

Emerging Trends in Entrepreneurial Finance: The Rise of ICOs

*Lesław Pietrewicz**

Initial Coin Offering (ICO), a fundamentally new funding model, can be viewed as “the next big thing” in entrepreneurial finance. ICOs are unregulated issuances of cryptocurrencies used by blockchain startups to fund the development of distributed applications where users interact directly with each other rather than through a central hub of the company which developed and controls the application. The aim of this exploratory study is to explain the spectacular rise of the ICOs and their relevance for entrepreneurial finance. The main finding is that ICOs effectively change the landscape of entrepreneurial finance, shifting barriers to capital formation, enabling funding previously unfundable projects, supporting new organizational and governance forms, democratizing finance, and contributing to the building of sharing digital economy.

Keywords: entrepreneurial finance, Initial Coin Offering, cryptocurrency, token, blockchain.

Submitted: 28.11.17 | Accepted: 01.02.18

Nowe trendy w finansowaniu przedsiębiorczości. Rozkwit ICO

ICO, czyli Initial Coin Offering, to zasadniczo nowy model finansowania, który można postrzegać jako przełom w finansowaniu przedsiębiorczości. ICO to nieregulowane emisje kryptowalut wykorzystywane przez start-upy rozwijające technologię blockchain, czyli łańcucha bloków, do finansowania rozwoju rozproszonych aplikacji, dzięki którym użytkownicy wchodzić ze sobą w interakcje bez konieczności korzystania z centralnego ośrodka, którym tradycyjnie była firma rozwijająca aplikację, ustalająca reguły i czerpiąca z tego zyski. Celem przeprowadzonych studiów rozpoznawczych było wyjaśnienie źródeł spektakularnego rozwoju ICO i jego znaczenie w finansowaniu przedsiębiorczości. Przeprowadzone analizy pokazały, w jaki sposób ta nowatorska forma pozyskiwania kapitału zmienia obraz rynku finansowania przedsiębiorczości, obniżając bariery tworzenia kapitału, umożliwiając finansowanie projektów, które wcześniej nie miały takiej możliwości, wspierając nowe formy organizacji i nadzoru, demokratyzując dostęp do zysków z kapitału i wspierając budowę cyfrowej gospodarki współdzielenia.

Słowa kluczowe: finansowanie przedsiębiorczości, Initial Coin Offering, kryptowaluta, token, łańcuch bloków.

Nadesłany: 28.11.17 | Zaakceptowany do druku: 01.02.18

JEL: G38, L17, L26

* **Lesław Pietrewicz** – PhD, Institute of Economics, Polish Academy of Sciences.
Correspondence address: Polska Akademia Nauk, Nowy Świat 72, 00-330 Warszawa; e-mail: pietrewi@inepan.waw.pl.

1. Introduction

For finance professionals, 2017 was the year of cryptocurrencies. Terms like alt-coins, digital currency, Bitcoin, token, ICO hit the headlines of business media around the world, and the prices of the most popular cryptocurrencies skyrocketed, leaving many people wondering what these really were and what their intrinsic value might be. Expressions like frenzy, hype, fad, and craze were the order of the day for the first time since the internet stock bubble at the turn of the century. Undiscouraged, in April 2017 Japan officially recognized bitcoin as a legal tender (Keirns, 2017), in August 2017 Estonia became the first country to consider launching a national cryptocurrency, soon followed by Venezuela and Russia, and in September the idea of central bank cryptocurrencies was scrutinized by analysts of the Bank of International Settlements (Bech & Garratt, 2017). The world's most influential financial institutions, including global investment banks J.P. Morgan Chase, Deutsche Bank and HSBC, global "Big 4" consultancy firms (Deloitte, EY, KPMG and PwC) and tech giants such as IBM have invested in developing competencies related to blockchain (Barnett, 2017; Green, 2017; Hackett, 2017), the distributed ledger technology underpinning cryptocurrencies. And blockchain startups raised more money through Initial Coin Offerings (ICOs hereafter) than through traditional venture capital financing (Ernst & Young, 2017).

According to the research website Coinschedule, blockchain startups raised \$96.4m in ICOs in 2016 (excluding DAO), and more than \$3.7 billion in 2017, an almost 40-fold increase. The number of ICOs surged from 46 in 2016 to 235 in 2017, and the average size of an ICO rose from \$2.1m to \$15.7m over that time (Coinschedule.com). The largest ICO to date brought more than \$250m (Protocol Labs in September 2017), and 5 ICOs raised \$100m or more each (in 2017). A further quantum leap is expected, with Telegram, the encrypted messaging service, seeking \$1.2bn in two installments in February and March 2018.

The enormous success of this new form of raising capital translates into a growing number of cryptocurrencies in circulation. As of 24 January 2018, there were 1491 cryptocurrencies listed on CoinMarketCap,

of which 564 were classified as tokens (total market cap \$59.9 billion), and 896 as coins, with the total market cap of \$495.3 billion. In comparison, the Swiss Association for Standardization, which maintains the International Standards Organization database, lists 177 national currencies presently in use.

These spectacular developments motivate the current study, which aims to explain the spectacular rise of the ICO and its relevance for entrepreneurial finance. Following the argument by Davis and Marquis (2005, p. 334), the "problem-driven approach" has been assumed in this study, oriented "toward explaining events in the world – starting with the question 'why is it that ...?'" and not beginning with hypotheses deduced from existing theories. Such an approach is particularly pertinent during a time of significant social and economic change (Davis & Marquis, 2005), of which "the spectacular rise of the ICO" (the research problem) will be argued to be an important part.

Given the very early stage of development of the ICO practice, this paper presents an exploratory study, by its nature aiming to diagnose the situation and discover new ideas rather than to offer conclusive answers to existing questions. As such, it follows a tradition of exploratory studies about new phenomena in entrepreneurship (e.g. Alvord, Brown, & Letts, 2004; Guerrero, Cunningham, & Urbano, 2015; Hanofov & Baldacchino, 2017; Mollick, 2014; Rice, 2002; Roure & Maidique, 1986; Tan, Shao, & Li, 2013).

