ORIGINAL PAPER



DOI: 10.26794/2587-5671-2019-23-6-6-25
JEL G30, G39

# Comparative Analysis of ICO, DAOICO, IEO and STO. Case Study

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## ABSTRACT

The article examines the problem of the ICO (Initial Coin Offering, from English — "initial offer of coins, initial placement of coins"). The information source is the ICO rating data of the return on investment in blockchain startups. The methodological base of the research is a situational comparative analysis of the ICO, DAOICO, IEO and STO and systematization of information. The author analyzes three new ICO models. The first one includes elements of Decentralized Autonomous Organizations (DAO). Its aim is to minimize the difficulties and risks associated with the ICO. The second model (Initial Exchange Offering (IEO), from English — "primary exchange offer") is designed to minimize risks, liquidity problems and a delay in listing tokens at the end of the token sale. The third model — the Security Token Offering (STO, from English — "offer of security token") — was designed to support real assets and comply with the SEC requirements. These models are a new direction for small and medium enterprises and investors. The absence of any scientific work emphasizes the relevance and scientific novelty of the study. The article is a follow-up of the empirical work related to the success of the ICO, as well as the basis for its revision using the case study results.
***Keywords:*** ICO; DAICO; IEO; STO; investment; case study

***For citation:*** **Myalo A.S. Comparative analysis of ICO, DAOICO, IEO and STO. Case study.** ***Finance: Theory and Practice.*** **2019;23(6):6-25. DOI: 10.26794/2587-5671-2019-23-6-6-25**

## INTRODUCTION

Implementing a blockchain, a slow and expensive database, has provided the tools and infrastructure for transferring primitive digital tokens of value via an open, public Internet between independent participants without trusted intermediaries, using each network node. Nodes collect recent transactions signed by a private key to the lists called blocks. After the block is completed, the node applies a special cryptographic hash-function to it. After some technical operations, the node of the required participant receives the block and sends it to the other nodes of the network for verification. Then the block is added to the blockchain and becomes an official record of all transactions. The meaning of membership is that if your node finds a block, then you get a reward in tokens. Blockchain technology allows creating a cryptocurrency that is demonstrated in such a way that transaction authentication improves in proportion to the number of people serving the cryptocurrency.

To create a new token, a cryptocurrency unit, a new blockchain network should be scaled or tokens should be issued relying on the creation of the blockchain platform already in use for Bitcoin. Both methods encounter some difficulties due to the complexity of the deployment, the achievement of network effects for the new block chain, and the difficulty of coding enough information related to the new tokens into raw Bitcoin transactions.

In 2015, Vitalik Buterin presented cryptocurrency Ethereum and the Ethereum platform based on the concept of decentralized smart contracts. Smart contracts are protocols that can be performed by the distributed register technology itself. This allows you to fully comply with the clauses of the contract, without any party verifying or fulfilling the contract. The most commonly used smart contract to attract capital is the ERC-20, creating a new cryptocurrency token and helping transfer a cryptocurrency from one person to another. This unique feature allows developers to create a wide range of innovative applications on top of the Ethereum blockchain, becoming the most popular blockchain for the ICO. Ethereum currently has 90,2%[1] of the market share for ICO platforms. However, Ethereum is relatively slow in its trans-

[1] Compiled by the authors, based on ICObench.com.

actions. In addition to transactions with primitive digital tokens, such an innovation as a smart contract also made it easy to create and autonomously allocate digital tokens of value to users making tokens tradable. This process of creating tokens and their distribution among users in exchange for a primitive digital network token (cryptocurrency) is called the Initial Coin Offering (ICO) process and can be seen as a new asset distribution channel. In the broad sense of the term, any cryptocurrency, other than Bitcoin, can be considered an ICO, as it is a financial tool which is the starting point for every "young" cryptocurrency. In the ICO process, there is a proposal (token sale) of the original coins (tokens) for future holders in the form of blockchain-based cryptocurrency or cryptoactive assets. An ICO may include the issuance of three different types of coins: (i) utility tokens, which offer future access to the campaign service; (ii) security tokens, which operate similarly to security and provide a share of the company's future profits; (iii) cryptocurrencies or payment tokens, which serve as a medium of exchange for investors. However, all three coin offerings can be traded after the initial offer on unregulated platforms and, thus, share the transferability characteristics of shares/bonds. An ICO can be interpreted as a form of collective support for innovative technological projects, one of the types of crowding (crowdselling) in the form of attracting new participants. At the same time, investors (buyers of tokens) do not become owners of the company's shares and there is no government regulation at the cryptocurrency market. For investors, the main motivation to invest in a new project is the hope for an increase in the of tokens after launch due to the successful operation of the currency. The main form of presentation of ICO information is the White Paper, while there are no standards or rules how to prepare this document. As a rule, the White Paper should contain the following sections:

- the description of a business idea or a problem;
- the proposed solution and the description of the relevant project/product;
- the description of a token implementation mechanism (how it interacts with the product, economy, and its technical implementation);
- the project team;
- the parameters and timing of the release of tokens, the plans for future.

