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Research-in-Progress

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Abstract

Initial Coin Offerings (ICOs), a novel fundraising form, allow blockchain-based ventures to issue crypto-assets in exchange for enormous amount of fund, with mere ideas in the conception stage, while without constraints of intermediaries or regulations. In this study, we develop a theoretical framework for how campaign profile, product quality, venture team characteristics, and expert ratings interrelate. Specifically, by establishing token sales as the primary ICO success measure, informational factors and the moderating role of expert ratings are proposed to investigate the underlying determinants affecting blockchain-based fundraising. By analyzing a dataset that consists of 4,183 ICOs from 2015 to 2020, we strive to clarify whether the investors should place more weight on the company ("the horse"), on the venture team ("the jockey"), or on the expert ratings ("the tips"). The research could promote the theoretical understanding of factors influencing ICOs, and help investors and entrepreneurs better appreciate the blockchain-based technology innovation.

Keywords: Fintech, blockchain, initial coin offering, entrepreneur financing

Introduction

"You could do it without going to a bunch of venture capitalists… here's my pitch, here's who we are, here's our plan, here's our bitcoin address, and anybody who sends coins to this address owns a piece of our new protocol. Anybody could do that!" - J.R. Willett, the founder of the ICO[1]

ICO, a novel fundraising mechanism, allows new ventures to sell blockchain-based digital tokens publicly on the Internet for external capital (Liu and Wang 2019). ICO investors contribute funding in exchange of digital tokens, either for potential profit gains from price difference after the completion of the ICOs, or for claiming the product or digital service after the implementation of the proposed

[1] Shin, L. 2017. "Here's the Man Who Created ICOs and This Is the New Token He's Backing," Forbes.Com, September 21. (https://www.forbes.com/sites/laurashin/2017/09/21/heres-the-man-who-created-icos-and-this-is-the-new-token-hes-backing/, accessed February 26, 2020).

project. Blockchain technology allows for transparency, immutability, improved monitoring and reporting, and trusted and secured peer-to-peer transactions without intermediary in the financial market (Dorfleitner and Braun 2019). Unlike venture capitalists (VCs) or business angels (BAs), which is usually bound by geographical constraints and require the participation of financing intermediary, ICO permits budding entrepreneurs to access external financing with less constrains, including reduced transaction costs as well as investment thresholds (Fisch 2019). Consequently, young ventures and micro, less-sophisticated investors are showing increasing interest in this innovative form of fundraising.

Recent years has seen tremendous influence of ICOs, which have become the major fundraising mechanism for blockchain-based start-ups. Numerous investors commit massive amounts of funding to blockchain-based ventures. To be precise, despite of the bitcoin slump, ICOs raised record amount of $11.4 billion funding in 2018 (Shepherd 2019). Originally, only blockchain-based start-ups sought funding through ICOs, aiming at the initial launch of their product (Chanson et al. 2018). Nonetheless, latterly, established companies from outside the blockchain community entered the arena and launched their own ICOs. Specifically, in early 2018, Telegram concluded a record-setting ICO that raised $1.7 billion (Coindesk 2018a). There is no doubt that ICOs are a very recent and fast developing phenomenon.

The astonishing returns on ICO investments both on short and long terms have been attracting hefty funds (Chanson et al. 2018). However, funders in ICOs bear a high investment risk. On the one hand, the absence of regulations on this novel fundraising mechanism, which allows young ventures to solicit colossal funding with minimal effort while avoiding the costs of compliance and intermediaries (Fisch 2019). On the other hand, because of the speculative nature in ICOs and cryptocurrencies, there is no pricing mechanism in them (Chen 2019). In addition, due to the intangibility of new innovations, individual unsophisticated investors encounter significant difficulty in assessing the value of nascent ventures (Lee et al. 2015). Near half of ICOs that were launched in 2018 have failed or turn out to be scams (Shepherd 2019). For instance, Kodak, the film company, had a spectacularly failed ICO and investors suffered huge losses (Gerard 2018). Furthermore, apart from the ICOs with varying background, among the sheer volume of ICO listings, even ICOs in the same industry perform inconsistently with regards to the capital solicited and token sold. Hence, understanding the factors affecting blockchain-based ICOs success, becomes increasingly important both from a practical (Clayton 2017) and a scholarly perspective (Liu and Wang 2019).