Exploratory research is "aimed at developing basic understanding, uncovering novel insights, and exploring and pursuing innovative concepts – that is research aimed at meeting future needs" (National Research Council, 1993, p. 10). Thus, the study aims to explore the nature of the studied phenomenon of ICOs and result in its better understanding. As very little systematic research has been done on the topic of ICOs, virtually all empirical evidence, with the exception of some of rudimentary statistics, is case-based. As scholars, we are now at the phase of making sense of the new phenomenon of ICOs, trying to identify and understand sources of their spectacular success, deduct underlying principles, assess impact on the business world. Instead of using unstructured interviews,

which is the most popular primary data collection method in exploratory research, this study is based primarily on blogs written by cryptocurrency, blockchain, fintech, finance and entrepreneurship experts, and relevant articles in professional finance and technology online media (mostly Bloomberg Markets, Bloomberg Technology, Business Insider, and Financial Times) as providing the most hands-on and up-to-date information and insights into the studied emerging phenomenon. As with every exploratory research project, this study is an attempt to lay the groundwork that will lead to future research, and all the conclusions derived in this paper should be viewed as hypotheses to be verified in further studies.

The structure of the paper reflects its aims specified above. The first section shortly introduces the concept of ICO, outlines its origins and puts it in the context of the underlying blockchain technology to explain its mechanisms, and interprets major developments on the ICO market. The second section focuses on the nature and types of tokens, i.e. the instruments launched in ICOs, and the third analyzes sources of ICO success. The fourth section relates ICOs to selected major sources of entrepreneurial finance, namely crowdfunding and venture capital funding, and the final section concludes.

2. The Origins of ICOs

ICOs are such a novelty that they are called “the wild west” of the tech (Cheng, 2017), “the wild west” of investing (Binham, 2017), or even “the wild west” of capitalism (Prusak, 2017). In essence, ICO is a fundamentally new funding model based on unregulated issuances of cryptocurrencies (Geiger, 2017), which are a form of vouchers that represent some rights, usually usage rights, and much less frequently “work rights” or rights to assets (Tomaino, 2017a). As such, they can replace or complement traditional sources of external finance in the form of debt capital (such as bank credit or bonds) or equity issuances for a specific type of organizations, discussed below.

In order to understand the complex and revolutionary nature of ICOs, it is indispensable to look at their origins. The history of cryptocurrencies is inextricably linked to the blockchain technology, originally developed to underpin the idea

of a seamless digital payments system, independent of central banks and governments, that would work on a global scale. It began in 2008, when Satoshi Nakamoto published the famous white paper (<https://bitcoin.org/bitcoin.pdf>) introducing the idea of bitcoin, the first digital currency that would be impossible to counterfeit. The idea was based on a combination of advanced decentralized encryption, anonymity and immutability, which were the building blocks of the blockchain technology (Marvin, 2017). Bitcoin was introduced to the market in 2009 and a network for sending value online gradually developed.

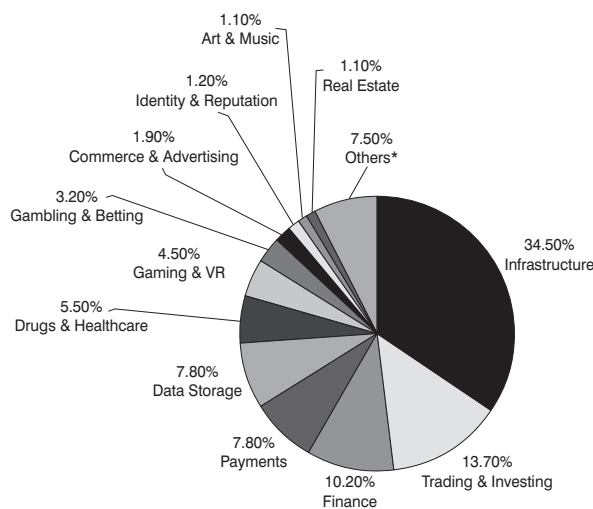
In January 2012, a white paper titled “The Second Bitcoin White Paper” was published. It proposed that the existing Bitcoin network be used as a protocol layer, on top of which new currency layers with new rules can be built (Shin, 2017). The idea materialized in 2013, with the launch of the first ICO, Mastercoin (now called Omni), and a tipping point came in 2017 with 235 ICOs and \$3,700m raised (Coinschedule.com), a huge majority of which took place on the Ethereum blockchain (ICO in 2014), rather than Bitcoin blockchain, but based on the same concept as outlined in “The Second Bitcoin White Paper” (Shin, 2017), with new features added.

While a lot of confusion exists in the cryptocurrency terminology (Bennington, 2017), two major types of cryptocurrencies must be distinguished at this point – coins and tokens – to explain the origins, evolution and prospects of ICOs. While the category of tokens will be further disambiguated in the following pages, the distinction between coins and tokens is fundamental, as they differ substantially in purpose and nature. In theory, the distinction is clear: a coin (known also as digital coin, crypto coin, alt coin) is a means of payment in which encryption techniques are used to regulate the generation of units of currency and verify the transfer of funds (e.g. Benoit, 2017), while token has wider functionality (Chronobank.io, 2017). Bitcoin is by far the most well known digital currency, and Ethereum has risen to be the most successful token (Eha, 2017), although CoinMarketCap classifies it as a cryptocurrency. In practice, the terms: cryptocurrency, coin and token are often used interchangeably (Chronobank.io, 2017), causing a lot of confusion.

In this paper, coins and tokens are clearly distinguished, while the term cryptocurrency is used as an umbrella term. The purpose of crypto coins is to act like money, that is as a unit of account, storage of value and means of payment (medium of transfer of value); while tokens also have value, it typically derives from their utility in the network, which should significantly exceed that of crypto coins (Chronobank.io, 2017). Said utility comes in various forms (and disguises, for regulatory reasons), motivating further categorization of tokens.

ICOs and tokens enable the development and running of new business models of distributed computing in great many possible applications. Possible applications, legitimized by successful ICOs, include distributed social networks, decentralized investment funds, decentralized carpooling platforms, decentralized marketplace (OECD, 2017), identity management, digital advertising, decentralized storage, governance (Cicero, 2017), content and digital rights management (Tapscott & Tapscott, 2017) and many others (see Figure 1).

Figure 1. ICOs by categories in 2017



* Others: Events & Entertainment, Legal, Energy & Utilities, Social Network, Communications, Mining, Privacy & Security, Content Management, Machine Learning, Recruitment, Commodities, Transport, Provenance & Notary, Travel & Tourism, Data Analytics, Supply & Logistics, Governance.

Source: coinschedule.com.

Distributed applications do not rely on a centralized organization to manage the network, but instead they are run in a decentralized manner as the so-called peer platforms (or peer platform markets) by aggregating the contributions of a distributed network of peers, where coordination is provided by a set of rules encoded in the blockchain-based protocol (OECD, 2017, p. 316), and not by the central hub of a company which controls the platform. Thus, they provide a new form of economic coordination and entail a new form of governance (Davidson, De Filippi, & Potts, 2016).