The procedure for issuing an ICO is usually the following:

1. Pre-ICO launch — pre-sale of units of a new currency, usually at a reduced price, compared to the one that will be at the first moment of selling an ICO.

2. ICO launch — immediate launch of the initial coin offering. Most purchases are made by investors who plan to resell the currency after its value has increased over time.

**Market overview**

The first token sale was held by Mastercoin in July 2013. Ethereum attracted money from the sale of tokens in 2014, raising 3,700 BTC in the first 12 hours, which at that time was approximately $ 2.3 million. Blockchain is used as a technological base for the ICO. For the last two years, total borrowed funds increased sharply. In April 2017, there was a big leap, ICO expenditures increased from $ 290,000 to $ 1.05 billion for 3 months, and increased by 4 times by November 2017. However, since the end of last year, the ICO market has been falling. For comparison, the market growth in June 2017 was 93%, while in November it was only 23%. Speaking about the geography of ICO projects, most ICOs were conducted in the USA ($ 1.031 billion), China ($ 452 million, including Hong Kong) and Russia ($ 310 million) with respect to regulating and supporting the blockchain industry, leading other countries. The most successful blockchain projects were implemented during the development of the blockchain infrastructure; the second place belongs to finance, the third — to social media, content, and advertising, and the fourth place was taken by the gaming industry and virtual reality.

According to the ICObench analytics, 2018 experienced both positive and negative changes in the whole crypto world. An extraordinary ICO Telegram Open Network took place in 2018. It broke all rules of the ICO market and attracted $ 1.7 billion. In 2018, the total number of ICOs increased by 3.5 times compared to the previous year. The whole ICO market took on new standards of sharing in terms of the increased number of advisors and expert ratings per

an ICO. Projects often set hard and soft limits, which indicates an increasing role of goal setting. Overall, the year of 2018 ended with a lower number of attracted funds compared to the beginning of the year. The total number of attracted funds has increased only by 15% compared to 2017. In 2018, the ICO was 4 times more than investment in blockchain projects ($ 3538 mln vs. $ 21017 mln).

In 2017, there were 718 complete ICOs and only 43 of them remained profitable 1 year later. The 2017 ICO's total market cap was 40% lower than the total amount of funds they raised together. In 2018, the average number of the funds raised by the ICO decreased in comparison to 2017 (*Table 1*). Still, there were projects that raised an impressive number of funds. However, these ICOs have an extremely negative ROI or they are not listed on exchanges now.

According to these statistics, the USA remains a leading ICO destination, reinforced by clear and firm regulatory requirements (e.g. KYC). In Europe, Switzerland stands out as the ICO capital, but in 2018, the UK gained terrain in terms of volumes and numbers. In Asia, Singapore is the main ICO hub, followed by Hong Kong. The Cayman Islands and the British Virgin Islands are among the largest ICO countries in terms of volume since they accepted Unicorn ICOs EOS ($ 4.1 billion) and Telegram ($ 1.7 billion). Other countries, not known for their large financial markets, are also among the leading ICO countries (for example, Estonia, Lithuania, Israel) (*details are given in Fig. 1 and Table 2–4*). In 2017, many planned ICOs did not occur or were not further publicly documented or communicated. The change in the leading countries is due to the change in regulation. The power of regulation at the beginning of 2019 among 95 countries is presented in *Fig. 2*.

## DISADVANTAGES AND LIMITATIONS

Risk is the biggest disadvantage of an ICO investment. The market is volatile, and no one ever knows the real intentions of a new company. The first risk is an ordinary fraud when the project team pursues the only goal: to collect investor money. In addition, since there are currently no laws regulating the behavior of cryptocurrency crowdsales from the perspective of an investor, it cannot be ruled out that the project may not reach the stage of product appearance or disappoint the investor with its implementation. Based on the statistical research provided by Satis Group [2], the premier ICO advisory company, approximately 81% of ICOs are scams, about 6% failed, about 5% had gone dead, and about 8% went on to trade on an exchange.

According to the Wall Street Journal, due to fraudulent crowdfunding campaigns, token holders lost more than a billion dollars. Actually, one of the main reasons for such statistics might be the lack of token holders' control over their investments, the absence of bills and laws regulating the legal field in the sphere of ICO.