Asymmetric information is deemed an important reason for the high risk (Ceballos and Hou 2017; Chen 2019; Park and Yang 2018). Consequently, drawing on signaling theory (Spence 1973), prior research has borne witness to how individual unsophisticated investors, when making ICO investment decisions, rely on diverse signals like the ICO campaign characteristics (Adhami et al. 2018; Fisch 2019), the team and advisory committee sizes (Chen 2019; Giudici and Adhami 2019), investor sentiment and investor awareness (Cai and Gomaa 2019), and social media communication (Chen 2019). Particularly, Chen (2019) found that technical signals from different channels exert different impacts on token sales, due to the various backgrounds and interpretation abilities of investors. Specifically, even though an objective interpretation of technical project schema increases the odds of successful ICOs, the content of these signals was not effectively communicated to the individual less-sophisticated investors because of the lack of professional skills in interpreting and evaluating them (Chen 2019; Fisch 2019). To attenuate this situation, certain leading ICO listing platforms, such as ICOBench, introduced expert rating functions to provide analytical, legal, and technical insights to the investors.

Despite the fact that informational factors influencing ICO fundraising have attracted extensive attention in academia, research on the effect of the expert ratings is virtually absent. Moreover, previous studies related to existing public offering methods, like IPOs and ECFs, cannot directly explain the ICO phenomenon because of the innovative blockchain technology. Whether the investors should place more weight on the company ("the horse"), on the founding team ("the jockey"), or on the expert ratings ("the tips") is inconclusive. In this study, therefore, we aim to investigate an integrated model to systematically study the effects of ICO campaign characteristics, founders' characteristics and expert ratings on fundraising success in ICOs.

This study would not only provide insights to blockchain-based start-ups on which factors should be emphasized during the ICO, but also facilitate investors' decision-making by considering important indicators. In addition, for governments without clear consensus on this new phenomenon, the findings of this study could illuminate appropriate regulation setting up to appreciate the benefit and mitigate the challenges brought by ICOs.

Theoretical Background

Entrepreneur Financing and ICO

Entrepreneurs have traditionally faced severe frictions in accessing external capital. Since the surging of Bitcoin in 2017, numerous technology-based start-ups have been attempting to utilize, complement, and substitute the blockchain technology to participate in the crypto-hype (Coindesk 2018b). Unfortunately, these young ventures often suffer from financing constraints because of lack of internal cash flows and collaterals, as well as asymmetric information and agency problems (Hall and Lerner 2010). These frictions hurdle their innovative attempts, limit their growth, and even threaten their survival (Brown and Earle 2017). Fortunately, the landscape for entrepreneurial finance has changed dramatically in recent years. New entrepreneurial financing alternatives, such as peer-to-peer lending, equity crowdfunding (ECF), and initial coin offering (ICO), have been introduced.

There are common concepts shared between initial public offerings (IPOs), ECFs and their vis-à-vis, ICOs. The sources of these fundraising venues are the public. Meantime, the price after issuance is determined by the demand and supply in the market. ICO, however, differ from its alternatives thanks to the innovative characteristics of the blockchain technology (Park and Yang 2018). IPOs are often the prime choice for start-ups in stable stages to legally collect a corresponding amount of capital based on its valuation through financing intermediaries in a certain capital market (Kazanjian 1988). A young venture in a commercialization stage prefers an ECF to issue securities in exchange for a considerable volume of fiat money (Park and Yang 2018). ICOs can attract unlimited amount of money of various forms, including cryptocurrencies and fiat money, with mere innovative ideas in the conception stage, and without restraints of intermediaries or regulations (Adhami et al. 2018). Therefore, despite sharing critical properties, ICOs are distinguishable enough from IPOs and ECFs in terms of the stage of start-ups, the constraints of regulations and geography, and the form and the size of issuing and receiving.

Signaling on ICO success

Signaling is all around people in everyday life. Signaling theory (Spence 1973) has been widely adopted in many field, including information systems, management, psychology and so forth (Karasek, Ray and Bryant 2012). Given the blockchain-based nature, ICOs bypass regulations and control from intermediaries, resulting in high investment risk. Most recent research in the blockchain-based fundraising literature has focused on investigating key signaling factors determining the success of an ICO fundraising campaign. In the extant literature, ICO success is conceptualized as the successful financing of blockchain-based technology venture, and it is operationalized as the binary outcome of the fundraising, or token sales amassed within the ICO period (Adhami et al. 2018; Fisch 2019). In such a context, signaling theory posits that information asymmetry inevitably occurs, and high-quality ventures can attract larger volume of funds by sending signals to potential investors. This has becomes the basis of many hypotheses, models, and ideas in this area.

