (e.g. interest rate charged and banking fees) (Chiorazzo et al., 2018). The technological and more accessible substitute products offered by fintechs pose the main risk to traditional institutions (Vives, 2017). PWC (2016) estimated that 28% of the banking and payment businesses, as well as 22% of the insurance, asset management, and wealth management systems, are at risk by 2020 due to the new competition. The reason is fintechs are operating concurrently with traditional banking particularly in the payments area, financial intermediation, and cryptocurrencies, putting pressure on established financial companies on margins charged, loss of market share, information security, and customer churn (PWC, 2016). Therefore, traditional industries are adopting fintechs' characteristics and include them into their business models with 48% of financial companies adopting fintechs' strategies (PWC, 2019). The strategies used by incumbent companies to deal with the appearance of fintechs vary and the most common are Mergers and Acquisitions (M&A) and cooperation. The M&A scheme is used to absorb fintechs into incumbents' business model and, consequently, this activity is growing since 2017 with the Q1+Q2 of 2019 amounting to USD 23.9 billion and about 160 deals completed worldwide (KPMG, 2019a). Currently financial institutions, as well as technological, media, and telecommunications companies are cooperating to create synergies and easily incorporate innovative solutions into their business models. Telecommunications companies have an advantage in offering customer-centric products which have great success but financial

institutions are well-established in the market and have acquired licensing to operate in financial solutions which creates the basis for a win-win cooperation (PWC, 2019). It is consensual that financial institutions should focus on several areas in order to survive and be adaptable within the new technology world, namely: (i) becoming digital (Bughin, Deakin, & O’Beirne, 2019); (ii) optimizing their business model (e.g. adopting robot advice, digital platforms, partnering with telecommunications companies); (iii) becoming more cost-efficient; (iv) retaining customers; (v) being able to attract talent; (vi) focusing on specific business segments with tailor-made solutions; (vii) being able to keep the pace with regulatory developments (PWC, 2016; Khanna & Martins, 2018; McKinsey&Company, 2018; PWC, 2019).

1.2.2. Fintech market snapshot

The analysis of the fintech market should be made distinguishing between investment in fintech, market volume, fintech hubs, and deals completed. Geographically speaking, the area with higher investment in fintechs from Venture Capital (VC), Private Equity or M&A, is the American continent where the United States of America (USA) is the biggest player with 87% of the investment made. The European continent and Asia Pacific region follow respectively in terms of investment (KPMG, 2019a). However, China is by far the largest player in terms of market volume, followed by the USA and Europe (Ziegler, et al., 2019). Concerning fintech hubs, the United States of America (USA) and China lead the way by far being London the only European city represented in the top 10 (position 4) of fintech hubs (University of Cambridge, 2018). Globally, in the first half of 2019 fintechs represented an investment of USD 37.9 billion with 962 deals which represents a decrease from 2018 (USD 120 billion and 2590 deals) mainly due to a preference of investors for smaller deals, a decrease in investment in Asia, a more matured market in blockchain, an increase in banks’ competitiveness in terms of digitalization and also an investment in financial services from big technological companies (KPMG, 2019a).

From a total of USD 361.9 billion in 2017 of market volume in the Asia Pacific region, China alone represents USD 358.3 billion with a clear market volume growth trend that has been present since 2013 with a growth from USD 6 billion in this year to USD 358 billion in 2017. Although much smaller, there are other players in this region by market volume such as Australia (USD 1.5 billion), South Korea (USD 1.13 billion), Japan (USD 348.7 million) and India (USD 268.6 million). Concerning the investments in fintech, the Asian region accounted USD 3.6 billion and 102 deals which represents a growth tendency (University of Cambridge, 2018). In the American continent, the USA is the largest player in terms of market volume

which represented USD 44.3 billion in 2017. Canada is the second most important market (2% of market volume) in the Americas. Latin American countries represent 1% of the total market value (University of Cambridge, 2018a). The European continent represents EUR 10.44 billion in 2017 in terms of market volume. The UK is by far the largest contributor to the fintech's market volume with EUR 7.07 billion.

In terms of investment in Fintech, the American market is the largest player with USD 55.3 billion in 2018 and the 10 biggest fintech deals in the first half of 2019 happening in the USA. The European continent represents USD 13.2 billion of investment and 307 deals. Most representative deals happening in the first half of 2019 took place in Germany and France followed by several UK deals and one single deal in Norway. The Asia Pacific region represents USD 3.6 billion of investment and 102 deals with the most important ones in the first half of 2019 taking place in China, South Korea, Australia, Indonesia, and Vietnam (KPMG, 2019a).

1.2.3. Initial Coin Offerings

The technology developments and the growing interest in cryptocurrencies supported the appearance of new investment and financing forms, specifically the ICOs. Furthermore, economies are becoming more digital than ever and local businesses are becoming international urging the need for a borderless and efficient flow of capital (Rrustemi & Tuchschnid, 2020). The general public had a growing interest in this topic with a peak in the years 2017 and 2018 with a decrease in popularity in the year 2019 (Google, 2020). ICOs are still a very recent topic with several literature gaps to fulfill and several dynamics to understand better (Chen & Chen, 2020). ICOs' main function is to fund innovative ventures which are based on a distributed ledger technology (DLT) such as blockchain (Kher, Terjesen, & Liu, 2020; Sharma & Zhu, 2020). The funding is performed via the tokens selling by the cutting-edge technological ventures and the tokens purchase by worldwide investors (Chiu & Greene, 2019). Therefore, the investors are able to buy tokens directly from the new venture without the need for a third party involved. This characteristic may work as a substitute for third parties such as banks and financial institutions since the security of the system is assured by the blockchain code and the process involves much lower costs. The token sold is the unity of value in ICO investments and there are different token types with associated characteristics. According to Howell, Niessner, & Yermack (2018), there are three main token categories: (i) currency token: used as a means of exchange and store such as a cryptocurrency; (ii) security token: used as conventional security but recorded and exchanged on a blockchain. The underlying of this token type can range from corporate equity (typical share) to commodities, real estate, or even currencies and;

(iii) utility token: the most common token type, that provides to the buyer consumptive rights to access a product or service. According to Kranz et al., 2019 there is a fourth type of token, namely, the donation tokens which do not grant any rights to the investor and are used to raise money for entrepreneurial and idealistic projects. According to Brochado (2018b), there are also hybrid tokens that combine more than one of the characteristics mentioned above. Besides, new token types should appear in the future (Fisch, 2019). The characteristics of the project are compiled in the whitepaper which is unregulated but tends to follow certain characteristics and can be compared to a regulated prospectus. The whitepaper is also a measure of the project's credibility, since it contains technical information as well as business information and information regarding the team (Chiu & Greene, 2019).

An ICO project might have none to several thresholds defining the capital which should be raised (Kranz et al., 2019): (i) no-cap: project without any limits regarding financing; (ii) soft-cap: minimum limit of capital achieved to proceed with the project; (iii) hard-cap: maximum amount of capital accepted; (iv) collect and return: a hard-cap is defined and, if surpassed, the tokens will be distributed respecting the ratio of the hard cap to the total funds received; (v) dynamic ceiling: several hard-cap limits are defined and kept secret, and; (vi) combination of several characteristics mentioned.

The ICO market is still largely unregulated as new ventures are not obliged to fulfill many regulations. Therefore, the importance of good quality signals increases (Bourveau, George, Ellahie, & Macciocchi, 2018). This lack of regulation is one distinct characteristic of ICO projects. They have been compared with crowdfunding, Venture Capital (VC), and Initial Public Offerings (IPOs) (Block, Groh, Hornuf, Vanacker, & Vismara, 2020), which are traditional ways of project financing, but there are substantial differences between these concepts (Biasi & Chakravorti, 2019) and ICOs have also been challenging them (Schückes & Gutmann, 2020). The concept of Crowdfunding can be defined as “an open call for the collecting of resources (funds, money, tangible goods, time) from the population at large through an Internet platform. In return for their contributions, the crowd can receive a number of tangibles or intangibles, which depend on the type of crowdfunding. It generally takes place on crowdfunding platforms, that is, internet-based platforms that link fundraisers to funders.” (Delivorias, 2017, p. 2). ICOs share similarities with crowdfunding mainly when the first use utility tokens and the latter follows a reward crowdfunding type, because both concepts allow the investor to use the final product once launched, although most ICOs do not confer equity rights contrary to crowdfunding (OECD, 2019). Besides, both types of financing allow the support of a project at a very early stage of its life. Indeed, ICOs share several characteristics

with crowdfunding but work under a blockchain system. Nevertheless, ICOs differ from crowdfunding because the first are mainly decentralized replacing intermediaries with a blockchain and the latter use a centralized platform that performs also some due diligence on the project. Companies using Crowdfunding might need to set in advance the price of the products contrary to ICOs campaigns (OECD, 2019). The main difference between both concepts is the existence of liquidity and a secondary market for the ICOs (Brochado, 2018b).

Venture Capital (VC) companies fill an important gap in entrepreneurial finance since they foster innovation and entrepreneurship financing new ventures “with growth prospects but few intangibles, little to no collateral, and high uncertainty about their future” (Gompers & Lerner 2004, cited Reuer, Matusik, & Jones 2019, p.316). Traditional lending institutions will not incur in such a risky situation as financing these projects with insufficient collateral. VC companies also rely on investors’ network who trust the VC’s work in selecting good entrepreneurial projects with high return potential. These investors will periodically trust their money in a VC company which will then invest it. VC companies also monitor the entrepreneurial ventures and should lastly sell their participation, usually convertible securities or equity, at a premium through an IPO or to another company (Reuer et al., 2019). ICO and VC have been compared although distinct. They are complementary to each other with VC companies’ participation in ICOs’ early stages (OECD, 2019). This complementarity is even more important due to the scrutiny performed by VC companies, its expertise, industry knowledge, and network which are of paramount importance in early-stage projects (Fried et al. 1998, cited OECD 2019, p.28). Once more, the great advantage of ICOs is the liquidity and the secondary market, because tokens are liquid and can easily be traded, which differs from VC investments that take several years to become liquid. ICOs have also been preferred to projects with higher risk associated due to the guarantees required by VC companies to finance such risky projects, at the same time that they take advantage of the founders’ network and help to build a future possible consumer base and brand awareness (OECD, 2019).

Companies conduct IPOs in a later phase of their life due to their need for capital expansion in a stage when other sources of capital might be insufficient. Capital raised through an IPO might be used to pay previous debts or invest in new projects. Higher transparency after an IPO might be important to a company to establish itself in the market once its businesses and accounts are much more scrutinized (Khurshed, 2019). Concepts of ICOs and IPOs have been compared but they are the most differentiated financing form from the three concepts analyzed. Firstly, ICOs involve much less costs in selling tokens than equity in an IPO and there is also a lower initial threshold for investment. These processes happen in different places once

an ICO is conducted completely virtually in a crypto exchange and an IPO must happen in stock exchanges. Therefore, the IPOs' market is highly regulated, and although ICOs have been catching regulators attention (Howell et al., 2018) they are still largely unregulated (Zhang, Zhang, Zheng, & Aerts, 2020) as well as the Whitepaper, which can be compared to an IPO's prospectus. Although largely unregulated, ICOs' regulation has been increasing and, in some markets, this is a regulated activity such as in the Swiss market (Spinedi, Rigotti, Canetta, Camoesa, & Redaelli, 2019). Shares and tokens differ mainly because the first give ownership rights to their holders together with possible vote rights over the company's decisions but tokens do not. Besides, ICOs finance an idea or a project in a very initial stage but IPOs happen when a company is growing and in a more mature phase of its life cycle and thus financing obtained is mostly based on a strong company track record of good performance. Lastly, in secondary markets, there is the chance of trading a fraction of a token but the same does not happen with shares (OECD, 2019).

1.2.4. Initial Coin Offerings market snapshot

The estimations for the size of the ICO market cannot be taken as completely correct and unbiased since there is no obligation to register the ICO in a specific and aggregated platform and since the data relies on manual entries (Fisch, 2019). Nevertheless, some websites are trying to aggregate a large number of projects and that can provide a good estimation of the market size (Rohr & Wright, 2019). Since the first ICO project in 2013 proposed by J.R. Willett, the ICO market has been increasing mainly due to its novelty and the hype caused by the valorization of cryptocurrencies, particularly Bitcoin, between the years of 2017-2018 (OECD, 2019). The years of 2017 and 2018 were the ones with higher amounts of funds raised as 2017 accounted for 442 token sales concluded with USD 6.4 billion (thousand million) of funds raised and 2018 was even better for the ICO market with 1051 token sales concluded and with USD 21 billion (thousand million) of funds raised. However, with the depreciation of Bitcoin since the end-2018, the ICO market also refrained and 2019 registered lower values compared with previous years, namely, 131 token sales concluded and USD 1.4 billion (thousand million) of funds raised (Coinschedule, 2020). Since 2016 that the categories of ICO investment have been changing but the investment in blockchain infrastructure has been constant over time and is in the top three investments since that year. The investment in financial projects was also constant since 2016 since they belong to the top three investments made, except in 2019. The investment in trading and investment platforms is also common and recently there were also significant investments in communications and payments platforms. Concerning the industries

in which ICO projects invest, the most relevant are: (i) platforms (3129 ICOs, USD 12.7B); (ii) cryptocurrency (2326 ICOs, USD 14.9B); (iii) business services (1271 ICOs, USD 4.3B); (iv) investment (996 ICOs, USD 3.4B), and; (v) smart contracts (840 ICOs, USD 2.1B). Geographically speaking, the countries with the largest number of ICOs are the following: (i) USA (716); (ii) Singapore (583); (iii) UK (505); (iv) Russia (328); (v) Estonia (299). In terms of the largest amount of funds raised in ICOs the top 5 countries are the following: (i) USA (\$7.3B); (ii) Singapore (2.5B); (iii) British virgin islands (2.4B); (iv) Switzerland (1.8B); (v) UK (1.5B) (ICOBench, 2020).

Until today, the top 5 ICOs raising more capital represent a cumulative amount of USD 7.8 billion. These ICOs are: (i) EOS (USD 4.1B): is a software-based on blockchain technology creating a technology that has the potential to scale to millions of transactions per second, eliminates user fees, and allows for quick and easy deployment of decentralized applications; (ii) Telegram Open Network (USD 1.7B): decentralized cryptocurrency which intends to be accessible to everyone (the founders state that bitcoin has established itself as the digital gold) integrating also a messenger service based on Telegram's blockchain; (iii) BITFINEX (USD 1B): is a cryptocurrency exchange allowing the buying and selling of several of these currencies; (iv) TaTaTu (USD 575M): social platform with a reward system based on the attribution of tokens to be used in the platform's market; (v) Dragon (USD 320M): is a decentralized cryptocurrency to be used in casinos which use the company's blockchain facilities (ICOBench, 2020).

1.2.5. Signaling theory

As previously mentioned, the ICO market is characterized by information asymmetries between the promoters and the investors (Momtaz, 2019). These asymmetries become more visible due to the ICO projects' characteristics and lack of regulation standards behind them (Kranz et al., 2019). Therefore, it is common that investors have much less information on the project than its promoters (Yadav, 2017). The signaling theory identifies this issue as an information asymmetry problem (Spence, 1973). Particularly in ICO projects, the role of institutional investors is of huge importance since they can overcome information asymmetries. Their ability to scrutinize a project and provide coaching allows them to do so and their participation in ICO projects has been linked to successful outcomes after the campaign has ended (Fisch & Momtaz, 2020).

The signaling theory states that several markets are characterized by an information gap between buyers and sellers, particularly the financial markets where the investors do not have

the same level of information as the entrepreneurs. Without proper information transfer among the participants the markets will perform poorly as the entrepreneurs may not always be completely transparent on the information they provide. Performing correct and deep due diligence is costly and thus third parties appear to overcome this difficulty. Being an outside party connecting both investors and entrepreneurs, these institutions fulfill the role of collecting unbiased information, being the channel among the market participants while being paid (Leland & Pyle, 1977). The signaling theory assumes the existence of signalers, receivers, and signals. The signalers possess crucial information on the project which must be sent to the receivers through signals in order to influence the quality perception of the project. The signals sent to the receivers must have two characteristics to be effective in reducing the existent information asymmetry: (i) observable sign by the receiver, and; (ii) be costly to realize and imitate since if no costs are involved the signals will be easy to replicate and thus have no value (Fisch, 2019). The cost to produce signals is a crucial part of the signaling theory as equivalent signals have different costs depending on high- or low-quality projects. If the costs to produce a signal are much higher in a low-quality project than in a higher-quality one, only the latter will choose to produce them (Fisch, 2019). High quality signals might be present in the whitepaper (Fisch, 2019), but might also be in websites with extensive databases (Giudici & Adhami, 2019) or social networks such as Twitter (Xuan, Zhu, & Zhao, 2020) or GitHub (Jong et al., 2018).

1.2.6. Human Capital Theory

The basic foundation of the Human Capital Theory is the focus on the individual and the idea that individuals and the society strongly and consistently benefit from the investment in people (Sweetland, 1996). This theory has old roots in the eighteenth century with economists such as Adam Smith, John Stuart Mill, and Alfred Marshall who focused on the fact that labor inputs must not only be considered quantitative but also qualitative since workers acquire abilities which increase productivity (Sweetland, 1996). Further studies have been focusing on the idea that people who are better educated also are better paid (Mincer, 1958; Schultz, 1961) and more productive (Fabricant, 1959). Some researchers also focused on the importance of human capital to the companies' profitability since human capital characteristics are directly linked with the productivity of the founder who is better able to use the inputs to increase the revenues of the company if previous investment in human capital was made (Bates, 1985). Besides, people with previous investment in human capital are seen to have obtained more income and capable of setting up businesses with more financial stability (Bruderl,

Preisendorfer, & Ziegler, 1992) overcoming eventual lack of capital (Brush, Greene, & Hart, 2001). Human capital characteristics are also seen as empowering founders with better abilities to foresee and embrace market opportunities (Unger, Rauch, Frese, & Rosenbusch, 2011). Particularly in younger businesses (Unger et al., 2011), human capital characteristics are capable of reducing information asymmetries of a project and work as signals of project's quality (Piva & Rossi-Lamastra, 2018). Characteristics such as years of schooling and work experience are seen as important success factors (Bruderl et al., 1992). Further characteristics such as business education, entrepreneurial experience, and networks (LinkedIn connections) are also considered to be important human capital characteristics (Piva & Rossi-Lamastra, 2018). The HCT usually assumes that experience means knowledge and skills (Frese & Rauch, 2001) which is not always true since professional experience does not necessarily mean expertise (Sonntag, 1995).

1.2.7. Initial Coin Offerings success factors

This research has found that most of the factors leading to the success of a project can also be considered signals of project's quality to the investors (Ackermann, Bock, & Bürger, 2020). The success factors might also be divided into categories according to their scope as follows: (i) success factors of the project; (ii) success factors of the campaign; (iii) success factors of social networks; (iv) success factors of the human capital.

The success factors of the project concern characteristics of the project itself, namely, every characteristic predefined when the ICO starts and related to the idea proposed and the future outcome. The measures of the project's success are not common to all researchers on this topic. In order to control for eventual different results, some studies have performed their analysis using different measures of success but obtaining similar results (Jong et al., 2018). The existence of a secondary market is so important in an ICO project that is seen as a measure of success since a project will only be truly successful if its token is traded in the secondary market (Amsden & Schweizer, 2019). The binary variable of soft-cap achievement was also built as a measure of success (Jong et al., 2018). Nevertheless, the most common measure of the project's success is the total amount of capital they achieved (Fisch, 2019; Šapkauskienė & Višinskaitė, 2020). The first factor identified as influencing the success of a project is the industry in which it is developed as some industries have intrinsically better results than others (Davies & Giovannetti, 2018). On the other hand, the experience of the founders in the industry of the project is not considered relevant (Mamonov & Malaga, 2018). The location factor is also considered widely in the literature and revealed to have an impact on the project's success

(Davies & Giovannetti, 2018; Charlotte, Sung, & Cheng, 2019; Fisch, 2019; Ackermann et al., 2020). Given the low regulation applied to ICO projects, there is no evidence that a reference to specific legislation influences the success of a project (Giudici & Adhami, 2019) but opaque projects tend to be less successful (Bourveau et al., 2018; Samieifar & Baur, 2020). The paramount source of information is the whitepaper (Adhami, Giudici, & Martinazzi, 2018) and there is a common idea that the length of the whitepaper influences project's success (Bourveau et al., 2018; Amsden & Schweizer, 2019; Fisch, 2019; Samieifar & Baur, 2020). Being a primary source of information, it is crucial to reduce information asymmetry between promoters and investors (Ofir & Sadeh, 2019). The effects of the technical level of the whitepaper are not unanimous in the literature. On one hand, technical whitepapers are assumed to contribute to the success of a project as they are assumed as a sign of their quality and technical expertise (Feng, Li, Wong, & Zhang, 2019; Fisch, 2019). On the other hand, there are arguments assuming that technical whitepapers do not influence a positive outcome in the long term, but have only a positive impact at the beginning of the ICO campaign (Albrecht, Lutz, & Neumann, 2019).

The campaign success factors are focused on the relevant aspects prepared before the beginning of the campaign and during that period. The common argument is that a longer campaign affects negatively the project's performance and shorter campaigns will most likely mean better outcomes (Davies & Giovannetti, 2018; An et al., 2019; Fisch, 2019; Ackermann et al., 2020; Roosenboom, Kolk, & Jong, 2020). Before the official campaign period starts, it is usual to have pre-sales of tokens offering discounts and bonuses for early investors (Liu & Wang, 2019). Although several studies reveal a positive impact of pre-sales of tokens success (Giudici & Adhami, 2019; Lyandres, Palazzo, & Rabetti, 2019; Ackermann et al., 2020; Roosenboom et al., 2020) there are also concerns of negative impacts (Momtaz, 2020a; Domingo, Piñeiro-Chousa, & López-Cabarcos, 2020) as pre-sales might be considered as an immediate need for capital and could later cause the dumping of tokens in the secondary market (Amsden & Schweizer, 2019). The existence of bonus schemes might negatively influence the success of a project (Adhami et al., 2018; Charlotte et al., 2019; Giudici & Adhami, 2019; Roosenboom et al., 2020) because ICO projects with larger bonuses are perceived as possible scams and are less likely to succeed (Lee, Li, & Shin, 2019). On the opposite, lower token prices seem to have a positive influence on the project's success since investors tend to be more interesting in cheaper tokens allowing them to buy several tokens from different projects (Burns & Moro, 2018; Jong et al., 2018; Yuryev, 2018; Yuryev, 2018). Similarly, if there are hard-cap financing thresholds previously established (Amsden & Schweizer, 2019) and their limits are

reasonable (Lyandres et al., 2019) they also contribute to a successful project. The impacts of soft-cap financing thresholds are not unanimous since there is evidence of their positive impact (Amsden & Schweizer, 2019) but also the contrary (Bourveau et al., 2018). Accepting several currencies is an evidence of project's quality revealing technical knowledge (Amsden & Schweizer, 2019). Thus, projects that accept more than one currency have higher success (Charlotte et al., 2019; Lee et al., 2019). The cryptocurrencies price also impacts the success of a project (Domingo et al., 2020). As most ICO projects are based on Ethereum technology, the ones which do not tend to be less successful (Fisch, 2019). This means that higher prices of Ether diminish the attractiveness of the investment in the ICO, resulting in a higher opportunity cost for the investor, and thus it is negatively correlated with the project's success (Amsden & Schweizer, 2019; Roosenboom et al., 2020). Besides, the existence and availability of high-quality code or code parts positively influence a project's success (Blaseg, 2018; Amsden & Schweizer, 2019; Ackermann et al., 2020) because investors have the chance to assess the degree of the project's technical quality (Adhami et al., 2018). The last campaign factor having an important impact on the success of a project is the rating attributed by external parties, as it can determine the success of an ICO with strong precision (Liu & Wang, 2019).

Social networks are part of today's world and good use of these platforms can contribute to promote a project and influence its success (Ante, Sandner, & Fiedler, 2018; Bourveau et al., 2018; Ackermann et al., 2020) as they can be used to influence investors' behavior (Liu & Wang, 2019). The most used social networks in ICO projects are Twitter and Github, the latter being a public repository of code. The use of Twitter has a positive relationship with market capitalization but this utilization must be regular and not exaggerated since high-intensity activity on Twitter is associated with positive returns in the very short term but with negative returns in the future (Benedetti & Kostovetsky, 2018). Overall, the importance of having a Twitter account in ICO projects is proved, as this is a good way to better communicate with investors and a further way to reduce information asymmetries (Burns & Moro, 2018; Cerchiello, Tasca, & Toma, 2019; Fisch, 2019; Xuan et al., 2020) similarly to what happens in crowdfunding (Greenberg, Hariharan, Gerber, & Pardo, 2013). The use of the Github platform as a source of available public code is also a positive contribution to the project's success (Albrecht et al., 2019; Amsden & Schweizer, 2019) particularly during pre-sales of tokens (Roosenboom et al., 2020).

The human capital success factors were also the focus of some previous studies. The main characteristics associated with the founding team are considered to be the following: (i) professional experience (Giudici & Adhami, 2019); (ii) experience in blockchain projects

(Brochado, 2018b); (iii) entrepreneurial profile (Howell et al., 2018); (iv) number of founders (Jin, et al., 2017); (v) existence of social media accounts (Albrecht et al., 2019; Yeh & Chen, 2020). The size of the founding team (Giudici & Adhami, 2019) and the number of advisors (Giudici, Moncayo, & Martinazzi, 2020) are positively correlated with a project's success as larger teams are associated with positive outcomes. The size of the team is particularly important in new ventures as a way of exchanging information and overcome information gaps (Jin, et al., 2017). Teams with diversity among their members are considered important to improve decision making and organizational performance (Boone & Hendriks, 2009), and new ventures are more successful if they have diverse teams (Zimmerman & Zeitz, 2002). Larger and diverse teams can also have setbacks as become inefficient due to the existence of too much expertise and management styles (Lechler, 2001). The cohesion of the founding team is considered important to maintain the stability of the team since instability may lead to members' exit. Indeed, larger founding teams are negatively correlated with later members' entry and positively associated with members' exit (Ucbasaran, Lockett, Wright, & Westhead, 2003). There are also variables that are considered not relevant as contributors to the success of an ICO project, for instance, the education and entrepreneurial experience (Giudici & Adhami, 2019). In crowdfunding, both education and professional experience are considered as human capital factors but only the latter has revealed statistically significant (Allison, Davis, Webb, & Short, 2017). Finally, the disclosure of teams' information is linked to higher funds raised (Samieifar & Baur, 2020). In terms of time needed to successfully complete an ICO, there is also a positive relationship between less time needed to achieve ICO's goals and the existence of a founding team with business, blockchain and technology experience, corporate board background, and large social networks (An et al., 2019). An innovative study was also developed to prove that emotional intelligence can also be a success factor of ICO projects, particularly the CEO affective traits. These affect the outcome of a project particularly for uninformed investors (Momtaz, 2020b).

1.3. Research gap and objectives

Existent studies provide little insights on the effects of fintech companies in traditional banking and financial institutions (Vives, 2017; Bughin et al., 2019). The studies on this subject are dispersed and most of the important information is not on academic researches but studies performed by consultancy companies (PWC, 2016; Deloitte, 2017; EY, 2018; McKinsey&Company, 2018; PWC, 2019). Furthermore, the new topics such as ICO projects still have several literature gaps, particularly on their success factors (Fisch, 2019; Giudici &

Adhami, 2019; Samieifar & Baur, 2020; Roosenboom et al., 2020) and some studies have also focused on unsuccessful cases (Rrustemi & Tuchschnid, 2020). The geographical location of the teams and the projects is pointed as an avenue for future research as some countries might have larger availability of qualified human capital (Huang, Meoli, & Vismara, 2019). Corporate governance issues are also pointed as a topic to explore (Goergen & Rondi, 2019) as ICOs do not have specific regulation nor follow any standard concerning this matter (Giudici & Adhami, 2019). The use of social media has been a central element in some researches (Albrecht et al., 2019), particularly, the activity on Twitter which is assumed as a contributor to the success of ICO projects (Grover, Kar, Janssen, & Ilavarasan, 2019). The characteristics of the whitepaper are identified as a success factor contributing to a positive outcome of the project and a better public perception of its value (Fisch, 2019; Amsden & Schweizer, 2019). Therefore, whitepapers' related variables should be included in further research to confirm their importance. Regarding market cycles, researches propose that the investment in ICOs is explained by the public "hype" regarding these projects (Gächtera & Gächterbc, 2020) as confirmed by Google searches (Google, 2020). Therefore, future studies should account for the importance of the ICO projects' timing for their overall success as market cycles might be contributors for ICOs' fundraising (Masiak, Block, Masiak, Neuenkirch, & Pielen, 2018). The ICO projects eliminate the need for a third party involved in the investment process (OECD, 2019) but the promoters also bear the responsibility of providing quality signals of their projects to the investors (Fisch, 2019). To overcome the complete inexistence of a third party evaluation, one of the quality signals is identified as an external and unbiased evaluation of the project in the form of an external rating (Liu & Wang, 2019). External ratings must be considered when evaluating a project's success (Xuan et al., 2020) but many studies were unable to include them in their analysis (An et al., 2019). The importance of the human capital to the success of the ICO projects is largely understudied and existing research highlights the importance of understanding the impacts of the teams' characteristics (Fisch, 2019). These characteristics are the biographies of the founders, their education and professional experience and their impacts should be confirmed using a large sample size (Fisch, Initial coin offerings (ICOs) to finance new ventures, 2019). The central role of advisors in ICO projects should not be neglected and their importance should be accounted in future research (Giudici et al., 2020). Although some studies have included human capital variables, they still miss important ones such as external ratings, professional experience and several control variables (An et al., 2019). Furthermore, these studies' database is composed mainly by non-European projects and are not industry specific (An et al., 2019) which could lead to biased results as the industry in which the project

is developed influences its outcome (Hartmann, Grottolo, Wang, & Lunesu, 2019) since some industries have tendentially less successful projects (Davies & Giovannetti, 2018). Lastly, a single measure of projects' success is still not adopted. Several studies assume the amount raised as the best measure for success (Fisch, 2019) but this measure does not capture important aspects such as the tradability of the tokens in the secondary market which might also be considered a measure of success (Amsden & Schweizer, 2019). Other authors propose different measures such as the capital obtained above the minimum threshold established by the promoters (Jong et al., 2018). As this measure might not be able to include several projects without a minimum threshold or tokens' tradability, there is the need to conduct a quantitative research with several dependent variables to understand their behavior.

Therefore, this thesis aims at answering all the literature gaps identified with a systematic literature review on fintech and several quantitative analyses on ICO projects, supported by an extensive database with a wide range of variables collected using computer programming and thus, with the least manual action as possible. This is achieved by the three studies composing the current thesis.

The aim of the first study is to assess the impact of fintechs appearance in the traditional business model of banking/financial institutions. The first study replies to the first gap identified and builds on current literature to provide insights on the effects of fintech companies in traditional banking and financial institutions which were the most affected by the new technological endeavors. This study aggregates academic literature and market information and ultimately performs a systematic qualitative review methods and narrative, supplemented by semantic network analysis and a content-analysis of the papers' abstracts through Leximancer. The first study aims at answering the following research questions: (i) What are the dominant concepts and narratives used by the fintech literature? (ii) How do fintechs impact traditional banking/financial institutions?

The aim of the second study is to identify general ICO projects' success factors and assess their impact on the success of a project building on the signaling theory. This study addresses the literature gaps concerning the location of the promoters and of the projects, the use of social media, the importance of whitepapers' analysis and lack of regulation, the existence of market cycles and includes external ratings. The second study's focus is on the general success factors of the ICO projects and performs an econometric model with a database composed of these projects. Using the existent literature to collect already identified variables contributing to projects' success, the study provides insights on which factors are relevant actors shaping the outcome of a project. Building on signaling theory, this study identifies success factors as

signals of the quality of the projects. The study is built on a large database and was able to collect a wide range of variables divided into variables of the project, variables of the campaign, variables of social networks, and variables of human capital. The second study aims at answering the following research questions: (i) what are the general ICO projects' success factors? (ii) what are the impacts of general ICO projects' success factors?

The aim of the third study is to identify human capital ICO projects' success factors and assess their impact on the success of a project building on Human Capital Theory (HCT). This study addresses the literature gap related with the human capital characteristics and is built on the assumptions of the Human Capital Theory which describes the importance of investment in people. The literature on HCT and ICO projects provides several human capital variables identified as relevant to the success of entrepreneurial projects. The database of this study is composed of a large number of profiles belonging to ICO projects' promoters. The information was extracted from ICOBench but also from the social network LinkedIn to obtain data on education, location, experience, or type of degree, for instance. The econometric model was able to identify the human capital variables that are relevant contributors to the success of a project complemented by several control variables. This represents a contribution to the ICO literature due to the specificity of the human capital topic that was not much explored until now. The third study aims at answering the following research questions: (i) what are the human capital ICO projects' success factors? (ii) what are the impacts of human capital ICO projects' success factors?

1.4. Research summary

This thesis is subdivided into three main studies, as already mentioned. The following diagram resumes the thesis' structure as well as its research problem, research context and the main topics explored in the literature review. Then, it explores the characteristics of each study.

Figure 1 - Diagram of the thesis' structure

Research Problem		
Identify the main impacts of fintech companies in traditional banking/financial institutions and identify the success factors of the ICO projects, particularly, the importance of human capital.		
Research Context		
An expanded view on the fintech industry, particularly, on the factors contributing to the entrepreneurial and technological ICO projects.		
Literature Review		
(i) Fintech market & industry	(ii) Fintech and traditional institutions	(iii) ICO market and industry
(iv) Signaling Theory	(v) Human Capital Theory	(vi) ICOs' general success factors
		(vii) ICOs' human capital success factors
Studies' title		
(i) Digital Business Transformation in the Banking Sector	(ii) Initial Coin Offerings (ICOs): why do they succeed?	(iii) Initial Coin Offerings (ICOs): the importance of human capital
Research Design		
Systematic literature review with 100 papers adopting a hybrid design	Quantitative approach. Econometric analysis using a database composed of 428 ICO projects collected via an API	Quantitative approach. Econometric analysis using a database composed of 340 ICO projects collected via an API and 3158 team profiles collected from LinkedIn
Research Questions		
(i) What are the dominant concepts and narratives used by the fintech literature? (ii) How do fintechs impact traditional banking/financial institutions?	(i) What are the general ICO projects' success factors? (ii) What are the impacts of general ICO projects' success factors?	(i) What are the human capital ICO projects' success factors? (ii) What are the impacts of human capital ICO projects' success factors?
Research aim		
Assess the impact of fintechs appearance in the traditional business model of banking/financial institutions	Identify general ICO projects' success factors and assess their impact on the success of a project building on the signaling theory	Identify human capital ICO projects' success factors and assess their impact on the success of a project building on Human Capital Theory
Publication Status*		
Published in an academic book chapter	Preliminary results accepted with minor changes in an international journal and full paper submitted to an international journal	Preliminary results published in an international journal, presented in an international conference and full paper accepted in an international journal

* Publication status at 29th of March, 2021.

2. First study: Digital Business Transformation in the Banking Sector

2.1. Abstract

Financial technology companies (fintechs) have gained tremendous importance in the last decade and particularly in the last four years. They have contributed with disruptive technological solutions and provided not only complementary but also substitute products to the traditional banking sector. New incumbents have been challenging banks already established and forced them to innovate in order to remain competitive. Indeed, banks have a heavy burden of slow processes, costly business models, and few innovative solutions. The authors collected 100 articles from Scopus related with the fintech and bank topics. This study adopted a hybrid design comprising a systematic qualitative review methods and narrative, supplemented by semantic network analysis. Based on the results of the systematic literature review, the authors explored the impacts that fintechs have had on traditional banking sector.