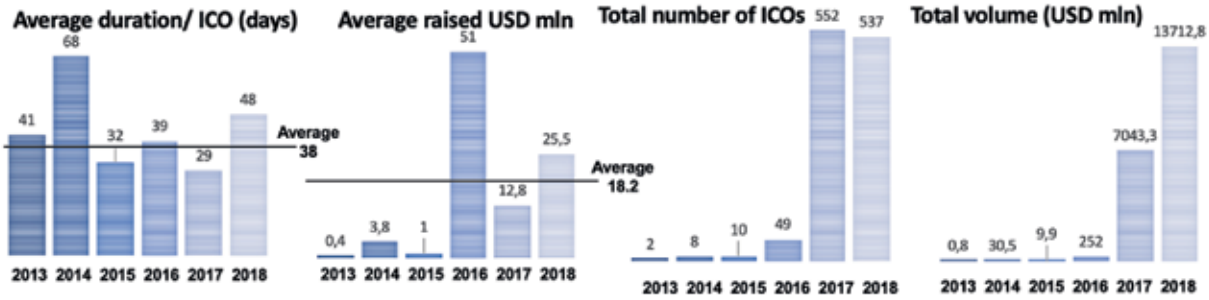
Another serious threat is hacker attacks. A study by Ernst & Young (2017) found that more than 10% of all funds raised by ICOs were stolen by cybercriminals. Analysts examined 372 ICOs conducted between 2015 and 2017. ICO's monthly loss from hackers was $ 1.5 million. Moreover, attackers often manage to gain access to personal data of investors: from their addresses and phone numbers to billing information. This ICO vulnerability is usually caused by errors in the smart contract code that were not specified during the audit. One of the most common types of attacks is a "51% attack". This happens when the attacker, in which a relatively small number of miners can play, has a "controlling share" of the hashrate, that is, processing power. In the result of the attack, miners gain control over the entire network and can create their own blocks. In such a way, hackers can have access to funds and transfer them to third parties.

Before launching an ICO, the development team determines the tasks for which it is necessary and indicates 2 digits in its White Paper: the minimum and maximum, called the Soft Cap and the Hard Cap. The Hard Cap defines the final goal, the upper limit of the amount of money invested, the most desired result. This is a very important indicator, precisely, because many cryptocurrencies have a limit on the total number of units in circulation. This, in turn, is one of the most important factors influencing the value of the coin, in addition to supply and demand. The Soft Cap is the minimum required amount of investment for the team to proceed the project implementation according the plan. If it is not reached

*Table 1*

**Statistics for 2013–2018 [1]**

| Year | Average duration/ ICO (days) | Average raised (USD, mln) | Total number of ICOs | Total volume (USD, mln) |
|---|---|---|---|---|
| 2013 | 41 | 0.4 | 2 | 0.8 |
| 2014 | 68 | 3.8 | 8 | 30.5 |
| 2015 | 32 | 1 | 10 | 9.9 |
| 2016 | 39 | 5.1 | 49 | 252 |
| 2017 | 29 | 12.8 | 552 | 7043.3 |
| 2018 | 48 | 25.5 | 537 | 13712.8 |
| All | 38 | 18.2 | 1158 | 21049.4 |




*Source:* calculated by the author based on EY research and PWC research.

within the specified period, the contract is closed, and it automatically returns all funds raised to the depositors. If the Hard Cap is reached, the sale of tokens stops. However, after overcoming the Soft Cap, investors control only the purchased tokens and cannot control the money invested or withdraw part of the investment.

Another disadvantage is the Gas War. The main ICO payment instrument was Ethereum. To conduct transactions in the Ethereum network, it is necessary to pay a commission to miners so that they confirm operations and enter them into a new unit. The higher the commission (GWEI) is, the more priority your transaction is for miners. Since the cost of ETH cryptocurrency is constantly changing, the developers decided to simplify the task and introduced an additional unit of calculation — Gas. It, in turn, is divided into two components — the limit (gas limit) and the price (gas price). Each miner receives a commission that is calculated in gas and is paid in ETH. The total commission is calculated by the sender, who sets the limit and the gas price and then multiplies one value by another. When the ICO participants use Ethereum token sale to compete and receive coins of new projects, they set high gas limits to increase the speed of transactions and first acquire tokens.