Based on extant literature, we classified the success determinants of ICO into three categories, namely project characteristics, ICO campaign profile, and venture team characteristics (see Table 1). For instance, Fisch (2019) studied the role of signaling technical capabilities of ventures in ICO success, and found that the availability of a technical white paper and high-quality source codes increases the amount of funds solicited. Additionally, Giudici and Adhami (2019) explored the impact of the governance signals of an ICO, in terms of the size of venture team and the advisory committee, as well as their experience, on the venture's ability to reach the fundraising goals. Furthermore, Moro and Wang (2019) advised that legal jurisdiction and effective disclosure of campaign information could increase the probability to have a successful issuance. In general, signaling theory explains that information

asymmetry can be reduced by the efforts of fundraisers to signal the values of ventures, and these signaling factors lead to successful fundraising via ICOs.

Table 1. Determinants of ICO Success

	Project				**ICO Campaign Profile**									**Team**			**DV**
	White paper	Technical white paper	Source code	Patents	Issue size	Trading volume	Token sold ratio	Token offered / retained ratio	Ethereum Platform	Pre-ICO sale	Bonus	Legal jurisdiction	Social media exposure	Team size	Advisory committee size	Team education / experience	
Adhami et al. (2018)	x		+							+	x	+					ICO success
Fenu et al. (2018)														x			ICO success
Fisch (2019)		+	+	x	x			x	+	x							Funds raised
Moro and Wang (2019)			+							+	x	+	+				ICO success
Felix and von Eije (2019)					-	+	x	x		-	x						Underpricing
Giudici and Adhami (2019)	+		+					-		+				+	+	+	ICO success
Chen (2019)	+	+	+									x	x	+			Funds raised
Panin et al. (2019)			+						+	x	x	+					ICO success
Note: +: positive effect; -: negative effect; x: no significant effect.																	

Although several factors influencing ICO success have been identified and examined, prior studies provided inconclusive findings, as shown in Table 1. We raised two issues regarding to the determinants of ICO success. Firstly, some variables, such as pre-ICO sale, white paper and token offered ratio, are significant in some settings (Adhami et al. 2018), but not in others (Fisch 2019). Sometimes, a same variable is even found significant in opposite directions in different studies (Adhami et al. 2018; Felix and von Eije 2019), which raise doubts about their diagnosticity and predictive capability. Secondly, an expert can alleviate information asymmetry by reviewing an issue (Megginson and Weiss 1991). However, previous studies mainly focus on the signaling factors from the blockchain ventures, there is a dearth of research the influence of expert ratings on ICO success. Therefore, to provide answers to these issues, we strive to propose an integrated model, and then empirically validate it using ICO data fused from multiple data sources.

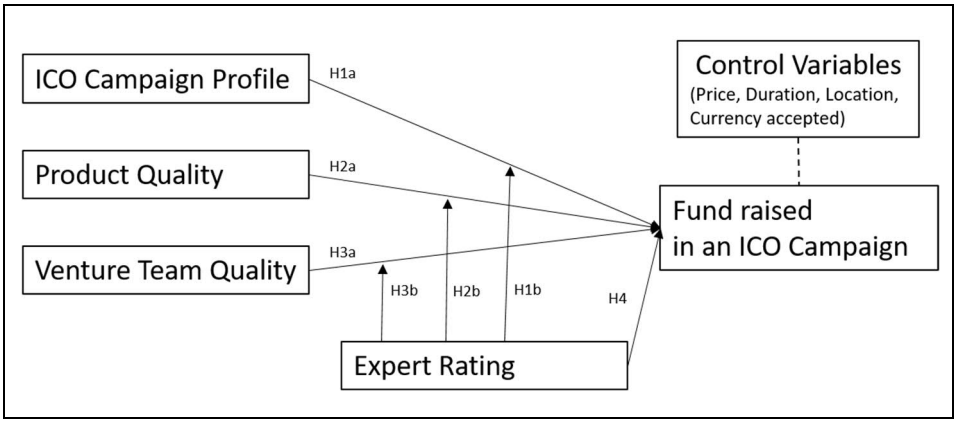

Figure 1. Integrated Research Model

The research model is depictured in Figure 1. Following the literature, we posit that the constructs of ICO campaign profile, product quality and venture team characteristics as factors influence ICO success. In addition, we hypothesize that expert ratings jointly affect the outcomes of ICOs. Particularly, the expert rating on each aspect of the campaign moderates the relationship between the corresponding factor and the likelihood of a successful ICO.