Of crucial importance is the proper protocol design which would regulate, among others, the nature of the cryptocurrency and the rules governing a given system (blockchain¹). As D. Tapscott and A. Tapscott (2016) note, blockchains can be programmed to record virtually everything of value and importance, e.g. money, titles, deeds, contracts, and virtually all other kinds of assets and rights.

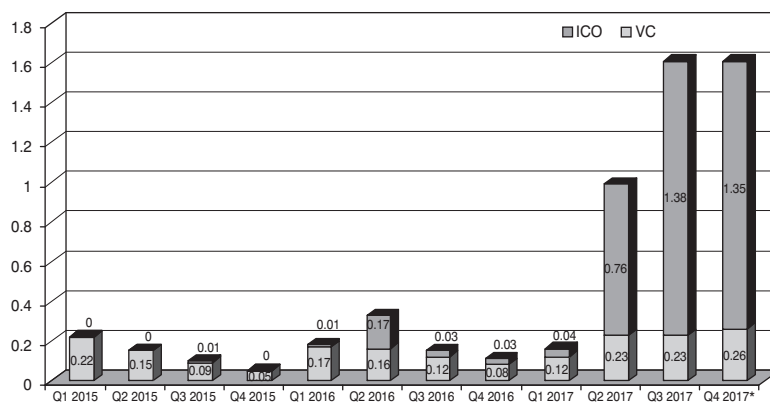
It is now believed that although the history of cryptocurrencies and the rise of ICOs started with the invention of bitcoin, the real breakthrough was not the idea of an independent, digital currency as such,

and not even advanced cryptology enabling secure transfer of it or any other asset, but the groundbreaking distributed ledger (blockchain) technology underpinning bitcoin that, unwittingly, enabled a new form of organization and new business models.

Blockchain technology is now widely seen as a major technological breakthrough (e.g. Tapscott & Tapscott, 2017), “the next big thing” after the invention of the internet. In recent months, listed companies’ name changes or even mentions of plans

to engage in development of the blockchain technology or its applications sent stock prices skyrocketing. At the same time, ICOs are seen as the primary way for startups to raise money for blockchain projects and the perception of blockchain as “the technology of the future” has contributed to an enormous success of this form of raising money and skyrocketing cryptocurrency prices on unregulated exchanges, allowing blockchain startups to raise more money through ICOs than through traditional venture capital financing (see Figure 2).

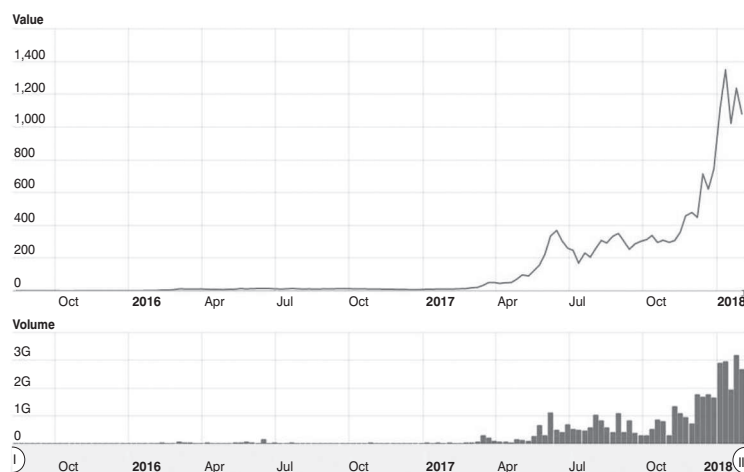
Figure 2. VC and ICO financing of blockchain projects (in US\$ millions)



* Till the end of November 2017.

Source: based on Ernst & Young (2017).

Figure 3. Ethereum token price in US\$ and volume



Source: worldcoinindex.com.

Over 80% of most recent ICOs have been taking place on the Ethereum blockchain (Eha, 2017), being a flexible, easily programmable (developer-friendly) protocol which enables designing token models incorporating many useful features beyond sending value online. These features suggest the direction of the evolution of ICOs and blockchain applications. Ethereum advocates argue that it could be a universally accessible machine for running businesses (Katz, 2017), but a more important point here is that its popularity shows the utility and value of a well designed protocol, attractive to users, and hence translating into cryptocurrency (here: Ethereum) price and volume (as a second-best proxy for popularity) increase (Figure 3).

This is the likely and welcome direction for the entrepreneurs interested in developing decentralized applications and for the ICO market, and developers should be experimenting with value-adding application features, skillfully linking them to tokens issued in ICOs.

3. The Nature of Tokens

Currently, there are different types of tokens, being part of distributed applications, typically developed on existing blockchains, like Ethereum. In the simplest but highly popular typology, two basic forms of tokens are distinguished – utility tokens and asset-backed tokens (Cadigan, Frank, & Chin, 2017), called also appcoins and tokenized equity, respectively (Srinivasan, 2017). In turn, the Crypto Valley Association of Switzerland defines three types of tokens: protocol counterparty, legal counterparty, and co-ownership (Müller, Meyer, Gschwend, & Henschel, 2017).

In one of the most informative token typologies, Tomaino (2017a) distinguishes four types of tokens, based on the source of the underlying value:

- (1) Traditional asset tokens. Such tokens represent underlying traditional assets such as equity, real estate, etc. Currently, it is the least common type of tokens.
- (2) Usage tokens. Tokens of this kind are required to access a protocol (a distributed digital service) and pay for the service. The fundamental value of such token derives from the usefulness of that digital service and uniqueness of

the resources underlying that service. Usage tokens are the most popular type of tokens.

- (3) Work tokens. A work token is a token that gives its holders the right to contribute work to a decentralized organization to help enable that decentralized organization to function. The fundamental value of a work token is determined by the utility that token holders get from the decentralized organization. That utility can take the form of a fee or goodwill. These tokens are much less popular than usage tokens.
- (4) Hybrid tokens. Many future tokens may function as both usage and work tokens. For example, when Ethereum switches from proof of work to proof of stake protocol, Ether will be both a usage token and a work token (it will give the right to validate transactions and earn in exchange for that work).

Tomaino (2017a) notes that there are tokens which do not fall into any of the above categories, but these tend to lack the ability to produce any long-term value. Taking this into account, and adding to this the recent history of scams on the ICO market (e.g. Tarasiewicz & Newman, 2015, p. 203), a fifth type can be added:

- (5) gambling (or empty) tokens, i.e. tokens lacking intrinsic value, that is lacking value-creating mechanisms, badly designed or simply scams, whose prices could grow only on speculation. An analysis of CoinMarketCap.com valuation tables may suggest that many tokens (and coins) fall into this category.

