# Initial Coin Offerings (ICOs): An Introduction to the Novel Funding Mechanism Based on Blockchain Technology

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## Abstract

Initial Coin Offerings (ICOs) are a novel form of funding mechanism that is based on blockchain technology. While ICOs are already the dominating financing paradigm in the blockchain industry, they might also disrupt well-established industries that rely on traditional funding systems. ICOs are a recent phenomenon. Hence, research on the topic is scarce and the phenomenon not yet well-understood. To address this research gap, we try to build a basic understanding of ICOs in this paper. More specifically, we identify constituent ICO building blocks by drawing on financialization literature. In addition, we analyze 96 ICOs with respect to these constituent building blocks. Our analysis provides first evidence that ICOs differ considerably regarding the identified building blocks. Based on these insights, we specify future research plans that encourage the development of a well-founded taxonomy and highlight limitations of our study.

**Keywords:** Blockchain, Distributed Ledger Technology (DLT), Initial Coin Offering (ICO), Token Sale.

## Introduction

An Initial Coin Offering (ICO) is a novel and unique form of blockchain-based financing mechanism, in which new coins are issued on a blockchain and transferred to investors in return for capital transmitted as cryptocurrency (Dell'Erba 2017). Typically, the key constituents of this process are fully automated by computer protocols on a blockchain, called smart contracts. As such, an ICO is based, at its core, on Information Technology (IT). The application of IT in the form of ICOs (i.e., a generally applicable funding mechanism) is of importance for human organizations and their management, as the funding of projects is one of the core tasks in the establishment of an enterprise. Hence, studying the phenomenon of ICOs meets the core interest of the IS discipline to advance knowledge about the use of IT in organizations and their management. ICOs contain features of Initial Public Offerings (IPOs), crowdfunding and venture capital (VC) at the same time (Dell'Erba 2017). ICOs have become the main funding mechanism for blockchain related startups in 2017, attracting billions of dollars from investors, by far exceeding traditional VC funding in the sector (Dell'Erba 2017) and reaching a level similar to quarterly VC investments in the *whole* internet sector (PricewaterhouseCoopers 2018). Specifically, Coindesk (2018) reports ICO funding of $5.4B for 2017. ICOs are a very recent phenomenon: Until April 2017 monthly funding was typically below $20M. Since then, steady strong growth has continued up to date, with the first two months of 2018 attracting over $4B (Coindesk 2018). In view of this massive growth, the disintermediation of traditional funding agents in the blockchain space through ICOs and the current strong movement towards disintermediation of financial services in general (e.g., peer-to-peer lending, social trading), ICOs have the potential to disrupt the established funding system. However, ICOs have been neglected by research so far and, hence, are not as well understood as related established investment types like IPOs, venture capital, and crowdfunding. Consequently, countries have started to issue tentative initial regulations, with some completely banning ICOs and others simply explicitly clarifying the impact of applicable existing law, leaving the long term regulatory setup open (Kaal 2018). Coins, however, differ substantially regarding their individual features

(Conley 2017) beyond our current comprehension (Elendner et al. 2016). It is, however, necessary to understand ICOs to develop and inform regulatory efforts (Dell'Erba 2017; Robinson 2017) particularly in the light of ICOs rapid socio-economic effects (Yadav 2017) and heightened risks for investors (Barsan 2017). To the best of our knowledge, peer-reviewed empirical approaches towards ordering and evaluating ICOs are virtually absent. Thus, we deem it necessary to build a basic understanding of blockchain-based funding mechanisms by disentangling ICOs into their constituent building blocks and characterizing these building blocks and their variation over different ICOs. This study merely reflects the initial steps in our endeavor to form a comprehensive taxonomy of ICOs. Hence, we formulate the following research question:

*What are the essential building blocks of ICOs and how do their specifications vary between ICOs?*

To overcome the current knowledge gap, we draw on extant literature of financialization to compartment ICOs into their constituents. We then iteratively derive features and corresponding operationalization items for each constituent to content-analyze 96 ICOs and show how the specific implementations of the found building blocks vary substantially between ICOs. Some coins are also called tokens and, consequently, ICOs sometimes named Token Sale. For simplicity, we use the former notation throughout this paper.