Overall, the main risks are tax risks (there is no agreement on whether the taxes/vat should be paid), regulation and legislation risks (there is no single position on the law and regulation of ICOs between countries, moreover, some location of ICOs may decrease the probability of success even with laws concerning the legal procedure of ICO [3]. An important question to investors is if ICO documents have a legal basis and if they have any rights in court), business (and investors) risks, structural risks (e.g. obfuscation[2] of how the founders will use ICO funds, undeclared salaries, unpublished financial documents, token holders cannot vote out the management of the token issuer, etc), team risks (there is a significant number of unqualified teams (no real business experience) and management quality is a classic factor affecting the financial performance of securities), token risks (they may be stolen/lost or the wallet may be hacked). Finally, the connection

[2] The deliberate act of creating source or machine code that is difficult for humans to understand. URL: https://en.wikipedia.org/wiki/Obfuscation_(software) (accessed on 20.08.2019).

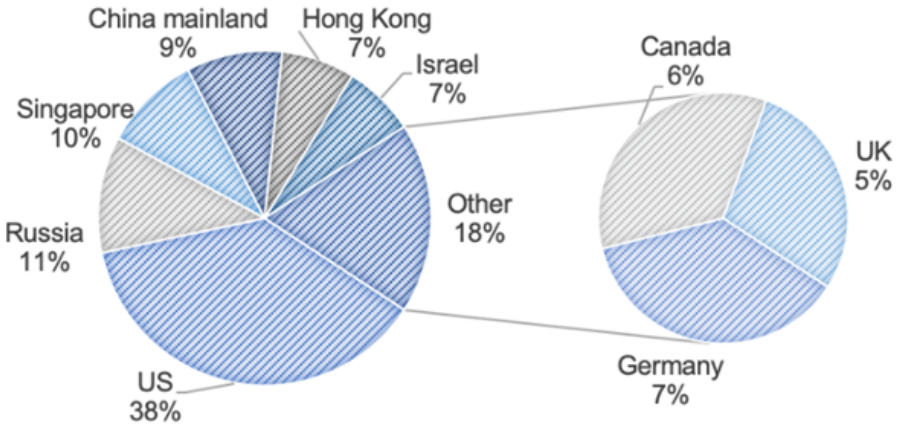



*Fig. 1.* **Geographical distribution of ICO projects (raised USD, mln) in June 2017–2018**

*Source:* calculated by the author based on coindesk.com, EY research, tokenmarket.com.

between the token holders and the holding company is of great concern, and several urgent questions arise. For example, what happens if the company that issued the tokens is sold or the token holders will have any rights under the new management?[3] To overcome this, new models are introduced. They are described in detail in sections 2–4.

## OVERVIEW AND CURRENT STATUS OF DECENTRALIZED AUTONOMOUS INITIAL COIN OFFERING

### Concept

"DAICO" abbreviation stands for Decentralized Autonomous Initial Coin Offering — decentralized autonomous public placement of tokens. A DAICO is a new fundraising model. Founder of Ethereum blockchain Vitalik Buterin proposed this model, combining the advantages of decentralized autonomous organizations (DAO) with the classic ICO. This synergistic model allows making the process of collecting and spending funds as transparent and safe as possible.

The idea of DAO has already existed for several years. However, the possibility of implementation appears only when using the blockchain, since the main goal of decentralized autonomous organizations is to build a decentralized business model for commercial companies. Blockchain technology has a timecode and a distributed registry, allowing a secure registry of contracts, acts and records that record ownership (or voting rights). The simplest explanation is the analogy proposed by Mike Hearn: 'Imagine a taxi without a driver. This taxi is searching for passengers. After the ride is finished, the taxi charges the fee and uses the profit to refuel. The taxi runs the coded algorithm autonomously'[4]. The same is true for DAO, they are coded to do a limited number of actions without any deviations. The main advantage of DAO is low operational costs (which arise due to principal agent problems) and reduced intermediation.

The DAICO is based on a smart contract that regulates all actions to attract and work with funds. From DAO, the concept takes extended control from the token holders. For example, after the public sale of tokens is completed, the contract temporarily blocks their free sale in order to avoid manipulation by the project team, one of the ICOs menace, and also determines how many funds developers can receive on a monthly basis. On the other hand, as in the classic ICO, a project team is working on the project, and not everyone, unlike the traditional DAO.

The difference between the DAICO and the ICO begins after the first stage when a mechanism called "tap" is launched[5]. Tap allows tokens holders to con-

[3] InvestItIn (2017). URL: https://www.investitin.com/ico-risks/ (accessed on 21.08.2019).

[4] (2018). URL: https://talk.bitzlato.com/t/decentralized-autonomous-organization-dao/420 (accessed on 21.08.2019).