The lack of popularity of the “traditional asset tokens” (better known as asset-backed tokens) should be seen predominantly as reflecting regulatory threat, as, in light of the July 2017 SEC report (<https://www.sec.gov/litigation/investreport/34-81207.pdf>), they would almost certainly be deemed securities and thus subject to regulation. In that report, SEC warned that cryptocurrencies unable to pass the so-called Howey test would be designated as securities, as such being subject to regulation. It can be argued that regulatory concerns leave particularly strong imprint on the emerging ICO market, inducing creativity in design and naming of distributed applications and

related cryptocurrencies, and motivating self-regulation. For example, those who buy a cryptocurrency in ICOs are called “contributors”, and not “investors” (e.g. Finlay, 2017) and cryptocurrencies are officially part of the distributed application, and not securities (Russo, 2017). In the USA, the biggest crypto market, the recently increased interest of regulators, and particularly the July SEC report, was received as significantly increasing the risk for utility (usage) tokens of being considered securities and thus subject to SEC regulation.

Apart from the US, currently the most popular country of origin of ICO projects, such projects have proliferated in many other parts of the world (see Table 1), attracting increased regulatory interest around the world. Some of it resulted in taking dramatic measures, for example, in September 2017 China, soon followed by South Korea, banned ICOs out of concern for money laundering, the market forming a speculative bubble, and increasing number of scams.

Table 1. Top 10 countries of origin for ICO projects (data in US\$ millions)

USA	1031
China*	452
Russia	310
Singapore	260
Israel	192
Germany	187
Canada	175
UK	145
Switzerland	64
Estonia	63

* China: including Hong Kong.

Source: Ernst & Young (2017).

Given the level of risks associated with participating in ICOs, including the scale and multitude of sources of possible losses through scams, phishing, “pump and dump” schemes, a large number of fraudulent and simply inconsistent projects, useless cryptocurrencies, issues of developer accountability and transparency, disappearing developers, etc., it seems that the blockchain and ICO communities should

welcome regulatory guidance and, where necessary, strict regulation. Coordination of efforts of regulators and entrepreneurs seems to be a necessary condition for civilizing this “wild west” of tech, investing, and, one can add, organization and governance. The “cryptocurrency industry” (blockchain technology and blockchain applications developers and many others) actually is working on self-regulation viewing it as the “taming of the wild west” (Cheng, 2017).

4. Sources of ICO Success

Year 2017 was a landmark year for ICOs. They became so popular that well over 90% of total funds raised through this mechanism were collected that year. There are a number of interrelated factors and developments that can be linked to this success.

4.1. The Promise of Blockchain and Distributed Software

The ICO boom is the product of a supposedly transformative blockchain technology (Waters, 2017). Analysts of Juniper Research (2017) note that much of the initial interest in cryptocurrencies as alternatives to fiat money has shifted to the potential of the technology that underpins them, i.e. blockchain. The last year brought intensified activities by startups interested in developing blockchain infrastructure and blockchain-based applications. Blockchain developer community advocates blockchain as the next technological breakthrough with potential to shape the future at least as big as that attributed to the internet 20 years ago. The advent of the internet sparked a magnitude of new business models, redefining businesses and markets. The same is now expected of the blockchain technology and new distributed business models.

Blockchain technology enables distributed organizations, which are an emerging new form of organization and governance, promising to rid of many problems plaguing hierarchical organizations, including large overheads and agency problems, and thus dramatically reducing severe transaction costs. Moreover, distributed organizations leave control in the hands of those who own tokens (in the proof of stake scenario) linked to a given blockchain, and not the central hub of the protocol devel-

oper. Hence, users can control the network and, depending on token design, also profit from its success.

ICOs are viewed as a dedicated form of funding distributed organizations.

4.2. Infrastructure Building and Societal Acceptance

The current popularity of ICOs was made possible by four years of building shared cryptocurrency infrastructure and growing societal acceptance (Katz, 2017; Srinivasan, 2017). Such infrastructure (open source) comprises open source tools which are necessary for tech developers to develop profitable applications (Srinivasan, 2017). Although there is no “killer app” yet (Ray, 2017), the expectation that tokens of the winning platforms could one day be worth “trillions of dollars” (Waters, 2017) clearly triggers interest in ICOs.

Moreover, during the last four years, the price of bitcoin, the original cryptocurrency, experienced wild swings, thus attracting popular interest, dozens of cryptocurrency exchanges opened around the world to facilitate the conversion of fiat currencies into a slowly growing number of digital ones, and major financial institutions began exploring the blockchain technology (Srinivasan, 2017). The maturation of infrastructure and societal acceptance for cryptocurrencies has set the stage for the next phase – ICOs of new tokens (Ibid.) and proliferation of crypto exchanges (estimated at 150–250 and counting). Moreover, the launching of Ethereum, an easily programmable blockchain protocol available as open source in 2014, attracted unprecedented interest of code developers, grossly facilitating the launch of new blockchain protocols and, consequently, new tokens.

4.3. Speculation in Cryptocurrencies

There can be no doubt that the success of bitcoin inspired other cryptocurrencies. The boom in cryptocurrency prices has been fed by uncontrolled speculation, driven by the perception of the underlying blockchain technology as the next technological breakthrough, lack of reliable valuation models, and the “fear of missing out”, among others. Cryptocurrencies’ rapid appreciation has been encouraging speculative formation of new ones (Ray, 2017), resulting in the speculative mania and

abundance of new ICOs. Since issuing new cryptocurrency is done by collecting funds in the form of existing cryptocurrencies, it propels demand, and thus their prices (and also accusations of cryptocurrencies being Ponzi schemes, refuted by the World Bank (Kaushik, 2014)). To give a few examples of spectacular returns that some cryptocurrencies brought to early buyers, as of 28 January 2018, NXT brought 1,992,221% from ICO in September 2013, IOTA brought 573,477% from ICO in November 2015, NEO 498,743% from ICO in October 2015, Ethereum 388,632% from ICO in July 2014, Spectrecoin 370,722% from ICO in November 2016 (<https://icostats.com/roi-since-ico>).

The crypto market growth is highly impressive. The market capitalization of all cryptocurrencies rose from \$7 billion in January of 2016 to over \$550 billion on 24 January 2018 (CoinMarketCap). The price of ether (unit of the Ethereum blockchain) rose from \$2.83 on 7 August 2015 to \$968 on 24 January 2018 (<https://coinmarketcap.com/currencies/ethereum/>). The price appreciation was partially due to Ethereum being the most widely used blockchain-based platform for ICO sales.