ICO Campaign Profile Disclosure

ICO campaign profile, consisting all necessary information to start a fundraising campaign, is the first resort for potential investors seeking information. For ICOs, several aspects of the campaign can be assessed. The mandatory profile usually presents the token type, the number and share of tokens offered for sale, token price in an ICO, duration of the campaign, and pre-ICO sale and bonus scheme (Fisch 2019). In order to have a successful ICO, a start-up tends to enrich its campaign profile by voluntarily disclosing more information and communicating with potential investors through social media channels (Chen 2019). Following the literature, we formulate this construct with multiple campaign-related variables (see Figure 1). Specifically, these variables are "issue size", "token offered / retained ratio", the type of "platform" (e.g. Ethereum, Bitcoin, etc.), the existence of a "pre-ICO sale," the existence of a "bonus scheme", the type of token (being utility, security or payment), the status of "legal jurisdiction" (e.g. a KYC - know your client report), and the level of "social media exposure". Due to the information asymmetry, especially in the conception stage when limited information about an ICO exists, investors rely on as much available information as possible to improve their investment decisions. To remove investors' doubts, blockchain-based start-ups try to offer all the data they need and answer their concerns. Consequentially, it is believed that the more information fundraisers provide about ICOs, the more individual investors contribute in ICO campaigns (Park and Yang 2018). ICO campaign information should be effectively disclosed in order to increase likelihood of successfully completing the ICO (Moro and Wang 2019). Therefore, we posit that:

H1a: Better campaign profile disclosure is positively related to ICO success.

Product Quality

The evaluation of a firm is related to consumers' perceptions of the product quality provided by the firm (Stoughton et al. 2001). While blockchain-based ventures usually have mere ideas in the conception stage, rather than working products. When assessing the quality of a technology start-up, a vital factor considered by investors is whether the idea can be successfully realized (Baum and Silverman 2004; Felix and von Eije 2019). However, the absence of available and accessible information make it difficult for individual investors to directly judge product quality. Therefore, in the ICO context, potential investors have to rely on alternative informational cues to infer the product quality, such as the availability of a white paper, the soundness of the technical information concerning the product, and evidence of high-quality source code (Chen 2019; Fisch 2019; Giudici and Adhami 2019). The white paper introduces a developmental roadmap, summaries project's commitment to understanding the market environment, describes the technical information as well as the token rights (Chen 2019). Technology ability is a unique feature in blockchain projects (Fisch 2019). The availability of an open source code library online represents the willingness of a start-up to voluntarily make their project progress transparent to the public investors. The number of commits to the source code library is recommended to infer the source code's quality when evaluating ICOs (Chen 2019; Fisch 2019). Following the literature, it is reasonable to presume that the availability of a white paper, an introduction of developmental roadmap and technical information, and the presence of high-quality source code indicate high produce quality concerning an ICO, which in turn affect its campaign success likelihood. Hence, we postulate that:

H2a: Higher product quality is positively related to ICO success.

Venture Team Quality

When assessing the quality of a technology start-up, a crucial criterion is whether the venture team has the personalities, professional experiences and resources necessary to successfully develop an idea into a business (Baum and Silverman 2004; Felix and von Eije 2019). In the ICO literature, the venture team qualities are reflected by a set of indicators, namely team size, advisory committee size, and team education and experience (Chen 2019; Giudici and Adhami 2019). In terms of team size, especially the top management and developer team size, researcher have found its substantial influence to the success of ICO campaigns. Particularly, public investors perceived a larger venture team as a positive signal of a technological start-up's capability to cope with market uncertainty (Chen 2019; Giudici and Adhami

2019). Giudici and Adhami (2019) find that the disclosure of venture team's information on education and ICO associated experience are related to better ICO outcomes. Therefore, we expect that venture team quality, defined as team size, advisory committee size, as well as team education and experience exerts effect on ICO outcome, and propose that:

H3a: Higher venture team quality is positively related to ICO success.