Keywords: Initial Coin Offering (ICO); fintech; bank; financial services; technology; business model; blockchain; innovation; literature review.

2.2.Introduction

New concepts of fintechs have appeared and became interesting due to the reputational challenge posed to traditional banking caused by the subprime crisis. Consumers have questioned the strategy of financial industry and the impacts it has had on the world economy (Dell'Atti, Trotta, Iannuzzi, & Demaria, 2017). Fintech companies have real impacts because their technological solutions are being broadly adopted in banking or retail being blockchain a case study even for cyber security (Kshetri, 2017). Fintechs impact the traditional banking system because they challenge the existent business model and provide much more technological solutions characterized by lower prices and higher accessibility. Fintech is a fast-growing sector with high potential and may be considered a disruption on the current state of technology. Consumers are adopting these services due to their advantages which constitute solutions for the future of banking and several other industries. Nonetheless, the risks associated with this new industry should also be considered. The current risks that fintech companies pose may affect consumers, companies and the entire financial stability (KPMG, 2019) because currently fintech offer a diverse range of services which can be a plain current account but also virtual investments in fiat or digital currencies (Brochado, 2018a). The examples are the Initial Coin Offerings (ICOs) which are an alternative investment form offering the possibility of direct financing from investors worldwide (Brochado, 2018b) and contributing to the democratization of entrepreneurship and access to capital markets (Chen Y. , 2018).

The aim of this chapter is to study fintech developments and in particular the impacts they have had in shaping traditional banking business models recently challenged (Roland Berger, 2018). This paper aims at answering the following research question: What insights does current literature offer regarding the impact of fintechs in the banking sector?

The structure of this chapter is as follows: (i) next section offers a descriptive analysis of the impact of fintechs and digital solutions in banking; (ii) the methodology describes the approach used to collect the papers under analysis and the content analysis approach; (iii) the results section includes a descriptive, narrative and semantic analysis (iv) the chapter ends with conclusions and the avenues for future research.

2.3. Theoretical framework

2.3.1. The fintech and the traditional banking

The concept of fintech is not consensual. Following the study of Schueffel (2016) fintechs are defined as “new financial industry that applies technology to improve financial activities” (p. 15). These new solutions gained hype after the European banks suffered several shocks which challenged their business model and have been affecting their profitability until today (Cheng & Mevis, 2018). This is confirmed by the historical prices of the Euro Stoxx for banks which still did not recover from values before the crisis. After the subprime crisis the strategies of central banks were to ease monetary policy reducing the interest rates and increasing the monetary base. This policy had not only consequences on credit expansion in order to create economic stimulus (Spyromitrosa & Tsintzos, 2019) but also on less opportunities for regular and even sophisticated investors because the interest rates on investments are much lower than before (e.g. regular savings, the LIBOR and EURIBOR are much lower which also impacts the availability of money and investments) (Kreidych, Roshchyna, & Kazak, 2018).

Traditional banking is characterized by a costly model of branches (Gomber et al., 2018), traditional lending, relationship deposits and traditional sources of revenue (e.g. interest rate charged and banking fees) (Chiorazzo et al., 2018). However, there are also drivers which support the appearance of fintech companies in an era of digital expansion with easy access to the internet. As per Gomber et al. (2018) and KPMG (2019), the main drivers of this technological revolution are: (i) Technology innovation: the pace of technological transformation is increasing very fast and technologies often interconnect with each other creating technological breakthroughs. As fintechs are based on IT structures, this technological improvement supports these companies; (ii) Process Disruption: the appearance of virtual currencies based in a blockchain process created a process disruption, making it the new model that should be adopted. Gomber et al. (2018) argued that “the entire financial services industry has been disrupted in fundamental ways” (p. 225); (iii) Services Transformation: a transformation in the service provided by financial companies has been noticed due to consumers’ pressure and technological developments. The fintechs’ service has been putting pressure on traditional service transformation; (iv) Economies of scale in IT applications: an example of economies of scale in IT is the outsourcing of IT systems to service providers (Lacity & Willcocks, 2001). A higher investment in IT systems also improves the productivity of a company (Woudstra, Berghout, Tan, Eekeren, & Dedene, 2017).

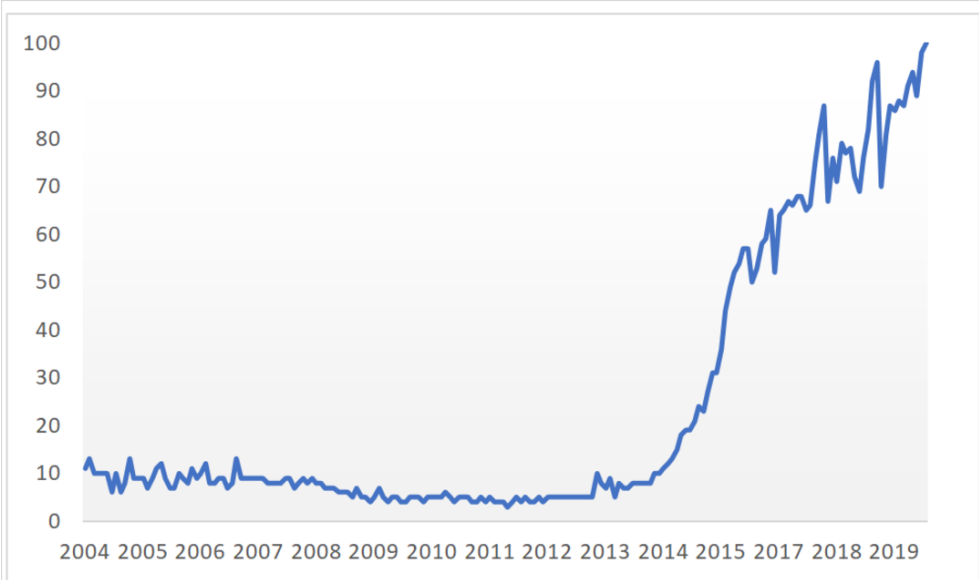
Fintechs pose a direct challenge to the traditional banks which need to adapt to new consumers' trends from which fintech companies took advantage. Heavy traditional banking industry's legacy might be a burden posing a threat to a fast and successful adaptation to the new reality (Gomber et al., 2018; Chiorazzo et al., 2018). According to Roland Berger (2018) there are also social factors such as: (i) unwillingness to change from both employees and management; (ii) risk of unacceptance from shareholders; and business factors such as: (i) lack of cooperation between business functions and IT. However, the pressure on banks to change their business model is increasing not only on a business perspective (threat from new digital incumbents) but also from a social perspective because clients are demanding bigger Corporate Social Responsibility (CSR) from banks. As an attempt to answer consumers' demands, banks are creating sustainable CSR policies (Costa-Climent & Martínez-Climent, 2018). Fintech companies were born in a context where CSR is demanded and they took advantage of this fact because a wide range of investments, such as ICOs, are on sustainable solutions and several fintech platforms allow investment in a broad range of "green" solutions. Complementary is the capacity of fintechs to finance Non-governmental Organizations (NGOs) and social causes worldwide due to their technology which captures the interest and investment of both companies searching for investing in social causes but also captures the interest of consumers (Freivogel, 2016). According to Roland Berger (2018) fintechs appear as the third driver of innovation in terms of relevance only after the "customer behavior" and "tech giants". Traditional banks are trying to adapt to this new reality by transforming their processes and making them more digital while cooperating with fintechs or acquiring them in order to integrate their innovations. According to the same report the fintechs are considered: (i) industry innovators, (ii) platform drivers and (iii) solution providers but currently not a direct substitute of the traditional banks as long as they can keep up the innovation pace.

2.3.2. The interest on fintechs

The banking sector is still recovering from the last financial crisis but has today achieved a steady position due to a feeling of safety caused by the central banks' measures. Although with several challenges such as poor growth, banks have achieved solid accomplishments revealed in market capitalization, tier 1 capital ratios or stable returns (McKinsey&Company, 2018). There are forces which drive innovation (e.g. technology expansion and permissive regulation) and promote the appearance of new market incumbents as the fintech companies that may affect banks profitability (Desai et al., 2019). Therefore, banks have been adapting and the ones

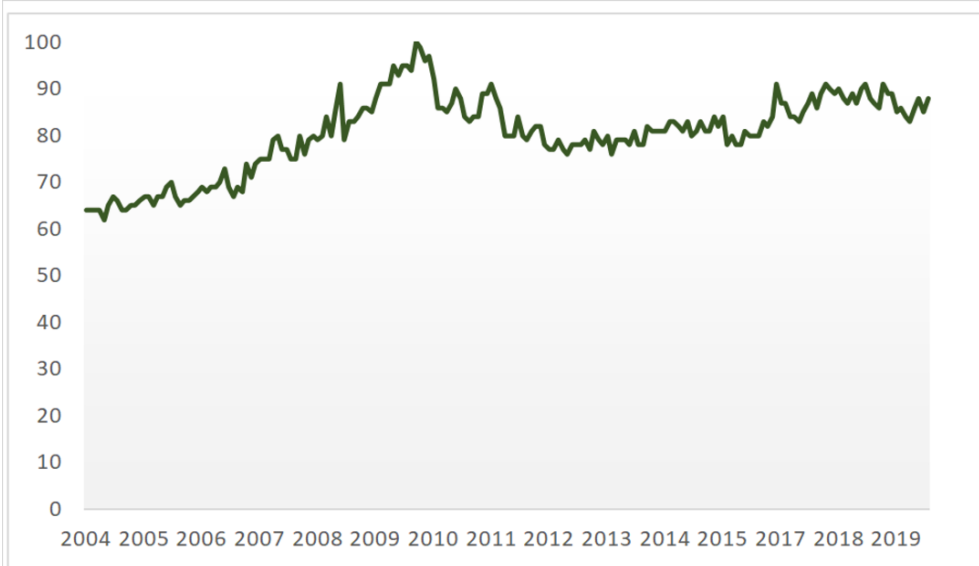
digitalizing faster are the ones that are more prone to obtain bigger efficiency gains and thus stay competitive in the market (McKinsey&Company, 2018).

Figure 2 - Worldwide interest in the topic "Fintech"



Source: Google Trends (<https://www.google.com/trends>). The numbers represent the popularity of the term selected in Google searches. The values range from 100 (most interesting) to 0 (no interest).

Figure 3 - Worldwide interest in the topic "Bank"



Source: Google Trends (<https://www.google.com/trends>). The numbers represent the popularity of the term selected in Google searches. The values range from 100 (most interesting) to 0 (no interest).

The interest in the new concept of fintech has been increasing and has had a rapid growth in popularity since 2013 as confirmed by Google Trends' data. On October, 2019 the interest in the word "fintech" has 100 points which means maximum interest while the word "bank" has about 85 points. The word "bank" has stable levels of interest along the time period between the years of 2004 and 2011 ranging from 65 to 85 points. The word was mostly searched between the years of 2008 and 2010 during the financial crisis and had an interest peak close to 100 points on 2009.

2.3.3. Risks posed by fintechs to traditional banking

Currently the new incumbents are a real threat to the well-established banking system due to the substitute products and services offered (Vives, 2017). PWC (2016) estimated that 28% of the banking and payment businesses as well as 22% of the insurance, asset management and wealth management systems are at risk by 2020 due to the new competition. The reason is fintechs are operating concurrently with traditional banking particularly in the payments area, financial intermediation and cryptocurrencies. Fintechs focus on customer centricity due to the services provided. As a result, the importance of this concept increases as well as the adoption of fintechs' strategies by traditional industries with 48% of financial companies adopting fintechs' strategies into their business model (PWC, 2019). The most likely technologies which drive change in traditional business model of financial services organizations are artificial intelligence, big data, cloud and blockchain, all of them at the core of fintechs' business model (PWC, 2019). The pillars for a strong fintech ecosystem are a sustained demand for their services from consumers, companies and financial institutions, the access to talent which currently is more global, an enabling environment based on strong collaboration among incumbents, access to local and international markets and forces to a sustainable development as well as a favorable regulation (EY, 2018). The majority of these conditions are met today which urges the adaptation of traditional banking (Deloitte, 2017).

2.3.4. Traditional banking adaptation to fintech

Financial institutions must adapt and incorporate the fintechs' technological solutions into their business model particularly investing in IT and upgrading their core platforms (Andrade, 2019). Fintech companies put pressure on established financial companies on margins charged, loss of market share, information security and customer churn (PWC, 2016). Thus, more than half of banks and capital markets institutions have incorporated emerging technologies into commercial banking and personal loans, and an additional 20% plan to do so in the next two years (PWC, 2019). Some of these institutions use the Mergers and Acquisitions (M&A)

scheme in order to absorb fintechs into their business model and consequently the M&A activity is growing since 2017 with the Q1+Q2 of 2019 amounting to USD 23.9 billion and about 160 deals completed worldwide (KPMG, 2019a). Currently financial institutions as well as technological, media and telecommunications companies are cooperating in order to create synergies and easily incorporate innovative solutions into their business model. Telecommunications companies have advantage offering customer centric products which have great success but financial institutions are well-established in the market and have acquired licensing to operate in financial solutions. However, both sectors have a clear focus on customer retention which is the key to succeed, they have different visions on the main aspects of emerging technology to focus in order to do so. Whilst financial institutions prioritize the ease of use and the faster service and processes, telecommunications companies prioritize personal digital contact and personalized service but both sectors are focusing on trust (PWC, 2019). This highlights the main weaknesses of both sectors because telecommunications companies lack the close contact to the customer and financial institutions have much heavier processes and less user-friendly platforms than their counterparties. Despite the last financial crisis impact on financial institution's reputation (Vives, 2017), they still have great trust from consumers (EY, 2014) mainly due to the security measures taken and surely they have a great advantage in the activities which involve closer contact with the customer and require a great deal of trust and safety. Therefore, they are seen as having a great advantage of continuing to be privileged financial intermediaries (McKinsey&Company, 2018). It is consensual that financial institutions should focus on several areas in order to survive and be adaptable within the new technology world, namely: (i) becoming digital (Bughin et al., 2019); (ii) optimize their business model (e.g. adopting robot advice, digital platforms, partnering with telecommunications companies); (iii) become more cost efficient; (iv) retain customers; (v) be able to attract talent; (vi) focus on specific business segments with tailor made solutions; (vii) being able to keep the pace with regulatory developments (PWC, 2016; Khanna & Martins, 2018; McKinsey&Company, 2018; PWC, 2019).

2.3.5. Fintechs' deals, investment and market volume by geography

Geographically, the areas with higher investments in fintech (i.e. investment of Venture Capital, Private Equity and M&A) are the Americas (the United States of America account for 87% of the investment) and Europe followed by Asia Pacific (KPMG, 2019a). However, there are important developments, deals and interest in regions such as China, which is by far the most important country in terms of market volume (Ziegler, et al., 2019), and Russia due to a

less developed capital market, less access to loans and capital controls. Concerning fintech hubs the United States of America (USA) and China lead the way by far being London the only European city represented in the top 10 (position 4) of fintech hubs (University of Cambridge, 2018). Globally, in the first half of 2019 fintechs represented an investment of USD 37.9 billion with 962 deals which represents a decrease from 2018 (USD 120 billion and 2590 deals) mainly due to a preference of investors for smaller deals, a decrease in investment in Asia, a more matured market in blockchain, an increase in banks' competitiveness in terms of digitalization and also investment in financial services from big technological companies (KPMG, 2019a). Nevertheless, there is an impressive growth in investment in alternative finance such as ICOs (Brochado, 2018b) and also in cryptocurrencies' market capitalization during the last 3 years (Brochado, 2018a) with an impressive valorization during 2017 and subsequent fall in 2018 followed by a slower valorization in 2019 which although smaller than the one occurred in 2017 is still much above the values previous to the first valorization as per the figure 4.

Figure 4 - Market capitalization of bitcoin and altcoins



Source: <https://coin.dance/>

The year of 2018 registered the highest investment in blockchain and cryptocurrency with USD 5 billion of capital investment and 586 deals whereas the first half of 2019 has registered USD 1 billion and 171 deals (KPMG, 2019a). On 2017, a growth of 184% was registered compared to the previous year on staff active in blockchain industry, tendency maintained in 2018 with a growth of 165% (Q1+Q2) (Rauchs, Blandin, Bear, & McKeon, 2019). Fintech must

be prepared for regulatory impacts (EY, 2017) creating ground to the appearance of RegTech, meaning, “any use of technology to match data to information taxonomies that are meaningful to both regulators and the companies they regulate, in order to automate compliance and oversight processes” (Schizas, et al., 2019). Most companies are present in the United Kingdom (UK) and the USA being the continental European representatives, Switzerland and Ireland (Schizas, et al., 2019). Investment in these companies fluctuates but 2018 represented USD 3.9 billion of investment and 123 deals whilst the first half of 2019 represented USD 1.5 billion of investment and 53 deals (KPMG, 2019a).

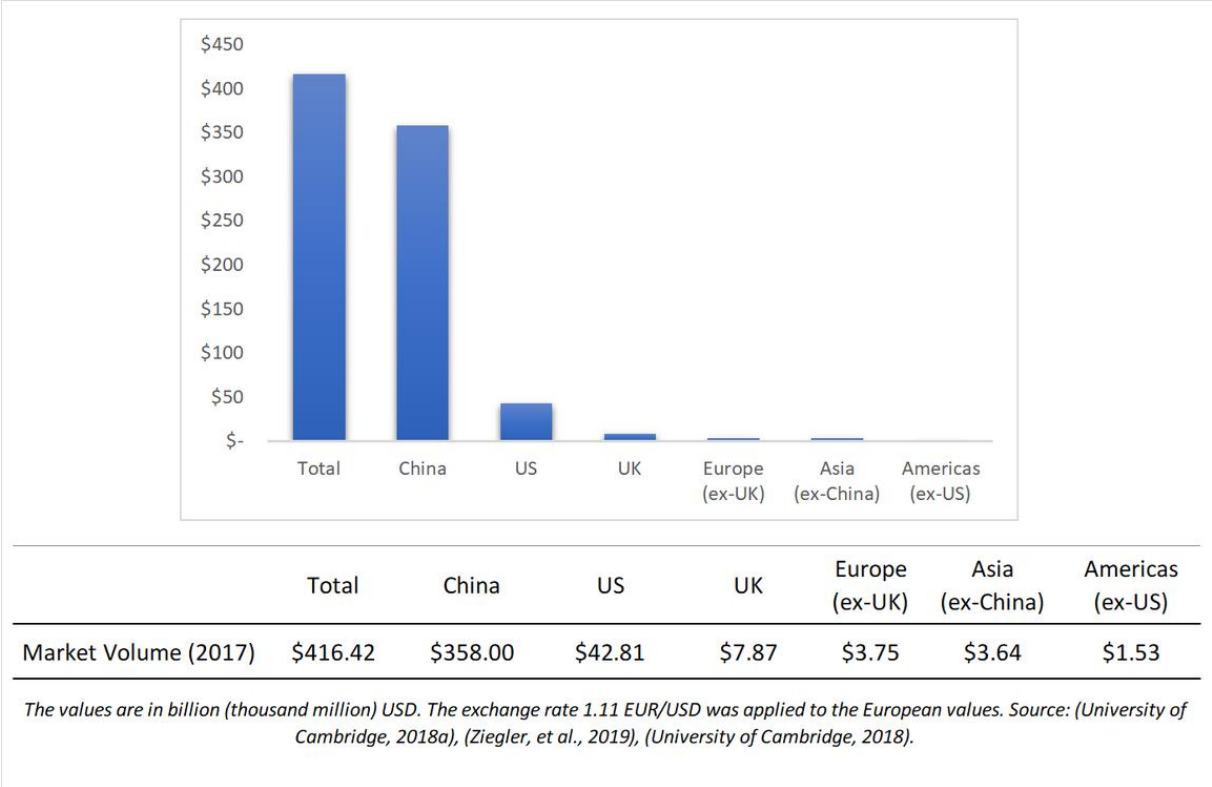
The USA is the largest market for fintech in the Americas and had a market growth of 88.5% each year between 2013 and 2017 representing a market volume of USD 42.81 billion of the global Americas market volume of USD 44.3 billion in 2017. Canada is the second most important market (2% of market volume) in Americas. Latin American countries represent 1% of the total market value (University of Cambridge, 2018a). Concerning investment in the activity, the American market represented USD 55.3 billion in 2018 and the 10 biggest fintech deals in the first half of 2019 also took place in the USA (Dun & Bradstreet, USD 6.9 billion; Investment Technology Group, USD 1 billion). The only two deals outside the USA happened in Canada (Shareworks by Morgan Stanley, USD 843.8 million; Wave Financial, USD 405 million), and Argentina (Prisma Medios de Pago, USD 725 million) (KPMG, 2019a).

In the European continent the UK is by far the largest contributor to the fintech’s market volume with EUR 7.07 billion of a total of EUR 10.44 billion in 2017 which represents 68%. The percentage was higher before with 81% in 2015 and 73% in 2016 which means the distance between the UK and the rest of Europe is decreasing (Ziegler, et al., 2019). The market volume of fintech has been constantly increasing in Europe although it is still much smaller than in the USA and Asia (including China). Concerning investment in fintech companies, the European market accounts for USD 13.2 billion and 307 deals which represents a growth tendency, although the values for the first two quarters of 2019 were smaller when compared to the same period of 2018. Most representative deals happening in first half of 2019 happened in Germany (Concardis, USD 6 billion) and France (eFront, 1.3 billion), followed by several UK deals and one single deal in Norway (KPMG, 2019a). In terms of number of platforms operating in Europe the UK leads with 77 platforms, followed by Germany with 46 platforms, France with 46 platforms, Italy with 45 platforms, Spain with 39 platforms and the Netherlands with 32 platforms (Ziegler, et al., 2019).

China is the country with the highest market volume in the world, but lacks in terms of investment. China represents a total of USD 358.3 billion with a global value for the entire

Asian market of USD 361.9 billion in 2017. China’s market volume growth trend is very clear and has been present since 2013 with a growth from USD 6 billion in this year to USD 358 billion in 2017 (University of Cambridge, 2018). After China, the most significant market volumes in Asia are represented by the counties of Australia (USD 1.5 billion), South Korea (USD 1.13 billion), Japan (USD 348.7 million) and India (USD 268.6 million) (University of Cambridge, 2018). Concerning the investments in fintech the Asian region accounted USD 3.6 billion and 102 deals which represents a growth tendency although with lower values in the first two quarters of 2019. Most relevant deals in the first half of 2019 happened in China (NCF Wealth Holdings, USD 2 billion; Shanghai Dianrong Financial Information Services, USD 100 million), South Korea (Blockchain Exchange Alliance, USD 200 million), Australia (Airwallex, USD 100 million), Indonesia (Akulaku, USD 100 million) and Vietnam (Momo, USD 100 million) (KPMG, 2019a).

Figure 5 - Market volume by region in 2017



2.3.6. Business models of alternative finance companies

There are several business models for alternative finance companies which adoption varies depending on the region where platforms are incorporated. As per table 1, lending services dominate in terms of market volume across all regions being the only exception the “invoice trading” in Europe.

Table 1 - Business models of Fintech per region with definitions

<u>Americas</u>	
Balance Sheet Consumer Lending	\$ 15.3 billion
P2P Consumer Lending	\$ 14.9 billion
Balance Sheet Business Lending	\$ 7.3 billion
<u>Europe</u>	
P2P Consumer Lending	\$ 1.56 billion
Invoice Trading	\$ 597 million
P2P Business Lending	\$ 520 million
<u>Asia</u>	
P2P Consumer Lending	\$ 225 billion
P2P Business Lending	\$ 98 billion
P2P Property Lending	\$ 6.6 billion
<i>Source: (University of Cambridge, 2018a), (Ziegler, et al., 2019), (University of Cambridge, 2018).</i>	
Balance Sheet Consumer Lending	The platform entity provides a loan directly to a consumer borrower.
P2P Consumer Lending	Individuals or institutional funders provide a loan to a consumer borrower.
Balance Sheet Business Lending	The platform entity provides a loan directly to a business borrower.
Invoice Trading	Individuals or institutional funders purchase invoices or receivable notes from a business at a discount.
P2P Business Lending	Individuals or institutional funders provide a loan to a business borrower.
P2P Property Lending	Individuals or institutional funders provide a loan secured against a property to a consumer or business borrower.

2.4. Methodology

This research aims to perform a systematic literature of current fintech research and to answer the question: What insights does current literature offer regarding the impact of fintech developments in the business model of the banking sector? A research on “banking” and “fintech” as search terms in the abstract, title or keywords in the database SCOPUS allowed the record of 100 relevant studies published in English. The search code used was (TITLE-ABS-KEY (bank AND fintech) OR TITLE-ABS-KEY (bank AND "Initial Coin Offerings") OR TITLE-ABS-KEY (bank AND crowdfunding) OR TITLE-ABS-KEY (bank AND digitalization) OR TITLE-ABS-KEY (bank AND "robot advice") OR TITLE-ABS-KEY (bank AND blockchain) OR TITLE-ABS-KEY (bank AND "artificial intelligence") OR TITLE-ABS-KEY (bank AND "big data") OR TITLE-ABS-KEY (bank AND "smart

contract") OR TITLE-ABS-KEY (bank AND "digital platform") OR TITLE-ABS-KEY (bank AND "digital transformation") OR TITLE-ABS-KEY (bank AND "virtual currency") OR TITLE-ABS-KEY (bank AND cryptocurrency)) AND (LIMIT-TO (SUBJAREA , "BUSI")) AND (LIMIT-TO (LANGUAGE , "English")) AND (LIMIT-TO (DOCTYPE , "ar") OR LIMIT-TO (DOCTYPE , "re")). The search was not restricted to chronological limits and was able to collect 102 papers but 2 of them focused on a different field of research, namely, medicine, and thus considered not relevant. Therefore, the 100 relevant papers have a date range from 2011 to 2019 excluding the year of 2013 where no paper was found. The papers from older years (i.e. 2011-2014) focus particularly on topics such as digital transformation, big data, crowdfunding or predictive models, respectively. Only in 2015 the fintech topic explicitly appears and in 2016 the research continues and expands also to blockchain related topics. The great majority of the papers are very recent and 85% were published between the years of 2017-2019. The information for each paper was recoded into an Excel spreadsheet, comprising the following columns: title of the paper, year, abstract, key-words, authors, authors' affiliations, and journal. The data was treated in Excel and complemented with further information when needed in order to have a more rigorous analysis. The authors also used the Scimago Journal and Country Rank in order to obtain quartiles and countries of several Journals analyzed.

This study adopted a hybrid design comprising the systematic qualitative review methods and narrative, supplemented by semantic network analysis. Using a systematic method, the authors document the geographical spread of the papers by author, year, research methods, and primary topical areas, thus providing a reproducible and reliable assessment of current progress in the research field. The narrative discussion indicates the research production within each of the topical areas, explores emerging themes and methods, and identifies knowledge gaps for future research directions. A semantic network analysis further explores connections among key topical areas. The authors also content-analyzed the papers' abstracts through Leximancer, a software program that automatically extracts semantic networks from qualitative data. Leximancer identified the connections among topics, having been successfully employed for literature review (Crofts & Bisman, 2010). This software generates conceptual maps based on co-occurrences of words in keyword lists. The analysis' reliability is secured by its stability (i.e., intercoder reliability) and reproducibility (i.e., high consistency in the way data are coded).

In order to make the research process clearer the authors developed a summary table with the procedures and steps taken in order to obtain the final results. Table 2 summarizes the steps but also the actions taken in each step and the outputs obtained.

Table 2 - Summary of the procedures and steps taken along the research process

Procedure	Actions taken	Results
1. Perform a search on SCOPUS		
1.1. Select the search criteria (e.g. key-words, language, research field)	Work with SCOPUS in order to obtain the final code line	Code line providing the final results
1.2. Select the data to export (e.g. abstract, authors, journal's name)	Work with SCOPUS and select the relevant information	Final data selected
1.3. Export the results to a CSV file	Export the results to a CSV file and treat it in Excel	CSV file to be treated in Excel
2. Analyze the data collected		
2.1. Analyze the data exported and select relevant papers	Transform the CSV file into a workable Excel file and check data consistency. For example, be sure that all the papers collected are relevant	Workable Excel file
2.2. Complete the data if some consistency is necessary (e.g. DOI missing, authors missing)	Complement the data obtained due to possible missing information	Final Excel file
2.3. Complete the data with the information on journals' ranking from Scimago	Cross-check information with Scimago in order to complement the data obtained	Further information on the Excel file
3. Descriptive analysis		
3.1. Perform simple statistics on the data collected (e.g. number of articles per journal, leading institutions or countries)	Select the data necessary and perform simple statistics	Summary statistics tables
4. Analysis of key-words		
4.1. Perform statistics on the most frequent key-words used by the authors	Select the necessary data and perform simple statistics	Summary statistics tables
4.2. Build a word-cloud with the most frequent key-words	Select a software and build a word-cloud having into consideration the most relevant key-words	Word-cloud
5. Leximancer analysis		
5.1 Run Leximancer software based on the abstracts collected	Input the data collected from SCOPUS and program Leximancer	Outputs from Leximancer (i.e. conceptual map)
5.2 Analyze Leximancer's results including the final conceptual map	Download all the software's results and analyze them	Conceptual map analysis complemented by the remaining
5.3. Connect Leximancer's results with the literature	Deeply analyze the papers collected by its themes and connect them with the conceptual map	Final analysis connecting the papers collected with the Leximancer's results

2.5. Results and discussion

2.5.1. Number of Articles by Journal

Table 3 depicts the top 17 institutions publishing papers on this topic. The authors have selected a top 17 given the relevance of global results obtained because below the 17th institution analyzed the publications decreased to 1 and therefore became less relevant for the analysis. Besides, the top selected represents 47 of the 100 papers studied.

Table 3 - Number of articles by Journal

	2011-2017	2018-oct, 2019	Total
<i>FI</i>	6	0	6
<i>ERSJ</i>	2	3	5
<i>JPSS</i>	0	4	4
<i>JEB</i>	0	3	3
<i>BH</i>	2	1	3
<i>FRBSLR</i>	0	3	3
<i>SC</i>	2	1	3
<i>IJeBE</i>	0	2	2
<i>IJFR</i>	0	2	2
<i>BBS</i>	0	2	2
<i>CE</i>	1	1	2
<i>QAS</i>	1	1	2
<i>EM</i>	0	2	2
<i>IEEEP</i>	2	0	2
<i>JFE</i>	0	2	2
<i>IJRTE</i>	0	2	2
<i>EBOLR</i>	0	2	2
Total	16	31	47

Note: FM = Financial Innovation; ERSJ = European Research Studies Journal; JPSS = Journal of Payments Strategy and Systems; JEB = Journal of Economics and Business; BH = Business Horizons; FRBSLR = Federal Reserve Bank of St. Louis Review; SC = Strategic Change; IJeBE = International Journal of e-Business Research; IJFR = International Journal of Financial Research; BBS = Banks and Bank Systems; CEQ = Contemporary Economics; QAS = Quality - Access to Success; EM= Electronic Markets; IEEEP = IEEE Potentials; JFE = Journal of Financial Economics; IJRTE = International Journal of Recent Technology and Engineering; EBOLR = European Business Organization Law Review

The institutions publishing more research about the banking and fintech topic are the journals Financial Innovation, European Research Studies Journal and the Journal of Payments Strategy and Systems. These institutions together published a total of 32% of the papers. There is an increasing interest on the topic and from 2018 onwards the papers published doubled when compared to the period between 2011 and 2017. Furthermore, there are more institutions publishing papers on this topic during most recent years which is confirmed by the fact that most of them have not published any paper between the years of 2011 and 2017 on the same

topic. Further to this analysis, the authors used Scimago in order to find the journals' country of origin and also the quartile to which they belong according to Scimago Journal and Country Rank.

Table 4 - Journals' Country and Rank by Scimago

	Quartile	Country
<i>FI</i>	Not available	China
<i>ERSJ</i>	Q2	Greece
<i>JPSS</i>	Not available	United Kingdom
<i>JEB</i>	Q2	Netherlands
<i>BH</i>	Q1	Netherlands
<i>FRBSLR</i>	Q2	United States of America
<i>SC</i>	Q2	United Kingdom
<i>IJeBE</i>	Q4	United States of America
<i>IJFR</i>	Not available	Canada
<i>BBS</i>	Q3	Ukraine
<i>CE</i>	Q3	Poland
<i>QAS</i>	Q3	Romania
<i>EM</i>	Q1	Germany
<i>IEEEP</i>	Q3	United States of America
<i>JFE</i>	Q1	Netherlands
<i>IJRTE</i>	Not available	India
<i>EBOLR</i>	Q2	Netherlands

Note: FM = Financial Innovation; ERSJ = European Research Studies Journal; JPSS = Journal of Payments Strategy and Systems; JEB = Journal of Economics and Business; BH = Business Horizons; FRBSLR = Federal Reserve Bank of St. Louis Review; SC = Strategic Change; IJeBE = International Journal of e-Business Research; IJFR = International Journal of Financial Research; BBS = Banks and Bank Systems; CEQ = Contemporary Economics; QAS = Quality - Access to Success; EM = Electronic Markets; IEEEEP = IEEE Potentials; JFE = Journal of Financial Economics; IJRTE = International Journal of Recent Technology and Engineering; EBOLR = European Business Organization Law Review

Most journals belong to the quartiles (Q) 1 and 2. The Q1 represents 23% of top journals and Q2 29%. Q3+Q4 together represent 38% of top journals publishing about this topic with only one journal belonging to the Q4. Only 4 journals were not included in the Scimago ranking and thus cannot be considered in the current analysis. Concerning the journals' origin, most of them are from the Netherlands, the USA and the UK. The top 17 journals include 2 open-source journals from China and India.

2.5.2. Leading Institutions with the most number of authors

The authors have also collected information on institutions publishing articles on this topic dividing them into “Academic” and “Non-academic”.

Table 5 - Leading institutions with the greatest number of authors

	2011-2017	2018-oct, 2019	Total
University of Latvia	1	6	7
University of Jyväskylä	0	6	6
York University	0	6	6
White&Case	0	5	5
SRM Institute of Science and Technology	0	4	4
Rostov State University of Economics	0	4	4
Tarbiat Modares University	0	4	4
Karlsruhe Institute of Technology	0	4	4
Universitas Padjadajaran	0	4	4
Sun Yat-sen Business School	4	0	4
University of Zurich	4	0	4
University of Piraeus	4	0	4
Total	13	43	56

Table 6 - Institutions' classification

	2011-2017	2018-oct, 2019	Total
Academic	68	149	217
Non-Academic	4	24	28
Total	72	173	245

There is a much higher number of authors and institutions publishing papers in more recent years than on the previous period between the years of 2011 and 2017 according to table 5. The top three institutions publishing research on the topic are the University of Latvia (Latvia), University of Jyväskylä (Finland) and the York University (Canada). Together they have published a total of 19 articles since 2011 and therefore represent 34% of the papers published by the top institutions. There is a clear tendency for the dominance of the academia concerning the publication of research. From all the 245 institutions studied 217 are academic. Nevertheless, there is also an increasing interest of non-academic institutions as only 4 institutions have published research between the period of 2011-2017 and since 2018 the

number increased to 24. Among the non-academic institutions, mostly are consulting companies, central banks, national public agencies, technology companies and a law company. Most of the interest comes from central banks and national public institutions. Besides, consulting companies seem to be cultivating the interest on these topics as they are trendy and most likely profitable. A law company from New York, namely White&Case, is among the leader institutions in terms of authors.