4.4. Community Building

Raising money is not the only goal of best structured ICOs. According to Teutsch, Buterin and Brown (2017), ICOs should aim not at maximizing their value but maximizing participation and transparency (i.e. informative efficiency). Such a statement, supported by V. Buterin, a co-founder of Ethereum, should be seen as indicative of a pronounced departure from the traditional vision of the nature of competition (five forces framework, industry value chain model, etc.), and orientation on building the user community.

Since the most popular type of token, i.e. utility token, is designed as a mechanism for the exchange of information and value within the ecosystem developed around a given blockchain, the more buyers acquire and hold tokens, the greater the potential for usage (Barnett, 2017). Since the value of a token at the time of ICO depends on the future popularity of the product or service for which it will serve as a means of payment, it makes sense to introduce prospective users to tokens at the ICO stage and in such a way as to bind

them to the project and let them earn on its success.

Barnett (2017) notes that increasing participation in an ICO jumpstarts the underlying service with a community of users as token holders, as the early token buyers are most likely to be future users and adopters of the protocol and offered services. Moreover, the chance to profit from the growth of a network provides ICO participants with a built-in incentive, making them more likely to make use of the distributed network (Waters, 2017). It is a win-win situation all the more that participants can become ambassadors of the project, motivated to contribute to its success, at the same time saving the developer on marketing and PR expenses (Barnett, 2017).

4.5. Democratization of Finance

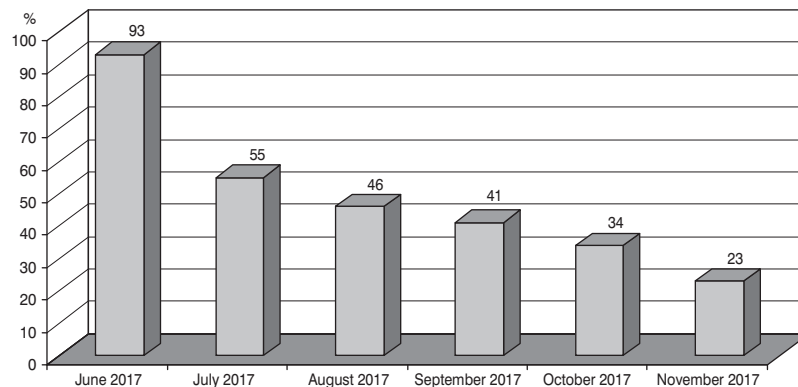
“The average investor is missing out on the Ubers and AirBnBs of the world.” (Russo, 2017). The traditional model of tech startup financing effectively keeps small investors from participating financially in the fortunes of promising new ventures. ICOs contribute to “democratizing finance” (Tapscott & Tapscott, 2017) by allowing individuals to allocate even small amounts of money (in the form of existing pre-specified cryptocurrencies) to an ICO, thus dramatically reducing entry barriers to participate financially in the successes

of the startup sector. As mentioned above, there is no “killer app” yet (Ray, 2017) but if or when its developer decides to issue tokens, that would be an opportunity for even small investors to profit from its success (Russo, 2017). At the same time, ICOs have made it possible for blockchain startups to raise far larger amounts than startups can usually tap (Waters, 2017).

4.6. Regulation

Till recently, regulators in almost all jurisdictions, with a notable exception of Chinese and South Korean authorities, proceeded very cautiously on cryptocurrencies. And, till recently, the blockchain community opted to avoid regulation. Limited regulations or lack thereof certainly favored increasing the number of new blockchain projects seeking financing, but has had an adverse effect on the quality of ICOs. With the notably lowered quality of ICOs (increasing number of badly designed tokens – artificially integrated blockchain technology into trivial business ideas (Roslyakov, 2017), erroneous code and simple scams – according to Coin-telegraph, on both Ethereum and Bitcoin blockchain, one in 10 transactions are scams) and more discerning investors, and, consequently, fewer ICOs reaching fundraising goals (Ernst & Young, 2017) (see Figure 4), this attitude is changing.

Figure 4. Share of ICO projects that reached hard cap



Source: Ernst & Young (2017).

It is increasingly recognized that both honest entrepreneurs and prospective ICO participants can benefit from stricter regulation. Broader regulation can help open

up a new market while protecting investors with regulated processes (Barnett, 2017). Certainly, overly restrictive regulations can also introduce overly burdensome require-

ments that would hamper innovation and capital formation (Ibid.).

The cryptocurrency industry is also increasingly experiencing accusations of facilitating money laundering and other illicit behaviors, therefore cooperation with regulators in dealing with such problems seems to be the best option for the blockchain community and the ICO market.

5. ICOs and Entrepreneurial Finance

Entrepreneurship research views entrepreneurial finance as comprising: (1) crowdfunding, (2) debt and (3) equity (Business Angels, Venture Capital, and Corporate Venture Capital) (e.g. Chemmanur & Fulghieri, 2013; Denis, 2004; Leach & Melicher, 2011; Stangler, Tareque, & Morelix, 2016). According to the most recent data compiled by the Ewing Marion Kauffman Foundation, the primary sources of initial financing for new businesses in the US are family savings, bank business loans, and personal credit cards, while other sources of funding, including venture capital, angel investments, and crowdfunding are less prevalent (Stangler et al., 2016). These authors as recently as in December 2016 called crowdfunding “the newest source of money on the entrepreneurial finance landscape” (p. 5). A year later, this perception should be viewed as grossly outdated. In 2017, this title belonged to Initial Coin Offerings.

Technically, ICO may look similar to crowdfunding (Geiger, 2017), but it sells instruments of different nature (holding specific rights), and uses blockchain technology instead of crowdfunding platforms for verification, and therefore should be viewed as a separate type of finance, however related to crowdfunding. The crowdfunding market itself is changing rapidly and it is likely that the rise of ICOs has played a role in its dynamic. As recently as at the beginning of 2016, Research and Markets analysts predicted the global crowdfunding market to grow at an impressive CAGR of 26.87% during the period 2016–2020 (Research and Markets, 2016). In August 2017, a year and a half later, the same research company predicted the global crowdfunding market to decline at a CAGR of 16.96% during the period 2017–2021. The dramatic change in prospects can be viewed as reflecting the

latest clear trend of crowdfunding becoming more of a marketing than financial tool. Whether this development should be linked to the rise of ICOs remains to be seen, but there are some clues that should be considered. In 2014, i.e. essentially in the pre-ICO time, Niederer predicted that by 2020 equity crowdfunding would give way to royalty-based crowdfunding and debt-equity hybrids would develop, not burdened by securities legislation, and also, participants would be larger and the money would originate from where the support community resides (“non-geographic”) (Niederer, 2014). Although these predictions have not materialized for crowdfunding, the ideas have found their way into the ICO model. In fact, in 2015 that author (a leading authority in equity-based crowdfunding) promoted the idea of moving equity crowdfunding to the blockchain (Niederer, 2015), and in 2017 he pointed at important parallels between ICOs and equity crowdfunding (Niederer, 2017). The additional flexibility offered by the blockchain technology, enabling tokens to be loaded with specific, bespoke features and rights, gives ICOs a distinct advantage over crowdfunding, offering much more limited options.