Expert Rating

As previously discussed, Megginson and Weiss (1991) argue that domain experts can reduce information asymmetry by reviewing an issue. Similarly for ICOs, it is common to receive a rating on the campaign profile, product quality, venture team, and the overall ICO evaluation (Felix and von Eije 2019). On ICO rating websites, like ICObench, blockchain experts give ratings and express opinions on ICOs. Investors can easily observe average ratings to induce the collective assessment regarding the quality of an ICO, especially when the experts have consensus on their ratings. However, due to fact that noise inevitably exists among signals, opinions of opposing poles may exist on the same ICO campaign. In this situation, opinion consensus, reflected by rating consistency, and average ratings can be jointly adopted as signaling cues. Since investors routinely use expert ratings to evaluate an ICO to mitigate information asymmetry, we assume that expert ratings and their consistency can impact ICO success. Meanwhile, investors may lack of professional skills in interpreting and evaluating the abovementioned ICO campaign criteria (Chen 2019; Fisch 2019). Therefore, individual less-sophisticated investors may adjust their assessment depending on expert ratings, which means that expert ratings and opinion consensus moderate the effects of other signals on ICO success. Hence, we hypothesize that:

H4: Expert rating and opinion consensus positively affect ICO success jointly.

H1b: Expert rating and opinion consensus moderate the effect of campaign profile on ICO success.

H2b: Expert rating and opinion consensus moderate the effect of product quality on ICO success.

H3b: Expert rating and opinion consensus moderate the effect of venture team on ICO success.

Research Methodology

Data Collection and Tentative Data Analysis

Our data comes multiple sources, including ICObench.com, topicolist.com and ICOdrops.com, which are all among the most popular ICO listing and rating sites in the blockchain community. We develop a Python web scraper to extracting data from these websites and perform data fusion to produce a more consistent, accurate, and thorough dataset, because each data source provides certain exclusive indicators. Finally, the resulting sample consists of 4,183 ICOs from 2015 to 2020. Table 2 shows the list of variables, including the dependent variable, the signals from various aspects of ICOs, and the control variables.

Partial least squares structural equation modeling (PLS-SEM), a statistical analysis method that has been widely adopted in IS studies, will be used to estimate both the measurement and the structural models depicted in Figure 1.

Table 2. List of Variables and Definitions

Category	Variable	Definition
DV	Fund raised	Total money raised of at the end of the ICO campaign
ICO Campaign Profile Disclosue	Issue size	Total number of tokens offered for sale multiplied by the offer price
	Token offered ratio	The relative share of tokens offered for sale
	Platform	Whether the venture is based on Ethereum, Bitcoin, Waves, own blockchain, others, or NA
	Token type	Whether the type of token issued is utility, security or payment
	Pre-ICO sale	Whether the ICO campaign holds a pre-sale
	Bonus	Whether the ICO campaign has a bonus scheme

	Legal jurisdiction	The availability of KYC report for the ICO campaign
	Social media exposure	The numbers of social media channels used and posts about the ICO
Product Quality	White paper	The availability of white paper for the ICO campaign
	White paper length	The word count of white paper for the ICO campaign
	Technical white paper	The technology relevance of white paper
	Source code	The availability of source code library online
	Source code committing	The total number of source code committing to the repository
	Patents	The number of patents the venture possesses
Venture Team Quality	Team size	The venture team size for the ICO campaign
	Advisory committee size	The number of advisors in the venture team
	Team education	Percentage of the venture team members with a master's degree or higher
	Team experience	Average number of associated ICOs within the venture team
Expert Rating	Overall rating	The overall rating received at ICObench
	Campaign profile rating	The expert rating of ICO campaign profile rating at ICObench
	Product quality rating	The expert rating of venture's product quality at ICObench
	Team rating	The expert rating of venture team quality at ICObench
	Opinion consensus	The consistency of each aspect of ratings measured by std.
Control Variables	Price	The offer price per token
	Duration	How long the ICO campaign lasts
	Location	Whether the venture is based in the US, Europe, or other countries
	Currency accepted	Whether the venture accept cryptocurrencies or fiat money

Expected Contributions

This research-in-progress paper could promote the theoretical understanding of factors influencing ICOs. This study assesses the effects of informational cues and the moderating roles of expert rating and opinion consensus on blockchain-based fundraising in the ICO context. The prior empirical studies about ICOs mainly focused the signaling cues sent from the entrepreneurs. This study is among the first to examine the moderating effects of expert ratings on other informational cues. By analyzing the interplay of signals either originate from the venture or a third party, a systematic investigation of the integrated model might yield conclusive results, and enrich the current debate.

Expected practical implications of this study can be divided into the perspectives of blockchain start-ups, investors, and governments. The result of this work could clarify whether the investors should place more weight on the company ("the horse"), on the venture team ("the jockey"), or on the expert ratings ("the tips"), and facilitate their investment decisions. The findings could provide guidelines to entrepreneurs on effectively send quality signals to public investors. The governments could also create information disclosure regulations according to our findings, and help investors and start-ups better appreciate the blockchain-based technology innovation.

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