2.5.3. Leading countries for papers and authors

A relationship between countries-papers published and countries-authors was also established. Tables 7 and 8 depict these relationships and confirm the pattern between them. In both cases the top 3 countries in terms of authors and papers published belong to the USA, UK and Germany. These countries represent a total of 56% of the papers published and 52% of the authors. China is in the top of countries with the most authors but India and Russia are in both rankings (authors and papers published). Lastly, Russia is present in both rankings and Switzerland in the countries for papers published ranking. Concerning Switzerland, it is interesting to notice that it represents a prosperous country for fintechs in Europe. This fact might be due to its strict laws which may work as safeguard for future expansion and also due to the fact that Switzerland is friendly to new technology innovation and a country historically known by its well-established banking sector.

Table 7 - Leading countries for papers published

	2011-2017	2018-oct, 2019	Total
United States of America	5	12	17
United Kingdom	4	8	12
Germany	3	8	11
India	2	4	6
France	2	3	5
Spain	0	5	5
Russia	2	2	4
Canada	2	2	4
Switzerland	3	1	4
Italy	0	4	4
Total	23	49	72

Table 8 - Leading countries for authors

	2011-2017	2018-oct, 2019	Total
United States of America	6	27	33
Germany	4	20	24
United Kingdom	4	13	17
India	5	9	14
France	4	7	11
Romania	3	7	10
Spain	0	9	9
Russia	3	6	9
Italy	0	8	8
China	8	0	8
Total	37	106	143

2.5.4. Word cloud with the most frequent key-words

The top three words of papers published are interconnected and constitute the real challenge for the banks' business model. Considering the word cloud in figure 6, it is visible that the most used key-words are banking, fintech and digital followed by the words finance, technology, lending and financial services, respectively. Therefore, the authors conclude that the most prominent topic in today's literature is the relation between the banks and fintechs.

Figure 6 - Word cloud with the most frequent key-words



Table 9 - Table with Most Frequent Key-words

	Frequency	Percentage
Banking	51	11%
Fintech	37	8%
Digital	36	8%
Finance	29	7%
Technology	29	7%
Lending	28	6%
Financial service	27	6%
Big data	21	5%
Innovation	17	4%
Regulation	17	4%
Blockchain	15	3%
Crowdfunding	15	3%
Payments	15	3%
Economics	13	3%
Markets	13	3%
Investment	12	3%
Strategy	11	2%
Digital transformation	9	2%
Information	9	2%
Artificial intelligence	7	2%
Bitcoin	7	2%
Machine learning	7	2%
Cryptocurrency	5	1%
Peer-to-peer lending	5	1%
Platform	5	1%
Secutiry	5	1%
Total	445	100%

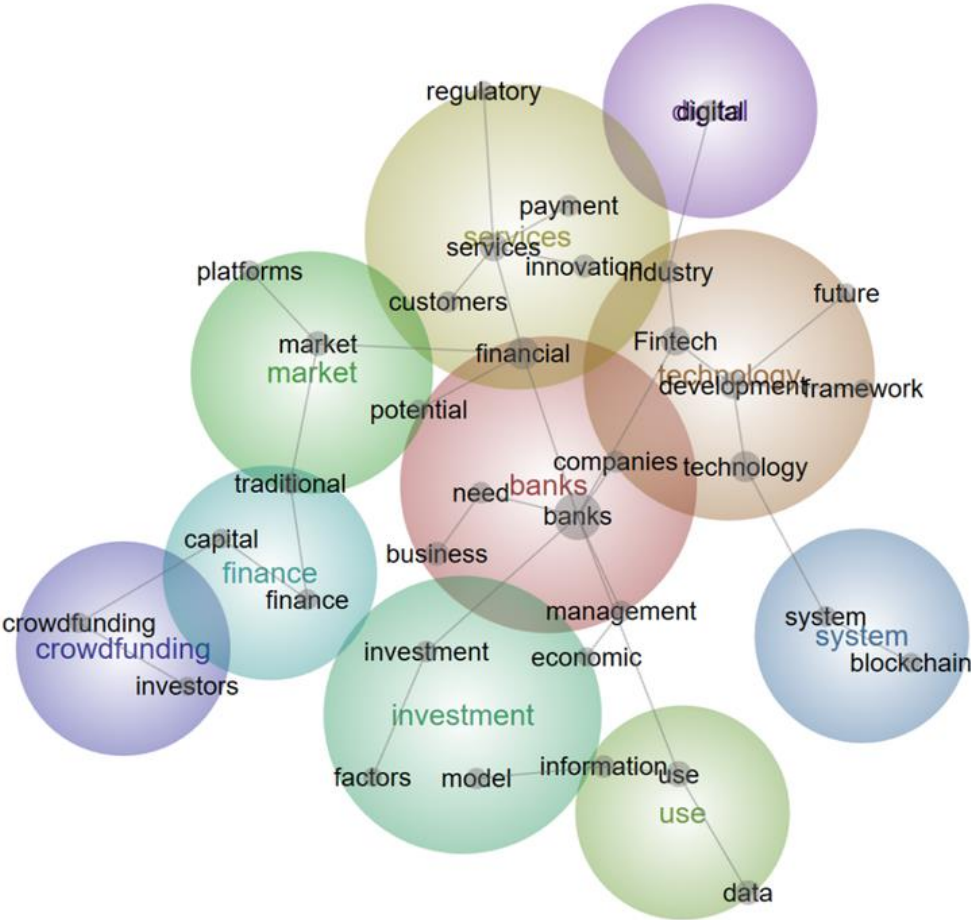
These topics are closely related with technology, finance and financial services because fintech companies are exactly characterized by these solutions. Moreover, the word big data is also very much cited because it is the base for the operations in new digital companies. There is also an interest in lending activities because it is banking activity's core and it is slowly being challenged by the new incumbents. Fintech companies are providing credit solutions based on big data, a new way of risk assessment and peer-to-peer lending with a much faster and cheaper model benefiting the consumer. With frequency table 9 as reference the authors conclude that most important topics discussed today fall within three categories: technology, services and regulation. Most of the words are related with technology such as digital, big data, innovation, blockchain, digital transformation, artificial intelligence and machine learning. These words

suggest that fintech transformation is based on digital solutions which are supported by big data, artificial intelligence and machine learning and the core process of blockchain. The second most significant group of words is related with services such as financial services, lending, crowdfunding and payments. In sum, the literature is focusing on the analysis of traditional banking services already provided by fintech companies, such as lending and payments, and also on new services such as crowdfunding. Finally, the authors have found that regulation is also important for the studies on this topic as well as security which is related with cyber security and consumer protection.

2.5.5. Word cloud with the most frequent words in the abstracts

The authors have used the software Leximancer in order to perform the papers abstracts’ analysis. The main objective was to find the most frequent words and the probability of two words appearing together. The final result was the concept map in figure 7.

Figure 7 - Conceptual map of research topics



The size of the circles, its color and centeredness represent concepts' importance in the dataset. Therefore, most central, seemingly red-colored and bigger circles are the most important in the dataset at the same time that the lines connect the related concepts. A total of 10 key themes are represented in the map with their respective concepts' groups of related topics. In line with what was previously found, the authors conclude that most central concepts are the "banks" (count: 201; relevance: 100%), "technology" (count: 83; relevance: 41%) and "services" (count: 65; relevance: 32%). The concept of "banks" is related with several other relevant concepts such as "need", "business" and "financial". The same logic applies to the concept of "technology" which is related with other concepts such as "fintech", "future", "framework" and "development". The concept of "services" is related with the concepts: "customers", "financial", "innovation", "payment" and "regulatory". The remaining themes which are not as central as the previous ones are "digital" (count: 45; relevance: 22%) and "system" (count: 35; relevance: 17%) which is related with the concept of "blockchain". The theme "crowdfunding" (count: 19; relevance: 19%) is related with the concept of "investors" and also with "finance" (count: 29; relevance: 14%) through the topic "capital". The theme "market" (count: 55; relevance: 27%) is related with the concept of "platforms" and also shares the topic of "traditional" with the theme "finance". The theme "investment" (count: 33; relevance: 16%) is related with the concepts of "factors" and "model". "Information" and "data" topics are related with the theme "use" (count: 70; relevance: 35%). Table 10 systematizes the themes identified by Leximancer and the papers associated to them and used in authors' further analysis. The table also provides a brief summary of the main literature findings.

A further analysis revealed that the theme "banks" is related with the need to adapt to new circumstances because they are clearly being challenged by new incumbents (Jakšič & Marinč, 2019). Fintech companies offer substitute products to the traditional banking and with their new solutions can even reach populations to whom banks' service is expensive and hard to access (Kim & Hann, 2019; Nigam, Mbarek, & Benetti, 2019) being fintechs very important in less developed markets (Coetzee, 2018). Banks are adapting to digital solutions, having most of them a robust readiness for their adoption, (Auvinen, et al., 2019). Banks are competing but mainly partnering (Bömer, 2018; Drasch, Schweizer, & Urbach, 2018) with fintechs which were already born digital (Iman, 2019). The adoption to new technologies such as blockchain (Min, 2019), big data and robot-advisors (Belanche, Casaló, & Flavián, 2019) will have impacts in the traditional banking structures (Semenyuta, Andreeva, Sichev, & Filippov, 2019), for instance, the need for very specialized work and less need for resources allocated to operational teams (Lavrinenko & Shmatko, 2019). Nevertheless, the implementation of these solutions will

have also a strong positive impact replacing complex and costly banking processes (Gonzalez, 2019) and facilitating several banking services such as payments (Gohary, 2019). The literature also highlights the need to foster entrepreneurship within banks' subsidiaries in order to nurture innovation and also to empower them to reinvent themselves (Wolf & Redford, 2019). Impacting banks and central banks are also the cryptocurrencies which have proliferated during the last years (Kovanen, 2019; Mehar, et al., 2019) and which advocate for more privacy (Harvey & Branco-Illodo, 2019) and independence from the central banks (Frias & Freire, 2019). These facts also urged for more regulation in fintech and cryptocurrencies' markets (Anagnostopoulos, 2018; Micheler & Whaley, 2019).

Table 10 - Systematization of themes, papers and main findings

Theme	Leximancer's Relevance	Papers	Main findings
Banks	100%	Anagnostopoulos, 2018; Auvinen, et al., 2019; Belanche, Casaló, & Flavián, 2019; Bömer & Maxin, 2018; Coetzee, 2018; Drasch, Schweizer, & Urbach, 2018; Frias & Freire, 2019; Gohary, 2019; Gonzalez, 2019; Harvey & Branco-Illodo, 2019; Iman, 2019; Kim & Hann, 2019; Kovanen, 2019; Lavrinenko & Shmatko, 2019; Mehar, et al., 2019; Micheler & Whaley, 2019; Min, 2019; Nigam, Mbarek, & Benetti, 2019; Semenyuta, Andreeva, Sichev, & Filippov, 2019; Wolf & Redford, 2019; Jakšič & Marinč, 2019	(i) Banks are being challenged by new incumbents. (ii) Fintechs are expanding and offering substitute products reaching populations to whom the traditional services are expensive or hard to access. (iii) Banks are trying to adapt to this new competition and mainly partnering with fintechs. (iv) The existence and adoption of new technologies will impact traditional banking's structures such as less allocation of operational resources, a need for specialized work and leaner processes. (v) Cryptocurrencies are also impacting banks and central banks. Their proliferations urges for regulation.
Technology, use and system	41%, 35%, 17%	Addo, Guegan, & Hassani, 2018; Anagnostopoulos, 2018; Gohary, 2019; Gonzalez, 2019; Hassani, Huang, & Silva, 2018; Kovanen, 2019; Micheler & Whaley, 2019; Procházka, 2018; Stewart & Jürjens, 2018; Yoon & Jun, 2019; Ashta & Biot-Paquerot, 2018; Belanche, Casaló, & Flavián, 2019	(i) The theme use is closely related with the use of technology and is not relevant on its own. (ii) The use of technology is related with the use of blockchain systems. That is the reason to the association of the theme system. (iii) Technology is associated to fintechs and the products they offer. (iv) Literature states that blockchain is the main technology breakthrough behind the fintechs' success. (v) Traditional banks need to adapt to this technological developments.
Services	32%	Anagnostopoulos, 2018; Anagnostopoulos, 2018; Döderlein, 2018; Drasch, Schweizer, & Urbach, 2018; Larios-Hernández, 2017; Passi, 2018; Romanova, Grima, Spiter, & Kudinska, 2018; Stewart & Jürjens, 2018; Yoon & Jun, 2019; Zalan & Toufaily, 2017	(i) Refers to traditional financial services offered by banks and currently fintechs. (ii) Banks are under pressure from the market and fintech companies to offer innovative digital services. (iii) Although the regulation might be a burden it has been eased in order to facilitate banks to adopt innovative measures. (iv) The fintechs are used mostly by young and educated people being very fruitful in developing markets in which they allow the access to financial services.
Market, crowdfunding and finance	27%, 19%, 14%	Brown, Boon, & Pitt, 2017; Cumming, Meoli, & Vismara, 2019; Hoegen, Steininger, & Veit, 2018; Kim & Hann, 2019; Nigam, Mbarek, & Benetti, 2019; Prakash, Reddy, & Vasaswi, 2019; Zilber, Silveira, Carvalho, & Imbrizi, 2016	(i) The themes finance (financial services and financing), market (financial markets) and crowdfunding are interconnected with predominance for crowdfunding. (ii) Crowdfunding is also considered an alternative financing source which had an important increase because it overcomes the usual difficulties in the traditional financing forms.
Digital	22%	Bantouna, Poullos, Tsagkaris, & Demestichas, 2014; Japparova & Rupeika-Apoga, 2017; Larios-Hernández, 2017; Liu, Chen, & Chou, 2011; Meena, Sriram, & Sundaram, 2017; Zalan & Toufaily, 2017	(i) Connected with the themes technology and service once digital is related with the appearance of disruptive digital services. (ii) Traditional banks need to become digitalized in order to remain competitive. (iii) The digitalization of the economy is possible due to large amounts of data available. (iv) There are concerns about the digital inclusion but clearly digital services promote entrepreneurship and the financial inclusion of populations in less developed markets.
Investment	16%	Bodislav, Bran, & Popescu, 2018; Hoegen, Steininger, & Veit, 2018; Jung, Dörner, Weinhardt, & Pusmaz, 2018; Sigo, et al., 2018; Brown, Boon, & Pitt, 2017	(i) Refers to the alternative ways of investment which differ from the traditional ones. (ii) Literature refers to automated investment counseling and the use of big data in the investment process.

The theme “services” is mainly referred in the literature to identify financial services offered traditionally by banks and currently also by fintechs (Zalan & Toufaily, 2017; Anagnostopoulos, 2018). Literature confirms banks are under pressure to offer innovative and

digital services which go in line with consumers' demands (Drasch et al., 2018; Yoon & Jun, 2019). The authors also confirmed that this innovation is considered to have positive effects on consumers and regulators (Anagnostopoulos, 2018). This pressure does not only come from fintech companies but also from the market which has been more flexible and prone to creating innovative services (Romanova, Grima, Spiter, & Kudinska, 2018). Although the regulation may still be seen as a burden to innovation (Döderlein, 2018), the new European Payment Services Directive (PSD2) regulation is an example of a regulatory measure which intends to increase the consumer protection at the same time that tries to homogenize and make the payment market more efficient (Passi, 2018). Literature also reveals that the fintech services, although clear substitutes to traditional banking, are still mostly used by younger and higher educated people (Stewart & Jürjens, 2018) being very fruitful in developing markets where the access to traditional financial services is very limited (Larios-Hernández, 2017).

Literature associates the theme "technology" with the fintech companies (Belanche et al., 2019) and innovative services provided by them (Yoon & Jun, 2019) mostly related with payments (Kovanen, 2019). Insights are also provided on the impacts fintech technology has on traditional services (Anagnostopoulos, 2018; Gohary, 2019). The theme technology is frequently interconnected with the topic blockchain through the theme system. Therefore, the literature assumes blockchain systems have been the main technological breakthrough behind the recent fintech innovation (Gonzalez, 2019) and relates it with the expansion of technology and with a real disruption in the monetary system (Ashta & Biot-Paquerot, 2018). The banking system is already adopting technological solutions, such as blockchain (Hassani, Huang, & Silva, 2018), in order to keep up the pace with their competitors (Addo, Guegan, & Hassani, 2018; Stewart & Jürjens, 2018). Nonetheless, new technological solutions, pose a challenge to regulation which has been increasing in this area (Procházka, 2018) with the example of the Bank of England adopting itself digital solutions for regulatory purposes (Micheler & Whaley, 2019). The theme "digital" also appears in line with both previous themes as it is related with the appearance of new disruptive digital services (Zalan & Toufaily, 2017) and the need to adopt digital solutions (Liu, Chen, & Chou, 2011). The literature focuses on banks and states that digitalization processes are crucial for banks to guarantee their own development (Japparova & Rupeika-Apoga, 2017). The economy's digitalization is possible due to large amounts of data available and the capacity to process it (Bantouna, Poullos, Tsagkaris, & Demestichas, 2014). Nevertheless, digitalization raises also some concerns regarding exclusion because there is a clear positive correlation between age and income and the utilization of digital solutions (Meena et al., 2017). However, the new digital financial services are able to promote

entrepreneurship and also financial inclusion (Larios-Hernández, 2017). The usage of the new technological financial services, the use of data and digital solutions are clearly increasing being the main reason for the existence of the theme use.

The themes “market”, “finance” and “crowdfunding” appear interconnected in the literature. The theme “market” refers mainly to financial markets and the theme “finance” mainly refers to the financial services and to the financing of companies and investments. Crowdfunding is also associated with a type of market and an alternative way of financing projects (Zilber, Silveira, Carvalho, & Imbrizi, 2016; Kim & Hann, 2019). Crowdfunding is defined as a way used by “organizations and individuals to obtain investments they otherwise might not receive from more traditional sources such as banks, angel investors, and stock markets” (Brown, Boon, & Pitt, 2017, p. 1). There is an increase in the financing by crowdfunding (Prakash, Reddy, & Vasaswi, 2019) because it is a way of overcoming financing difficulties in projects which are unable to obtain financing via traditional forms (Cumming et al., 2019; Nigam et al., 2019). The volume of crowdfunding increased 1000% in a small number of years and it is nearly outpacing the worldwide venture capital spending (Hoegen, Steininger, & Veit, 2018).

Finally, the literature refers the theme “investment” and associates it with alternative ways of investment (Brown et al., 2017). These alternative forms have different decision-making processes compared to the traditional ones (Hoegen et al., 2018). Furthermore, the literature refers new ways of automated investment counseling such as robot-advisor systems (Jung, Dorner, Weinhardt, & Puzmaz, 2018) and the use of big data in investment processes as a way of making better decisions (Bodislav, Bran, & Popescu, 2018; Sigo, et al., 2018).

The entire map proves the idea that the central topic is still banks and the services they offer which are being challenged by substitute products offered by new incumbents. Fintechs are prone at providing a consumer-focused service and therefore, there is a strong interest in topics such as technology which is identified as a future’s trend and with new frameworks’ development within fintech companies. These new revolutionary services are mostly digital and based on blockchain system which has captured banks’ attention which have adopted some of fintech’s processes mainly through cooperation. Although the traditional financial institutions are struggling to keep pace with innovation, they are putting the best effort on this in order to guarantee their survival.

2.5.6. Table with the methodologies used

The current section is dedicated to the analysis of the methodologies used in the papers considered for this research. The authors have divided the methodologies into: literature review; quantitative; qualitative; mixed; conceptual (e.g. new model); experimental. Furthermore, the type of data is analyzed and divided into: primary; secondary; both types of data. A summary of the analysis can be found in table 11.

The authors have concluded that the majority of the papers fit into the methodology of the literature review representing a total of 42 papers. The second type of research representing 29 papers of the sample is the quantitative research followed by the qualitative research methodology used in 23 of the sample papers. The remaining approaches still have low significance but there are mixed methods approaches, conceptual frameworks and experimental researches on this topic. The mostly used type of data is secondary data mainly due to the literature review papers but also due to the quantitative research which uses mainly this type of data. In sum, the secondary data is used in 77 of the papers analyzed while the primary data is used in 20 of the papers analyzed with a reduced number of papers using both types of data which accounts to 3 of the papers analyzed.

Table 11 - Summary of the methodologies used

Methods	Papers	Secondary data	Primary data	Both data
Literature Review	42	42	0	0
Quantitative	29	23	4	2
Qualitative	23	9	14	0
Mixed	3	1	1	1
Conceptual	2	2	0	0
Experimental	1	0	1	0
Total	100	77	20	3

2.6. Conclusions and further research

2.6.1. Main conclusions

The aim of this paper was to answer the following research question: what insights does current literature offer regarding the impact of fintech in the banking sector? Accordingly, the authors developed a systematic literature review. Fintech are gaining relevance in the last years as concluded by the analysis of Google Trends' data and also by the literature analysis. Internet interest on this topic has increased as well as the number of articles published and the number of authors, journals, private institutions and universities interested in the topic.

The literature proves that the USA, the UK and Germany are the most relevant countries in terms of research on current topic. These are the most important markets for the fintech (after China) and also the ones with the most developed educational system. Despite having several active authors interested on fintech and the Journal which publishes the most, China is still behind several countries in terms of authors and publications, namely, the emerging markets for fintech such as Germany, Italy, Spain, Eastern Europe and India. The most cited words in papers' key-words are consistent with current state of the fintech/banking market. The most prominent topics focus on banks, fintechs and finance. The interest is clear on services provided by fintech which are mostly similar to traditional banking's ones. Hence, there is strong interest in payments, financial services, lending and currency. Together with these concepts are technological ones such as big data, blockchain, artificial intelligence, data transformation and machine learning. The analysis also highlights the focus on regulation. Leximancer's concept map and literature associated with it proves the conclusions already found through the snapshot done previously.

Previous studies revealed that fintechs are indeed direct competitors of traditional financial institutions since they offer substitute products (PWC, 2016; Vives, 2017), while technological companies have the strong advantage of being completely digitalized, offering services and products in a much faster and cheap manner than financial institutions (PWC, 2019). Traditional financial institutions, particularly the banks, have a heavy burden of old processes and costly business models based on fees (Chiorazzo et al., 2018; Gomber et al., 2018). After the last financial crisis (2007-2008) banks jeopardized their reputation and fintechs expanded based on the idea that there is no need for third party intermediation with blockchain based systems which can ultimately substitute central banks' role as currency issuers. Previous studies also stated that although fintechs have expanded and currently pose a direct threat to traditional banking they are not considered clear substitutes though (Roland Berger, 2018). Nonetheless, they are considered disruptive innovators and are forcing banks to rapidly adapt (Deloitte, 2017; PWC, 2019). Hence, banks are adapting in order to change their processes and focus on consumers' needs taking advantage of the trust on traditional and regulated institutions (EY, 2014). Banks are dealing with fintechs through acquisition or collaboration (KPMG, 2019a; PWC, 2019). Banks recognize the importance of concepts such as data, digital and technology and the necessity of integrating them onto their business model (Addo et al., 2018; Hassani et al., 2018; PWC, 2019). Simultaneously, fintech market is expanding and its three most relevant regions are China, the USA and the UK. Although the European market is expanding (e.g. in Germany, France, Italy, Spain or Netherlands) the UK is clearly the center for the European innovation in

fintechs. The USA are an important market for fintech but China is today the most prominent one globally.

2.6.2. Avenues for future research

Future studies on banks' digital transformation should focus on technologies and systems used in fintech industry currently being adopted by banks (e.g. blockchain, robot-advising, big data). Banks are thriving to adopt new technologies and solutions in order to improve old processes and remain competitive which is key to their survival and maintenance as key players in the financial industry. Therefore, technologies adopted and their purposes are of high importance. For instance, which is the use of blockchain in traditional banking and what risks and advantages does it pose? Have the banks adopting these technologies become more competitive and have they attracted more consumers? Besides pure fintech technologies, future studies should also focus on banks' adoption of digital solutions (e.g. home banking applications, digital customer support). Are banks offering more digital solutions to their clients? What is the percentage of traditional banks' clients actively using digital solutions and in what depth do they use them?

Financial institutions have several ways of dealing with fintechs but a model of cooperation has been preferred because it seems to allow traditional companies to easily adopt fintechs' technological solutions (Roland Berger, 2018; PWC, 2019). A future study on the models used by traditional financial institutions to deal with fintechs would be of interest. Which models have been adopted in the relation between traditional institutions and new incumbents? Do models of cooperation produce better results? Who has benefited the most with the cooperation?

The authors have found that new financial services still benefit from more permissive regulation than traditional banks (EY, 2018; Desai et al., 2019). Traditional institutions can benefit from regulation because it increases trust on them but it may also jeopardize much of the innovation. There are also signs of openness in regulators in order to allow the traditional banks to adopt innovative solutions. Studies on regulation and the way it affects the new incumbents are interesting. Is regulation (or the lack of it) favoring fintech? How can fintechs protect and adapt themselves to possible future regulatory measures? Are banks taking advantage of regulatory openness?

There is clear evidence that investments are taking different forms and are also becoming digital due to the existence of new solutions and new markets which are replacing the traditional ones (Brochado, 2018b; Hoegen et al., 2018; Cumming et al., 2019; Nigam et al., 2019; Prakash

et al., 2019). Examples of these new investments are crowdfunding and more recently the Initial Coin Offerings (ICOs) which use virtual currencies and tokens to attract investment. Therefore, further studies should also focus on studying the success factors of new fintech companies and in particular the success factors of these new investment vehicles. Which are the success factors of a completely digital company offering financial services? Which are the success factors of campaigns such as the ICOs which are completely digital, using virtual currencies and with a global reach?

2.6.3. Main research limitations

The database collected from SCOPUS is limited to 100 relevant papers and the great majority of them were published in the last 3 years. The conclusions would be stronger if a larger database was available and also if an older track record existed. In other words, this would result in more bibliography as well as an established group of researchers and consequently more consistency of the results. The current research is limited to a search on SCOPUS database. Consequently, it could be enlarged if other indexes are cross-checked among them and the number of articles included is increased. The SCOPUS search was limited to papers written in English for the sake of comparison among them and an easy and unbiased analysis. Although the largest majority is written in English several papers were lost in the analysis and consequently important information might also be lost. The search on SCOPUS is performed selecting several combinations of words which result in a final list of papers. Although the authors think that the sample is relevant, they might have not included important words to the search on the platform and thus some papers might not have been included in the analysis. The novelty of the topic is also cause of constant changes in concepts and market data. Therefore, the data presented in the theoretical framework might be outdated soon and requires constant updates to be relevant. This limitation increases due to the volatility of fintech business and constant valorization and depreciation of cryptocurrencies.

In sum, fintechs are clearly reshaping the traditional market of financial services by offering digital solutions and customer centric products. Traditional institutions are adapting to this new reality and are adopting technological solutions in order to remain competitive. Future studies on these topics will be important to understand how the market is moving and what the impacts of innovation are.

3. Second study: Initial Coin Offerings (ICOs): why do they succeed?

3.1. Abstract

Current literature has been focusing on Initial Coin Offering (ICO) projects which are an innovative form of venture financing through cryptocurrencies using blockchain technology. Nevertheless, there are still several literature gaps to be fulfilled, for instance, on the success factors of ICO projects. Our research is focused on the success of ICO projects and its main purpose is to capture factors that influence a project's outcome. After a literature review from which several variables were collected, we have used a database composed by 428 ICO projects in the banking/financial sector to regress an econometric model. We have regressed the econometric model using both the standard OLS method and a robust regression confirming the first results. We have confirmed the impacts of several variables with particularly important results concerning project and campaign's variables. Our research contributes to the ICOs' success factors literature by capturing most of the success factors previously identified and testing their impacts based on a large database.

Keywords: Initial Coin Offering (ICO); fintech; bank; financial services; technology; blockchain; innovation; venture capital; crowdfunding; success.

3.2. Introduction

The Initial Coin Offerings (ICOs) are a novel concept which appeared for the first time in 2013 with the MasterCoin project proposed by J.R. Willett. These projects allow the financing of innovative ideas at a global level which contributes to the democratization of the financial investments and also allows an entire new reach hardly achieved through conventional means (Brochado, 2018). The ICO projects are technological ventures based on the blockchain technology and financed via cryptocurrencies. Thus, an investor might pass through the process of converting fiat currencies into cryptocurrencies in order to participate in the project (Kranz et al., 2019). Once the funds have been released to the project promotor, the investor must receive the tokens correspondent to the contribution made. There are several token types in ICO projects (Howell et al., 2018): (i) currency token: used as a means of exchange and store such as a cryptocurrency; (ii) security token: used as a conventional security but recorded and exchanged on a blockchain. The underlying of this token type can range from corporate equity (typical share), to commodities, real estate or even currencies, and; (iii) utility token: is the most common token type and provides to the buyer consumptive rights to access a product or service. The characteristics of the project are compiled in the whitepaper which is unregulated but tends to follow certain characteristics and can be compared to a regulated prospectus. The whitepaper is also a measure of project's credibility once it contains technical information as well as business information and information regarding the team. As in crowdfunding, the success of an ICO project might be ascertained through the capital it was able to raise. An ICO project might have none to several thresholds defining the capital which should be raised (Kranz et al., 2019): (i) no-cap: project without any limits regarding financing; (ii) soft-cap: minimum limit of capital achieved in order to proceed with the project; (iii) hard-cap: maximum amount of capital accepted; (iv) collect and return: a hard-cap is defined and, if surpassed, the tokens will be distributed respecting the ratio of the hard cap to the total funds received; (v) dynamic ceiling: several hard-cap limits are defined and kept secret, and; (vi) combination of several characteristics mentioned. Having in mind the characteristics highlighted, we could define ICOs as an alternative investment form offering the possibility of direct financing from worldwide investors and which contributes to the democratization of entrepreneurship and access to capital markets (Brochado, 2018). This definition is in line with Fisch (2019) who also highlights the similar approaches of crowdfunding and ICOs.

The interest in the ICO projects has been increasing as per the interest revealed in internet searches and the size of the ICO market followed that trend (Google, 2020). Since 2016 until 2019 the number of token sales successfully concluded were 1676 which represented a total of

about USD 29,2 billion (Coinschedule, 2020). The highly financed project obtained USD 4.1 billion and was a project of 2017 named EOS which is a software based in blockchain technology (ICOBench, 2020). The countries with the highest amount of ICOs and capital raised are the United States of America (USA) and Singapore. In terms of number of ICOs the country in the third place is the United Kingdom (UK) and in terms of capital raised are the British Virgin Islands (ICOBench, 2020). The categories of in which ICOs are performed vary from year to year being the investment in blockchain infrastructure a constant investment regardless of the year. In 2019 the majority of ICOs investments were in trading and investment platforms, payment platforms and blockchain infrastructure (Coinschedule, 2020). The hype gained by ICO projects has reduced in 2019 after 2 years of large amounts invested and high amounts of token sales successfully concluded. This is also due to the depreciation cryptocurrencies suffered in 2019 after 2 years of enormous appreciation of their value against fiat currencies (Fisch, 2019).

ICO projects have been compared with other more traditional forms of financing such as Initial Public Offerings (IPOs) (Ofir & Sadeh, 2019), Venture Capital (VC) and crowdfunding (Block et al., 2020). Nevertheless, ICOs have unique characteristics which make them different from other types of financing (Biasi & Chakravorti, 2019). These unique characteristics are, among others, much less costs involved in the investment process, investment in cryptocurrencies, projects based in blockading technology, existence of a secondary market for the tokens sold (Chen Y. , 2018), no third parties involved and lower investments thresholds (OECD, 2019). These characteristics allow a truly global reach of the projects and a democratization of the access to capital markets (Brochado, 2018).

The current research is particularly focused on the success factors of ICO projects since the existent literature on this is still scarce and with several gaps to fulfil (Chen & Chen, 2020). From the best of our knowledge, there are no studies capturing an extensive range of success factors being most of them focused on particular impacts of specific variables. Our research was able to capture several success factors and group them into categories. Thus, we have contributed to the literature by grouping a large number of success factors into one research applied to a single large database. Therefore, we will be focusing on projects' characteristics that influence their final outcome and understand which of them are relevant. Our research aims to answer the following proposition: which are the relevant success factors pf ICO projects and which are their impacts on the projects' outcome?

3.3.Literature review

3.3.1. Signaling theory

The ICOs market is characterized by information asymmetries between promoters and investors (Momtaz, 2019). The promoters of the projects detain crucial information on their capabilities and the project's characteristics which the investors do not (Yadav, 2017). Building on the signaling theory, it is an information asymmetry problem (Spence, 1973). The signaling theory states that several markets are characterized by an information gap between buyers and sellers, particularly the financial markets where the investors do not have the same level of information as the entrepreneurs. Without a proper information transfer among the participants the markets will perform poorly as the entrepreneurs may not always be completely transparent on the information they provide. Performing a correct and deep due diligence is costly and thus third parties appear in order to overcome this difficulty. Being an outside party connecting both investors and entrepreneurs, these institutions fulfil the role of collecting unbiased information, being the channel among the market participants while being paid (Leland & Pyle, 1977). Thus, the signaling theory is composed by signalers, receivers and signals. The signalers have access to privileged information and must transmit it to the receivers in order to be perceived as having a high-quality project. The signals sent to the receivers must have 2 characteristics in order to be effective reducing the existent information asymmetry: (i) observable sign by the receiver, and; (ii) be costly to realize and imitate since if no costs are involved the signals will be easy to replicate and thus have no value (Fisch, 2019). A crucial assumption in signaling theory is that equivalent signals have different costs depending on high- or low-quality projects. If the costs to produce a signal are much higher in a low-quality project than in a higher-quality one, only the latter will choose to produce them (Fisch, 2019). In venture capital projects it is assumed that the aspects to be confirmed in the due diligence process are: (i) the size of the problem the business is attempting to solve; (ii) the elegance of the solution (iii) the entrepreneurial team; (iv) financial statements, and; (v) legal aspects (Yadav, 2017). As ICO projects are highly technological once they use Distributed Ledger Technology (DLT) (Kranz et al., 2019), bear an enormous investment risk and have a lack of information disclosure, the information asymmetries are substantially larger for these projects, which increases the need for signaling (Fisch, 2019). As ICOs are highly technological, possible signals they can use to affirm high-quality projects to investors are: (i) patents: are crucial in early financing stages and fulfill the criteria for effective signaling; (ii) technical whitepaper: as the prime source of detailed information about the project, the whitepaper should have information on the

technological infrastructure of the project which is costly to produce and explain, and; (iii) high-quality source code: most developments based on blockchain technology happen through programming and thus, high-quality code is required (Fisch, 2019). The signals to reduce information asymmetries might be published in the whitepaper but might also be available in other sources, such as in dedicated ICO websites with extensive databases (Giudici & Adhami, 2019), or social networks such as Twitter (Xuan et al., 2020) or GitHub (Jong et al., 2018).

3.3.2. Success factors

Signals are considered as success factors of ICO projects because they reduce information asymmetries and the projects are easily perceived as high-quality projects (Ackermann et al., 2020). There are further factors which may not be considered signals, once they do not fulfill the necessary characteristics, but that might also influence the success of a project. The attention was in the past mainly directed to crowdfunding projects due to their pre-existence to ICO projects but due to their similarities, the literature has been also adapting crowdfunding success factors to ICO projects. Although, the success factors which have been identified by the literature to be relevant both in traditional crowdfunding and blockchain based crowdfunding are few and built around the following concepts: (i) industry; (ii) location; (iii) team size; (iv) number of advisors; (v) social network presence; (vi) share of retained equity/tokens, and; (vii) early investment possibility (Hartmann et al., 2019). Success factors can be categorized, for instance, as being related with the project itself or the campaign (Hartmann et al., 2019) and the literature has been paying special attention to the importance of the social networks as a determinant success factor in this type of projects (Albrecht et al., 2019) as well as to the team characteristics (Giudici & Adhami, 2019).