Moreover, with ICOs, the old barriers to capital formation collapse – ICOs have made it possible to raise far more money than startups could usually tap (Waters, 2017). Thus, ICOs allow promising blockchain startups to bypass not only crowdfunding but also traditional capital. An additional advantage of ICOs relative to more traditional finance is the high speed and low cost of collecting money for entrepreneurial activity. ICOs are much cheaper than traditional IPOs (Initial Public Offerings), easier and less troublesome than venture capital funding (Kamińska & Murphy, 2017), allowing startups to collect larger capital and often faster than with crowdfunding (Kastelein, 2017), thus making ICOs a preferred funding option for blockchain entrepreneurs.

While access to far larger capital is a conspicuous selling point of ICOs, it also has a darker side. According to CB Insights report (2017), entrepreneurs holding ICOs may be receiving too much money too quickly, compared to traditional equity financing in the sector (amounting to an average of \$3m for early stage, i.e. seed,

angel, Series A capital, deals). With ICOs regularly raising upwards of \$10m, startups run the risks of mismanagement after receiving such large sums in a short time (CB Insights, 2017).

The rise of cryptocurrencies and ICOs is challenging the very concept of venture capital (Brustein, 2017). Traditionally, venture capitalists identify emerging technology trends, invest in startups developing them, and cash out a few years later when the companies go public or sell out. Venture capitalists' business model is based on their expertise in emerging tech trends and markets, and access to startups. Liquidity is a major issue in this investment model as it typically takes years before a venture capital firm can cash out. With ICOs, the public has direct access to promising investment opportunities, so they do not need to pay fees to VCs, and they can trade in cryptocurrencies on unregulated platforms soon (even a few days) after purchasing them. Thus, direct access and liquidity are major attractions, but these come at a cost of large information asymmetries between tech startups and prospective investors, and outright scams, although the situation is going to improve significantly with regulation.

Moreover, an entirely new industry developing around ICOs, partially resembling one developed around regulated securities industry, promises to mitigate the problems. Online platforms devoted to ICOs peer reviews and discussion are developing, consultancies specializing in ICO marketing, legal issues and even portfolio management tools (e.g. Prism by ShapeShift) are mushrooming. For example, ICORating recently introduced an ICO assessment platform with which potential investors can look into the risks, merits, and overall advantages of an ICO.

In a major step forward, the Weiss Ratings agency, one of the oldest professional and financial grading services in the US, released the much-anticipated cryptocurrency ratings on 24 January 2018 (Harper, 2018). The rating, covering 74 cryptocurrencies, was met with some controversy by the crypto investment community. Robust and impartial ratings are much needed in the hectic cryptoassets market as they point to value drivers like quality of technology and likelihood of adoption. Certainly, much more work is needed on methodol-

ogy issues and competition between rating agencies is welcome.

Traditional venture capital (VC) firms respond to the challenge by buying the rights to acquire tokens ahead of an ICO through novel legal agreements, so-called Simple Agreements for Future Tokens, or SAFT (Brustein, 2017). Another strategy for VC firms is to invest in so-called crypto hedge funds, such as Polychain Capital, trading cryptocurrencies and active in the ICO market; VC firms also add provisions to standard investment contracts to address possible future ICOs (Ibid.).

ICOs and tokens have another advantage over traditional sources of entrepreneurial finance in that they provide a way to fund previously unfundable shared infrastructure, like open source projects (Srinivasan, 2017), which are viewed as "unfundable" by traditional investors (Kastelein, 2017). Thus, they positively affect the structure and innovativeness of the digital economy, as open source projects provide infrastructure for software developers (Srinivasan, 2017), i.e. tools which, from the economics point of view, can be considered public goods.

Moreover, ICOs and tokens have the advantage of enabling a new business model, which Srinivasan (2017) calls "better-than-free". While firms like Google or Facebook run multilateral platform business models, enabling them to offer customers free access to their services in exchange for data, which are sold to third parties, mainly advertisers, blockchain technology offers some users an opportunity to earn. This particularly applies to early adopters of a new blockchain, who can make money by transacting on it with their clients (Ibid.).

6. Conclusions

ICOs developed into a means for blockchain startups to fund development of distributed applications, where users would interact directly with each other rather than through a central hub of the company which owns the platform, sets the rules and acts as its gatekeeper (Waters, 2017). The selling point of ICOs is that the control, and thus profits, will be in the hands of the application users. This is the idea behind the most popular type of tokens, so-called utility tokens, currently dominating in the ICO market.

Thanks to the distributed ledger technology, users form distributed networks, in which value is created and shared among them, changing the nature of relations between network participants comparing not only to stakeholders of traditional hierarchical organization, but also to centralized network organization, i.e. one with a central hub. Distributed ledger and smart contracts rid of the need for a central hub which sets and changes rules at its discretion and often appropriate a large proportion of created value (Facebook and Google are the best known examples). Thanks to ICOs, blockchain startups can be in the vanguard of popularizing more inclusive forms of economic activities, promoting fairer distribution of wealth.

ICOs effectively change the landscape of entrepreneurial finance, introducing instruments with unprecedented characteristics, enabling funding previously unfindable projects, supporting new organizational and governance forms, and contributing to disruptive innovations, democratizing finance, and building sharing digital economy.

The lack of regulation, including self-regulation and best practices, and also a very early stage of research on the ICO market are major challenges for the crypto industry. ICOs are such a new concept that the market is way ahead of policy, regulation, let alone in-depth studies.

Further research is necessary to understand the economics of distributed computing and distributed organizations, identify determinants of optimal smart contracts, design token valuation models, determine rules effectiveness of capital allocation, and clarify many other issues related to ICOs and their implications.

Endnotes

- ¹ “Blockchains are platforms for building bespoke economic coordination using distributed ledgers augmented with computationally embedded features such as programmable money (cryptocurrencies), programmable contracts (i.e. smart contracts), and organizations made of software (DAOs).” (Davidson et al., 2016, p. 8).