## Theoretical Background – ICOs as a Unique Form of Funding

In an ICO investors, in the past often anonymous, transfer capital in the form of cryptocurrency over a blockchain (1), to support a project (2) with funding and receive newly generated project-specific coins in return (3), as shown in Figure 1. Blockchain technology and blockchain-based ICO funding constitutes a unique form of banking disintermediation distinct from related concepts in the traditional financial industry (i.e., IPOs, VC, crowdfunding) (Dell'Erba 2017; Tapscott and Tapscott 2016). By democratizing start-up funding through the inclusion of individual small-scale, non-expert investors in addition to traditional venture capitalists, ICOs constitute a key driver in the financialization of non-financial firms and thereby advance the disintermediation of the banking industry. The financialization of non-financial firms is generally important to consider, since it affects the nature of profits generated in many industries (Aalbers 2017). Proponents of financialization argue that, hereby, long-term investments and innovations are sacrificed for the sake of short-term profits and outsourcing causing an increased outflow of money through interest payments, issued dividends, and share buy-backs (Crotty 2005; Lazonick and O'sullivan 2000). Considering the socio-economic pervasiveness of blockchain technology, in general, and the growing economic relevance of ICOs, in particular, we deem it necessary to build an understanding of ICOs.

As of now, however, there is a limited understanding regarding the specifics of ICOs. The terms under which participation in the ICO take place vary substantially from one ICO to another: For example, the price of a project-specific coin may increase (e.g., Ether), stay constant (e.g., BAT) or decrease (e.g., Gnosis) during an ICO. The amount of total funding to be raised by the project can differ substantially, from low amounts up to several $100M (e.g., Telegram, Tezos, Bancor). Participation may be limited to certain minimal and maximal investment thresholds per participating person. In the Nebulas ICO, for example, a minimum of 100 Ether had to be invested by every participant, which corresponded to around $73,000. Contrarily, in the case of Civic a maximum of $25,000 was possible to invest. Additionally, the type of coin received in

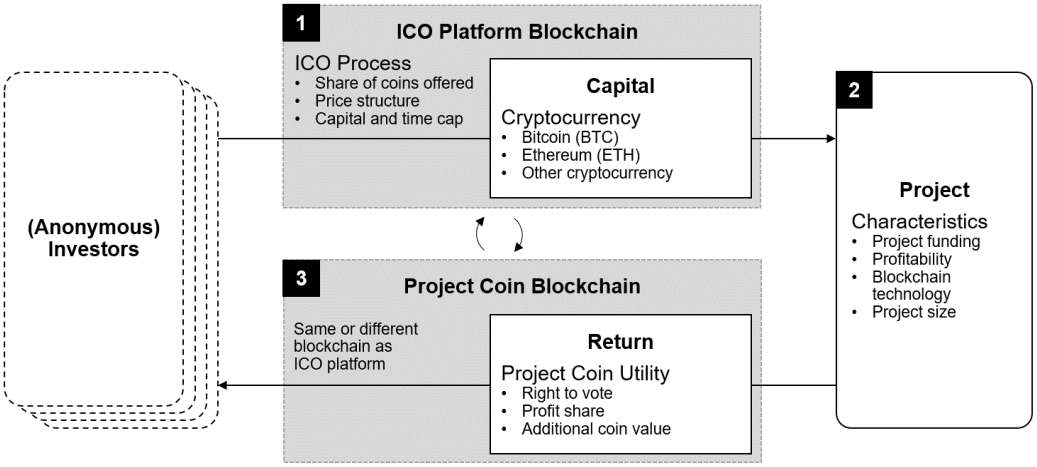


**Figure 1. Schematic Process of an ICO**

return can differ a lot. Technically, it can be based on the same blockchain as the one used to pay the cryptocurrency in the ICO, typically Ethereum. However, it can also be detached from the platform used for the ICO itself and built on another blockchain, or transition from one to the other a certain time after the ICO. Furthermore, the rights associated with the coin vary substantially between different ICOs and, thus, make it difficult to compare them easily. Lastly, of course, the projects themselves are different in every ICO, from their vision, team and technical implementation perspectives.