3.3.3. Success factors of the project

The project's success factors cover characteristics inherent to the project itself, namely, every characteristic predefined when the ICO starts and related with the idea proposed and the future outcome. In crowdfunding the most technological companies are the ones obtaining more financing being the most successful. Other than that, the younger companies are also the most successful ones because crowdfunding is directed to this target companies (Ralcheva & Roosenboom, 2016). Being also a financing way of high-risk projects, the ICO projects fulfil these characteristics because they are technological ventures based on blockchain, mostly without any track record and only created to conclude the ICO and develop a project. The first success factor we have identified is related to the industry in which the project is integrated. The industry of the project is directly linked to its success and studies reveal that depending on

the project's area, there are different coefficients influencing the outcome of the project, being so there are also several negative coefficients revealing that some areas negatively influence the outcome (Davies & Giovannetti, 2018). Nevertheless, it is also important to notice that previous experience of the project's promoters in the industry is not considered relevant for a successful outcome, revealing that entrepreneurial experience and industry expertise is not necessary to conduct a successful project (Mamonov & Malaga, 2018). The location factor is also considered widely in the literature and revealed to have an impact on the project's success (Davies & Giovannetti, 2018; Charlotte et al., 2019; Fisch, 2019; Ackermann et al., 2020). Projects located in the US are considered to have particularly positive outcomes (Fisch, 2019) along with projects located in Israel and China (Fenu, Marchesi, Marchesi, & Tonelli, 2018). There is also the suggestion that projects located in larger cities are more successful than others (Ralcheva & Roosenboom, 2016). In ICO projects a reference to follow a specific legislation does not influence the project's success mainly due to the market characteristics of very low regulation (Giudici & Adhami, 2019). As the overall ICO market is unregulated, investors tend to reduce information asymmetries through the available channels, namely, project's website, social media platforms or whitepapers. Therefore, opaque projects are penalized by the investors and are less successful (Bourveau et al., 2018). Despite having no regulation, the investors follow certain rules which could eventually help regulators to intervene in the future (Amsden & Schweizer, 2019). Most of those rules are present in the whitepapers which are a crucial step in an ICO project. Several studies have focused in the whitepaper's role as a fundamental way of reducing information asymmetry and have come to relevant conclusions. Nevertheless, the mere existence of a whitepaper does not influence positively the project's outcome, importance resides in the content of the whitepaper (Adhami et al., 2018). There is a common idea that the length of the whitepaper influences project's success (Bourveau et al., 2018; Amsden & Schweizer, 2019; Fisch, 2019). Being a primary source of information, it is crucial to reduce information asymmetry between promoters and investors (Ofir & Sadeh, 2019). Although the conclusions are very much similar concerning the whitepaper's length, there are some discrepancies concerning the technical nature of the whitepaper. Technical whitepapers are the ones considered to include system architecture, smart contract description as well as technical diagrams (Albrecht et al., 2019). Whitepapers with technical aspects are considered to contribute to the success of the project because they are assumed as a sign of their quality and technical expertise (Feng et al., 2019; Fisch, 2019). Nevertheless, there are arguments on the opposite direction assuming that technical whitepapers do not influence a positive outcome on the long term, but have only a positive impact in the beginning of the ICO

campaign (Albrecht et al., 2019). Having a secondary market and a tradable token is a predominant characteristic of the ICO projects and the main distinguishing point from crowdfunding (Brochado, 2018). Therefore, having a secondary market, meaning, being listed in at least one crypto exchange is crucial to project's success. As the tradability of the token in secondary market is of tremendous importance (Ackermann et al., 2020), there is also a positive effect of being listed in more than one crypto exchange (Lyandres et al., 2019). Some researchers consider the secondary market to be as important as the capital raised and is therefore considered to be a measure of success itself because the project is only appraised as successful once it is tradable (Amsden & Schweizer, 2019). It is important to highlight that the tokens' value is highly volatile and can be seriously jeopardized by adverse industry events, such as, technical hacks or regulatory actions (Momtaz, 2020a).

3.3.4. Success factors of the campaign

Regarding the campaign's success factors, they are focused on the relevant aspects prepared prior to the beginning of the campaign and during that period. These factors are of enormous relevance once the campaign period is the timeframe during which promoters raise capital and when the project will reveal a positive or negative outcome. The common argument is that a longer campaign affects negatively the project's performance and shorter campaigns will most likely mean better outcomes (Davies & Giovannetti, 2018; An et al., 2019; Fisch, 2019; Ackermann et al., 2020; Roosenboom et al., 2020). It is also important that, during the campaign period, the promoters do not put exaggerated pressure on the investors to obtain financing because these attitudes are associated with negative results in terms of capital raised (Albrecht et al., 2019). Before the campaign's official period starts, it is very common to have a pre-sale of tokens in ICO projects. These sales offer discounts and bonuses to investors who bear more risk by making an early investment (Liu & Wang, 2019). Several studies suggest a positive impact of pre-sale campaigns and project's success (Giudici & Adhami, 2019; Lyandres et al., 2019; Ackermann et al., 2020; Roosenboom et al., 2020). There is also the concern raised that pre-sale campaigns may have indeed a negative impact on the project's success (Momtaz, 2020a), mainly because it is perceived by the investors as an immediate need to cover expenses and the bonuses offered to investors may lead them to dump the tokens in the secondary market in order to maximize profits which impact negatively the project's overall success (Amsden & Schweizer, 2019). The bonus schemes, sometimes offered by the promoters, may negatively affect project's success (Adhami et al., 2018; Charlotte et al., 2019; Giudici & Adhami, 2019; Roosenboom et al., 2020) because ICO projects with larger bonuses

are perceived as possible scams and are less likely to succeed (Lee et al., 2019) increasing also the chances of token dumping in the secondary market. On the opposite, lower token prices seem to have a positive influence in the project's success once investors tend to be more interesting in cheaper tokens allowing them to buy several tokens from different projects (Burns & Moro, 2018; Jong et al., 2018; Yuryev, 2018). The need to buy tokens from different projects concerns the need to have a portfolio diversification because, due to information asymmetries, investors have a high likelihood of selecting poor projects, which urges the importance of portfolio diversification (Boreiko & Risteski, 2019). Nevertheless, most of the times, investors can spot scam projects and avoid investing on them which provides them with tremendous returns when investing in an ICO (Benedetti & Kostovetsky, 2018). In terms of project's financing thresholds, (i.e. soft-cap and hard-cap limits), the existence of hard-cap limits positively influences project's success once investors can better assess tokens' value (Amsden & Schweizer, 2019). However, higher hard-cap limits, seemingly impossible to achieve, have negative effects on the project's success (Lyandres et al., 2019). The existence of soft-cap limits is considered to have a positive influence on the project's success by some researches (Amsden & Schweizer, 2019) but it is not unanimous, because there is also evidence of its negative effects (Bourveau et al., 2018). The investment in ICOs is done in cryptocurrencies and several may be accepted by the project's promoters. Campaigns accepting multiple currencies are more successful than the ones which accept a single one (Charlotte et al., 2019; Lee et al., 2019). Accepting several currencies is an evidence of project's quality revealing technical knowledge (Amsden & Schweizer, 2019). As the ICOs financing is done via cryptocurrencies, their volatility has a large impact on project's success, particularly Ethereum volatility (Myalo & Glukhov, 2019) because most projects are based on Ethereum technology (Fenu et al., 2018). Not surprisingly, Ethereum based ventures achieve more successful results (Fisch, 2019). Consequently to this characteristic, higher prices of Ether diminish the attractiveness of the investment in the ICO, which means a higher opportunity cost for the investor, and thus it is negatively correlated with project's success (Amsden & Schweizer, 2019; Roosenboom et al., 2020). Most of the project's require quality code in order to be successful and fulfill smoothly all the extensive requirements of an ICO campaign. Therefore, the existence and availability of high-quality code or code parts positively influence a project's success (Blaseg, 2018; Amsden & Schweizer, 2019; Ackermann et al., 2020) because investors have the chance to assess the degree of project's technical quality (Adhami et al., 2018). Lastly, as previously mentioned, the expert's rating of the projects is also a way of reducing information asymmetries and identify better projects. Although some concerns have been raised, the ratings attributed by third parties

tend to substitute traditional third party involvement and can determine the success of an ICO with strong precision (Liu & Wang, 2019). Consequently, ratings attributed by experts are linked to project success (Fenu et al., 2018; Rhue, 2018; Lee et al., 2019; Xuan et al., 2020).

3.3.5. Success factors of social networks

Serious importance has been given to the presence and use of social networks as they influence the output of ICO projects. A good management of social networks can promote high amounts of early contributions and the constant updates along the ICO campaign contribute to project's success (Ante et al., 2018; Bourveau et al., 2018; Ackermann et al., 2020). Social media can be used to influence investors' behavior (Liu & Wang, 2019) but only being present in one or several social networks does not influence the project's success. In order to be relevant, social networks must be maintained and managed correctly including posting frequently updates on the campaign (Xuan et al., 2020). The importance of social media derives from the fact that it can be used to influence investors' behavior (Liu & Wang, 2019). The mostly used social networks in ICO projects are Twitter and Github, the latter being a public repository of code. Concerning the Twitter network, there is evidence of a positive relationship between market capitalization and actively using Twitter. Nevertheless, this utilization must be regular and not exaggerated since high intensity activity on Twitter is associated with positive returns on the very short term but with negative returns in the future (Benedetti & Kostovetsky, 2018). The activity on Twitter must be related with positive messages associated with the project and an interaction with potential investors must be kept during the campaign (Albrecht et al., 2019). Therefore, the content related with the Twitter account is of paramount importance because some contents may be considered as cheap marketing and have negative effects on the project's success, for instance, linking the campaign with the cryptocurrency topic, and the opposite may also happen when the campaign is linked to the blockchain topic (Albrecht et al., 2019). Furthermore, there is proof that the activity of the social network account is also important because there is a proved negative effect on the number of accounts the project is following and the project's success (Albrecht et al., 2019). This is also considered cheap marketing and an easy way to obtain followers back. Overall, the importance of having a Twitter account in ICO projects is proved, as this is a good way to better communicate with investors and a further way to reduce information asymmetries (Burns & Moro, 2018; Cerchiello et al., 2019; Fisch, 2019; Xuan et al., 2020) similarly to what happens in crowdfunding (Greenberg et al., 2013). The importance of having active and well managed social network accounts is extended to the use of Github platform as a source of available public code which strengthen

the project's success (Albrecht et al., 2019; Amsden & Schweizer, 2019) particularly during pre-sales of tokens (Roosenboom et al., 2020). Finally, several researchers point out the importance of having an active and well managed website as a driver to differentiate high-quality projects from scams, which overall contributed to positive project's outcomes (De Jong, Roosenboom, & van der Kolk, 2018; Cerchiello et al., 2019; Pereza, Sokolova, & Konate, 2020).

3.3.6. Success factors of the team

The importance of team's characteristics, as well as their disclosure, has been highlighted by the literature as having an impact in project's success (An et al., 2019). Several human capital characteristics have been highlighted ranging from team size, professional experience, technological background to presence in social media (Brochado, 2018). In ICO projects, larger teams tend to be related to more successful projects as pointed out by several studies (Ante et al., 2018; Amsden & Schweizer, 2019; Cerchiello et al., 2019; Giudici & Adhami, 2019; Liu & Wang, 2019; Roosenboom et al., 2020). Similarly, there is also a positive relation between larger advisory teams and the success of ICO projects (Ante et al., 2018; Amsden & Schweizer, 2019; Cerchiello et al., 2019; Charlotte et al., 2019; Giudici & Adhami, 2019). Concerning team characteristics such as professional experience, managerial experience, education or entrepreneurial background, there is proof that only past managerial experience is relevant for a project's success while education, professional experience and entrepreneurial background are not relevant (Giudici & Adhami, 2019) as already proved in crowdfunding projects (Allison et al., 2017). Likewise, in human capital's characteristics, higher ratings attributed by independent experts to the teams are associated with a successful project outcome (Momtaz, 2020).

3.3.7. Measures of success

There is still no consensus regarding a single success measure for ICO projects since different studies follow different measures each of them with a purpose and good reasoning to capture the success of a venture. Some studies even aggregate several measures with similar results (Jong et al., 2018). As the secondary market is seen as extremely important for the project to be successful, it is even considered to be able to measure its success because it is considered that the project's success is directly linked to tokens' tradability (Amsden & Schweizer, 2019). Other measures were also developed and are equally relevant. Another measure is a binary variable in which a positive result is achieved when the project reaches its own soft-cap threshold and intrinsically related is the measure in which a percentage is made

on the capital reached above the mentioned threshold, being the most successful the the ones with higher percentages (Jong et al., 2018). However, these measures require disregarding several projects, namely, the ones with no soft-cap limits. Therefore, as in crowdfunding, the most common measure of success is the capital raised allowing the inclusion of all the projects in a database and allowing their differentiation given the amount of capital they have achieved (Fisch, 2019; Šapkauskienė & Višinskaitė, 2020).

3.4. Methodology

3.4.1. Database

The database was collected through an API accessible with a premium subscription of ICO Bench website. This database is comprised of 556 projects in the banking/financial sector which was selected due to the impacts it faces with the appearance of Fintech companies and due to their role as third parties which is being challenged by new models such as ICOs (Campino et al., 2020). The database contains several key information on ICO projects, namely, information on the project itself (e.g. project's year), information on the campaign (e.g. threshold amounts) and information on the team (e.g. team composition). From the 556 projects available we were able to work with 428. The projects discarded had incomplete information which did not allow their correct analysis and could lead to a biased model. Complementing the mentioned database, we have collected information using the Twitter and LinkedIn social network platforms. Therefore, we were able to collect information on Twitter activity, such as the number of followers and activity during the ICO campaign, and on LinkedIn networks, such as the team member's number of connections from team members.

3.4.2. Variables description

We were able to collect 26 variables using the methods previously described. These variables can be divided into 4 main groups: (i) project variables: related with the project's characteristics; (ii) campaign variables: related with ICO campaign characteristics; (iii) social network variables: related with the activity on social networks, and; (iv) team variables: related with human capital characteristics.

Concerning the project variables, we captured variables related with the project itself and obtained the following: (i) project rating: the rating attributed by an algorithm and by experts to the overall project; (ii) whitepaper: we have captured three main whitepaper's characteristics, namely, its length, the disclosure of the project's team and technical aspects; (iii) secondary market: captures the tradability of the token and therefore their success; (iv) restricted countries:

number of countries in which the project has restrictions, and; (v) region: the project's region divided into North America, Asia-Pacific and Europe.

The variables capturing the campaign characteristics are focused on aspects relevant during the ICO campaign as follows: (i) pre-sales: captures the existence of tokens pre-sales; (ii) bonus scheme: captures the existence of bonus to investors; (iii) fundraising goal: captures the existence of financing thresholds, such as, soft-cap or har-cap limits; (iv) token price: captures the price the token was sold; (v) ICO duration: captures the number of days the campaign was active; (vi) cryptocurrencies average price: captures the yearly average price of Bitcoin and Ethereum, and; (vi) currencies accepted: captures the number of currencies the project accepts as investment.

Social networks have become an essential part of new ventures' promotion and we captured their characteristics as follows: (i) Twitter activity: activity during the campaign, the number of followers the project has and the number of tweets made; (ii) Github activity: captures the existence of a Github account and the existence of publicly available code before the ICO campaign, and; (iv) website active: captures the existence of an available website on May, 2020.

Concerning the team variables, we were able to capture the following aspects: (i) team members: number of members in the team; (ii) advisors: number of advisors in the project, and; (iii) LinkedIn connections: the sum of team members' LinkedIn connections.

There were several further variables which we were able to capture but have decided not to include in the model due to multicollinearity issues (Wooldridge, 2013). We were able to obtain several ratings attributed to the project, namely, the project rating, team rating, vision rating and product rating. These variables had a strong relation among them and although for prediction purposes this would not be an issue, collinearity could influence regression coefficients. Therefore, we have decided to keep only project rating because it is the more general rating capturing more project features. The same happened with Twitter followers and profiles followed by the project. A collinearity issue was present in this case and we have decided to keep only Twitter followers because, according to the literature, is an important characteristic and also because it was the variable considered statistically significant and with a higher coefficient.

3.4.3. Robust regression

We have used the software STATA 14 to develop the econometric model and perform several tests. We have firstly regressed the econometric model using the standard OLS method and performed a test to detect skewness and kurtosis which we verified was present. Therefore,

we have performed a Shapiro-Wilk test which conformed that the residuals were not normally distributed (STATA, 2020a). There was also an issue with heteroskedasticity once the residuals exhibit non-constant variation confirmed by the Breusch-Pagan test and reinforced by the White's general test for heteroskedasticity which overcomes some limitation of the first test (Williams, 2020). We have confirmed that there was no issue with multicollinearity, after adjusting the variables, with a Variance Inflation Factor (VIF). Although the standard OLS method could be used it could also be biased and we have decided to run a robust regression using the command "*rreg*" in STATA (STATA, 2020b). Although the OLS estimator has dominated the literature, and the application of regression techniques the robust regression techniques appeared as a strong substitute to it once they offer protection against distortion of anomalous data (Li, 1985). This regression type was already used in the ICO literature (Jong et al., 2018; Fisch, 2019). After regressing the models with the different methods, we have confirmed that they reach very similar results which we present. Furthermore, we will progressively add the variables in order to verify the coefficient and p-values behavior as a model's robustness check.

3.4.4. Econometric Model

With the econometric model we aim to confirm which are the relevant variables contributing to the ICO projects success within the categories described before (project, campaign, social network and team variables). We have tried to cover the literature on ICOs and the relevant variables highlighted and apply them to our database. Therefore, we aim to confirm if they can be considered relevant and their impact on banking/financial projects.

3.5. Results

3.5.1. Descriptive statistics

The projects composing the database have a similar distribution in terms of success. There are 53% of unsuccessful projects and 47% of successful projects considering the capital raised and project's amounts obtained below/equal or above sample median as per table 12. Considering the project's variables, we have obtained the expected results concerning the rating and whitepaper variables but not as clearer results concerning countries restrictions and project's regions. Hence, we confirmed that lower ratings attributed to the project are linked to unsuccessful outcomes because 29% of projects are considered unsuccessful and have ratings from 0 to 2.9 being the successful projects only 13% with these ratings.

Table 12 - Cross table between dependent and independent variables

		Capital Raised in USD				
		Below/Equal Median	%	Above Median	%	
<i>Project Variables</i>						
Project Rating	0-2.9	124	29%	56	13%	
	3-3.9	73	17%	106	25%	
	4-5	28	7%	41	10%	
Whitepaper: Team Disclosed	No	141	33%	83	19%	
	Yes	84	20%	120	28%	
Whitepaper: Technical	No	208	49%	136	32%	
	Yes	17	4%	67	16%	
Whitepaper: Word Count	Below	136	32%	78	18%	
	Above	89	21%	125	29%	
Secondary Market	No	207	48%	145	34%	
	Yes	18	4%	58	14%	
Restricted Countries Median	Below	112	26%	108	25%	
	Above	113	26%	95	22%	
Region: North America	No	196	46%	188	44%	
	Yes	29	7%	15	4%	
Region: Asia-Pacific	No	172	40%	150	35%	
	Yes	53	12%	53	12%	
Region: Europe	No	115	27%	94	22%	
	Yes	110	26%	109	25%	
<i>Campaign Variables</i>						
Pre-sales	No	100	23%	96	22%	
	Yes	125	29%	107	25%	
BonusScheme	No	139	32%	97	23%	
	Yes	86	20%	106	25%	
Fundraising Goal	No	44	10%	21	5%	
	Yes	181	42%	182	43%	
Token Price Median	Below	112	26%	102	24%	
	Above	113	26%	101	24%	
ICO Duration Days Median	Below	108	25%	108	25%	
	Above	117	27%	95	22%	
BTC Price Median	< USD 1000	0	0%	1	0%	
	USD 1000 - USD 5000	26	6%	52	12%	
	> USD 5000	199	46%	150	35%	
ETH Price Median	< USD 100	0	0%	1	0%	
	USD 100 - USD 200	58	14%	19	4%	
	> USD 200	167	39%	183	43%	
CCY Accepted Median	Below	152	36%	132	31%	
	Above	73	17%	71	17%	
<i>Social Network Variables</i>						
Twitter Active Campaign	No	113	26%	64	15%	
	Yes	112	26%	139	32%	
Twitter Followers Median	Below	146	34%	68	16%	
	Above	79	18%	135	32%	
Twitter Number of Tweets	Below	143	33%	72	17%	
	Above	82	19%	131	31%	
Github Account	No	125	29%	83	19%	
	Yes	100	23%	120	28%	
Github Code Prior ICO	No	159	37%	113	26%	
	Yes	66	15%	90	21%	
Website Active on May, 2020	No	117	27%	73	17%	
	Yes	108	25%	130	30%	
<i>Team Variables</i>						
Team Members Median	Below	138	32%	77	18%	
	Above	87	20%	126	29%	
Advisors Median	Below	142	33%	103	24%	
	Above	83	19%	100	23%	
LinkedIn Connections Median	Below	134	31%	80	19%	
	Above	91	21%	123	29%	
		Total	225	53%	203	47%

On the opposite, among the projects with higher ratings (4 to 5), 10% are successful and 7% unsuccessful being the clear discrepancy in average ratings (3 to 3.9) where 17% are unsuccessful against 25% successful projects. Concerning the whitepaper variables, it is clear that disclosing the team and having a technical and longer whitepaper is associated with success, being the higher successful percentages associated with projects with these characteristics. In terms of countries restrictions and project region, it is not clear the division between successful and unsuccessful projects, being the percentages similarly divided and not leading to a clear conclusion. Concerning the campaign variables, we cannot reach a clear conclusion with descriptive statistics on the variables related with the existence of pre-sales, the number of currencies accepted by the project and the token price. This is due to a similar allocation of successful and unsuccessful projects regardless of the value of this variable. In terms of the existence of fundraising goals, although not expressive, we can see a tendency to have more successful projects when there is a fundraising goal (43%) than when there is not (5%). The duration of the ICO campaign seems to be related with project success once campaigns with duration above the median tend to be unsuccessful, when the contrary happens to shorter campaigns. The price of cryptocurrencies, namely, Bitcoin and Ethereum, seem to be related with project's success in inverse ways. Whereas a cheaper price for Bitcoin is related with more successful projects the contrary happens with Ethereum which tends to have more successful projects when its price is higher. The variables related with the use of social networks revealed to have a tendency to influence project success. Having an active Twitter account during the ICO campaign is associated with successful projects (32%) in contrast to not having an active Twitter campaign (15%) as well having a higher group of followers is linked to successful projects (32%) inversely to smaller networks (16%). The number of tweets does not allow a clearer analysis due to the percentages obtained. Although in a much smaller scale, we also confirm that having a Github account active is linked to higher success (28%) instead of not having one (19%). Having code publicly available before the ICO campaign starts is not confirmed to have a strong relation with success contrary to the existence of an active website because more projects are considered successful when they have one (17%) than the ones that have not (30%). Finally, the team variables considered relevant to project's success are the number of team elements and the LinkedIn networks. Larger teams and networks have higher percentages of successful projects (29% for both) than the opposite (18% and 19% respectively).

Table 13 - Descriptive statistics table

	Descriptive Statistics				
	Observations	S.D.	Min.	Max.	Mean
Project Rating	428	0,76	1,1	4,90	3,15
Whitepaper Word Count	428	6738,09	0	88211	6464,51
Restricted Countries	428	6,47	0	124	1,56
Token Price Log	428	0,42	0	3,48	0,21
ICO Duration Days Log	428	0,43	0	2,76	1,67
Bitcoin Price Log	428	0,12	2,75	3,88	3,82
Ethereum Price Log	428	0,20	1,03	2,68	2,54
CCYs Accepted	428	2,02	1	30	2,23
Twitter: Followers Log	428	1,52	0	5,45	2,46
Twitter: Number of Tweets Log	428	1,14	0	3,85	1,72
Team Members	428	8,22	1	47	12,89
Advisors Log	428	0,35	0	1,23	0,34
Linkedin Connections Log	428	1,47	0	4,24	2,71

Table 14 - Frequencies table

		Frequencies Table		
		Frequency	Percentage	Cumulative Percentage
Whitepaper: Team Disclosed	No	224	52%	52%
	Yes	204	48%	100%
	Total	428	100%	-
Whitepaper: Technical	No	344	80%	80%
	Yes	84	20%	100%
	Total	428	100%	-
Secondary Market	No	352	82%	82%
	Yes	76	18%	100%
	Total	428	100%	-
Region: North America	No	384	90%	90%
	Yes	44	10%	100%
	Total	428	100%	-
Region: Asia-Pacific	No	322	75%	75%
	Yes	106	25%	100%
	Total	428	100%	-
Region: Europe	No	209	49%	49%
	Yes	219	51%	100%
	Total	428	100%	-
Pre-sales	No	196	46%	46%
	Yes	232	54%	100%
	Total	428	100%	-
Bonus Scheme	No	236	55%	55%
	Yes	192	45%	100%
	Total	428	100%	-
Fundraising Goal	No	65	15%	15%
	Yes	363	85%	100%
	Total	428	100%	-
Twitter Active Campaign	No	177	41%	41%
	Yes	251	59%	100%
	Total	428	100%	-
Github Account	No	208	49%	49%
	Yes	220	51%	100%
	Total	428	100%	-
Github Code Prior ICO	No	272	64%	64%
	Yes	156	36%	100%
	Total	428	100%	-
Website Active on May, 2020	No	190	44%	44%
	Yes	238	56%	100%
	Total	428	100%	-

As per table 13, the projects composing the database can have ratings from 0 to 5 and have a mean value of 3.2. Great discrepancies are found in the whitepaper word count where there are whitepapers with 0 words because they were not found or did not exist and whitepapers with 88 211 words being the mean value of 6465 words. The same happens with data concerning restricted countries which can be 0 up to 124 with a small mean of 2 counties. In order to normalize data, we have rescaled several variables using a log transformation. We have also developed a frequencies table to binary variables as per table 14. We can verify that, although balanced, most whitepapers choose not to disclose the team (52%) and the large majority is not technical (80%). Furthermore, only 18% of the projects obtain tradability in secondary market and the predominant region for project's location is Europe (51%). Although the majority of the projects decided to do pre-sales of tokens (54%) most of them decided not to have a bonus scheme (55%). Great part of the projects decided to adopt a fundraising goal (85%). In terms of variables related with the use of social networks, we verify that the majority of projects had an active campaign on Twitter (59%). The projects with a Github account represent 51% of the sample and only 36% of them had publicly available code prior to the ICO campaign. Currently, 56% of the projects have an active website.

After performing a correlation and VIF analysis we confirm that there are no collinearity issues. As explored before in the methodology section, we have discarded 4 variables which showed high VIF values (higher than 10) which could compromise the future analysis, particularly concerning the model regressed with the standard OLS method. These variables were clearly correlated among them, namely, the ratings attributed to different aspects of the project and Twitter profiles followers and followed by the project. After reducing the number of variables, we obtained comfortable VIF values with a very comfortable mean of 1.90.

3.6. Econometric Model

We have regressed a model using the standard OLS method and, due to data limitations, regressed a second model using the robust regression in STATA (table 15). As expected, we have obtained very similar results independently of the method used. Although the measure R-squared and adjusted R-squared are not the most appropriate measures to apply to a robust regression, we have decided to present them and use them since they are consistent with the values obtained when the standard OLS method was used. We have obtained a final R-squared of 0.36 for the OLS model and the robust regression, as well as a final adjusted R-squared of 0.32 for both methods. These measures increase with the inclusion of further independent variables progressively contributing for the variance of the dependent variable. Along with the inclusion of new variables in both models, the already existent ones keep their significance and new ones are added which can also be considered statistically significant. This is a proof of model's robustness being the only exception the binary variable location for North America in the robust model which can be considered significant in the second and third regressions but not in the final model. In both models the final variables which can be considered statistically significant are the same with very similar levels of significance and coefficients. We have proved statistical significance for the following project variables: (i) project rating; (ii) whitepaper: team disclosed; (iii) whitepaper: technical and; (iv) secondary market. The campaign variables considered significant are: (i) bonus scheme; (ii) token price; (iii) ICO duration; (iv) Bitcoin price, and; (v) Ethereum price. Concerning the social network variables, the ones considered significant are: (i) Twitter active during ICO campaign, and; (ii) Twitter number of followers. The team variable considered significant is: (i) number of team members. Although not statistically significant we would like to highlight the importance of the existence of a fundraising goal as a good way of investors assessing the value of a token as highlighted in the literature. We would like also to highlight the importance of Twitter activity measured by the number of Tweets since, as in the literature, we have found that extremely active Twitter accounts, which put pressure on the investors may contribute negatively to project success.

Table 15 - Robust regression model

	Model 1 Project Variables		Model 2 + Campaign Variables		Model 3 + Social Networks Variables		Model 4 + Team Variables	
R2	0.24		0.33		0.35		0.36	
Adjusted R2	0.23		0.30		0.31		0.31	
Observations	428		428		428		428	
	Coefficient	Strd. Error	Coefficient	Strd. Error	Coefficient	Strd. Error	Coefficient	Strd. Error
<i>Project Variables</i>								
Project Rating	0.86	0.22***	1.02	0.23***	0.89	0.27***	0.75	0.30**
Whitepaper: Team Disclosed	1.13	0.37***	1.07	0.35***	1.06	0.35***	0.99	0.36***
Whitepaper: Technical	2.18	0.43***	1.96	0.42***	1.96	0.42***	1.89	0.42***
Whitepaper: Word Count Log	0.05	0.13	0,00	0.12	-0.03	0.12	-0.01	0.12
Secondary Market	2.32	0.43***	1.44	0.44***	1.37	0.44***	1.40	0.44***
Restricted Countries	-0.01	0.02	0,00	0.02	-0.01	0.02	-0.01	0.02
Region: North America	-0.50	0.66	-1.11	0.62*	-1.15	0.62*	-1.03	0.63
Region: Asia-Pacific	0.24	0.54	0.12	0.51	-0.01	0.51	-0.02	0.51
Region: Europe	0.40	0.49	0.12	0.46	0.02	0.46	0.06	0.46
<i>Campaign Variables</i>								
Pre-sales			-0.18	0.32	-0.11	0.31	-0.14	0.32
Bonus Scheme			0.62	0.33*	0.73	0.33**	0.76	0.33**
Fundraising Goal			0.55	0.44	0.58	0.44	0.54	0.45
Token Price Log			0.72	0.37*	0.75	0.37**	0.70	0.37*
ICO Duration Days Log			-0.66	0.38*	-0.89	0.39**	-0.83	0.39**
BTC Price Log			-10.16	1.82***	-9.61	1.82***	-9.32	1.83***
ETH Price Log			4.49	1.01***	4.47	1.01***	4.12	1.03***
CCY Accepted			0.05	0.08	0.07	0.08	0.06	0.08
<i>Social Network Variables</i>								
Twitter Active Campaign					1.07	0.43**	1.07	0.44**
Twitter Followers Log					0.30	0.20	0.33	0.20*
Twitter Number of Tweets Log					-0.40	0.28	-0.43	0.29
Github Account					0.01	0.46	-0.05	0.46
Github Code Prior ICO					-0.19	0.46	-0.11	0.46
Website Active on May, 2020					0.09	0.34	0.05	0.34
<i>Team Variables</i>								
Team Members							0,00	0,00
Advisors Log							0.05	0.02**
LinkedIn Connections Log							-0.02	0.49
							-0.07	0.13

Significance levels: $p < 0.01$ (***); $p < 0.05$ (**); $p < 0.1$ (*)

3.7. Conclusions and discussion

3.7.1. Results discussion

We have regressed two models with the same variables and, using the same robustness check of gradually increasing the number of variables included, using two different methods, namely, standard OLS method and a robust regression. As expected, after the descriptive statistics analysis, despite the data limitations, we have obtained the same results despite of the method used confirming the validity of the model. We have decided not to include some variables due to their degree of collinearity, namely, ratings attributed to the team, vision and product. Nevertheless, we would like to highlight that, when they were included in the model, they were considered statistically significant and their removal only changed marginally the coefficients as expected. The ratings for the team and product had a positive impact on the project success and the rating for the vision had a negative impact in the project. This is due to the fact that visionary projects tend to be more difficult to achieve and harder to understand, creating a barrier for investment (Gompers & Lerner, 2001). Therefore, we confirm that the ratings attributed to projects by external parties can be a strong indicator of project's performance success (Fenu et al., 2018; Rhue, 2018; Lee et al., 2019; Xuan et al., 2020) as confirmed by the results obtained for the variable project's rating. The whitepaper has become a crucial part of ICO projects in order to reduce information asymmetry. We conclude that the length of the whitepaper, although with a positive coefficient, cannot be considered statistically significant contrary to its contents. Therefore, we assume that investors tend to take more attention to the content of the whitepaper than to its length (Adhami et al., 2018), namely, to the disclosure of the team members and to technical details (Feng et al., 2019; Fisch, 2019). These two variables have high coefficients and are approved at the highest level of significance. The same happens with the secondary market which can also be considered as a measure of success (Amsden & Schweizer, 2019) because only tokens tradable in the secondary market should be considered as being truly successful (Ackermann et al., 2020). Tokens with secondary market are the most successful ones as per our analysis, being a variable with a strong coefficient. Our conclusions do not confirm the argument that bonus schemes negatively affect project's success. In our analysis, we have a positive influence of bonus schemes for ICOs in the baking/financial sector. Furthermore, our analysis reveals that higher token prices are linked to more successful projects. Our research suggests that investors prefer more expensive tokens with bonus schemes which allows them to overcome higher prices which are perceived as a good quality signal. As per our analysis, cheaper tokens are less successful and can be

considered as schemes, while the contrary happens with higher token prices. In accordance with the literature, we confirm that longer ICO campaigns are less successful (Davies & Giovannetti, 2018; An et al., 2019; Fisch, 2019; Ackermann et al., 2020; Roosenboom et al., 2020) as confirmed by an expressive negative coefficient for this variable. The prices of cryptocurrencies are also linked to project's success as confirmed in our research and in the literature (Myalo & Glukhov, 2019). We have found a negative impact of higher prices of Bitcoin in project's success. On the contrary, higher Ethereum prices mean more successful projects. As most ventures are Ethereum based (Fenu et al., 2018) the appreciation of the cryptocurrency might influence investors to perceive an ICO as a good investment. Our research shows also a strong relation between the use of Twitter and the project's outcome. Having an active ICO campaign on Twitter has a strong impact on the project's success, as well as the network of followers as a way of reducing information asymmetries and keep potential investors informed (Burns & Moro, 2018; Cerchiello et al., 2019; Fisch, 2019; Xuan et al., 2020). The literature points that larger teams tend to be more successful (Ante et al., 2018; Amsden & Schweizer, 2019; Cerchiello et al., 2019; Giudici & Adhami, 2019; Liu & Wang, 2019; Roosenboom et al., 2020). We were also able to confirm that argument with our analysis revealing that larger teams have more changes to be heterogeneous and have more diverse inputs creating valuable human capital.

3.7.2. Theoretical contributions

The implications of our study for researchers are mainly related with the contribution made to the literature. We were able to collect a database and test most of the variables concerning ICOs' success factors present in the literature. We have confirmed most of the conclusions on the existing literature but revealed different results in some aspects which contributes to a wider discussion. Therefore, our research is a contribution to clarify the success factors of ICO projects and complement the current literature.

3.7.3. Managerial implications

Our research is also important for regulators, mainly on the conclusions concerning the whitepaper. The ICO projects are highly unregulated but due to the amounts involved and the importance they have been acquiring, regulators will need to take closer attention to them. Particularly, the whitepaper has been a way to reduce the lack of information in ICO projects and works as a self-regulated prospectus with crucial information on the project. As per our research there are strong evidence that a professional whitepaper which discloses important

information is essential to the project's success. These conclusions might be important to guide future regulator's actions.