References

Alvord, S.H., Brown, D., & Letts, C.W. (2004). Social entrepreneurship and societal transformation: An exploratory study. *The Journal of Applied*

Behavioral Science, 40(3), 260–282. <https://doi.org/10.1177/0021886304266847>

Arnold, A. (2017). *Bitcoin’s valuation is confusing currency analysts*. Bloomberg Technology. Retrieved from <https://www.bloomberg.com/news/articles/2017-06-07/bitcoin-perplexes-currency-analysts-as-valuation-debate-grows>

Barnett, C. (2017) *Inside the meteoric rise of ICOs*. Retrieved from <https://www.forbes.com/sites/chancebarnett/2017/09/23/inside-the-meteoric-rise-of-icos/#28def1bd5670>

Bech, M. & Garratt, R. (2017). Central bank cryptocurrencies. *BIS Quarterly Review* (September), 55–70.

Bennington, A. (2017) Utility coins or crypto assets? Token terminology is one big gray area. Retrieved from <https://www.coindesk.com/utility-coins-crypto-assets-token-terminology-one-big-gray-area/>

Benoiel, M. (2017). *Understanding the difference between coins, utility tokens and tokenized securities*. Retrieved from <https://medium.com/startup-grind/understanding-the-difference-between-coins-utility-tokens-and-tokenized-securities-a6522655fb91>

Binham, C. (2017). *ICO regulation inconsistent as cryptocurrency bubble fears grow*. Retrieved from <https://www.ft.com/content/32315636-cb01-11e7-ab18-7a9fb7d6163e>

Browne, R. (2017). *Burger King has launched its own cryptocurrency in Russia called ‘WhopperCoin’*. Retrieved from <https://www.cnn.com/2017/08/28/burger-king-russia-cryptocurrency-whoppercoin.html>

Brustein, J. (2017). *Bitcoin is challenging the entire concept of venture capital*. Retrieved from <https://www.bloomberg.com/news/articles/2017-12-18/bitcoin-is-challenging-the-entire-concept-of-venture-capital>

Cadigan, T., Frank, J., & Chin, K. (2017) *This is what you get when you invest in an initial coin offering*. Retrieved from <https://www.businessinsider.com.au/ico-initial-coin-offering-explained-bitcoin-ethereum-2017-11>

CB Insights. (2017). *Blockchain investment trends in review*. CB Insights Research Report. Retrieved from <https://www.cbinsights.com/research/report/blockchain-trends-opportunities/>

Chemmanur, T. & Fulghieri, P. (2013). Entrepreneurial finance and innovation: An introduction and agenda for future research. *Review of Financial Studies*, 27(1), 1–19. <http://dx.doi.org/10.1093/rfs/hht063>

Cheng, E. (2017). *The people behind the hype-filled ICO craze are trying to regulate themselves*. Retrieved from <https://www.cnn.com/2017/10/03/people-behind-the-hype-filled-ico-craze-are-trying-to-regulate-themselves.html>

- Chronobank.io. (2017). *Token vs coin — what's the difference?* Retrieved from <https://blog.chronobank.io/token-vs-coin-whats-the-difference-5ef7580d1199>
- Cicero, S. (2017). *Blockchain powered platforms: Tokens*. Retrieved from <https://stories.platform-designtoolkit.com/blockchain-powered-platforms-tokens-8363755fdd83>
- Davidson, S., De Filippi, P., & Potts, J. (2016). *Economics of blockchain*. <http://dx.doi.org/10.2139/ssrn.2744751>
- Davis, G. & Marquis, C. (2005). Prospects for organization theory in the early twenty-first century: Institutional fields and mechanisms. *Organization Science*, 16(4), 332–343. <https://doi.org/10.1287/orsc.1050.0137>
- Denis, D. (2004). Entrepreneurial finance: An overview of the issues and evidence. *Journal of Corporate Finance*, 10(2), 301–326. [https://doi.org/10.1016/S0929-1199\(03\)00059-2](https://doi.org/10.1016/S0929-1199(03)00059-2)
- Eha, B. (2017). *Why this venture capitalist wants to make traditional VC obsolete*. Retrieved from <https://www.americanbanker.com/news/why-this-venture-capitalist-wants-to-make-traditional-vc-obsolete>
- Ernst & Young. (2017). *EY research: Initial coin offerings (ICOs)*. Ernst & Young.
- Finlay, D. (2017). *What to expect when participating in a token launch*. Retrieved from <https://media.consensys.net/what-to-expect-when-participating-in-a-token-launch-649e35343e85>
- Geiger, L. (2017). *Here's how the ICO market is creating a new financial subculture*. Retrieved from <http://www.businessinsider.com/what-is-an-ico-2017-10?IR=T>
- Green, T. (2017). *IBM scores blockchain deal with 7 major banks*. Retrieved from <https://www.fool.com/investing/2017/06/27/ibm-scores-blockchain-deal-with-7-major-banks.aspx>
- Guerrero, M., Cunningham, J., & Urbano, D. (2015). Economic impact of entrepreneurial universities' activities: An exploratory study of the United Kingdom. *Research Policy*, 44(3), 748–764. <https://doi.org/10.1016/j.respol.2014.10.008>
- Hackett, R. (2017). Big business giants from Microsoft to J.P. Morgan are getting behind Ethereum. Retrieved from <http://fortune.com/2017/02/28/ethereum-jpmorgan-microsoft-alliance/>
- Hanohov, R. & Baldacchino, L. (2017). Opportunity recognition in sustainable entrepreneurship: an exploratory study. *International Journal of Entrepreneurial Behavior & Research*. <https://doi.org/10.1108/IJEBR-12-2015-0275>
- Harper, C. (2018). *Weiss cryptocurrency ratings unveiled under complicated circumstances*. Retrieved from <https://coincentral.com/weiss-cryptocurrency-ratings-unveiled-complicated-circumstances/>
- Juniper Research. (2017). *Which industries are the best for blockchain?* Juniper Research Whitepaper.
- Kamińska, I. & Murphy, P. (2017). *Bitcoin's surge fuels fears of basset bubble*. Retrieved from <https://www.ft.com/content/ce3ef54e-371b-11e7-bce4-9023f8c0fd2e>
- Kastelein, R. (2017). *Why are Initial Coin Offerings (ICO) more popular than equity crowdfunding with the JOBS act?* Retrieved from <https://www.quora.com/Why-are-Initial-Coin-Offerings-ICO-more-popular-than-equity-crowdfunding-with-the-JOBS-act>
- Katz, L. (2017). *Bitcoin is at risk of no longer being the biggest digital currency*. Retrieved from <https://www.bloomberg.com/news/articles/2017-05-31/bitcoin-risks-being-eclipsed-by-digital-coin-cousin-ethereum>
- Kaushik, B. (2014). Ponzis: The science and mystique of a class of financial frauds. Retrieved from <http://documents.worldbank.org/curated/en/660611468148791146/Ponzis-the-science-and-mystique-of-a-class-of-financial-frauds>
- Keirns, G. (2017). *Japan's Bitcoin Law goes into effect tomorrow*. Retrieved from <https://www.coindesk.com/japan-bitcoin-law-effect-tomorrow/>
- Leach, J. & Melicher, R. (2011). *Entrepreneurial finance* (4th ed.). Mason, OH: South-Western Cengage Learning.
- Marvin, R. (2017, February 1). Blockchain: The invisible tech that's changing the world. *PC Magazine*, 91–113.
- Mollick, E. (2014). The dynamics of crowdfunding: An exploratory study. *Journal of Business Venturing*, 29(1), 1–16. <https://doi.org/10.1016/j.jbusvent.2013.06.005>
- Müller, L., Meyer, S., Gschwend, C., & Henschel, P. (2017). *Conceptual framework for legal & risk assessment of blockchain crypto property (BCP)*. Zurich: MME. Retrieved from https://www.mme.ch/fileadmin/files/documents/Publikationen/170926_BCP_Framework_-_Genesis_Version.pdf
- National Research Council. (1993). *Advanced exploratory research directions for extraction and processing of oil and gas*. Washington, DC: National Academy Press.
- Niederer, P. (2014). *Crowdfunding in 2020*. Retrieved from <http://www.paulniederer.com/2014/03/crowdfunding-in-2020/>
- Niederer, P. (2015). *Equity crowdfunding needs to embrace tomorrow not yesterday to get traction*. Retrieved from <http://www.paulniederer.com/2015/08/equity-crowdfunding-needs-to-embrace-tomorrow-not-yesterday-to-get-traction/>
- Niederer, P. (2017). *Parallels between ICO's and the early days of equity crowdfunding*. Retrieved from <https://fintechworld.com/2017/10/09/paral>