Thus, we approach ICOs in the theoretical terms of financialization, which describes "*the increasing role of financial motives, financial markets, financial actors and financial institutions in the operation of the domestic and international economies"* (Epstein 2005, p. 3), which results "*in a structural transformation of economies, firms (including financial institutions), states and households*" (Aalbers 2017). Thereby, financialization addresses the current trend of banking disintermediation. To comprehensively understand ICOs, we consider the unique properties of the respective capital seeking features in terms of the drivers of financialization: information technology development, deregulation, and the emphasis of the shareholder paradigm (Lagoarde-Segot 2017).

First, one of the key drivers of socio-economic change, in terms of financialization, is considered to be the increased *deregulation* (Lagoarde-Segot 2017). Despite current attempts to introduce regulation into the cryptocurrency market by formally auditing exchanges and issuing tax reports for clients, the *ICO process* is generally deregulated. While the ICO process generally follows an emergent (time-related) sequence, the specifics of the ICO process still vary substantially (Dell'Erba 2017). Second, we look at the financialization driver of *information technological developments* in terms of the *project characteristics*. Since all ICOs are naturally related to blockchain technology, as the core processes are entirely automated by IT, we need to consider specifics of the project characteristics to assess the different IT effects between ICOs. The characteristics of the projects that are funded through the ICO vary substantially themselves. Most prominently, not all projects are equally dependent on blockchain technology. Most ICOs concern projects that provide blockchain related services and technical solutions (e.g., Chanson et al. 2017). However, off-chain projects and traditional firms might simply use ICOs as a straightforward financing approach (e.g., Telegram, Kodak). Furthermore, even though an ICO is considered to be a legally less arduous financing approach compared to IPOs or VC (Flood and Robb 2017), projects can still rely on these traditional fundraising methods in addition to coin releases (e.g. Storj). Third, the concept of financialization describes the special emphasis of the *shareholder paradigm* as a key driver for socio-economic effects (Lagoarde-Segot 2017). In the context of ICOs, coins offer distinctive values to their investors. ICOs are characterized by the *coin utility* that the project provides. Unlike IPOs, for example, that always denote a share of ownership of the respective company and enable benefiting from the company's profitability (Teoh et al. 1998), coins offer project-specific rights. They can fulfill a variety of roles on different platforms. Each project's technological vision calls for coins with unique properties and uses such as securities, currencies or other entirely new ones (Conley 2017; Flood and Robb 2017). Overall, this study adopts a financialization-based lens towards building a first understanding of ICOs from a capital seeking perspective regarding project characteristics, the ICO process, and coin utilities.

## Empirical Study

To gain insights into the differences between ICOs and prepare for a later taxonomy development, we analyzed a total of 96 coins. Initially, we identified 210 existing coins by taking a sample of Coinmarktetcap (coinmarketcap.com) on August 2nd, 2017, 11:00 CET where we included the 210 coins with biggest market capitalization. The corresponding market capitalizations were in the range from $45B (Bitcoin) to $4.9M (Pascal Coin). Of all these coins, 100 had completed an ICO and of those for 96 coins enough information was available for a detailed analysis. For this analysis, we derived 3 constituents of ICOs by linking the phenomenon to extant literature of financialization. In a next step, we derived features and their corresponding operationalization for each constituent in an iterative process (Morris 1994): We created an initial version through an extensive literature review of existing research papers on ICOs, whitepapers of projects explaining details regarding the constituents for specific ICOs and the corresponding reaction of investors in social media channels frequented by the crypto community. This version was then circulated to and discussed with people familiar with the blockchain investment ecosystem, specifically persons who successfully organized and executed ICOs, legally accompanied ICOs, actively manage professional investment funds for blockchain assets and/or have been investing in numerous ICOs since several years.

Additionally, we conducted beta surveys for 10 ICOs to test the viability of the item operationalization. Including the feedback from all iterations resulted in the final version, shown in Table 1. The presented item operationalizations were then used to content-analyze each ICO in terms of the project website and whitepaper, posts of team members on the social media platforms Medium, Reddit and Bitcointalk, and metadata websites maintaining detailed information about whole lists of projects, like Coinmarketcap, Coindesk, Coinschedule, Icodrops or Smith+Crown.