For ICO projects promoters, the implications of this research are mainly related with the investors' perception of the project and the aspects promoters should pay particular attention to when promoting their ideas. We reinforce some literature conclusions and add new insights which can be important to determine a project's outcome. Indeed, a project promoter should, for instance, focus on having a detailed whitepaper where the team is disclosed and some technical details are highlighted. Furthermore, the project's timing should be selected to take advantage of cryptocurrencies prices and have the shorter campaign possible having at the same time a good management of social networks. In sum, ICO project's promoters should take advantage of the messages present in the literature in order to control all the factors possible to obtain the best outcome.

3.7.4. Research's main limitations

The database used for this research was composed originally by 558 ICO projects but some of them must be discarded due to lack of information, remaining 428 projects to analyze. The database was only composed by projects in the banking/financial sectors. Therefore, we conclude that these compose limitations of the study, namely, some information missing leading to discard several observations and the fact that the conclusions are limited to projects in banking/financial sectors and can be different in other industries. We also removed some variables collected, namely, ratings and Twitter activity, due to their levels of collinearity. It would be important to be able to keep these variables in futures studies in order to clearly observe their behavior. Concerning the Twitter and Github activity, we faced an issue with inactive or blocked accounts. Although the number was not significant in order to compromise the research, we point the fact that for some cases we were not able to collect information on social platforms activity due to current unavailability of the account. The same issue happened with some project's whitepapers which we could not find after searching in several platforms dedicated to ICOs and on the official website.

3.7.5. Avenues for future research

There are wide avenues for future research in ICO projects due to the novelty of the topic and several unexplored paths. After performing the current research, we have found that some variables represent strong impacts on project's success, for instance, the whitepaper. For future studies, it would be interesting to isolate these variables and focus on their particular effects. Regarding the whitepaper, it would be interesting to have a study focused on analyzing the

smallest aspects of it and understand which are the most relevant. Furthermore, we have confirmed that the secondary market is of great importance too. Therefore, it would be important to analyze the behavior of tokens in the secondary market in terms of volatility, tradability, returns for investors and many other relevant factors. Concerning the database, we consider it to be relevant to take a wider database and cluster it by project's industry. Then, confirm the most successful industry and confirm the success factors which are transversal to industries or the ones which only apply to a specific one.

4. Third study: Initial Coin Offerings (ICOs): the importance of human capital

4.1. Abstract

The Initial Coin Offerings (ICOs) subject has been gaining relevance due to its novelty, due to the capital amounts involved in the projects, as well as the disruptive technology and methods involved. ICOs are a disruptive way to finance new projects which involve high risks and which are mainly technological. This way to finance a project has been compared to others, namely, crowdfunding, venture capital or Initial Public Offerings (IPOs). Nevertheless, ICOs have very specific characteristics which make them unique. We have studied the ICO projects and developed a literature review on the topic. Building on the Human Capital Theory (HCT), we have also studied the importance given to the project's team and its perceived impact on projects' success. Our contribution to fill in this literature gap was to develop an econometric model which measures the impact of team's characteristics on the success of a project. The database was collected with the combination of two data sources and is composed of 3158 profiles and 340 ICO projects. We have concluded that team variables are significant contributors to project's success. Our data suggests that people's location contributes to projects' success as well as promoters' networks. The ratings attributed by external parties to the project are also indicators of success. Several control variables such as the implementation of thresholds to investment, the number of currencies accepted, the platform in which the ICO is developed, the existence of bonus schemes and the year of the project were found to be statistically significant having an impact on projects' outcome.

Keywords: Initial Coin Offering (ICO), fintech, bank, financial services, technology, blockchain, human capital, innovation, venture capital, crowdfunding.

4.2. Introduction

Traditional financing ways have been dominating the investment arena but new ways such as crowdfunding have been emerging. The technological developments allowed for even more disruptive financing methods to appear, namely, the Initial Coin Offerings (ICOs) (Mamonov & Malaga, 2020). The ICOs are disruptive and based on blockchain technology allowing the investment via a token and not fiat currencies (Chiu & Greene, 2019) eliminating both investment and geographic barriers and democratizing the access to investments (OECD, 2019). Although the similarities and the comparison done between ICOs and other financing forms such as crowdfunding, venture capital or Initial Public Offerings (IPOs) (OECD, 2019) the first have unique characteristics which distinguish them (Kranz et al., 2019). The success of the ICO projects has also been studied in the academic literature (Jong et al., 2018) but several gaps still exist (Chen & Chen, 2020), for instance, a deeper study on the importance of the human capital on the success of projects (Fisch, 2019) since this factor has been considered to be relevant (Allison et al., 2017; An et al., 2019). With this paper we aim to fill in the literature gap by analyzing the team's characteristics and understanding their impact on the project's outcome. We have created a database composed by 3158 profiles and 340 projects retrieved from a combination of two sources, namely, ICOBench and LinkedIn. The database contains several information on the profiles and on the projects from which it was possible to create variables and integrate them in an econometric model. We have concluded that several team variables contribute to the success of a project, namely, the promoters' location, their networks, the size of the team and the ratings attributed to external parties concerning teams' aspects. Our data also suggests that characteristics related with promoters' education or professional experience do not play a relevant role defining the success of a project. Several control variables revealed to be significant contributors to the success of projects, namely, the implementation of thresholds to investment, the number of currencies accepted, the platform in which the ICO is developed, the existence of bonus schemes and the year of the project. Our research will start in section 3 with the literature review in which we will be focusing on the ICOs' main characteristics, perform a market snapshot, understand the advantages and disadvantages of the ICOs, clarify the ICOs' differentiation and lifecycle and understand the human capital importance in the projects. In section 4 we will explore the methodology used in the research and in section 5 we will present the results of our study starting with descriptive statistics followed by a correspondence analysis and the econometric model. We will conclude and discuss the results in section 6.

4.3.Literature review

4.3.1. Main ICOs' characteristics

ICOs are an emerging topic in the literature but there is still a considerable literature gap due to their novelty (Chen & Chen, 2020). ICOs' main function is to fund innovative ventures which are based on a distributed ledger technology (DLT) such as blockchain (Kher et al., 2020; Sharma & Zhu, 2020). The funding is performed via the tokens selling by the cutting-edge technological ventures and the tokens purchase by worldwide investors (Chiu & Greene, 2019). Therefore, the investors are able to buy tokens directly from the new venture without the need of a third party involved. The tokens sold will be venture capital project's functional future units, in other words, they will have a utility function, right of ownership or royalties (Fisch, 2019). According to Howell et al. (2018) there are three main token categories: (i) currency token: used as a means of exchange and store such as a cryptocurrency; (ii) security token: used as a conventional security but recorded and exchanged on a blockchain. The underlying of this token type can range from corporate equity (typical share), to commodities, real estate or even currencies and; (iii) utility token: is the most common token type and provides to the buyer consumptive rights to access a product or service. According to Kranz et al., 2019 there is a fourth type of token, namely, the donation tokens which do not grant any rights to the investor and are used to raise money for entrepreneurial and idealistic projects. According to Brochado (2018b) there are also hybrid tokens which combine more than one of the characteristics mentioned above. Besides, new token types should appear in the future (Fisch, 2019). All the characteristics and main information on the ICO should be described in the Whitepaper of the new venture which, although unregulated, tries to mimic a regulated prospectus (Chiu & Greene, 2019).

According to Brochado (2018b) we could define ICOs as an alternative investment form that offers the possibility of direct financing from worldwide investors and which contributes to the democratization of entrepreneurship and access to capital markets. The ICOs are based on Blockchain technology and offer the chance to invest in a project's initial phase through the acquisition of a token. It also allows the transaction of tokens in the secondary market which is essential to their success (Chen Y. , 2018). This definition is in line with Fisch (2019) who also highlights the similar approaches of crowdfunding and ICOs, although an innovative characteristic of the latter is the possibility of selling tokens in a secondary market, which is not available in crowdfunding.

4.3.2. ICOs' snapshot

The ICO market represents large volumes of token sales but also large amounts of capital raised (Moedl, 2018). Data on ICOs cannot be completely correct and unbiased mainly due to two main reasons: (i) there are not official platforms where the ICOs might occur and be registered; (ii) several websites track ICOs but their data relies on manual user entries (Fisch, 2019). Nevertheless, the website CoinSchedule (www.coinschedule.com) is used by several authors and its information can be taken as reliable (Masiak et al., 2018; Chiu & Greene, 2019; Maume & Fromberger, 2019; Rohr & Wright, 2019).

The first ICO was the MasterCoin in 2013 proposed by J.R. Willett and since then the ICO market has increased mainly due to its novelty and the hype caused by the valorization of cryptocurrencies, particularly Bitcoin, between the years of 2017-2018 (OECD, 2019). During the last 4 years the ones with the largest amount of funds raised are 2017 and 2018. The year of 2017 had a total of 442 token sales concluded with USD 6.4 billion (thousand million) of funds raised and 2018 was even better for the ICO market with 1051 token sales concluded and with USD 21 billion (thousand million) of funds raised. However, with the depreciation of Bitcoin since the end-2018, the ICO market also refrained and 2019 registered lower values compared with previous years, namely, 131 token sales concluded and USD 1.4 billion (thousand million) of funds raised (Coinschedule, 2020). A global vision can be found in table 16.

Table 16 - Global vision of token sales and funds raised evolution

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	
2016														
Number of Token Sales Concluded		1	0	1	0	5	1	4	4	6	7	10	13	52
Funds Raised	300 000	-	5 500 000	-	182 719 734	972 798	2 456 342	12 295 227	11 990 546	12 609 349	22 102 411	5 976 334	256 922 741	
2017														
Number of Token Sales Concluded	9	7	5	14	26	32	32	38	60	69	62	88	442	
Funds Raised	82 008 737	22 463 657	18 837 264	81 817 029	289 723 458	662 053 515	492 790 512	426 955 503	868 759 649	979 231 108	813 617 738	1 701 690 123	6 439 948 293	
2018														
Number of Token Sales Concluded	97	109	110	120	141	97	89	64	55	60	64	45	1 051	
Funds Raised	2 098 059 389	1 707 584 429	4 486 267 223	1 215 465 341	1 973 566 501	5 796 394 009	863 487 460	874 328 860	526 327 636	618 923 080	406 763 417	518 758 069	21 085 925 414	
2019														
Number of Token Sales Concluded	24	19	21	9	7	12	9	4	9	5	9	3	131	
Funds Raised	290 671 532	111 498 733	193 224 902	73 633 660	91 319 322	158 610 707	57 441 868	11 550 000	373 751 392	43 423 497	46 553 123	2 458 940	1 454 137 676	

Based on data in: <https://www.coinschedule.com/stats>. All the amounts are in USD.

The table provides a global vision of the number of token sales and funds raised between the years of 2016 and 2019 on a monthly basis. Clearly the highest amounts in both categories took place in 2017 and 2018.

Table 17 - Token sales by categories

2016	
Finance	64,80%
Blockchain Infrastructure	14,40%
Trading&Investment	4,70%
2017	
Blockchain Infrastructure	20,60%
Finance	16,90%
Trading&Investment	12,40%
2018	
Blockchain Infrastructure	25,00%
Finance	15,40%
Communications	10,10%
2019	
Trading&Investment	46,50%
Payments	8,80%
Blockchain Infrastructure	7,80%

Based on data in: <https://www.coinschedule.com/stats>. The table provides a yearly based view on the categories which represent more token sales. The values include ICO, STO and IEO, the last two acronyms being new forms of ICOs.

Figure 9 - Amounts raised per country

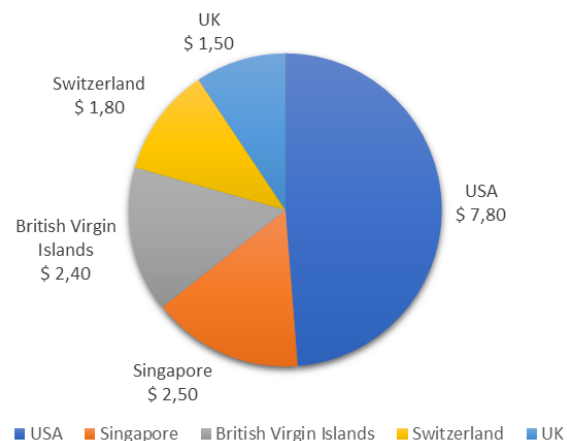
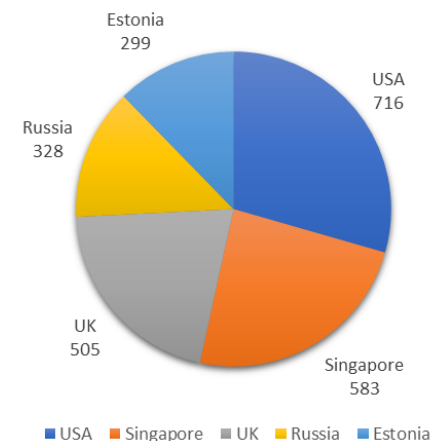


Figure 8 - Countries with the largest number of ICOs



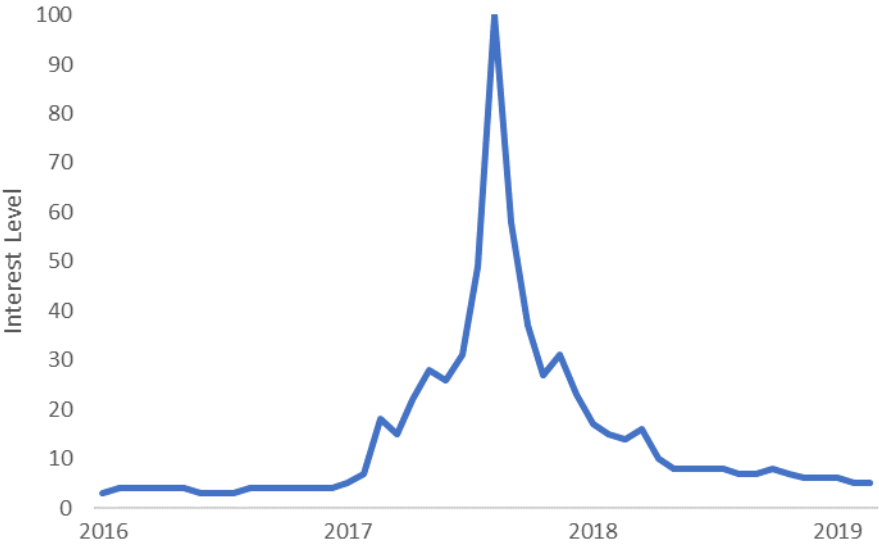
The categories into which the ICOs fit have been changing since 2016. Nevertheless, the investment in blockchain infrastructure has been constant over time and is in the top three investments. In 2016 it represented 14.4% of the ICO investments, in 2017 it represented 20.6%, in 2018 it represented 25% and in 2019 the total percentage investment in this category was 7.8%. The investment in financial projects is also constant over time in the ICOs categories representing 64.8% of the investment in 2016, 16.9% in 2017 and 15.4% in 2018. Trading and investment platforms were in the top 3 investments in 2016 representing a percentage of 4.7%, in 2017 representing 12.4% and in 2019 and 46.5% of the total investment. Two new categories appeared in the top three investments in 2018 and 2019. In 2018 ICOs in the communications category appeared with a total investment representing 10.1% of the total investment and the category payments represented 8.8% of the total investment in 2019 (Coinschedule, 2020). Furthermore, according to ICOBench (2020), which has a large database composed of 5690 ICO, the main ICO industries are: (i) platforms (3129 ICOs, USD 12.7B); (ii) cryptocurrency (2326 ICOs, USD 14.9B); (iii) business services (1271 ICOs, USD 4.3B); (iv) investment (996 ICOs, USD 3.4B), and; (v) smart contracts (840 ICOs, USD 2.1B). Geographically speaking, the counties with the largest number of ICOs are the following: (i) USA (716); (ii) Singapore (583); (iii) UK (505); (iv) Russia (328); (v) Estonia (299). In terms of the largest amount of funds raised in ICOs the top 5 countries are the following: (i) USA (\$7.3B); (ii) Singapore (2.5B); (iii) British virgin islands (2.4B); (iv) Switzerland (1.8B); (v) UK (1.5B) (ICOBench, 2020). A summary can be found in table 16 and figures 8 and 9.

The ICOs market represents significant amounts of investment despite the fact that in 2017 45% of them have failed (Risley et al. 2017, cited OECD 2019, p.49). Furthermore, prior to trading in 2018, 81% of the ICOs were considered as scams and only 8% moved to trade from which only 3.8% were successful (Dowlat and Hodapp 2018, cited OECD 2019 p.35). The 5 ICOs which raised the largest amounts of funding represent a total of USD 7.8 billion. These ICOs are the following: (i) EOS (USD 4.1B): is a software based on blockchain technology creating a technology that has the potential to scale to millions of transactions per second, eliminates user fees and allows for quick and easy deployment of decentralized applications; (ii) Telegram Open Network (USD 1.7B): decentralized cryptocurrency which intends to be accessible to everyone (the founders state that bitcoin has established itself as the digital gold) integrating also a messenger service based on Telegram's blockchain; (iii) BITFINEX (USD 1B): is a cryptocurrency exchange allowing the buying and selling of several of these currencies; (iv) TaTaTu (USD 575M): social platform with a reward system based on the attribution of tokens to be used in the platform's market; (v) Dragon (USD 320M): is a

decentralized cryptocurrency to be used in casinos which use the company’s blockchain facilities. Based on the information provided by ICOBench (2020), the authors have found that the team composition of the most successful projects are quite similar. The founding teams are considered commonly large as EOS project has 4 elements, Telegram has 5 elements, BITFINEX has 6 elements, TaTaTu has 12 elements and Dragon has 17 elements. These teams are quite diversified as ICO projects use global talent as its source. The founding members are from different regions of the world. The teams have elements with managerial and technological experiences and sometimes both combined. There is a predominance of members with university degrees, mainly bachelor and master degrees. The ratings attributed by external parties to the project are considered high as the lowest rating of 3.2 was attributed to the Dragon project and the highest rating of 4.1 was attributed to EOS project. The team ratings are considered very high (except for the Dragon project which was unavailable) as the lowest rating was 3.6 attributed to TaTaTu and the highest of 4.8 to BITFINEX.

The huge attention given to ICOs is also verified by a Google trends analysis. The ICO topic had a peak in popularity in the years of 2017-2018 and the level of interest reached 100 points between those years as per figure 10 (Google, 2020). The high level of interest verified is also in line with the amounts of funds raised as explored before.

Figure 10 - ICO’s level of interest according to Google Trends



One of the reasons that explain the increasing amount of funds raised in ICOs during the years of 2017-2018 is the increase of value of cryptocurrencies during those years (Fisch, 2019; OECD, 2019) because shocks in cryptocurrencies have impacts on ICO volumes (Masiak et al.,

2018). Not only the interest in these kinds of topics raises awareness of a wider public but also a constant increase of value of cryptocurrencies that are used to finance ICOs contributes to a larger amount of funds the new ventures can obtain. The authors have collected data on the funds raised by ICOs from Coinschedule (2020) and data on Bitcoin and Altcoins' market capitalization (CoinDance, 2019) (previously used in research (Sovbetov, 2018)) and performed a simple linear regression between both. Therefore, a correlation was found with an R-squared of 0.2 with data between the years of 2016-2019 as per figure 11. The movements can be easily observed in the line chart in figure 12. Altcoins have been introduced recently as feasible alternatives to Bitcoin and their introduction has a negative effect on Bitcoin's returns (Nguyen, Nguyen, Nguyen, & Nguyen, 2019). The correlation between ICOs funds raised and cryptocurrencies market cap is even larger when only Altcoins are considered.

Figure 11 - Correlation between cryptocurrencies' market cap and ICOs' funds raised

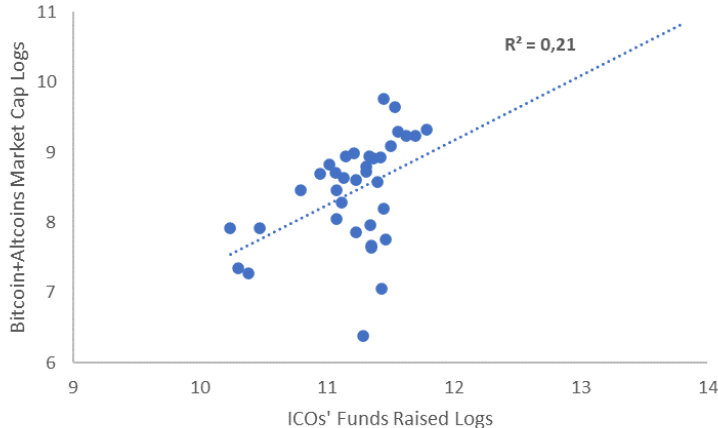
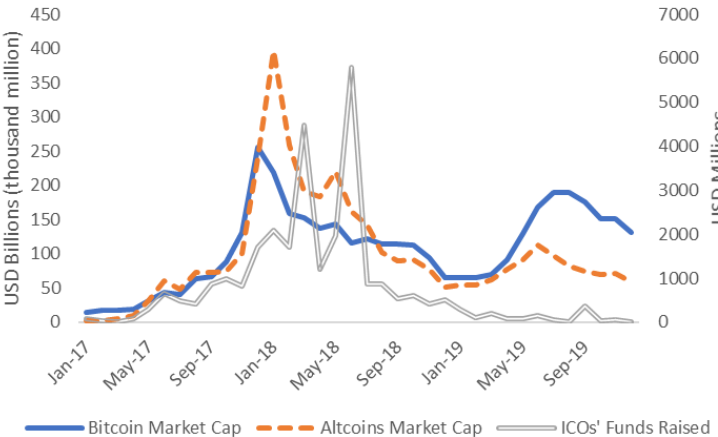


Figure 12 - Cryptocurrencies market cap (left axis) and ICOs' funds raised (right axis)



4.3.3. Advantages and disadvantages of ICOs

The ICOs are a new and innovative way of funding projects which have several advantages from which investors can take advantage. According to Brochado (2018b) the advantages can be distinguished between entrepreneurs and investors. The main advantages to the entrepreneurs begin with the fact that many projects are open source (e.g. Wikipedia) and that the ICO is a way of rewarding the promoters of these projects. Through the ICOs the entrepreneurs can have access to a large number of investors globally and this constitutes a form of financial investments democratization. The promoters' network is crucial for a successful campaign and the appreciation of a token's value can increase the investment on it due to the awareness created which also leads to a wide brand exposure. The utility tokens work as a sign of demand for the product offered and can help entrepreneurs take decisions. For the investors, the ICOs offer the possibility of a wider portfolio diversification not only due to being a different type of investment but also due to a large spectrum of projects in several industries (Adhami & Guegan, 2019). This global reach of ICOs is also important for investors who can invest worldwide. Besides, there is a democratization of investments also for investors once there are much lower costs associated with ICOs investment and also a lower entrance amount. The investors can enter in the project in its very initial phase being the tokens bought as a liquid asset exchanged in several platforms. Although not guaranteed, the existence of a secondary market for tokens (listed on crypto-exchanges) is desirable and highly recommended to the promoters of the ICOs once it gives the possibility to the investors to trade their tokens (Boreiko, Ferrarini, & Giudici, 2019) and also provides a view of the projects' success once the token's price is in principle determined freely (OECD, 2019). Crypto exchanges are gaining huge importance which are seen as complementary to the ones in capital markets (Boreiko et al., 2019). There are also some disadvantages in the use of ICOs for entrepreneurs and investors. The entrepreneurs can face an opportunity cost due to selling the tokens in an early phase when the tokens are still undervalued and also face serious difficulties achieving the financing needed. This difficulty is particularly present in hard cap projects once this imposition means that an amount which should be raised is previously established and translated into a cap in the number of tokens that will be raised. The projects without a hard cap may suffer from the erosion of the value of the token since new tokens are constantly issued and force depreciation of previous ones (OECD, 2019). Investors who finance a project in such an early stage admit a high risk once they are investing in project that is still intangible and that may have little information on them which leads to a deficient project's evaluation. As a high percentage of ICOs are confirmed as scams, investors may finance fraudulent projects. Cybersecurity is also an issue

due to possible breaches in personal accounts. Furthermore, although a secondary market for ICOs should exist it does not imply low token volatility. A disadvantage to both entrepreneurs and investors is a possible tough fiscal policy on money obtained through an ICO. On the other side, a risk posed to regulators is fiscal evasion or money laundering through these investments since they are mostly anonymized and thus criminals can take advantage of technology to pursue criminal activities (Foley, Karlsen, & Putniņš, 2018). Nevertheless, evidence based on ICO statements issued by regulators shows that they do not seem to focus on utilization by criminals of these instruments, which do not constitute high risk, but mostly with fraud (Dostov, Shust, Leonova, & Krivoruchko, 2019). In general terms, the risks associated with fintechs may also be applied to the use of ICOs and therefore divided in risks for the consumers, companies and financial stability (KPMG, 2019). Consequently, the main risks for consumers are associated with the lack of consumer understanding and deficient selling of products and services. Concerns are also raised in terms of data privacy, security and protection as well financial exclusion of populations due to less access to technology (Meena et al., 2017; Chen Y ., 2018). However, the use of digital financial services promotes inclusion and entrepreneurship even for populations living in less developed countries with less access to technology (Larios-Hernández, 2017). Companies using these innovative solutions (i.e. fintech or ICOs) will also need to assess their business model viability such as conducting a strong Anti-Money Laundering (AML) policy. They will also need to be able to handle high amounts of data. If ICOs become widely used, they may also pose challenges to the entire financial stability such as concentration, wide use of crypto assets, the use of alternative challenges of financial intermediation and herd-like behavior (OECD, 2019).

4.3.4. ICOs' Investment Process and Ecosystem

The process of investing in an ICO starts by identifying the ongoing opportunities and also by collecting information on more interesting projects. Then, the investor should select an exchange and open an account to which fiat currency should be transferred and used to acquire virtual currencies. At that point, the investor should select a wallet. The process's last phase is to check the ICO's Agreement (i.e. Whitepaper), download the recommended wallet and buy tokens transferring the virtual currency previously purchased to the ICO address. The tokens should be kept or sold in an Exchange (Kranz et al., 2019). The main aspects of the project are described on the so-called Whitepaper which has not only the detailed aspects of the project but also its expected returns from dividends or participation on the company's capital. Most ICOs are capped and happen in Ethereum blockchain (Howell et al., 2018).

The ICOs' ecosystem is composed of several players being individuals or institutions willing to invest or be financed (Spinedi et al., 2019). Among others, the players are digital exchanges, trading platforms, digital wallet providers, financial and technological advisors and traditional players if ICOs are used in traditional financial market schemes, for instance, bought by hedge funds. The networks are of extreme importance in ICOs hand in hand as marketing and information spread about the project. Information might be shared in social media or specialized websites. The network importance is proved by the "airdrop" technique in which promoters deliver free tokens to active wallets in order to create awareness of the projects and attract more investment (OECD, 2019). Token sales are usually characterized by four main aspects: (i) cap on the amount of money to raise: uncapped ICOs cause issues with price volatility; (ii) time limit for the token sale: although currently ICOs receive most investments within the first moments of the sale the process closes as soon as the time established expires or the cap limit is reached; (iii) transparency of the total number of tokens in circulation and in the sale: crucial for buyers in order to determine the tokens' value during the token sale; (iv) clear token value: token value can be explicitly stated or easily derived from the cap limit and number of tokens available (Massey, Dalal, & Dakshinamoorthy, 2017). Currently, besides the ICO model there are also two additional models, namely, Initial Exchange Offering (IEO) and Security Token Offering (STO). IEOs are popular since 2019 and contrary to the ICOs they happen in a specific crypto exchange and are conducted by a determined platform which charges fees and a percentage of tokens to the new venture. STOs are security tokens issued publicly traded and with some degree of regulation and investor protection in some jurisdictions. STOs, contrary to ICOs, offer some rights to the buyers and are backed by companies' assets (Davis, et al., 2019).

4.3.5. Lifecycle of an ICO

According to Kranz et al., (2019) the token sales, commonly referred here as ICO, have three main stages which can be considered the project's lifecycle and have specific characteristics and activities. These phases are: 1) pre-token sale; 2) token sale; 3) post-token sale.

In the first and longer stage of the process, named by the authors the "pre-token sale", the promoters should decide on the type of tokens to be sold among the several possibilities (donation, utility, currency or security tokens) according to the project's characteristics and investors' expectations. Thereafter, the promoters should decide on whether to apply caps and their typology, in other words, the maximum limit of tokens issued and their value. The type of caps are: (i) no cap: where there are no limits for the issue of new tokens and capital raised

which has negative impacts on the value of tokens (OECD, 2019); (ii) soft-cap: defines a minimum amount of tokens to be sold and the investment will be returned if this limit is not achieved; (iii) hard-cap: an upper limit of tokens to sell is defined and once reached no more investment is accepted; (iv) collect and return: a hard-cap is defined and if surpassed the tokens will be distributed respecting the ratio of the hard cap to the total funds received; (v) dynamic ceiling: several hard-cap limits are defined and kept secret. Therefore, the token sales will be done in several rounds avoiding the dominance of a small group of big investors. The promoters should also define the tokens' pricing model which can be fixed or floating and define the token sales' schedule which can include a pre-sale where tokens are sold at a discount and this is used to attract visibility and investment. After the designs are defined a smart contract must be developed. The final task of this stage is to publish the Whitepaper with all the relevant information on the project which should be as detailed as possible to overcome the lack of regulation (Howell et al., 2018).

The second phase is named the "token sales" and starts with the activation of the smart contract and the actual sale of tokens which usually lasts for 41 days (Kostovetsky and Benedetti 2018, cited Kranz et al., 2019, p.749). During this phase a due diligence on the investors might be requested in order to avoid money laundering activities. The actual token sales happen when the investors' funds are transferred to the promoters' wallets via the smart contract.

The third and last phase according to Kranz et al., (2019) is the "post-token sales" in which the tokens are distributed to the investors' wallets via the smart contract. The issuers should then develop the product or service financed and keep the relation with investors healthy by keeping them informed and engaged in order to increase awareness and recognition on the project since it most likely is listed in a crypto exchange subject to price volatility as traditional stocks.

4.3.6. Human Capital Theory (HCT) and the ICO projects

The Human Capital Theory (HCT) is focused on the individual and states that the individuals and the society strongly and consistently benefit from the investment in people. This theory also differentiates the consumptive expenditures from the human capital expenditures since the first provides fewer and immediate benefits while the second is considered an investment (Sweetland, 1996). This theory has its first roots in the eighteenth century with economists such as Adam Smith, John Stuart Mill and Alfred Marshall who focused on the fact that labor inputs must not only be considered quantitative but also qualitative, since workers acquire abilities which increase productivity (Sweetland, 1996). Further studies have been

developed to focus particularly on education and experience proving that better educated people are also better paid (Mincer, 1958; Schultz, 1961) and more productive (Fabricant, 1959). Moreover, studies have been developed on the subject mainly due to the interest raised in the USA aiming to explain a large part of economic growth unaccounted by conventional economic means (Becker, 1994). Several studies have focused on the human capital characteristics without mentioning their direct link to HCT. Nevertheless, more recent research has evolved to include further human capital characteristics and link them to the success obtained by ventures and companies with a direct link to the theory (Bruderl et al., 1992). Studies focused on the HCT have argued that human capital characteristics influence organizational success since greater human capital increases the productivity of the founder, who is able to better use his or her inputs, which then increases company's profits (Bates, 1985). Indeed, human capital is positively related to better planning and strategy which influences success (Unger et al., 2011). There are also mechanisms which operate prior to the founding of the enterprise since better human capital equipped individuals obtain higher previous income which allows them to set larger businesses with higher financial stability (Bruderl et al., 1992). Human capital is found to be also important to overcome eventual lack of financial capital (Brush et al., 2001). Furthermore, human capital is seen as important to endow founders with the capabilities of foreseeing and exploring market opportunities which contributes to the success of a project (Unger et al., 2011). Human capital signals are important to reduce information asymmetries between investors and promoters which should lead to a better perception of the venture (Piva & Rossi-Lamastra, 2018). The human capital characteristics are particularly decisive in younger businesses (Unger et al., 2011).

Overall, the human capital characteristics are considered to be linked with the success of a company and the individual success. Characteristics such as years of schooling and work experience are seen as important success factors (Bruderl et al., 1992). Further characteristics such as business education, entrepreneurial experience and networks (LinkedIn connections) are also considered to be important human capital characteristics (Piva & Rossi-Lamastra, 2018). Nevertheless, studies based on human capital theory frequently assume that experience means knowledge and skills (Frese & Rauch, 2001). This is not always the case as more experience may not mean that an individual is a better professional. This differentiation is sharper when analyzing the tasks performed by excellent and average professionals (Sonnetag, 1995).

4.3.7. ICOs' corporate governance and human capital

ICOs have been compared with crowdfunding, Venture Capital (VC) and Initial Public Offerings (IPOs) (Block et al., 2020), which are traditional ways of project financing, but there are substantial differences between these concepts (Biasi & Chakravorti, 2019) and ICOs have also been challenging them (Schückes & Gutmann, 2020). Besides some common characteristics between the concepts they are mostly distinct and, consequently, so is the relationship between entrepreneurs and investors (OECD, 2019). The main difference in the entrepreneur-investor relation among the different financing forms is the complete inexistence of intermediaries in pure ICOs (OECD, 2019). The same does not happen in crowdfunding (Delivorias, 2017), VC (Gompers & Lerner, 2001) or IPOs (Howell et al., 2018). The regulation is very tight in IPO processes where a rigid due diligence is made on the company and on the investors, which creates barriers to participate in the process (Khurshed, 2019), while ICOs are mainly unregulated (Zhang et al., 2020). Investors will ultimately interact with each other and indirectly with the entrepreneurial team when the token is traded in the secondary market available in ICOs but not in crowdfunding (Brochado, 2018b) or VC (OECD, 2019).

As stated before, ICOs have two main measures of fundraising goals: (i) soft-cap, and; (ii) hard-cap. Therefore, the total amount raised by an ICO is considered to be the best measure of its success (An et al., 2019; Fisch, 2019). Although founders' collective human capital affects the amounts raised by an ICO (An et al., 2019) most of them are not subject to traditional corporate governance rules since entrepreneurs and promoters have total control over the funds raised which increase the need to a strong corporate governance (Goergen & Rondi, 2019; Momtaz, 2020). Hence, most ICOs do not have a formal or informal type of board which works as an oversight mechanism of management. Besides, regular reporting is not a frequent practice which poses a further risk to investors (OECD, 2019). Therefore, if a traditional company wishes to pursue an ICO, it should also have several impacts on its current corporate governance. These facts increase the importance of a strong entrepreneurial team in order to achieve the success expected (Spinedi et al., 2019). VC companies state that the most important feature of a new project is the experience of the team. Skills are considered the most frequent selection criteria for VC companies. Besides, projects with larger top management teams, presidents with wider roles and that currently preside other projects, obtained much higher VC funding. The fact that the president executes several roles proves that he has more expertise but, on the contrary, if the president has participated previously in entrepreneurial projects with less success that negatively affects the funding of the current one (Baum & Silverman, 2004).