- lens-between-icos-and-the-early-days-of-equity-crowdfunding/
- OECD. (2017). *OECD digital economy outlook 2017*. Paris: OECD Publishing. <http://dx.doi.org/10.1787/9789264276284-en>
- PricewaterhouseCoopers & CB Insights. (2018). *2017 MoneyTree report*.
- Prusak, M. (2017). *ICOs, dumb money, and Ethereum's (ethical) dilemma*. Retrieved from <https://www.coindesk.com/icos-dumb-money-ethereums-ethical-dilemma/>
- Ray, T. (2017). *Blockchain's got no 'killer app' yet, says morgan stanley, even as Bitcoin soars*. Retrieved from <https://www.barrons.com/articles/blockchains-got-no-killer-app-yet-says-morgan-stanley-even-as-bitcoin-soars-1497377427>
- Research and Markets. (2016). *Global crowdfunding market 2016–2020 report*. Retrieved from <http://www.reportlinker.com/p03588291-summary/view-report.html>
- Rice, M. (2002). Co-production of business assistance in business incubators: An exploratory study. *Journal of Business Venturing*, 17(2), 163–187. [https://doi.org/10.1016/S0883-9026\(00\)00055-0](https://doi.org/10.1016/S0883-9026(00)00055-0)
- Roslyakov, M. (2017). *What's wrong with the ICO market?* Retrieved from <https://cointelegraph.com/news/whats-wrong-with-the-ico-market-expert-blog>
- Roure, J. & Maidique, M. (1986). Linking prefunding factors and high-technology venture success: An exploratory study. *Journal of Business Venturing*, 1(3), 295–306. [https://doi.org/10.1016/0883-9026\(86\)90006-6](https://doi.org/10.1016/0883-9026(86)90006-6)
- Russo, C. (2017). *The hottest new way of investing in Silicon Valley comes with a big catch*. Bloomberg Markets. Retrieved from <https://www.bloomberg.com/news/articles/2017-05-24/digital-tokens-unlock-stakes-in-blockchain-as-icos-proliferate>
- Securities and Exchange Commission. (2017). *Report of investigation pursuant to section 21(a) of the Securities Exchange Act of 1934: The DAO*. Retrieved from <https://www.sec.gov/litigation/investreport/34-81207.pdf>
- Shin, L. (2017). *Here's the man who created ICOs and this is the new token he is backing*. Retrieved from <https://www.forbes.com/sites/laurashin/2017/09/21/heres-the-man-who-created-icos-and-this-is-the-new-token-hes-backing/#1fd6da251183>
- Srinivasan, B. (2017). *Thoughts on tokens*. Retrieved from <https://news.earn.com/thoughts-on-tokens-436109aabcbe>
- Stangler, D., Tareque, I., & Morelix, A. (2016, December). *Trends in venture capital, angel investments, and crowdfunding across fifty largest U.S. metropolitan areas*. Ewing Marion Kauffman Foundation.
- Tan, J., Shao, Y., & Li, W. (2013). To be different, or to be the same? An exploratory study of isomorphism in the cluster. *Journal of Business Venturing*, 28(1), 93–97. <https://doi.org/10.1016/j.jbusvent.2012.02.003>
- Tapscott, A., & Tapscott, D. (2017). How blockchain is changing finance. *Harvard Business Review Online* (March 1). Retrieved from <https://hbr.org/2017/03/how-blockchain-is-changing-finance>
- Tapscott, D. & Tapscott, A. (2016). *Blockchain revolution: How the technology behind bitcoin is changing money, business, and the world*. New York: Penguin.
- Tarasiewicz, M. & Newman, A. (2015). Cryptocurrencies as distributed community experiments. In D. LeeKuo Chuen (Ed.), *Handbook of digital currency: Bitcoin, innovation, financial instruments, and big data*. London: Academic Press.
- Teutsch, J., Buterin, V., & Brown, C. (2017). *Interactive coin offerings*. Retrieved from <https://people.cs.uchicago.edu/~teutsch/papers/ico.pdf>
- Tomaino, N. (2017a) *On token value*. Retrieved from <https://thecontrol.co/on-token-value-e61b10b6175e>
- Tomaino, N. (2017b). *The token economy*. Retrieved from <https://thecontrol.co/the-token-economy-81beed26b9de>
- Waters, R. (2017). *To coin a craze: Silicon Valley's cryptocurrency boom*. Retrieved from <https://www.ft.com/content/2b0d8926-96d9-11e7-b83c-9588e51488a0>