| Constituent | Feature | Item operationalization |
|---|---|---|
| ICO Process | Share of coins offered | What share of project coins was offered for sale at the ICO? |
| | Price structure | Did the price of project-coins change during ICO? Did the price rise or decline or did it have another structure? |
| | Capital and time cap | Was there an upper limit (cap) for the amount of money raised? Was there a time cap for the duration? How quickly did the ICO finish? |
| | Payment | What coins were accepted as payment? (Ethereum, Bitcoin or other) |
| Project Characteristics | Project Funding | Did the project receive traditional funding (i.e. venture capital, crowdfunding, or business angel) before the ICO? Or afterwards? |
| | Profitability | Do the project initiators mention explicitly the goal of a profit generating project (as opposed to a self-sustaining open source project)? |
| | Blockchain technology | Is the project based on its own blockchain? If not, on which existing one? How important is Blockchain technology for the project (high/low)? |
| | Project size | How much funding did the ICO raise (USD, at valuations of the time of the ICO)? How many team members were there at time of the ICO? |
| Coin Utility | Right to vote | Do coin holders have same or similar voting right as shareholders of public listed companies? Can coin holders vote on the product implementation decisions of the blockchain project? Or on something else? |
| | Right to profit share | Are coin holders entitled to a profit share, similar to a dividend in normal companies? Does the coin generate any other return? |
| | Additional coin value | What is the main value of the coin? (Access to a service, profit sharing, monetary like transactions, or something else) |

**Table 1. Constituents, features and according operationalization for ICO content analysis**

## First Results and Discussion

A selection of our results is shown in Table 2, illustrating for all constituents corresponding item operationalizations of features that differ substantially over the analyzed ICOs. Explicitly, we registered if a majority (i.e., controlling share) or less than 20% (i.e., as in a typical VC investment) was offered in the ICO and noted the upper and lower quartile of the duration. Additionally, we specified binary criteria, such as the prevalence of different utilities, type of blockchain technology and VC funding. For example, 40% of the analyzed ICOs are based on completely new blockchains, while 60% use existing blockchains as platforms to build their project, which is a fundamental difference. Similar observations can be made for features of each constituent. These results support our assumption, that not all ICOs are alike and the details regarding all constituents have to be analyzed to understand ICOs. Note that we merely intend to show the existence of differences here, and will apply a more comprehensible approach for the later taxonomy development.

| Constituent | Feature | Differences over analyzed ICOs | | | |
|---|---|---|---|---|---|
| ICO Process | Share of coins offered | 14% | Less than 20% offered | 65% | More than 50% offered |
| | Capital and time cap | 24% | Sold within 1 day | 25% | Sold in > 1 month |
| Project Characteristics | Project Funding | 16% | Also traditional funding | 84% | No traditional funding |
| | Blockchain technology | 40% | Build new blockchain | 60% | Use existing blockchain |
| Coin Utility | Additional coin value | 65% | Main value utility | >15% | Profit sharing or Monetary |

**Table 2. A selection of our descriptive analytics results**

In addition, we considered the investment performance of all 96 analyzed ICOs. We collected a second sample of the market capitalizations on Coinmarketcap on February 4th 2018 and investigated the changes

compared to the initial sample of August 2nd (i.e. over a period of 6 months) in absolute and relative terms, and benchmarked against the performance of Ethereum. In any specific measure, we observe big differences in return. The average performance was 330% with a standard deviation of 320% and a mean of 230%, while four projects resulted in a total loss. This indicates that the risks linked to individual ICOs may vary substantially, as the features do, although further research is needed to confirm this.

## Conclusion and Further Research

In this paper, we introduced ICOs as a novel form of blockchain-based funding mechanism, dominating the financing in the blockchain industry, with the potential to disrupt the established global funding system. As an emerging phenomenon, ICOs are not yet well understood and almost no peer-reviewed publications exist on the topic. We provide first insights on the fundamental constituents of ICOs, by drawing on extant theory of financialization. Additionally, we show that ICOs differ substantially between each other regarding all constituents introduced, by content-analyzing 96 ICOs. Furthermore, we show indications that also the risk varies substantially between ICOs. Our results are limited as the analysis is explorative and the investigation of ICO performance basic. However, these results merely reflect the initial steps in our plans to establish a taxonomy of ICOs through cluster analysis and investigate risks involved more thoroughly. This could impact significantly both future research and practice, particularly regulators, ICO creators and investors.

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