The human capital characteristics of the founding team can be considered the following: (i) professional experience (Giudici & Adhami, 2019); (ii) experience in blockchain projects (Brochado, 2018b); (iii) entrepreneurial profile (Howell et al., 2018); (iv) number of founders (Jin, et al., 2017); (v) existence of social media accounts (Albrecht et al., 2019; Yeh & Chen, 2020). Investors prefer teams with founders who have a past record of success in blockchain projects (Brochado, 2018b). According to a study performed using a database of 935 ICOs between 2014-2017, the probability of success is positively related with the number of members in the project team and the number of members of the advisory committee as well as to the token retention rate by the ICO promoters (Giudici & Adhami, 2019). The importance given to the size of the teams is particularly important for new ventures, which face complex tasks and uncertain environments, since it is viewed as a way of exchanging information (Jin, et al., 2017). The diversity associated with team size is considered important to improve the decision quality and organizational performance (Boone & Hendriks, 2009). New ventures have better chances of survival if their teams are considered to have a high degree of diversity (Zimmerman & Zeitz, 2002). Larger teams also have the chance to combine skills leading to better performance, but larger team size could also mean inefficiency due to the existence of too much expertise and management styles (Lechler, 2001). Cohesion of the founding team is considered important in order to maintain the stability of the team since instability may lead to members' exit. Indeed, larger founding teams are negatively correlated with later members' entry and positively associated with members' exit (Ucbasaran et al., 2003). Therefore, we have found arguments in favor of larger teams with warnings concerning their failure leading us to conclude that both small and large teams have their own advantages. Other human capital variables are not that relevant for ICOs' success such as education or teams with more entrepreneurial experience (Giudici & Adhami, 2019). The same logic is already applied to crowdfunding once one of the sources of credibility is the entrepreneurs' human capital which is characterized by education and experience. Thus, both education and experience are positively correlated with a good crowdfunding performance but only the second is statistically relevant (Allison et al., 2017). On the opposite, in entrepreneurship, the entrepreneurs' education and experience is important for external stakeholders. It is also perceived that entrepreneurs with high academic degrees tend to pursue innovative strategies but entrepreneurs with experience in finance or sales do not (Burton, Sørensen, & Beckman, 2002). Finally, the disclosure of teams' information is linked to higher funds raised. In terms of time needed to successfully complete an ICO, there is also a positive relation between less time needed to achieve ICO's goals and the existence of a

founding team with business, blockchain and technology experience, corporate board background and large social networks (An et al., 2019).

4.4. Methodology

4.4.1. Database and variables

The data used in this research is secondary and collected from ICOBench a website which comprises a large database on ICOs (ICOBench, 2020). The information provided by the website is mostly related to the projects and concerns among other data: the project's year, amounts raised, type of cap, existence of pre-sales or bonus schemes. It also compiles information on the team, such as their composition and functions. The data was collected via a premium subscription which gave access to an API. As the main objective of the research is to study the ICO's teams, the complementary information was collected from the public LinkedIn profiles of the team members. This data treatment resulted in the collection of 556 ICO projects, on the banking/financial area, from which 216 were discarded due to lack of crucial information and leaving the database with 340 projects. The projects' teams were composed of 5025 profiles from which we were able to keep 3158 once 1867 were discarded due to lack of crucial information. We have selected ICO projects in the banking/financial area due to the impact this industry faces and the challenges put to their traditional business model with the appearance of fintech companies. Financial institutions' role as third parties is being challenged by new models such as ICOs (Campino et al., 2020). Furthermore, the industry in which the project is developed influences its outcome (Hartmann et al., 2019) since some industries have tendentially less successful projects (Davies & Giovannetti, 2018). We would like to avoid the risk of a biased result given the specificities of our research focused on the human capital. There are some studies using a mixed industry database (An et al., 2019) and thus, we would like to differentiate from that approach in this case.

There is no consensus concerning the most correct measure for ICOs' success and thus we have developed three of them and tested them in different models (Jong et al., 2018). The first dependent variable is a binary variable of achievement of the minimum level of capital defined by the project's promoters. The second dependent variable is the natural logarithm of the percentage above the minimum capital achieved, in other words, the successful projects are the ones which achieve at least the minimum capital and the most successful will be the ones which surpass that threshold by a higher percentage. The last dependent variable is the natural logarithm of the total capital achieved. We have defined several independent variables

concerning the team: (i) person location; (ii) number of projects per person; (iii) number of LinkedIn connections; (iv) previous managerial experience; (v) previous technology experience; (vi) education; (vii) business degree; (viii) technology degree; (ix) team rating; (x) vision rating; (xi) number of team elements. The control variables included and related with the project itself are: (i) soft cap limit existence; (ii) hard cap limit existence; (iii) token price; (iv) currencies accepted in the ICO; (v) the ICO is based on an Ethereum platform; (vi) bonus scheme existence; (vii) ICO rating according to ICOBench; (viii) ICO year. We have summarized the variables in table 18.

Table 18 - Variables included in the econometric models

Variable	Description	Coding	Source
<i>Dependent Variables</i>			
Log of capital raised	Logarithm of the total capital raised in USD	Decimal	ICO Bench
Log of capital raised over soft-cap	Logarithm of the total capital raised divided by the soft-cap threshold in USD	Decimal	ICO Bench
Soft-cap achieved	Binary variable of soft-cap threshold achievement	Binary	ICO Bench
<i>Independent Variables</i>			
Bonus Scheme	Binary variable of bonus scheme existence	Binary	ICO Bench
Business Degree	Binary variable of profile's education	Binary	LinkedIn
Currencies Accepted	Number of currencies accepted by the project	Integer	ICO Bench
Education	Level of education achieved	Integer	LinkedIn
Ethereum Platform	Binary variable identifying if the project is based on Ethereum	Binary	ICO Bench
Fundraising Goal	Binary variable identifying the existence of a fundraising goal such as had- or soft-cap	Binary	ICO Bench
ICO Year	Year of the ICO campaign	Integer	ICO Bench
LinkedIn Connections	Connections on LinkedIn	Integer	LinkedIn
Managerial Experience	Binary variable of profile's experience	Binary	LinkedIn
Number of projects per person	Number of projects in which each person participated	Integer	ICO Bench
Number of team elements	Size of project's team	Integer	ICO Bench
Location	Location of the team member. Sub-divided into regions, e.g. America and Europe.	Binary	LinkedIn
ICO Rating	Rating attributed by ICO Bench	Decimal	ICO Bench
Team Rating	Rating attributed by ICO Bench	Decimal	ICO Bench
Technology degree	Binary variable of profile's education	Binary	LinkedIn
Technology Experience	Binary variable of profile's experience	Binary	LinkedIn
Token Price	Price of the token when launched	Decimal	ICO Bench
Vision Rating	Rating attributed by ICO Bench	Decimal	ICO Bench

The variables described in this table were included in the econometric models and were collected from the ICOBench database and from LinkedIn.

4.4.2. Robust regression and multiple logistic regression

In order to regress our model, test the assumptions and perform several graphs we used the software STATA 14. We started by performing a matrix scatter plot for all the variables in our model and have confirmed that sometimes the data appeared to have a normal distribution but most of the times that was not the case. The non-normality of the residuals is confirmed when a skewness and kurtosis test is performed which confirmed the null hypothesis. Furthermore, we have performed a Shapiro-Wilk test which confirmed that the residuals were not normally distributed (STATA, 2020a). The data also suffered from heteroskedasticity once the residuals exhibit non-constant variation confirmed by the Breusch-Pagan test and reinforced by the White's general test for heteroskedasticity which overcomes some limitation of the first test (Williams, 2020). We have also checked for multicollinearity performing a Variance Inflation

Factor (VIF) test which did not confirm collinearity. Therefore, regressing the model using the OLS method for the logarithmic variables could lead to biased estimations and we adopted the robust regression using the command “*rreg*” in STATA (STATA, 2020b) which is a strong substitute to the standard OLS method since it offers protection against distortion of anomalous data (Li, 1985). Concerning the binary variable measuring the achievement of the soft-cap threshold a different model was used, namely, the multiple logistic regression model using the command “*logit*” in STATA (STATA, 2020c).

4.4.3. Model and hypothesis

Building on the human capital theory, the characteristics of the entrepreneurs influence the outcome of their projects. Indeed, studies suggest that education improves economic capabilities of people (Schultz, 1961) and positively impacts the outcome of a project side by side with other variables such as professional experience and geographic location (Bruderl et al., 1992). Current literature has also focused on the human capital characteristics in crowdfunding (Piva & Rossi-Lamastra, 2018) and entrepreneurship suggesting that human capital variables are important for a successful project (Unger et al., 2011). Literature dedicated to the study of ICOs has also dedicated attention to the founders’ characteristics and their impact on the outcome of a project (An et al., 2019) and (Giudici & Adhami, 2019). Hence, we have built our research on the human capital theory and the characteristics identified as having an impact on the success of a project. Therefore, our research aims to test the hypothesis that team’s characteristics influence the success of ICOs projects (Fisch, 2019). We have tested this hypothesis following a quantitative approach. We have developed three econometric models with three different dependent variables following the approach by Jong et al. (2018).

4.5. Results

4.5.1. Profiles descriptive statistics

The focus of our research is the ICO promoters’ profiles and thus we have developed several descriptive statistics on the profile’s characteristics. Regarding networks which are crucial in this type of projects, we verified that the profiles analyzed have large networks judging by the LinkedIn connections. In our sample, 71% of the profiles have 500 or more connections on LinkedIn and 97% have 1 social network. The most used social network is LinkedIn (source of several information on the profiles) followed by Facebook and Twitter.

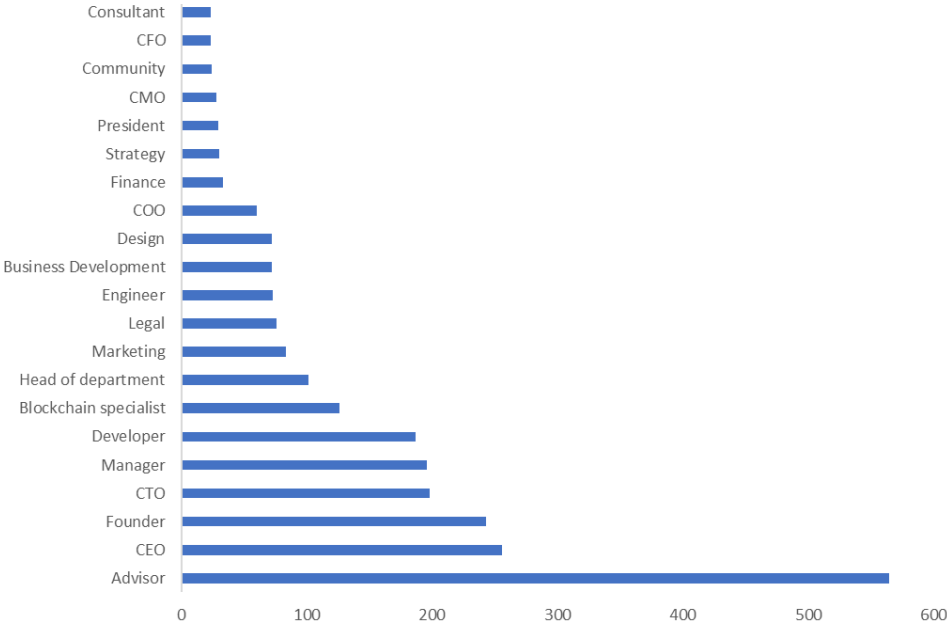
The large majority of the profiles are located in Europe (49%) followed by Asia-Pacific (25%), North America (17%) and other regions (9%). Within Europe the predominant countries

are the UK (18%), Russia (15%), France (8%), Switzerland (7%), Germany (5%) and Ukraine (5%). In North America the United States are by far the country with more promoters with 88% of the sample and Canada representing 12%. In the Asia-Pacific region the predominant countries are India (21%), Singapore (18%), Australia (10%), Korea (8%) and China (5%). The remaining regions represented in the sample are the Middle East (38%), Africa (29%), South America (27%) and Central America (6%).

The profiles on our sample are highly educated since 98% have an academic degree. From the entire sample 52% have a bachelor degree, 40% have a Master degree, 6% have a PhD and therefore only 2% have no academic degree. The percentage of profiles with a business or technology degree is roughly the same with 35% and profiles having both degrees represent 8% of the sample.

Regarding previous professional experience we concluded that 69% of the profiles had a managerial experience and 25% had a technology experience. Profiles combining both experiences represent 11% of the sample. In terms of project participation, 96% of the profiles participated in 1 project, 3% in 2 projects and 1% in more than 2 projects. The teams are composed by 18% of advisors. Within the ICO teams (excluding advisors) 51% have managerial functions, 32% have a technological function and 11% have both functions. The main functions' titles are in line with traditional companies but these projects include innovative positions, for instance, in the board. The main functions titles are represented in figure 13.

Figure 13 - Main functions of ICOs' teams



4.5.2. Variables descriptive statistics

We have developed a correspondence table which allows a deeper understanding of the distribution of variables conditional to the dependent variable selected.

Table 19 - Cross-table between dependent and independent variables

		Soft cap achieved				Log of capital raised/softCap				Log of capital raised			
		No	%	Yes	%	Below median	%	Equal/Above median	%	Below median	%	Equal/Above median	%
Person Location	North America	283	9%	265	8%	262	8%	286	9%	295	9%	253	8%
	Europe	747	24%	809	26%	702	22%	854	27%	754	24%	802	25%
	Asia	359	11%	420	13%	328	10%	451	14%	352	11%	427	14%
	Africa	44	1%	33	1%	43	1%	34	1%	50	2%	27	1%
	Central America	14	0%	4	0%	13	0%	5	0%	13	0%	5	0%
	South America	52	2%	22	1%	52	2%	22	1%	51	2%	23	1%
	Middle East	56	2%	50	2%	53	2%	53	2%	56	2%	50	2%
Number of projects per person	1 to 3	1509	48%	1564	50%	1408	45%	1665	53%	1520	48%	1553	49%
	4 to 6	19	1%	25	1%	18	1%	26	1%	22	1%	22	1%
	9 to 12	27	1%	14	0%	27	1%	14	0%	29	1%	12	0%
LinkedIn Connections	0 to 100	149	5%	97	3%	137	4%	109	3%	154	5%	92	3%
	101 to 200	115	4%	74	2%	109	3%	80	3%	111	4%	78	2%
	201 to 300	95	3%	90	3%	92	3%	93	3%	101	3%	84	3%
	301 to 400	69	2%	58	2%	62	2%	65	2%	64	2%	63	2%
	401 to 500+	1127	36%	1284	41%	1053	33%	1358	43%	1141	36%	1270	40%
Managerial Experience	No	506	16%	479	15%	469	15%	516	16%	511	16%	474	15%
	Yes	1049	33%	1124	36%	984	31%	1189	38%	1060	34%	1113	35%
Technology Experience	No	1143	36%	1212	38%	1062	34%	1293	41%	1147	36%	1208	38%
	Yes	412	13%	391	12%	391	12%	412	13%	424	13%	379	12%
Education	<Bachelor	22	1%	39	1%	22	1%	39	1%	25	1%	36	1%
	Bachelor	851	27%	811	26%	794	25%	868	27%	863	27%	799	25%
	Master	590	19%	660	21%	555	18%	695	22%	593	19%	657	21%
	PhD	92	3%	93	3%	82	3%	103	3%	90	3%	95	3%
Business Degree	No	902	29%	870	28%	834	26%	938	30%	904	29%	868	27%
	Yes	653	21%	733	23%	619	20%	767	24%	667	21%	719	23%
Technology degree	No	981	31%	1062	34%	916	29%	1127	36%	990	31%	1053	33%
	Yes	574	18%	541	17%	537	17%	578	18%	581	18%	534	17%
Team Rating	0 to 2,9	672	21%	392	12%	654	21%	410	13%	657	21%	407	13%
	3 to 3,9	262	8%	286	9%	203	6%	345	11%	243	8%	305	10%
	4 to 5	621	20%	925	29%	596	19%	950	30%	671	21%	875	28%
Vision Rating	0 to 2,9	592	19%	387	12%	574	18%	405	13%	577	18%	402	13%
	3 to 3,9	400	13%	538	17%	335	11%	603	19%	419	13%	519	16%
	4 to 5	563	18%	678	21%	544	17%	697	22%	575	18%	666	21%
Number of team elements	0 to 10	363	11%	193	6%	342	11%	214	7%	347	11%	209	7%
	11 to 20	750	24%	670	21%	683	22%	737	23%	779	25%	641	20%
	21 to 30	281	9%	454	14%	244	8%	491	16%	295	9%	440	14%
	31 to 40	161	5%	219	7%	184	6%	196	6%	150	5%	230	7%
	41 to 50	0	0%	67	2%	0	0%	67	2%	0	0%	67	2%
Soft Cap Limit	No	416	13%	456	14%	416	13%	456	14%	462	15%	410	13%
	Yes	1139	36%	1147	36%	1037	33%	1249	40%	1109	35%	1177	37%
Hard Cap Limit	No	189	6%	77	2%	187	6%	79	3%	188	6%	78	2%
	Yes	1366	43%	1526	48%	1266	40%	1626	51%	1383	44%	1509	48%
Token Price	< Median	910	29%	973	31%	803	25%	1080	34%	945	30%	938	30%
	>= Median	645	20%	630	20%	650	21%	625	20%	626	20%	649	21%
Currencies Accepted	1	661	21%	751	24%	641	20%	771	24%	724	23%	688	22%
	2	203	6%	252	8%	171	5%	284	9%	194	6%	261	8%
	3	269	9%	238	8%	245	8%	262	8%	262	8%	245	8%
	4	229	7%	184	6%	231	7%	182	6%	228	7%	185	6%
	5	87	3%	62	2%	87	3%	62	2%	99	3%	50	2%
	6	44	1%	73	2%	27	1%	90	3%	15	0%	102	3%
	7	20	1%	24	1%	9	0%	35	1%	20	1%	24	1%
	8+	42	1%	19	1%	42	1%	19	1%	29	1%	32	1%
Ethereum Platform	No	286	9%	128	4%	255	8%	159	5%	255	8%	159	5%
	Yes	1269	40%	1475	47%	1198	38%	1546	49%	1316	42%	1428	45%
Bonus Scheme	No	774	25%	683	22%	727	23%	730	23%	794	25%	663	21%
	Yes	781	25%	920	29%	726	23%	975	31%	777	25%	924	29%
ICO Rating	0 to 2,9	453	14%	230	7%	439	14%	244	8%	450	14%	233	7%
	3 to 3,9	706	22%	852	27%	647	20%	911	29%	730	23%	828	26%
	4 to 5	396	13%	521	16%	367	12%	550	17%	391	12%	526	17%
ICO Year	2017	105	3%	311	10%	110	3%	306	10%	136	4%	280	9%
	2018	1001	32%	1137	36%	912	29%	1226	39%	1004	32%	1134	36%
	2019	442	14%	155	5%	424	13%	173	5%	424	13%	173	5%
	2020	7	0%	0	0%	7	0%	0	0%	7	0%	0	0%
	Total	1555	49%	1603	51%	1453	46%	1705	54%	1571	50%	1587	50%

The cross-table is divided by the three dependent variables used in the econometric models. Then, the independent variables are distributed according to their categories. Therefore, the table allows a comprehensive view on the distribution of variables into successful and unsuccessful projects. The results are similar regardless of the dependent variable used.

Table 19 identifies all the independent variables used in the econometric model and depicts their distribution given the dependent variable selected. For instance, it depicts the geographic profiles' distribution linking it to a successful or unsuccessful project. Therefore, we conclude that the variable distribution is similar regardless of the dependent variable selected. In terms of geographic location there is a trend of more successful projects promoted by profiles located in Europe and Asia-Pacific. The North American region is associated with similar percentages of success and unsuccess regardless of the measure selected. The remaining regions tend to have more unsuccessful projects except for the Middle East which, as North America, tends to have the same percentages for successful and unsuccessful projects. As the large majority of the profiles participate in 1 up to 3 projects, the most successful ones are within this range and when the project's participation increases, they are less successful. As previously stated, the networks are crucial in this type of projects and thus having a higher number of connections on LinkedIn is also associated with more successful projects. In the correspondence table we confirm that profiles with less connections tend to be associated with less successful projects and the contrary happens with profiles with higher number of connections. In terms of professional experience, we confirm that although the difference is small, there is a higher percentage of successful projects when the profile had previous managerial experience and the contrary happens when the profile has previously technological experience. The variable education, which is divided into several levels, does not have a significant variation in percentage of successful projects when the level of education increases. For instance, the PhD level has always the same percentage of successful and unsuccessful projects and the highest difference in the percentages is using the dependent variable log of capital raised over soft-cap threshold and for bachelor and master's levels where there is a higher percentage of successful projects. Regarding the type of academic degree, we can see that the same situation happens with the professional experience once although small percentage differences, there is a tendency to have successful projects when the profile has a business degree inversely to when the profile has a technology degree. The projects' ratings are attributed by a combination of an automated analysis from the ICOBench's algorithm together with experts' evaluation (ICOBench, 2020). Therefore, they are an important factor to be considered by the investors before deciding to whether to support a project or not. As expected, the variable team rating shows considerable percentage changes between successful and unsuccessful projects depending on the attributed rating. The teams with lower ratings are associated with less successful projects. Together with the team rating, the vision rating also shows the same trend although much more moderated. Across all the dependent variables the tendency to have successful projects linked to larger

teams is verified. The teams with less people tend to be less successful than projects with larger teams.

In table 20 we also present the descriptive statistics for each variable including their mean, standard deviation, minimum and maximum values. For the nominal and ordinal variables, we present the frequencies table in table 21.

As previously mentioned, the data did not suffer from collinearity issues as confirmed by the VIF test performed. As per the correlation and VIFs analysis performed, we confirmed that VIF values are low for every variable and there is no further need to take corrective measures. The values are always below 5 with a mean of 1.67.

Table 20 - Descriptive statistics

	Descriptive Statistics				
	Observations	S.D.	Min.	Max.	Mean
Number of Projects per Person	3158	1.21	1	12	1.27
Number of Team Elements	3158	9.25	1	47	18.93
Token Price	3158	179.90	0	3000	20.07
Currencies Accepted	3158	2.49	1	30	2.56

The descriptive statistics table displays key statistics for the variables, namely, number of observations, standard deviation, minimum and maximum values and the mean.

Table 21 - Frequencies table

		Frequencies Table		
		Frequency	Percentage	Cumulative Percentage
Location	North America	548	17%	17%
	Europe	1556	49%	67%
	Asia	779	25%	91%
	Africa	77	2%	94%
	Central America	18	1%	94%
	South America	74	2%	97%
	Middle East	106	3%	100%
	Total	3158	100%	-
LinkedIn Connections	<=200	435	14%	14%
	201 to 400	312	10%	24%
	>=401	2411	76%	100%
	Total	3158	100%	-
Managerial Experience	No	985	31%	31%
	Yes	2173	69%	100%
	Total	3158	100%	-
Technological Experience	No	2355	75%	75%
	Yes	803	25%	100%
	Total	3158	100%	-
School Degree	<Bachelor	61	2%	2%
	Bachelor	1662	53%	55%
	Master	1250	40%	94%
	PhD	185	6%	100%
	Total	3158	100%	-
Business Degree	No	1772	56%	56%
	Yes	1386	44%	100%
	Total	3158	100%	-
Technological Degree	No	2043	65%	65%
	Yes	1115	35%	100%
	Total	3158	100%	-
Team Rating	0-2,9	1064	34%	34%
	3-3,9	548	17%	51%
	4-5	1546	49%	100%
	Total	3158	100%	-
Vision Rating	0-2,9	979	31%	31%
	3-3,9	938	30%	61%
	4-5	1241	39%	100%
	Total	3158	100%	-
Soft-cap Limit	No	872	28%	28%
	Yes	2286	72%	100%
	Total	3158	100%	-
Hard-cap Limit	No	266	8%	8%
	Yes	2892	92%	100%
	Total	3158	100%	-
Ethereum Platform	No	414	13%	13%
	Yes	2744	87%	100%
	Total	3158	100%	-
Bonus Scheme	No	1457	46%	46%
	Yes	1701	54%	100%
	Total	3158	100%	-
ICO Rating	0-2,9	683	22%	22%
	3-3,9	1558	49%	71%
	4-5	917	29%	100%
	Total	3158	100%	-
ICO Year	2017	416	13%	13%
	2018	2138	68%	81%
	2019	597	19%	100%
	2020	7	0%	100%
	Total	3158	100%	-

The frequencies table displays the variables' codification and the frequency for each one. The percentage that a specific codification represents is also shown as well as the cumulative percentage.

4.5.3. Econometric Model

We have regressed three models with three different dependent variables and which are measures of a project's success, namely, a binary variable asserting the projects' achievement of the soft-cap threshold, a logarithmic variable of the percentage of obtained capital above the soft-cap threshold and the logarithmic variable of the capital raised amount. The methods used were a logistic method for the first model and a robust regression for the remaining two models as described in the Methodology section. For the models regressed with a robust regression, we have previously used the standard OLS method in order to compare the results. We confirm that the results along the models are almost identical.

Adopting three levels of significance of 0.01(***) , 0.05(**) and 0.1(*) there are seven team variables considered statistically significant. As well as the results in the correspondence analysis we confirm that the projects located in Europe and Asia-Pacific tend to be more successful than projects in other locations. The network effect is also confirmed in our analysis once there is a positive coefficient for the variable LinkedIn connections, accepted in all models with the highest significance level, meaning that larger LinkedIn networks have a positive effect on the project's success. The variable team rating is also accepted in all models with the highest significance level and shows a positive coefficient which leads us to the conclusion that the rating attributed to the team has also a positive effect on project's success as a measure of teams' quality, experience and cohesion. The same scenario happens with the variable measuring the teams' size by the number of elements composing a team. As in the correspondence analysis, larger teams are connected with more successful projects. Given the conflicting findings in the literature on the impact of team size in the success of a project, we have decided to perform a further analysis by conducting a new regression of the three models which included the squared variable of team size. This analysis would allow us to find a U-shaped curve relationship (Jin, et al., 2017). Although we have obtained a negative coefficient for the squared variable of team size, this revealed not significant which compromises the validity of this hypothesis. Therefore, a U-shaped relationship concerning the team size was not found. The variable related with the project's vision rating, which we attribute to the team once the vision should come from it, is considered to be statistically significant although with a pronounced negative impact on projects' success. There are two different arguments on this: (i) the better the project's vision, the most successful it should be (Kaplan, Sensoy, & Stromberg, 2009); (ii) highly disruptive visions are difficult to perceive and implement and thus tend to have a negative impact in project's success (Gompers & Lerner, 2001). In the ICO market the second argument is even

more pronounced due to the technological and disruptive projects involved which jeopardizes project's success despite the disruptive vision (Momtaz, 2020a).

Nonetheless, we could not confirm the effects of all the team variables proposed. The variable measuring the number of projects per person is not significant due to the fact that the great majority of the profiles participated only in one project. Although we have found a tendency in the correspondence analysis concerning the variables related with profiles' professional experience, education level and type of academic degree, they all showed not significant in our econometric analysis. Professional experience does not necessarily means expertise (Frese & Rauch, 2001) and our data confirms this as more experienced professionals have equal chances of success (Sonnetag, 1995). Concerning the level of education, we find this variable not significant as the large majority of the profiles have education at university level, namely, bachelor's degree (1662) and master's degree (1250). Only 61 profiles have less than a bachelor's degree. Therefore, we find that the sample is very homogenous regarding this variable and thus we could not differentiate between successful and unsuccessful profiles on this point. Consequently, we also assumed that a specific level of expertise is needed to participate in ICO projects due to the complex concepts behind it. Nevertheless, this expertise is not captured by the type of academic degree (i.e. technology of business degree) but rather by other variables such as the ratings attributed to the project and to the team. The remaining control variables, focused on the project itself and not on the profiles' characteristics, also showed significance across all models except for the variable token price which is not accepted in the second model and the variables soft-cap limit and currencies accepted which are not accepted in the last model.

Table 22 - Logit and robust regressions

	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
	Logit Regression		Logit Regression		Robust Regression		Robust Regression		Robust Regression		Robust Regression	
	Soft-cap achieved		Soft-cap achieved		Log capital raised over soft-cap		Log capital raised over soft-cap		Log capital raised		Log capital raised	
R2	0.06		0.161		0.10		0.19		0.09		0.21	
Adjusted R2	-		-		0.10		0.19		0.09		0.20	
Observations	3 158		3 158		3 158		3 158		3 158		3158	
	Coefficient	Strd. Error	Coefficient	Strd. Error	Coefficient	Strd. Error	Coefficient	Strd. Error	Coefficient	Strd. Error	Coefficient	Strd. Error
<i>Team Variables</i>												
Number of Projects per Person	-0.04	0.03	-0.03	0.03	0.00	0.00	0.00	0.00	-0.08	0.05	-0.07	0.05
Location: North America	0.34	0.16**	0.16	0.17	0.05	0.02***	0.05	0.02**	0.78	0.27***	0.39	0.25
Location: Europe	0.42	0.14***	0.34	0.15**	0.05	0.02***	0.03	0.02*	0.83	0.24***	0.56	0.22**
Location: Asia	0.49	0.15***	0.51	0.16***	0.08	0.02***	0.06	0.02***	1.15	0.26***	1.00	0.23***
LinkedIn Connections	0.03	0.01***	0.03	0.01***	0.00	0.00***	0.00	0.00***	0.05	0.01***	0.04	0.01***
Managerial Experience	0.07	0.09	0.00	0.09	0.01	0.01	0.00	0.01	0.13	0.15	0.00	0.14
Technology Experience	0.05	0.10	-0.03	0.11	0.01	0.01	0.00	0.01	-0.01	0.17	-0.14	0.15
School Degree Rate	0.05	0.06	0.06	0.06	0.01	0.01	0.01	0.01	0.15	0.10	0.14	0.09
Business Degree	0.13	0.08	0.13	0.09	0.01	0.01	0.01	0.01	0.13	0.14	0.06	0.13
Technology Degree	-0.09	0.09	-0.06	0.09	0.00	0.01	0.00	0.01	-0.16	0.15	-0.06	0.14
Team Rating	0.56	0.07***	0.42	0.08***	0.10	0.01***	0.10	0.01***	1.02	0.13***	0.70	0.12***
Vision Rating	-0.30	0.08***	-0.43	0.09***	-0.07	0.01***	-0.09	0.01***	-0.45	0.13***	-0.74	0.13***
Number of Team Elements	0.03	0.00***	0.04	0.00***	0.01	0.00***	0.00	0.00***	0.06	0.01***	0.05	0.01***
<i>Control Variables</i>												
Soft-Cap Limit			-0.28	0.11***			0.08	0.01***			0.24	0.15
Hard-Cap Limit			1.05	0.17***			0.05	0.02***			1.09	0.23***
Token Price			0.00	0.00**			0.00	0.00			0.00	0.00***
Currencies Accepted			-0.10	0.02***			-0.01	0.00***			0.02	0.03
Ethereum Platform			0.78	0.13***			0.05	0.01***			0.76	0.18***
Bonus Scheme			0.36	0.09***			0.02	0.01*			0.30	0.13**
ICO Rating			0.50	0.08***			0.04	0.01***			0.93	0.11***
ICO Year			-1.13	0.08***			-0.11	0.01***			-1.98	0.11***

Significance levels: p < 0.01 (***); p < 0.05 (**); p < 0.1 (*)

The regression table summarizes the results of the three regressions performed and is divided by the dependent variable. First, is depicted the model with the human capital variables and then the control variables are introduced. The first two models are logistic and the remaining ones are robust regressions. Although the R-squared is not the most appropriate measure for these types of models, we have introduced it due to its universality and easy interpretation.

4.6. Conclusions and discussion

4.6.1. Results discussion

The ICO projects have been gaining importance due to their novelty (OECD, 2019) but also due to the capital amounts involved in the projects (Coinschedule, 2020) and also due to the regulation challenges they pose (Dostov et al., 2019). The hype verified around the ICOs topic had a peak in the years of 2017 and 2018 (Google, 2020) mainly due to the valorization of the cryptocurrencies (Fisch, 2019). Nevertheless, the ICO projects are extremely innovative and digital (Kranz et al., 2019) and will disrupt the investment world with their characteristics which can be also adopted by more traditional financing models. The ICOs have been compared to other types of financing such as crowdfunding, venture capital or IPOs but they have unique characteristics which distinguish them largely from other forms of financing projects (OECD, 2019). Nonetheless, due to some similarities, the literature has also applied theory and methods related with crowdfunding to ICO projects (Fisch, 2019). The importance of the human capital in the ICO projects is not minor and is taken as having a great importance in the success of a project (An et al., 2019). We were able to capture several teams' characteristics with the variables collected from our database, namely, education, professional experience, number of team elements, networks and social media. In line with research that states the importance of large teams (Giudici & Adhami, 2019), we also confirm that larger teams have better chances of success. Although we have tried to find the existence of a U-shaped relationship (Jin, et al., 2017), this proved not statically significant. On the opposite, the disruptive vision of the projects, particularly exacerbated in ICO projects, has a negative impact on their success once it may become difficult to perceive and implement (Momtaz, 2020a). Determinants such as team members' education or professional experience are considered not relevant determining the success of a project (Giudici & Adhami, 2019) which was also confirmed by our analysis going on the opposite direction of studies performed on crowdfunding (Allison et al., 2017) or entrepreneurship (Burton et al., 2002). In addition, our analysis has included variables controlling for the profiles' location, which have revealed to be significant, as well as variables controlling for ratings attributed to the team with the same result. We also conclude that the number of projects in which a person has participated is not relevant in our study. In terms of success' measure, our study confirms that the results are very similar regardless of the independent variables selected and they can be confidently used in order to estimate a project's successful outcome.

4.6.2. Theoretical contributions

We have performed a literature review with the main topics currently discussed on the ICO projects complemented by a market snapshot which captures the main market characteristics in complement to the academic research. We have added our contribution to the research done on ICO projects since we studied the impact of some teams' characteristics to the success of a project. For future research these variables should be considered and included in models trying to measure a project's success. Furthermore, theories applied to these projects should also account for the importance of the human capital in a project success. Concerning the human capital theory, we have confirmed that human capital characteristics are important contributors for ICO project's success. Nevertheless, our data confirms that characteristics such as professional experience might not be the best signalers of human capital quality and might not be good predictors of successful projects since they do not necessarily mean expertise (Sonntag, 1995). As university degrees are common in our database, they tend to be not relevant and other variables such as networks gain importance in these kinds of projects. The location variables seem to become also important for the project success since they may represent the proximity to open markets with larger availability of capital. Furthermore, human capital theory should consider the role of larger and diversified teams' contribution to the successful outcome of ICO projects. The study developed by An et al. (2019) also addresses the characteristics of the ICOs impacting their success, including human capital characteristics. Nevertheless, we believe there are substantial differences between our research and the one mentioned which make both studies unique. We have used An et al. (2019) in our literature review and the differences we have identified between our study and theirs are the following: i) our study is dedicated to a specific industry, namely banking/financing area, since there are proof that different industries have different outcomes and thus, they must be separated in order to obtain clearer results (Davies & Giovannetti, 2018; Hartmann et al., 2019); ii) their database is mainly composed by projects outside Europe. Our database has several projects located in Europe but also a representation of other world's regions, for instance, Africa, South America and Middle East, which is very small or non-existent in An et al. (2019); iii) we include other variables in the models such as location, third party ratings or experience and several control variables not included in An et al. (2019), such as, currencies accepted, ICO year or the existence of fundraising goals; iv) we have included 3 different dependent variables in order to test which one would better represent a project's success and to control for different results using different dependents.

4.6.3. Managerial implications

Investing in ICO projects is a highly risky investment which can provide enormous return but also requires enormous attention and due diligence from investors in order to maximize and secure their gains. We have stated the main characteristics of ICOs and the current state of the art in terms of academic research complemented by the market volumes and investment areas of ICO projects in the market snapshot. When investors perform due diligence on a project, they should also look for teams' characteristics once they are related with the successful outcome of the project (Giudici & Adhami, 2019). Particularly, the human capital characteristics should be considered as important to determine the success of a project (Unger et al., 2011). Based on our data, the investors and managers should consider that professional experience does not always mean expertise since the best professionals might not always be the most experienced (Sonntag, 1995). Furthermore, we conclude that there is a certain level of expertise needed to participate in ICO projects as the great majority of the team members have a university degree. Nevertheless, this level of expertise is not ascertained by the level of education since most people should have a high degree. The expertise is also not determined by the type of degree (i.e. technologic or business) but rather by other variables such as ratings attributed by external parties. Besides, we conclude that the ratings attributed to the team are also important in order to ascertain the projects' future performance.

4.6.4. Research limitations

The database is composed of profiles who developed projects in the banking/financial services sector. Thus, a limitation of this research is that the conclusions taken were based on projects in only one sector while they would eventually be more robust if the database included more areas although our conclusions are in line with the already existent literature. Furthermore, the data was collected from different data sources, combined and treated manually which involves a degree of human error. We have cross-checked the information several times and have performed consistency controls, but we cannot exclude some bias in our research. Besides, the data collected from ICOBench and LinkedIn is generally uploaded to these websites manually based on information provided by projects' promoters which may, at some extent, compromise the integrity of the information (Momtaz, 2019) although there is no obvious reason to doubt it.

4.6.5. Avenues for future research

We have performed an analysis focused on the impact of teams' characteristics on the projects' success which contributes to fill in a gap in the current literature. Although there are

already some studies on ICOs' success, further investigation and new databases should be applied to this intent. We have concluded that human capital is important to the project's success but we still think that a comparative analysis on the importance of human capital along several ways of financing would be important, namely, ICO, crowdfunding and venture capital (Fisch, 2019). We would like to stress also the importance of cryptocurrencies to the ICO projects and their valorization might influence the projects' capital raised. Therefore, a deeper analysis on this topic would be interesting. Testing how token-types affect ICO success also merits future research. The regulation on ICOs is still not extensive and a future research on the regulation already done and future paths would be interesting (Boreiko & Risteski, 2019; Zhang et al., 2020). Another research topic could be understanding the impacts of regulation on projects' success: does a more regulated project performs better than an unregulated one? The whitepaper's importance should also be deeply addressed in the future in order to understand their similarities with regulated prospectus and new ways to regulate this important document. Concerning the size of the teams, it would be important to determine the causes of larger teams in an ICO project, in other words, why do ICO teams tend to be composed by a large number of elements? Are there any correlations between the experience and education of the team members and do these factors interact with the team size? Does the demographic diversity of ICO projects' team impacts their success?

5. Conclusions

This thesis aims at exploring the topic of fintech companies and to understand their impacts on traditional banking/financial institutions. Furthermore, it is focused on ICO projects which are highly technological and disruptive financing forms. The thesis highlighted the success factors of ICO projects and their impacts on projects' outcomes, particularly, human capital factors. This thesis is divided into three studies each one aiming at answering different questions and filling different literature gaps.

5.1. First study

The research focus of the first study is to assess the impact of fintechs appearance in the traditional business model of banking/financial institutions. This study aims to answer the following research questions: (i) What are the dominant concepts and narratives used by the fintech literature? (ii) How do fintechs impact traditional banking/financial institutions? A systematic literature review was developed complemented by a semantic network analysis with that purpose. The topic of fintechs has been gaining importance in the last years and the academy has been also paying attention to it. The USA, UK, and Germany are the countries in which most academic research is done on this topic. Concerning the first research question, the most cited words in the papers' key-words are consistent with the current state of the fintech/banking market. The most prominent topics focus on banks, fintechs, and finance. The interest is clear in services provided by fintech which are mostly similar to traditional banking ones. Hence, there is a strong interest in payments, financial services, lending, and currency. Together with these concepts are technological ones such as big data, blockchain, artificial intelligence, data transformation, and machine learning. The analysis also highlights the focus on regulation. Leximancer's concept map and literature associated with it proves the conclusions already found through the snapshot done previously. Concerning the second research question, this study concludes that fintech companies are direct competitors of traditional banking/financial companies since they offer substitute products and services. They are not yet in a position of replacing completely traditional companies but have several advantages such as being born digital, technological adapted, and being able to offer faster and cheaper equivalent services. Fintechs have taken advantage of the banks and financial institutions' reputation damage after the last financial crisis and overcome the heavy business model structure of incumbents. The disruption caused by fintech companies led traditional companies to adapt to change their processes and focus on consumers' needs, taking advantage of the trust in traditional and regulated institutions still existent. Traditional institutions are

dealing with fintechs by cooperating or acquiring them and later integrating most of their innovations in the traditional business model (i.e. use of big data, digital and technological solutions).

5.2. Second study

The research aim of the second study is to identify general ICO projects' success factors and assess their impact on the success of a project building on the signaling theory. This study aims to answer the following research questions: (i) What are the general ICO projects' success factors? (ii) What are the impacts of general ICO projects' success factors? Building on the signaling theory and using the existent literature, the study identifies the main variables (signals) influencing the success of a project and builds an econometric model to clarify their impacts. Concerning the first research question, it was also possible to divide the variables into three main groups: (i) variables of the project; (ii) variables of the campaign; (iii) variables of social networks; (iv) variables of the human capital. Despite the method used to regress the econometric model (e.g. standard OLS regression or robust regression) the results were very similar. Concerning the second research question, the study concluded that external ratings attributed by third parties have a positive impact on projects' success, except for the rating considering the team's vision. It is concluded that visionary projects tend to be more difficult to achieve and harder to understand, creating a barrier for investment. The whitepaper is considered to be a golden source of information on the project and one of the best ways to mitigate information asymmetries between investors and promoters. The length of the whitepaper, although showing a positive coefficient, revealed to be statistically insignificant. The contrary happens with its contents, namely, the disclosure of the team and the existence of technical details, that show statistical significance and positive coefficients. The existence of a secondary market is also considered crucial to the success of ICO projects. This aspect can be even considered a measure of project success itself since only traded tokens can be considered as being truly successful. The study reveals that the existence of bonus schemes is positively related to project success and can be linked with token prices. Investors prefer higher token prices, as lower prices might indicate fraud, complemented with a bonification. In line with the entire literature, the study proved that longer campaigns are generally less successful than shorter ones. The prices of cryptocurrencies are also linked to project success as Bitcoin increasing prices have negative effects on ICO projects' outcomes and the contrary happens with Ethereum prices. The social media platform variables were also positively related to the outcome of a project. The correct use of Twitter might be a way of reducing information

asymmetries and a solid marketing option. Having an active ICO campaign on Twitter and a large network of followers has revealed to be important to achieve the desired project outcome. Finally, this study confirms that larger teams tend to be more successful due to their heterogeneity that contributes to wider discussions and share of knowledge.

5.3. Third study

The research aim of the third study is to identify human capital ICO projects' success factors and assess their impact on the success of a project building on Human Capital Theory. This study aims to answer the following research questions: (i) What are the human capital ICO projects' success factors? (ii) What are the impacts of human capital ICO projects' success factors? Concerning the first research question, and building on the Human Capital Theory, this study concludes that human capital characteristics are an important indicator of a successful outcome. A large set of data was collected via ICOBench and assessing public information from LinkedIn allowing the inclusion of several variables such as professional experience, education, or location. Concerning the second research question, this study confirms the importance of larger teams as a success factor is confirmed. As there are arguments in the literature in favor of the existence of a u-shaped curve concerning teams' size, the study performed an additional analysis but the existence of such curve could not be proven. The vision rating is also proved to have a negative impact on the project's success. The variables concerning professional experience and education were considered not statistically significant and their impact on projects' success could not be proved. On the opposite, the location variables and the external ratings attributed to the team were considered relevant contributors to the outcome of a project. The number of projects in which a promoter has participated is considered not relevant. This study regressed the econometric model using three different dependent variables to identify possible differences in the results but regardless of the variable used, the results were very similar.

5.4. Theoretical contributions

The first study on the impacts of fintech on traditional institutions adds to the current literature by providing an updated systematic literature review and a semantic network analysis which did not exist until now. The study provides an extensive summary of the fintech market, the current fintech topics being investigated in academic literature, and a global vision of countries, journals, and institutions more actively publishing on this topic.

The second study on the general success factors of ICO projects was able to aggregate into groups several success factors identified in the literature and test their impacts using an

econometric model built on a large database of ICO projects. The main contribution of this study was to assemble several variables of different categories into one single model and explore their joint impacts. For signaling theory, this study contributes to identify the ICO projects' success factors as possible signals to investors in order to reduce information asymmetries and as a way of assessing the quality of a project.

The third study on the impacts of human capital success factors in the outcome of an ICO project provides several theoretical contributions to the Human Capital Theory. The study analyzed several human capital variables and identified their impacts, concluding that human capital variables are important contributors to projects' success. HCT tends to assume that professional experience is important to a successful venture as this theory frequently links professional experience with expertise. This study confirms that they may be not interconnected as professional experience does not contribute to a projects' success. The role of a larger and diversified team should be considered by the HCT as it contributed to the success of a project. Although previous studies are covering the human capital topic in ICO projects, the study here presented is unique adding several contributions to the current literature. The research by An et al. (2019) also highlights the importance of human capital but there are substantial differences between the study in this thesis and the one mentioned: i) this study is dedicated to a specific industry, namely banking/financing area, since there is proof that different industries have different outcomes (Hsieh & Oppermann, 2020) and thus, they must be separated to obtain clearer results (Davies & Giovannetti, 2018; Hartmann et al., 2019); ii) in An et al. (2019) the database is mainly composed by projects outside Europe. The current study's database has several projects located in Europe but also a representation of other world's regions, for instance, Africa, South America, and Middle East, which is very small or non-existent in An et al. (2019); iii) this study has included other variables in the models such as location, third party ratings or experience, and several control variables not included in An et al. (2019), such as, currencies accepted, ICO year or the existence of fundraising goals; iv) this study has included 3 different dependent variables to test which one would better represent a project's success and to control for different results using different dependents.

5.5. Managerial implications

The first study on the impacts of fintech on traditional institutions provides managerial implications concerning the digital and technological adaptation needed by banks and the way these institutions are currently dealing with new disruptive competitors. The need for cooperation with fintech is important to remain competitive and there is the need to integrate

new technologies in the traditional business model. The study also has implications for regulators as the growing fintech market is highly unregulated and the need to regulate it is latent. Some fintech companies already adopted regulation and their ways to disclose information. Therefore, they should be more prepared to adapt to future regulatory constraints.

The second study on the general success factors of ICO projects complements the implications for regulators already identified in the first study. The second research proves that, although unregulated, the great majority of ICO projects present a whitepaper with a high degree of information on the project. As the whitepaper is a way of assessing the project's quality and as it contains a fair amount of information, regulators might use it as a good starting point to assess and regulate ICO projects. For ICO projects' promoters, the implications of this research are mainly related to the investors' perception of the project and the aspects promoters should pay particular attention to when promoting their ideas. Selecting a good time to present the project (e.g. taking advantage of cryptocurrencies prices), making the disclosure of information, having a clear, structured, and technical whitepaper, and actively manage ICO's campaign on Twitter, might be of extreme importance to influence a successful outcome.

The third study on the impacts of human capital success factors in the outcome of an ICO project has provided some implications to practitioners. Investors should pay particular attention to the human capital variables when investing in an ICO project as they are special contributors to its success. Investors and managers should consider that professional experience does not necessarily mean expertise since the best professionals might not always be the most experienced. The level of expertise needed to participate in an ICO project cannot be ascertained by the university degree or experience but rather by external third-party ratings.

5.6. Research limitations

The first study on the impacts of fintech on traditional institutions has its main limitations on the size of the literature database which is composed by 100 relevant papers and the great majority of them were published in the last 3 years. Besides, the research was limited to the SCOPUS database. The conclusions would be even stronger and wider if the research could be expanded to analyze more literature from other databases. The SCOPUS search was done for literature in English and a predefined group of words. In the future, similar research could be enlarged to include other languages and further key-words.

The second study on the general success factors of ICO projects, has its main limitations concerning the need to discard several observations from the database due to missing information. Besides, there was the need to remove some variables related to the Twitter activity

and external ratings due to their high level of collinearity with other variables. Therefore, their effects were not taken into account.

The third study on the impacts of human capital success factors in the outcome of an ICO project has a caveat regarding the collection of the data. Although most of the data was collected in an automated manner, some of the profiles' information needed to be collected by hand due to missing fields, different languages, or codifications. Therefore, there is a margin for human error. The data is based on LinkedIn information which is publicly available and uploaded by projects' promoters. There should also be highlighted that this data could be not completely accurate as it is not reviewed by independent parties.

5.7. Avenues for future research

Concerning the topic of fintechs' impact on traditional institutions, future studies should focus on technologies and systems used in fintech industry currently being adopted by banks (e.g. blockchain, robot-advising, big data). As technology adoption is a crucial factor to keep competitiveness, technologies adopted and their purposes are of high importance. For instance, which is the use of blockchain in traditional banking and what risks and advantages does it pose? Have the banks adopting these technologies become more competitive and have they attracted more consumers? Are banks offering more digital solutions to their clients? What is the percentage of traditional banks' clients actively using digital solutions and in what depth do they use them? As models of cooperation and acquisition have been adopted by incumbents to deal with fintech companies, this should also be a topic of future research. Which models have been adopted in the relation between traditional institutions and new incumbents? Do models of cooperation produce better results? Who has benefited the most from the cooperation? Future studies should also focus on regulations, the lack of regulation applied to fintechs, and rigidity applied to traditional institutions. Is regulation (or the lack of it) favoring fintech? How can fintechs protect and adapt themselves to possible future regulatory measures? Are banks taking advantage of regulatory openness? As also proposed by other studies, what are the policy implications for start-ups, fintechs, and ICOs? Are these policies protecting the investors (Kher et al., 2020)?

The second study on the general success factors of ICO projects has made important discoveries concerning the whitepaper. For future studies, it would be interesting to focus on analyzing the smallest aspects of the whitepaper and understand which are the most relevant. Regarding the secondary market, it would be important to analyze the behavior of tokens in terms of volatility, tradability, returns for investors, and many other relevant factors. A future

study could also collect a wider database covering several industries and then cluster it to obtain industry-specific results and not biased results. As ICOs appear as a substitute financing form, can they emerge as a new financing mechanism for Small and Medium Enterprises (SMEs) (Kher et al., 2020)?

Several avenues for future research were identified in the third study concerning the impacts of human capital success factors in the outcome of an ICO project. It is suggested that a comparative approach is done across several types of financing forms in order to understand the human capital impacts in each of them. The effects of the token-types should also be considered in future studies. Concerning the size of the teams, it would be important to determine the causes of larger teams in an ICO project, in other words, why do ICO teams tend to be composed by a large number of elements? Are there any correlations between the experience and education of the team members and do these factors interact with the team size? Does the demographic diversity of ICO projects' team impacts their success? The investors' expectations should also be the focus of future studies. How are investor expectations different in ICOs versus traditional financing (Kher et al., 2020)?

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7. Appendixes

7.1. Appendix A – Preliminary results of the third study



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Human Capital's importance in Initial Coin Offerings' (ICOs) success

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Abstract

The Initial Coin Offerings (ICOs) are an emerging topic in the literature with several gaps still to fulfill. The ICOs have increased its importance not only due to the interest they have been raising but also due to the capital amounts involved in the projects, the innovative solutions they offer and the challenges they pose to regulators. There is some research on the ICOs' success factors but there is still no common measure of success as well as not many researches focused on the human capital importance for the projects success. In our research we will perform a literature review on the ICOs' topic and develop an econometric model with a database composed by 3158 profiles and 340 ICO projects in the banking/financial sector. We will be focusing on the human capital importance in these projects and propose three measures for project's success. With our research we intend to complement the literature on the ICOs projects and shed some light on the factors driving their success.

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1. Introduction

The Initial Coin Offerings (ICOs) are an emerging topic in the literature but there is still a considerable literature gap due to their novelty. ICOs' main function is to fund innovative ventures which are based on a distributed ledger technology (DLT) such as blockchain. The funding is performed via the tokens selling by the cutting hedge technological ventures and the tokens purchase by worldwide investors (Chiu & Greene, 2019). Therefore, the investors are able to buy tokens directly from the new venture without the need to a third party involved. The tokens sold will be venture capital project's functional future units, in other words, they will have a utility function, right of ownership or royalties (Fisch, 2019). According to Howell et al. (2018) there are three main token categories: (i) currency token: used as a means of exchange and store such as a cryptocurrency; (ii) security token: used as a conventional security but recorded and exchanged on a blockchain. The underlying of this token type can range from corporate equity (typical share), to commodities, real estate or even currencies; (iii) utility token: is the most common token type and provides to the buyer consumptive rights to access a product or service. According to Kranz et al., 2019 there is a fourth type of token, namely, the donation tokens which do not grant any rights to the investor and are used to raise money for entrepreneurial and idealistic projects. According to Brochado (2018) there are also hybrid tokens which combine more than one of the characteristics mentioned above and new token types should appear in the future (Fisch, 2019). All the characteristics and main information on the ICO should be described in the Whitepaper of the new venture which, although unregulated, tries to mimic a regulated prospectus (Chiu & Greene, 2019). According to Brochado (2018) we could define ICOs as an alternative investment form offering the possibility of direct financing from worldwide investors and which contributes to the democratization of entrepreneurship and access to capital markets. The ICOs are based on Blockchain's technology and offer the chance to invest in a project's initial phase through the acquisition of a token. It also allows tokens' transaction on secondary market which is essential to their success (Chen Y. , 2018). This definition is in line with Fisch (2019) who also highlights the similar approaches of crowdfunding and ICOs although an innovative characteristic of the latter is the possibility of selling tokens in a secondary market not available in crowdfunding.

2. Literature review

ICOs are frequently compared with other ways of financing young and risky ventures such as Initial Public Offerings (IPOs), Venture Capital (VC) and Crowdfunding. Nevertheless, ICOs are disruptive and although they share some of more traditional financing ways characteristics, they are very distinct from them (Biasi & Chakravorti, 2019). The main characteristics of ICOs are: less costly; lower investment thresholds; democratization of investments; blockchain based; no intermediaries involved (e.g. banks); low regulation; completely digital; existence of a secondary market (Brochado, 2018; OECD, 2019).

The ICO projects usually set boundaries for their financing, namely, a minimum amount of financing to be obtained in order to proceed with the project and a maximum amount of capital accepted once this is proved to positively influence tokens' valuation (Howell et al., 2018). This is done by determining how many tokens are available for sale and their initial price. Therefore, the ICOs can have the following models: (i) not capped: where there are no limits for financing; (ii) soft-capped: where a minimum amount of financing is established in order to proceed with the project; (iii) hard-capped: maximum amount of financing accepted; (iv) combination of both soft- and hard-cap limits and hybrid methodologies such as accepting financing above the hard cap and setting several ceilings instead of only one (Kranz et al., 2019).

In terms of determining the success of an ICO project the mostly commonly used measure is the amount raised (An et al., 2019; Fisch, 2019). As most of the times the projects are capped,

further strong measures of success should be the achievement of the minimum capital previously defined and, in positive cases, the percentage of the amount raised over it (Jong et al., 2018).

2.1. Market Snapshot

The first ICO was the MasterCoin in 2013 proposed by J.R. Willett and since then the ICO market has increased mainly due to its novelty and the hype caused by the valorization of cryptocurrencies, particularly Bitcoin, between the years of 2017-2018 (Masiak et al., 2018). Indeed, during the last 4 years the ones with the largest amount of funds raised are 2017 and 2018. The year of 2017 accounted 442 token sales concluded with USD 6.4 billion of funds raised and 2018 was even better for the ICO market with 1051 token sales concluded and with USD 21 billion of funds raised. However, with the depreciation of Bitcoin since the end-2018, the ICO market also refrained and 2019 registered much lower values compared with previous years, namely, 131 token sales concluded and USD 1.4 billion of funds raised (Coinschedule, 2020). The ICO's market represent significant amounts of investment despite the fact that in 2017 45% of them have failed (Risley et al. 2017, cited OECD 2019, p.49). Furthermore, prior to trading in 2018, 81% of the ICOs are considered as scams and only 8% move to trade from which only 3.8% are successful (Dowlat and Hodapp 2018, cited OECD 2019 p.35). The 3 ICOs which raised the largest amounts of funding represent USD 6.8 billion, namely, EOS (USD 4.1B), Telegram Open Network (USD 1.7B) and BITFINEX (USD 1B) (Coinschedule, 2020).

3. Methodology

3.1. Database

The data used in the research is secondary and collected from ICOBench a website which comprises a large database on ICOs (ICOBench, 2020). The information provided by the website is mostly related with the projects and concerns among other data: the project's year, amounts raised, type of cap, existence of pre-sales or bonus schemes. It also compiles information on the team, such as their composition and functions. The data was collected via a premium subscription which gave access to an API. As the main objective of the research is to study the ICO's teams, the complementary information was collected from the public LinkedIn profiles of the team members. This data treatment resulted in the collection of 556 ICO projects, on the banking/financial area, from which 216 were discarded due to lack on crucial information and leaving the database with 340 projects. The projects' teams were composed by 5025 profiles from which we were able to keep 3158 once 1867 were discarded due to lack of crucial information.

3.2. Model and Propositions

The main objective of this research is to study the ICOs' teams and their impact on project's success. Therefore, we have collected 3 dependent variables, several independent variables related with the teams' characteristics and several control variables more focused on the projects' characteristics. We developed a univariate analysis and the purpose will be to develop an econometric model. The current research proposition is to understand the impact of the teams' characteristics on the projects' success.

4. Results

In the current section we will present the database's descriptive statistics followed by the univariate analysis of the variables selected. Thus, we have selected as dependent variables: (i) a binary variable on achievement of soft-cap limits; (ii) the log of the percentage above the soft-cap limit achieved; (iii) the log of the total capital raised. The independent variables concerning the team are: (i) person location; (ii) number of projects per person; (iii) LinkedIn connections;

(iv) previous managerial experience; (v) previous technology experience; (vi) education; (vii) business degree; (viii) technology degree; (ix) team rating; (x) vision rating; (xi) number of team elements. The control variables are: (i) soft cap limit existence; (ii) hard cap limit existence; (iii) token price; (iv) currencies accepted in the ICO; (v) the ICO is based on an Ethereum platform; (vi) bonus scheme existence; (vii) ICO rating according to ICOBench; (viii) ICO year.

4.1. Database descriptive statistics

Table 23 - Database descriptive statistics

	Descriptive Statistics					Frequencies Table			
	Observations	S.D.	Min.	Max.	Mean		Frequency	Percentage	Cumulative Percentage
Number of Projects per Person	3158	1.212	1	12	1.2704				
Number of Team Elements	3158	9.2453	1	47	18.9316				
Token Price	3158	179.8997	0	3000	20.0707				
Currencies Accepted	3158	2.4934	1	30	2.5592				
						Frequencies Table			
						Frequency	Percentage	Cumulative Percentage	
Location	North America	548	17%	17%					
	Europe	1556	49%	67%					
	Asia	779	25%	91%					
	Africa	77	2%	94%					
	Central America	18	1%	94%					
	South America	74	2%	97%					
	Middle East	106	3%	100%					
	Total	3158	100%	-					
LinkedIn Connections	<=200	435	14%	14%					
	201 to 400	312	10%	24%					
	>=401	2411	76%	100%					
	Total	3158	100%	-					
Managerial Experience	No	985	31%	31%					
	Yes	2173	69%	100%					
	Total	3158	100%	-					
Technological Experience	No	2355	75%	75%					
	Yes	803	25%	100%					
	Total	3158	100%	-					
School Degree	<Bachelor	61	2%	2%					
	Bachelor	1662	53%	55%					
	Master	1250	40%	94%					
	PhD	185	6%	100%					
	Total	3158	100%	-					
Business Degree	No	1772	56%	56%					
	Yes	1386	44%	100%					
Total	3158	100%	-						
Technological Degree	No	2043	65%	65%					
	Yes	1115	35%	100%					
Total	3158	100%	-						
Team Rating	0-2,9	1064	34%	34%					
	3-3,9	548	17%	51%					
	4-5	1546	49%	100%					
Total	3158	100%	-						
Vision Rating	0-2,9	979	31%	31%					
	3-3,9	938	30%	61%					
	4-5	1241	39%	100%					
Total	3158	100%	-						
Soft-cap Limit	No	872	28%	28%					
	Yes	2286	72%	100%					
Total	3158	100%	-						
Hard-cap Limit	No	266	8%	8%					
	Yes	2892	92%	100%					
Total	3158	100%	-						
Ethereum Platform	No	414	13%	13%					
	Yes	2744	87%	100%					
Total	3158	100%	-						
Bonus Scheme	No	1457	46%	46%					
	Yes	1701	54%	100%					
Total	3158	100%	-						
ICO Rating	0-2,9	683	22%	22%					
	3-3,9	1558	49%	71%					
	4-5	917	29%	100%					
	Total	3158	100%	-					
ICO Year	2017	416	13%	13%					
	2018	2138	68%	81%					
	2019	597	19%	100%					
	2020	7	0%	100%					
	Total	3158	100%	-					

The focus of the current research is on teams' impact on ICOs' success and therefore the database is focused on the profiles of the team members. All the profiles have at least one social network, namely LinkedIn, from which the profiles information was extracted. The great majority of the people have 1 social network (96.7%) and only 3.4% have 2 or more social networks. The most used social network is LinkedIn followed by Facebook and Twitter. The networks in these types of projects are essential and 71% of the profiles have 500 or more connections on LinkedIn. Almost half of the profiles analyzed are currently located in Europe (49%), followed by Asia-Pacific (25%), North America (17%) and other locations (9%). In Europe the top three countries in which profiles are located are the United Kingdom (18%), Russia (15%), France (8%) and Switzerland (7%). In North America, 88% of the profiles are located in the United States and 12% in Canada. In Asia-Pacific region the most representative areas are India (21%), Singapore (18%) and Australia (10%). Concerning the other locations, the regions represented in the database are the Middle East (38%), Africa (29%), South America (27%) and Central America (6%). The profiles are highly educated with 98% having a university degree. 52% of the profiles have a bachelor degree, 40% have a master degree and

only 6% have a doctoral degree. In terms of professional experience, 56% of the profiles had a managerial experience, 21% had a technological experience, 9% had both and 14% had other or no experience at all. Below we present the summary statistics of the database variables

4.2. Correspondence analysis

Table 24 - Correspondence analysis

		Soft cap achieved				Log of capital raised/softCap				Log of capital raised			
		No	%	Yes	%	Below median	%	Equal/Above median	%	Below median	%	Equal/Above median	%
Person Location	North America	283	9%	265	8%	262	8%	286	9%	295	9%	253	8%
	Europe	747	24%	809	26%	702	22%	854	27%	754	24%	802	25%
	Asia	359	11%	420	13%	328	10%	451	14%	352	11%	427	14%
	Africa	44	1%	33	1%	43	1%	34	1%	50	2%	27	1%
	Central America	14	0%	4	0%	13	0%	5	0%	13	0%	5	0%
	South America	52	2%	22	1%	52	2%	22	1%	51	2%	23	1%
	Middle East	56	2%	50	2%	53	2%	53	2%	56	2%	50	2%
Number of projects per person	1 to 3	1509	48%	1564	50%	1408	45%	1665	53%	1520	48%	1553	49%
	4 to 6	19	1%	25	1%	18	1%	26	1%	22	1%	22	1%
	9 to 12	27	1%	14	0%	27	1%	14	0%	29	1%	12	0%
LinkedIn Connections	0 to 100	149	5%	97	3%	137	4%	109	3%	154	5%	92	3%
	101 to 200	115	4%	74	2%	109	3%	80	3%	111	4%	78	2%
	201 to 300	95	3%	90	3%	92	3%	93	3%	101	3%	84	3%
	301 to 400	69	2%	58	2%	62	2%	65	2%	64	2%	63	2%
	401 to 500+	1127	36%	1284	41%	1053	33%	1358	43%	1141	36%	1270	40%
Managerial Experience	No	506	16%	479	15%	469	15%	516	16%	511	16%	474	15%
	Yes	1049	33%	1124	36%	984	31%	1189	38%	1060	34%	1113	35%
Technology Experience	No	1143	36%	1212	38%	1062	34%	1293	41%	1147	36%	1208	38%
	Yes	412	13%	391	12%	391	12%	412	13%	424	13%	379	12%
Education	<Bachelor	22	1%	39	1%	22	1%	39	1%	25	1%	36	1%
	Bachelor	851	27%	811	26%	794	25%	868	27%	863	27%	799	25%
	Master	590	19%	660	21%	555	18%	695	22%	593	19%	657	21%
	PhD	92	3%	93	3%	82	3%	103	3%	90	3%	95	3%
Business Degree	No	902	29%	870	28%	834	26%	938	30%	904	29%	868	27%
	Yes	653	21%	733	23%	619	20%	767	24%	667	21%	719	23%
Technology degree	No	981	31%	1062	34%	916	29%	1127	36%	990	31%	1053	33%
	Yes	574	18%	541	17%	537	17%	578	18%	581	18%	534	17%
Team Rating	0 to 2,9	672	21%	392	12%	654	21%	410	13%	657	21%	407	13%
	3 to 3,9	262	8%	286	9%	203	6%	345	11%	243	8%	305	10%
	4 to 5	621	20%	925	29%	596	19%	950	30%	671	21%	875	28%
Vision Rating	0 to 2,9	592	19%	387	12%	574	18%	405	13%	577	18%	402	13%
	3 to 3,9	400	13%	538	17%	335	11%	603	19%	419	13%	519	16%
	4 to 5	563	18%	678	21%	544	17%	697	22%	575	18%	666	21%
Number of team elements	0 to 10	363	11%	193	6%	342	11%	214	7%	347	11%	209	7%
	11 to 20	750	24%	670	21%	683	22%	737	23%	779	25%	641	20%
	21 to 30	281	9%	454	14%	244	8%	491	16%	295	9%	440	14%
	31 to 40	161	5%	219	7%	184	6%	196	6%	150	5%	230	7%
	41 to 50	0	0%	67	2%	0	0%	67	2%	0	0%	67	2%
Soft Cap Limit	No	416	13%	456	14%	416	13%	456	14%	462	15%	410	13%
	Yes	1139	36%	1147	36%	1037	33%	1249	40%	1109	35%	1177	37%
Hard Cap Limit	No	189	6%	77	2%	187	6%	79	3%	188	6%	78	2%
	Yes	1366	43%	1526	48%	1266	40%	1626	51%	1383	44%	1509	48%
Token Price	< Median	910	29%	973	31%	803	25%	1080	34%	945	30%	938	30%
	>= Median	645	20%	630	20%	650	21%	625	20%	626	20%	649	21%
Currencies Accepted	1	661	21%	751	24%	641	20%	771	24%	724	23%	688	22%
	2	203	6%	252	8%	171	5%	284	9%	194	6%	261	8%
	3	269	9%	238	8%	245	8%	262	8%	262	8%	245	8%
	4	229	7%	184	6%	231	7%	182	6%	228	7%	185	6%
	5	87	3%	62	2%	87	3%	62	2%	99	3%	50	2%
	6	44	1%	73	2%	27	1%	90	3%	15	0%	102	3%
	7	20	1%	24	1%	9	0%	35	1%	20	1%	24	1%
	8+	42	1%	19	1%	42	1%	19	1%	29	1%	32	1%
Ethereum Platform	No	286	9%	128	4%	255	8%	159	5%	255	8%	159	5%
	Yes	1269	40%	1475	47%	1198	38%	1546	49%	1316	42%	1428	45%
Bonus Scheme	No	774	25%	683	22%	727	23%	730	23%	794	25%	663	21%
	Yes	781	25%	920	29%	726	23%	975	31%	777	25%	924	29%
ICO Rating	0 to 2,9	453	14%	230	7%	439	14%	244	8%	450	14%	233	7%
	3 to 3,9	706	22%	852	27%	647	20%	911	29%	730	23%	828	26%
	4 to 5	396	13%	521	16%	367	12%	550	17%	391	12%	526	17%
ICO Year	2017	105	3%	311	10%	110	3%	306	10%	136	4%	280	9%
	2018	1001	32%	1137	36%	912	29%	1226	39%	1004	32%	1134	36%
	2019	442	14%	155	5%	424	13%	173	5%	424	13%	173	5%
	2020	7	0%	0	0%	7	0%	0	0%	7	0%	0	0%
	Total	1555	49%	1603	51%	1453	46%	1705	54%	1571	50%	1587	50%

The correspondence analysis done through a cross-table allows the understanding of the behavior of the independent variables in relation to the dependent variable. In this case, we can understand the distribution of the profiles within the independent variables when exposed to the binary version of the dependent variable. We have selected three dependent variables: (i) soft-cap limit achieved; (ii) the log of the percentage of capital obtained above the soft-cap; (iii) the log of the total capital raised. The percentage of profiles linked to successful projects is similar across the three models proposed with a higher tendency for successful projects. The distribution of profiles within the independent variables is similar across models which leads us to similar conclusions regardless of the dependent variable.

We have also created a chi-square table in order to attest the statistical significance of each independent variable having in mind the dependent variables selected. The significance levels adopted below are the following: 0,001 (***), 0,01 (**), 0,05 (*).

Most of the significant variables are consistent across models, in other words, the models seem to provide similar results again. The most significant variables accepted at 0,001 significance level are the person's location, number of LinkedIn connections, team rating, vision rating and number of team elements. These variables are accepted regardless of the dependent variable selected. The variable number of projects per person is also significant at 0,05 level for the dependent variables related with soft-cap achievement and the percentage achieved above that threshold. The variables related with technological profiles (i.e. technology experience and technology degree) are only relevant with 0,05 significance level for the dependent variables related with total capital achieved. The variables education and business degree are only relevant for the dependent variable related with soft-cap achievement at 0,05% significance level. Therefore, we conclude that the first variables are the strongest to build a model with the current data.

Table 25 - Chi-square table

		Soft cap achieved	Log of capital raised/softCap	Log of capital raised
Person Location	Chi-square	26,744	32,186	33,2
	df	6	6	6
	Sig.	,000***	,000***	,000***
Number of projects per person	Chi-square	15,939	18,424	12,412
	df	8	8	8
	Sig.	,043*	,018*	,134
LinkedIn Connections	Chi-square	45,958	38,104	43,675
	df	19	19	19
	Sig.	,001***	,006**	,001***
Managerial Experience	Chi-square	2,6	1,483	2,602
	df	1	1	1
	Sig.	0,107	0,223	,107
Technology Experience	Chi-square	1,842	3,119	4,021
	df	1	1	1
	Sig.	,175	,077	,045*
Education	Chi-square	8,898	6,026	7,779
	df	3	3	3
	Sig.	,031*	,11	,051
Business Degree	Chi-square	4,467	1,81	2,601
	df	1	1	1
	Sig.	,035*	,178	,107
Technology degree	Chi-square	3,459	3,211	3,843
	df	1	1	1
	Sig.	0,063	,073	,050*
Team Rating	Chi-square	133,814	154,685	92,595
	df	2	2	2
	Sig.	,000***	,000***	,000***
Vision Rating	Chi-square	73,173	105,169	48,536
	df	2	2	2
	Sig.	,000***	,000***	,000***

		Soft cap achieved	Log of capital raised/softCap	Log of capital raised
Number of team elements	Chi-square	647,849	766,152	640,861
	df	40	40	40
	Sig.	,000***	,000***	,000***
Soft Cap Limit	Chi-square	1,134	1,395	5,043
	df	1	1	1
	Sig.	,287	,238	,025*
Hard Cap Limit	Chi-square	55,293	68,993	50,899
	df	1	1	1
	Sig.	,000***	,000***	,000***
Token Price	Chi-square	1945,01	1987,91	2010,225
	df	202	202	202
	Sig.	,000***	,000***	,000***
Currencies Accepted	Chi-square	89,85	141,691	157,924
	df	9	9	9
	Sig.	,000***	,000***	,000***
Ethereum Platform	Chi-square	75,052	46,583	26,752
	df	1	1	1
	Sig.	,000***	,000***	,000***
Bonus Scheme	Chi-square	16,316	16,452	24,402
	df	1	1	1
	Sig.	,000***	,000***	,000***
ICO Rating	Chi-square	102,825	117,568	94,905
	df	2	2	2
	Sig.	,000***	,000***	,000***
ICO Year	Chi-square	254,962	232,362	170,203
	df	3	3	3
	Sig.	,000***	,000***	,000***

5. Discussion

From the descriptive statistics performed on the data collected we conclude that most of the projects' promoters on the banking/financial sector are currently located in Europe and that social networks are important in order to keep contacts. Most of the people prefer the professional network LinkedIn in order to feed their network which tends to be large due to the number of connections each profile has. The project's promoters tend to be very educated people with university degree, most of them at bachelor's level. The majority of the profiles had a managerial experience and about 21% of them had a technological experience. Looking at the correspondence analysis, we conclude that these projects do not have a high degree of success measured by our dependent variables. The independent variables which can be considered significant are the profile location, once we confirmed that the most successful projects are promoted by people located in Europe, Asia-Pacific and the United States. The remaining regions are less significant in the sample and are related with less successful outcomes. The number of projects per person can also be considered significant for two of the three dependent variables and is related with the experience of each profile. While most of the profiles had participated only in one project, we see that if the promoter has participated in one up to six projects, they tend to be more successful. For higher projects participation (i.e. more than 6) the results are negative. The variables measuring the professional experience of the profiles as well as the ones measuring the education turned out to be not much significant. The variable measuring the level of education (i.e. ranging from less than bachelor up to PhD) is only significant for the dependent variable related with soft-cap achievement. This conclusion is indeed expected once the great majority of the profiles have higher education making them less distinct in this factor. The variables related with the ratings attributed by experts revealed to be significant regardless of the dependent variable. The ratings are one of the most visible and impactful factors when an investor decides to engage with a project once they are presumed to reflect the expert's opinion on the project as well as the rating automatically attributed by an algorithm. The teams' size revealed also significant regardless of the dependent variable and we conclude that smaller teams tend to have worst results.

6. Conclusion

We have engaged in exploring the new concept of ICO and particularly the composition of the projects' teams and their impact on the success of a project. Therefore, we have helped filling a literature gap on this subject by proposing three different measures of success and several measures for team's characteristics. We have concluded that several of the variables we propose tend to be significant, having in mind our dependent variables, and we were also able to describe a large set of profiles who are promoters of ICO projects. The avenues to complement these preliminary results are to enlarge the literature review and develop an econometric model based on our conclusions until now. Despite the contributions made the main limitations foreseen in the current research is the predominance of European projects/profiles in the database as well as limited variables for profiles which could in the future be complemented with new variables (e.g. data on profile's socioeconomic details). A larger database could also be tested including other type of projects beyond the banking/financial sector.

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4.3. HUMAN CAPITAL'S IMPORTANCE IN ICOS SUCCESS

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1. Abstract

Initial Coin Offerings (ICOs) are an alternative investment form offering the possibility of direct financing from worldwide investors and contribute to the democratization of entrepreneurship and access to capital markets. The ICOs are based on blockchain's technology and offer the chance to invest in a project's initial phase through the acquisition of a token (Brochado, 2018c). It also allows tokens' transaction on secondary market which is essential to their success (Chen Y. , 2018). There are three main types of token which vary according to their purpose and investors' rights: (i) currency token: used as a means of exchange and store such as a cryptocurrency; (ii) security token: used as a conventional security but recorded and exchanged on a blockchain. The underlying of this token type can range from corporate equity (typical share), to commodities, real estate or even currencies; (iii) utility token: is the most common token type and provides to the buyer consumptive rights to access a product or service (Howell et al., 2018). Since the first ICO of MasterCoin in 2013 proposed by J.R. Willett the interest on this topic has been increasing and reached a peak between the years of 2017-2018. This is confirmed by an analysis of Google trends for the word “ICO” at a worldwide level (Google, 2020). This increase in popularity goes hand in hand with the appreciation of cryptocurrencies during the same period. Indeed, the market capitalization of cryptocurrencies influences the amounts raised by ICOs (Masiak, Block, Masiak, Neuenkirch, & Pielen, 2018; OECD, 2019; Fisch, 2019). The literature has been following this tendency and several studies have focused on ICOs although there are still several literature gaps due to the novelty, different and complex interaction of an ICO process. The studies' focus has also been on the success factors of ICOs (An et al., 2019; Fisch, 2019; Goergen & Rondi, 2019; Giudici & Adhami, 2019; OECD, 2019). The current paper intends to focus particularly on human capital which is

considered to be an essential factor in a successful venture (An et al., 2019). The common measure for asserting an ICO's success has been the amount raised in the campaign (Fisch, 2019). ICOs propose to achieve both soft-cap (least amount the funders will accept to proceed with the project) and hard-cap (maximum amount the founders will accept) thresholds. Therefore, the time elapsed until achieving one of these limits is also a measure of ICOs' success along with the amount raised (An et al., 2019). In terms of human capital, the characteristics of the founding team can be considered the following: (i) experience in the financial sector; (ii) experience in computer science; (iii) experience in blockchain projects; (iv) entrepreneur's profile; (v) number of founders; (vi) existence of social media accounts (Brochado, 2018c).

In the current study, the authors propose to analyze human capital as an ICO's success factor using a database collected from ICObench (<https://icobench.com/>) via its API through computer programming. The database was filtered in order to comprise 556 ICOs in the banking/financial sector. The database also included information on the founders' profile who the current paper will study. It was possible to complement the information on the database with public information available on the LinkedIn profiles. The result was extra information of 4552 founders' profiles.

Keywords: Fintech, Initial Coin Offering (ICO), human capital, success factor, cryptocurrencies

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3. Conference forum discussion

Discussant: Dear José, Ana and Álvaro, thanks for sharing your research. I venture to say that you are quite pioneers on this topic so congratulations. In your presentation, you mention that you want to tackle human capital's importance and later you also mention that the objective is to understand the impact the team's characteristics have on the success of an ICO project and you also pay attention to innovative board positions. So, I wonder, are you also considering analyzing the dynamics that need to be fostered among working teams, for example, the innovative board? And do you think that the innovative board position plays a relevant role in the ICO's strategy? José Campino: Dear all, I hope to find you well on these special circumstances which pose so many challenges to our creativity and also urge innovative solutions as the current way to meet and share ideas. I look forward to receiving your feedback on the research and will be very glad to clarify any topics you may find interesting. Thank you and talk to you soon.

José Campino: Thank you very much for your comment, very much appreciated. Indeed, this is a very new topic that has been explored due to its expansion, due to its innovative characteristics, due to the challenges posed to regulators and also due to the significant money amounts involved. Therefore, there is a large gap in the literature to explore and in which any of us could be a contributor. The main objective of the study will be to explore the teams' importance as a determinant of the projects' success, in other words, we are developing a correspondence analysis and an econometric model to measure certain teams' characteristics, such as location, networks or education. As you speak, I thought that it could be interesting to include a variable related to the board composition and check for its significance. Concerning the board, we have been verifying that although there are traditional board positions there are also so many others which we consider as innovative (slide 21). Besides, the board might not have the traditional composition and strict division of roles and hierarchy. These are usually technological, highly innovative and highly risky companies that adopt a much more flexible model. Replying now directly to your question, the composition of the board should, as all the company's organization, contribute to its strategy much more comparable to a start-up or a venture capital project than to a traditional company.

José Campino: Dear all, dear Iliana, would you have in mind a variable that could measure the board's impact on the project's success (given the circumstances)? What do you think about the impact on a company's strategy of this lean model of companies which will most likely start with the founders and eventually develop into a risky project? Do you find these companies

interesting to study as they could be a very innovative way to obtain financing (comparable to a digital IPO)?

Discussant: Hi José, thanks for answering my questions I appreciate it. And yes, I completely agree with you, there is more than ever a need for a flexible model, and if I understood you correctly this should include new board composition, or at least a new role, one that fosters creativity and innovation. In my opinion, that new model should also include a board that recognizes leadership, talent and capabilities in "lower ranks in terms of written structure" but who are not at all low in terms of potential for organizations. What is your perspective on it?

Discussant: Thanks for asking back, José. "Would you have in mind a variable that could measure the board's impact on the project's success (given the circumstances)?" I think that whenever we want to measure the behavior of group, like in this case the board's impact in project success, and then we want to extract the variables off to measure it, we face a bigger problem: "Human behavior" which is affected by their context, by the people themselves and by how the behavior itself affects again the context itself and the people, here we are talking about reciprocal determinism. Therefore, I would not focus on a specific variable, because it may not exist, or better to say, there may be so many variables to consider that it would become impossible to measure. I would rather focus on analyzing what are the conditions, what is the context that need to be allowed or created to enable all the participants of the organization to contribute and achieve the goals of the organization.

Discussant: "What do you think about the impact on a company's strategy of this lean model of companies which will most likely start with the founders and eventually develop to a risky project?" I am of the opinion that the impact on the strategy of lean companies can only be determined depending on the strategy itself. For example, if the strategy is focused on creativity, innovation and flexibility, lean companies may benefit from the presence of a founder that fosters networking, resilience, tolerance for error and risk. But again it depends. I truly believe that we cannot play anymore with a one fits it all model. What do you think on this regard, it is very interesting?

Discussant: "Do you find these companies interesting to study as they could be a very innovative way to obtain financing (comparable to a digital IPO)?" I feel very humble with this question, but I venture once again to say that YES, this indeed may be the future. Just look at the entire world right now with the Coronavirus. Are we spending our normal currencies? At least in Germany no, we cannot even pay with cash because we have to touch it. Stores are accepting only credit and debit cards because in that way their employees do not have to expose

themselves to the virus, and this is just the beginning!!!! I am not saying that we will change everything in one year, but we never know. I am convinced you are on the right path, what do you think?

José Campino: Iliana, I couldn't agree more with you. Yes, indeed the ICOs' board composition should be innovative in structure and also in terms of positions. In my opinion, when we meet the corporate world in most of the cases, particularly multinational companies, we find such a division of tasks and so many departments with strict hierarchies which might not allow at all "lower ranks" to shine, prove their value and be recognized. I guess this is can be a price to pay when having great growth. In a start-up or in such innovative projects such as ICOs a "lower rank" might most likely have contact with high-rank positions and many more chances to be seen as valuable for the organization. I think these companies are much more adapted to innovate in terms of work, (e.g., much more prepared for remote working, flexible offices, and flexible schedules) and could be of value to understand how they promote employee satisfaction and recognition. A position at the board which would have a function of promoting employee recognition would be innovative and of tremendous impact, I think.

José Campino: Thank you for replying. It is very important to me to receive feedback and learn from it, it is for sure a determinant of success in this case I agree it is very hard to measure that. I should reflect a while more on the subject and try to find a good way to include this.

José Campino: I think that the future is not at all the one fits all, which I think has proven to not foster innovation or by itself promote employee satisfaction and recognition. I guess also that in these cases the strategy will be, at least in the beginning, the vision of the founders. I mean, the founders will determine if the company is prone to innovate, the way it does and growth paths to follow. But yes, I believe the companies' organization models should follow a much more flexible structure and as tailor-made the employees as possible to allow them to be productive in their own way keeping the company together. This is a great challenge which I think these companies may reply to.

José Campino: This is a topic that interests me a lot. I have also been looking at Fintech companies and the revolution they are forcing on traditional banking systems. The value of currency exists because each one of us believes it exists. For example, why is our euro valuable? Is it because it is backed by the European Central Bank because it is tradable in several economies in an entire continent? It is for sure not because we can assign a specific value to it, for example, a value in gold. So, cryptos are the same thing backstopped by a blockchain system but not as tradable as the traditional currencies. If they were, for sure they would have much bigger importance. I think, as you said, this is the future. I think the future will most likely

depend on traditional institutions to reply to these challenges, for example, there are central banks issuing cryptos (e.g., China). The future is for sure digital and there are so many solutions adopting traditional currencies but overcoming much of the physical barriers and physical exchanges (e.g., Revolut, N26). Here in Portugal, we have a platform that basically works as an ATM in your phone and allows creating disposable cards for safe internet purchases without fees for example (i.e., MBWay). Germany is a very interesting country, innovative in these aspects and headquarter of many Fintech. Do you think people and companies are adapting and willing these innovations?

Discussant: Absolutely, it is the founder who sets the corporate culture that, at the end, will allow innovation and creativity, and now that you mention, I think that we also have a broad field to explore in terms of corporate culture and corporate governance or not? People and companies adapting and willing these innovations? That is hard to answer. There is something going on definitely, we are moving in that direction, but I am afraid that not at the speed that the historical moment is requesting from us and not at the level that organizations and people inside them also need. For example, in this conference, I have only detected other 2 colleagues besides you and me who are discussing more or less the same "new governance" if we want to name it somehow, while the rest is still focusing on the traditional structures and even claiming for additional regulations and more hierarchy. It is going to be a tough path indeed, but the truth is that we cannot fight evolution, the traditional corporate governance model is based on hierarchy and control, and that structure comes from a mental infrastructure developed during the industrial revolution when people use to work with their hands. We are not in that stage anymore, we are mental workers!!! Once again just look at cryptocurrency, is not possible that a constructed concept like money has already developed, while corporate governance is still embedded in an idea of the power of control from the 18th century. But what we know for sure is that evolution always wins... sooner or later.

José Campino: Absolutely yes. These projects, specifically the ICOs, are almost unknown to most of the people and to the academy. Therefore, there are so many topics one can explore. I did not found studies on ICOs' corporate governance or culture but as we have been speaking, they can propose disruptive ideas that can be applied to other realities. So, there is a lot to study on this field, for example, how are the boards composed, by whom and the hierarchies proposed (or their inexistence). How tends to be the corporate culture of these companies, how are they organized in terms of CSR? For example, Fintech companies do not have the burden of heavy crises such as banks, promote the employee's satisfaction and benefits and can be more prone to CSR initiatives. For example, as the target market of these companies and their internal

composition is much younger in terms of people's age, they are eventually more eager to tackle environmental CSR strategies? This is just an idea.

José Campino: It has been wonderful to discuss this with you. I completely share this idea. I would be very happy if more people start dedicating more time to these issues and start exploring more future trends and less on past experiences. For sure today we have new and disruptive necessities which are much clearer in terms of crisis such as the one of today. Hence, corporate governance should for sure keep up the pace at all levels to adapt to this new reality we are living in.

Discussant 2: Hi Jose, I went through both your paper and the comments of my colleagues above. My vision of your innovative ideas is about the possibility to integrate all the transformations the board should experience after your suggestions, into the existing infrastructure of corporate governance and regulation worldwide. First – stock exchanges should modify their listing requirements (related to the boards). Second – regulators (various commissions, like the SEC in the USA) should accept a need for these innovations. Third – shareholder activists should pick up these good ideas and promote it to their companies. Your contribution is very important as you outlined your innovative ideas and put it in the profile of the new board structure and probably functions. Recently, you and the community of scholars should promote these ideas to the market participants mentioned above in the way of scholarly papers, market reports, social networks, blogs, and surely conferences. You have just fixed the first stone into the wall, Jose.

Discussant: I agree with you Alex, indeed. In terms of regulators, my personal belief is that that is still a long shot since there are a lot of political and economic individual interests involved, but I may be wrong. Maybe for now we could be content by trying to integrate this transformation in organizations that even though are not public and are not subject to specific legal frameworks are self-regulating themselves by incorporating corporate governance frameworks, maybe, that could be the first step in this long path. What do you think?

José Campino: Hello Alex. Thank you so much for your comments. It is a very good point and very good insight. I completely agree with you on this and you touched a crucial point here, the regulators and regulations. Indeed, for a company to adapt it also needs so much adaptation to regulations that can block innovation and a cutting hedge decision-making process. This type of companies (Fintech, ICO projects) has much less regulation (sometimes none) and that can be a competitive advantage. They are trying to adapt though. For example, the Whitepaper works for these companies as a prospectus of a fund. The difference is the regulation once in

the Whitepaper almost no regulator will have a role to play. Nevertheless, there are places where this is changing and regulators are looking more closely on the topic.

Discussant 2: I see your vision, Iliana. Yes, I think that scholars and scholarly research are drivers of the transformations you meant. My experience tells me that very often scholars are seriously disordered (mainly by politicians) what scholars should do and what incentives should be fixed for us. They forget that scholars are entirely, naturally independent, so my point of view is about the scholarly activism that should have certain outcomes (ideas) and promote it actively through the public.

José Campino: If I may complement somehow what was said by Alex, I would say that the regulators were created to regulate the traditional institutions which have (sometimes) tremendous power and influence. Imagine the disruption caused in banks by the appearance of a competitor which completely changes their business model and offers the same but refined product with much lower costs. Sometimes this innovation will likely disappear and be integrated into the usual business model once a traditional institution has the power to buy the new incumbent. Studies have also highlighted the slowness of the regulators adapting to new realities. Regulation can be for sure a safe harbor but at the same time jeopardize innovation if it does not adapt quickly. Besides, today a question appears: what regulators can in fact do to avoid tremendous crisis as the last financial crisis?

José Campino: That is a very interesting insight. Alex, may I ask: in your opinion which qualities should a scholar have in order to remain independent despite all the interests surrounding? What are the most effective ways for academics to reach the global public and attract institutions' attention (e.g., regulators, companies)?

Discussant: Following your idea Alex, I just came across a concept from psychology that supports exactly what you say, the concept is "availability heuristic", probably you already know it, but for me it was novelty, it refers to "how we tend to judge how likely an event is by how easily we can retrieve an example of it", the relevance of this concept in terms of policy making, according to the author is that, policy makers judge rare events (like Enron & WorldCom) as being much more common, because they can remember them more easily, and therefore they spend larger amounts in them in policy making to combat threats that are not actually the standard in the context, which makes harder and more expensive more regular good behaved organizations to comply with the rules. So, exactly as you say it will correspond the scholarly activism to help policy makers to open their minds to new solutions for old problems.

7.3. Appendix C – VIF Table of the OLS model regressed in the second study

Table 26 - VIF Table of the OLS model regressed in the second study

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)	VIF	
Capital Raised Log (1)	1.0000																												-
Project Rating (2)	0.2835*	1.0000																											2.41
Whitepaper: Team Disclosed (3)	0.2215*	0.2262*	1.0000																										1.49
Whitepaper: Technical (4)	0.3410*	0.1844*	0.1173*	1.0000																									1.30
Whitepaper: Word Count Log (5)	0.2129*	0.2110*	0.4985*	0.2820*	1.0000																								1.61
Secondary Market (6)	0.3100*	0.0791	0.0095	0.2322*	0.0622	1.0000																							1.32
Restricted Countries Median (7)	-0.0272	0.0627	-0.0318	-0.0154	0.0042	-0.0288	1.0000																						1.06
Region: North America (8)	-0.0730	-0.1398*	0.0466	-0.0123	0.0383	0.0440	-0.0566	1.0000																					1.71
Region: Asia-Pacific (9)	0.0296	0.0481	-0.0490	0.0844	-0.0736	0.0025	0.0082	-0.1942*	1.0000																				2.30
Region: Europe (10)	0.0311	0.0550	-0.0129	-0.1057*	-0.0150	0.0258	0.0229	-0.3465*	-0.5873*	1.0000																			2.46
Pre-sales (11)	-0.0314	0.1603*	0.1354*	-0.0417	0.0798	-0.1865*	-0.0483	-0.0286	-0.0267	0.0496	1.0000																		1.16
Bonus Scheme (12)	0.1195*	0.2985*	0.1363*	-0.0436	0.0701	-0.0995*	0.0158	-0.0888	0.0375	-0.0023	0.1973*	1.0000																	1.29
Fundraising Goal (13)	0.1196*	0.2555*	0.1301*	0.0288	0.0354	-0.0419	0.0769	-0.0711	0.0769	-0.0096	0.2121*	0.2639*	1.0000																1.22
Token Price Log (14)	0.0655	-0.0844	-0.1042*	-0.0984*	-0.0507	0.0037	-0.0430	0.0406	-0.1043*	0.0350	-0.0301	-0.0845	-0.0174	1.0000															1.11
ICO Duration Days Log (15)	-0.1317*	0.0302	-0.0115	-0.2194*	-0.0013	-0.2216*	0.0094	-0.0726	-0.2392*	0.1794*	0.0489	0.1089*	0.0284	0.0373	1.0000														1.37
BTC Price Log (16)	-0.1986*	0.1600*	0.1254*	-0.0794	0.0260	-0.3470*	0.1069*	-0.1516*	0.0638	0.0024	0.2123*	0.1628*	0.1761*	-0.2026*	0.1422*	1.0000													2.22
ETH Price Log (17)	0.0316	-0.0122	0.1711*	-0.0055	0.1500*	-0.1515*	0.0360	-0.0298	-0.0409	0.0673	0.1060*	0.1065*	0.1126*	-0.0787	0.1948*	0.6129*	1.0000												1.96
CCY Accepted (18)	0.0938	0.2120*	0.1132*	0.0874	0.0592	-0.0462	0.0224	-0.0991*	-0.0645	0.0982*	0.0731	0.2295*	0.1671*	0.0275	0.1439*	0.0902	-0.0277	1.0000											1.19
Twitter Active Campaign (19)	0.2054*	0.2359*	0.0795	0.0566	0.1032*	0.0922	0.0608	-0.0126	-0.0018	0.0339	-0.0577	-0.0534	-0.0249	-0.0162	0.1471*	-0.0763	-0.0368	-0.0068	1.0000										2.17
Twitter Followers Log (20)	0.2987*	0.3653*	0.1779*	0.1865*	0.2065*	0.1898*	0.0192	-0.0346	0.0024	0.0271	-0.0089	0.0646	0.0667	-0.0092	-0.0390	-0.0845	-0.0513	0.1070*	0.6248*	1.0000									4.16
Twitter Number of Tweets Log (21)	0.2676*	0.3972*	0.1979*	0.1969*	0.2240*	0.1790*	0.0481	0.0177	-0.0191	-0.0055	-0.0036	0.0317	0.0335	-0.0048	0.0046	-0.0957*	-0.0656	0.1018*	0.6921*	0.8600*	1.0000								5.00
Github Account (22)	0.1415*	0.5084*	0.0855	0.1038*	0.1426*	0.0114	-0.0050	-0.1018*	0.0489	0.0040	0.1008*	0.2097*	0.1747*	-0.0484	-0.0106	0.0764	0.0063	0.0908	0.1137*	0.1824*	0.1770*	1.0000							2.49
Github Code Prior ICO (23)	0.1487*	0.4560*	0.1132*	0.1025*	0.1002*	0.0673	0.0225	-0.0805	0.0603	0.0017	0.0627	0.1564*	0.1446*	-0.0273	-0.0744	0.0419	-0.0268	0.0858	0.1726*	0.2244*	0.2186*	0.7364*	1.0000						2.35
Website Active on May, 2020 (24)	0.1733*	0.2356*	0.0806	0.1929*	0.2753*	0.1691*	-0.0472	-0.0072	0.0224	-0.0638	0.0282	-0.0262	0.0543	-0.0121	-0.0669	-0.1607*	-0.1501*	-0.0349	0.2046*	0.3448*	0.3336*	0.0251	-0.0073	1.0000					1.38
Team Members (25)	0.2634*	0.4471*	0.2091*	0.1821*	0.1594*	0.0135	0.0784	-0.1521*	0.0530	0.0174	0.1239*	0.1337*	0.1991*	0.0153	-0.0221	0.1113*	0.1306*	0.1147*	0.1196*	0.1679*	0.2181*	0.2287*	0.1808*	0.1499*	1.0000				1.69
Advisors Log (26)	0.1096*	0.3738*	0.1807*	0.0447	0.1411*	-0.0602	0.0666	-0.1268*	-0.0436	0.0877	0.1067*	0.2252*	0.1568*	-0.0593	0.1428*	0.1575*	0.0735	0.1577*	0.0559	0.0971*	0.1388*	0.2540*	0.1981*	-0.0134	0.4391*	1.0000			1.42
LinkedIn Connections Log (27)	0.1928*	0.5374*	0.2399*	0.1335*	0.2289*	0.0137	0.1134*	-0.1155*	-0.0600	0.1194*	0.1692*	0.2479*	0.2587*	-0.0321	0.0418	0.1326*	0.0747	0.1339*	0.1690*	0.2400*	0.2616*	0.2544*	0.2324*	0.1451*	0.4866*	0.3267*	1.0000	1.70	
																													Mean
																													1.90

Notes: Number of observations = 428. Pearson correlation coefficients with disgnificance level = p < 0.05 (*). VIFs based on the model regressed using standard OLS estimator.

7.4. Appendix D – VIF Table of the OLS model regressed in the third study

Table 27 - VIF Table of the OLS model regressed in the third study

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	VIF			
Soft-cap achieved (1)	1.0000																									-		
Log Capital Raised (2)	0.8922*	1.0000																									-	
Log Capital Raised Over Soft-Cap (3)	0.6017*	0.5758*	1.0000																								-	
Number of Projects per Person (4)	-0.0206	-0.0275	-0.0126	1.0000																							1.04	
Location: North America (5)	-0.0220	-0.0176	0.0445*	0.0261	1.0000																						2.57	
Location: Europe (6)	0.0243	0.0112	-0.0238	0.0717*	-0.4516*	1.0000																					3.51	
Location: Asia (7)	0.0361*	0.0580*	0.0413*	-0.0719*	-0.2622*	-0.5640*	1.0000																				2.98	
LinkedIn Connections (8)	0.0937*	0.0869*	0.0439*	0.1068*	0.0893*	-0.0183	-0.0454*	1.0000																				1.10
Managerial Experience (9)	0.0287	0.0309	0.0003	0.0228	0.0468*	-0.0515*	0.0158	0.1978*	1.0000																			1.18
Technology Experience (10)	-0.0241	-0.0328	-0.0049	-0.0271	-0.0026	-0.0097	-0.0086	-0.1135*	-0.3383*	1.0000																		1.32
School Degree Rate (11)	0.0156	0.0231	0.0394*	-0.0691*	0.0006	0.0406*	-0.0306	0.0456*	0.0196	-0.0416*	1.0000																	1.05
Business Degree (12)	0.0376*	0.0290	0.0122	0.0164	0.0093	-0.0152	-0.0117	0.1575*	0.1574*	-0.2527*	0.1781*	1.0000																1.22
Technology Degree (13)	-0.0331	-0.0344	-0.0149	0.0167	0.0411*	-0.0548*	0.0384*	0.0183	-0.0961*	0.3598*	-0.0057	-0.3116*	1.0000															1.25
Team Rating (14)	0.2038*	0.2232*	0.1678*	-0.0182	-0.0482*	0.0491*	0.0632*	0.0344	0.0010	-0.0021	-0.0388*	-0.0282	-0.0327	1.0000														3.22
Vision Rating (15)	0.1200*	0.1432*	0.1100*	0.0085	-0.0095	0.0235	0.0540*	0.0407*	-0.0035	-0.0032	-0.0389*	-0.0237	-0.0203	0.8059*	1.0000													3.27
Number of Team Elements (16)	0.2022*	0.2117*	0.1295*	-0.0253	-0.0616*	0.0320	0.0187	0.0303	-0.0367*	-0.0227	-0.0452*	-0.0492*	-0.0268	0.3634*	0.2617*	1.0000												1.26
Soft-Cap Limit (17)	-0.0189	0.0582*	0.2178*	0.0455*	-0.0574*	-0.0288	0.1037*	-0.0434*	-0.0367*	0.0191	-0.0417*	-0.0147	0.0087	0.0957*	0.1259*	0.1912*	1.0000											1.38
Hard-Cap Limit (18)	0.1323*	0.1456*	0.1212*	-0.0123	-0.0176	-0.0227	0.0545*	-0.0071	0.0099	0.0095	-0.0012	0.0270	-0.0121	0.0796*	0.0712*	0.1410*	0.3865*	1.0000										1.22
Token Price (19)	0.0856*	0.0918*	-0.0119	-0.0242	0.0560*	-0.0438*	-0.0034	0.0116	0.0086	-0.0083	-0.0109	0.0199	-0.0136	-0.0280	-0.0101	0.0114	-0.0471*	0.0320	1.0000									1.04
Currencies Accepted (20)	-0.0837*	0.0072	-0.0498*	0.0198	-0.0055	0.0274	-0.0338	-0.0228	-0.0042	-0.0379*	-0.0295	0.0220	-0.0448*	0.1149*	0.0903*	0.1311*	0.1561*	0.1220*	-0.0177	1.0000								1.14
Ethereum Platform (21)	0.1542*	0.0973*	0.1121*	0.0178	0.0467*	-0.0132	-0.0324	0.0618*	0.0099	0.0178	-0.0260	-0.0214	0.0357*	0.0871*	0.1218*	0.0648*	-0.1014*	-0.0469*	0.0425*	-0.1466*	1.0000							1.07
Bonus Scheme (22)	0.0719*	0.0908*	0.0697*	0.0445*	-0.0053	-0.0116	0.0301	-0.0176	-0.0047	-0.0226	-0.0336	0.0159	-0.0393*	0.1569*	0.1468*	0.0371*	0.2809*	0.1401*	-0.1036*	0.1793*	-0.0301	1.0000						1.18
ICO Rating (23)	0.1541*	0.1958*	0.0676*	0.0231	-0.0822*	0.0105	0.0750*	0.0016	-0.0261	-0.0067	-0.0313	-0.0232	-0.0390*	0.5437*	0.5927*	0.3024*	0.1917*	0.1284*	-0.0142	0.1750*	0.0407*	0.2449*	1.0000					1.78
ICO Year (24)	-0.2829*	-0.2931*	-0.1746*	0.0285	-0.0715*	-0.0644*	0.0784*	-0.0614*	-0.0565*	-0.0033	-0.0203	-0.0331	0.0222	-0.0494*	0.0092	0.0367*	0.2095*	-0.0171	-0.1173*	0.1940*	-0.0895*	0.0612*	0.1713*	1.0000				1.19
																											Mean	
																											1.67	

Notes: Number of observations = 3 158. Pearson correlation coefficients with disgnificance level = $p < 0.05$ (*). VIFs based on the models regressed using standard OLS estimator.

7.5. Appendix E – OLS method regressed in the second study

Table 28 - OLS method regressed in the second study

	Model 1 Project Variables		Model 2 + Campaign Variables		Model 3 + Social Networks Variables		Model 4 + Team Variables	
R2	0.2299		0.3304		0.3511		0.3580	
Adjusted R2	0.2461		0.3026		0.3142		0.3163	
Observations	428		428		428		428	
	Coefficient	Strd. Error	Coefficient	Strd. Error	Coefficient	Strd. Error	Coefficient	Strd. Error
<i>Project Variables</i>								
Project Rating	0.79	0.20***	0.96	0.21***	0.86	0.25***	0.76	0.28***
Whitepaper: Team Disclosed	0.96	0.34***	0.96	0.33***	0.93	0.33***	0.87	0.33***
Whitepaper: Technical	1.97	0.40***	1.81	0.39***	1.81	0.39***	1.75	0.39***
Whitepaper: Word Count Log	0.07	0.11	0.00	0.11	-0.01	0.11	0.01	0.11
Secondary Market	2.14	0.39***	1.39	0.41***	1.31	0.41***	1.35	0.41***
Restricted Countries	-0.01	0.02	-0.01	0.02	-0.01	0.02	-0.01	0.02
Region: North America	-0.51	0.6	-0.98	0.59*	-1.00	0.58*	-0.86	0.59
Region: Asia-Pacific	0.21	0.49	0.11	0.48	-0.01	0.48	-0.01	0.48
Region: Europe	0.29	0.44	0.08	0.43	-0.02	0.43	0.03	0.43
<i>Campaign Variables</i>								
Pre-sales			-0.19	0.30	-0.13	0.30	-0.15	0.30
BonusScheme			0.55	0.31*	0.63	0.31**	0.67	0.31**
Fundraising Goal			0.52	0.42	0.55	0.42	0.53	0.42
Token Price Log			0.68	0.35*	0.70	0.34**	0.65	0.34*
ICO Duration Days Log			-0.62	0.36*	-0.81	0.37**	-0.76	0.37**
BTC Price Log			-9.72	1.71***	-9.31	1.71***	-9.03	1.71***
ETH Price Log			4.32	0.95***	4.27	0.95***	3.96	0.96***
CCY Accepted			0.06	0.07	0.07	0.07	0.06	0.07
<i>Social Network Variables</i>								
Twitter Active Campaign					0.98	0.41**	0.98	0.41**
Twitter Followers Log					0.29	0.18	0.33	0.18*
Twitter Number of Tweets Log					-0.38	0.27	-0.42	0.27
Github Account					-0.02	0.43	-0.06	0.43
Github Code Prior ICO					-0.18	0.44	-0.14	0.43
Website Active on May, 2020					0.00	0.32	-0.03	0.32
<i>Team Variables</i>								
Team Members							0.04	0.02*
Advisors Log							0.03	0.46
LinkedIn Connections Log							-0.09	0.12

Significance levels: p < 0.01 (***); p < 0.05 (**); p < 0.1 (*)

7.6. Appendix F – OLS method regressed in the third study

Table 29 - OLS method regressed in the third study

	Model 1 OLS Estimator Log capital raised over soft-cap		Model 2 OLS Estimator Log capital raised over soft-cap		Model 3 OLS Estimator Log capital raised		Model 4 OLS Estimator Log capital raised	
R2	0.05		0.14		0.09		0.21	
Adjusted R2	0.04		0.14		0.08		0.21	
Observations	3 158		3 158		3 158		3 158	
	Coefficient	Strd. Error	Coefficient	Strd. Error	Coefficient	Strd. Error	Coefficient	Strd. Error
<i>Team Variables</i>								
Number of Projects per Person	0.0	0.01	-0.01	0.01	-0.07	0.05	-0.06	0.05
Location: North America	0.18	0.04***	0.13	0.04***	0.72	0.24***	0.38	0.23*
Location: Europe	0.09	0.03***	0.05	0.03	0.75	0.22***	0.49	0.2**
Location: Asia	0.15	0.04***	0.1	0.04***	1.04	0.23***	0.89	0.22***
LinkedIn Connections	0	0*	0	0	0.04	0.01***	0.04	0.01***
Managerial Experience	-0.01	0.02	-0.02	0.02	0.12	0.14	0.01	0.13
Technology Experience	0.01	0.02	-0.01	0.02	-0.01	0.15	-0.12	0.14
School Degree Rate	0.04	0.01**	0.04	0.01***	0.14	0.09	0.15	0.09*
Business Degree	0.01	0.02	0	0.02	0.12	0.13	0.06	0.12
Technology Degree	-0.02	0.02	-0.02	0.02	-0.15	0.14	-0.06	0.13
Team Rating	0.11	0.02***	0.11	0.02***	0.89	0.11***	0.59	0.11***
Vision Rating	-0.05	0.02**	-0.06	0.02***	-0.38	0.12***	-0.63	0.12***
Number of Team Elements	0	0***	0	0**	0.06	0.01***	0.05	0.01***
<i>Control Variables</i>								
Soft-Cap Limit			0.31	0.02***			0.26	0.14*
Hard-Cap Limit			0.03	0.04			0.92	0.22***
Token Price			0	0*			0	0***
Currencies Accepted			-0.01	0***			0.01	0.02
Ethereum Platform			0.17	0.03***			0.67	0.17***
Bonus Scheme			0	0.02			0.31	0.12***
ICO Rating			0	0.02			0.89	0.1***
ICO Year			-0.18	0.02***			-1.87	0.1***

Significance levels: p < 0.01 (***); p < 0.05 (**); p < 0.1 (*)