[5] (2018). URL: https://hackernoon.com/overview-of-the-daico-crowdfunding-model-c611d55d4365) (accessed on 21.08.2019).

*Table 2*

**Comparison of funding in 2017 and 2018 in top-10 countries**

| Country | Raised in 2018 (USD, mln) | Raised in 2017 (USD, mln) | Change |
|---|---|---|---|
| Cayman Island | 4254 | 162 | 2526% |
| Singapore | 1192 | 641 | 86% |
| USA | 1092 | 1722 | –37% |
| UK | 507 | 275 | 84% |
| Switzerland | 456 | 1462 | –69% |
| Estonia | 323 | 63 | 413% |
| Lithuania | 259 | 51 | 408% |
| Israel | 226 | 192 | 18% |
| Hong Kong | 223 | 196 | 14% |

*Source:* calculated by the author based on coindesk.com, EY research, tokenmarket.com.

*Table 3*

**Top countries in 2018 (based on funding)**

| Country | Raised in 2018 (USD, mln) | Closed ICO, 2018 | Planned ICO, 2018 |
|---|---|---|---|
| Cayman Island | 4254 | 10 | 16 |
| British Virgin Island | 2227 | 16 | 2 |
| Singapore | 1192 | 53 | 52 |
| USA | 1092 | 56 | 50 |
| UK | 507 | 48 | 51 |
| Switzerland | 456 | 28 | 36 |
| Estonia | 323 | 31 | 40 |
| Lithuania | 259 | 6 | 5 |
| Israel | 226 | 5 | 5 |
| Hong Kong | 223 | 20 | 15 |

*Source:* calculated by the author based on coindesk.com, EY research, tokenmarket.com.

*Table 4*

**Top countries in 2017 (based on funding)**

| Country | Raised in 2017 (USD, mln) | Closed ICO, 2017 | Planned ICO, 2017 |
|---|---|---|---|
| USA | 1722 | 87 | 40 |
| Switzerland | 1462 | 33 | 1 |
| Singapore | 641 | 35 | 13 |
| Russia | 438 | 57 | 43 |
| China | 306 | 14 | 2 |
| UK | 275 | 26 | 23 |
| Japan | 195 | 6 | 6 |
| Canada | 163 | 10 | 5 |
| Cayman Island | 162 | 3 | 0 |

*Source:* calculated by the author based on coindesk.com, EY research, tokenmarket.com.

trol how much money is available for the team. The tap determines the amount per second that the development team can withdraw from the contract. Such a tool gives token holders control over the spending of raised funds and guarantees the security of their own investments. Payments to developers are not made once, but gradually, for example, once a month. If they need more than it is written in the smart contract, then this question is put to the vote. Token holders can either approve this proposal or not. So, the DAICO's key advantage over the ICO is that holders have a greater control with a possibility to vote and restrict access to investments, which negates the risk of manipulation of tokens and funds by the team.


*Fig. 2.* **The power of regulation**

*Source:* compiled by the author.

Moreover, such a synergy between DAO and the ICO decreases the possibility of a "51% attack". In the case of a 51% attack that maliciously increases the 'tap', the development team may simply reduce the 'tap' to the actual amount requested, or simply not use the extra money. Then the intruders will not be able to send funds to any other 3rd party chosen by the attacker. Token holders are not allowed to reduce the 'tap' by vote, this can only be carried out by the development or management team, which maintains a stable level of the tap not to keep funds stuck in the contract indefinitely. Even if a "51% attack" happens, the consequences when a hacker sends funds to a selected third party will be limited to the level where the depositors or the development team were allowed to withdraw funds. The DAICO platform reduces the risk and damage of two kinds of "51% attacks" on the ICO since the number of funds released by breaking a smart contract is limited and the 'tap' is strictly controlled.

The issue of extra investment can be solved by the DAICO model. The DAICO, like the ICO, has two goals on charges — the Soft Cap and the Hard Cap. In case of the ICO, developers return funds to investors only if they failed to collect the required amount during the Soft Cap. If the required amount of the Soft Cap is reached, investment cannot be refunded to token holders even if the project is stopped or it is terminated along the way. After the Soft Cap, fundraising continues until the Hard Cap. Sometimes the amount exceeds the set maximum value and continues to increase. In this case, the organizers must terminate the ICO and return the extra funds to investors. Unfortunately, the organizers do not always meet these obligations. Whereas, implementation of the DAICO platform increases the accountability of developers to investors and gives the latter additional guarantees that extra investments will be returned at the initial stage. In general, the DAICO solves the problem of irrevocable overspending of ICOs. In addition, if the token holders are dissatisfied with the development of the project, they can vote for the refund of the funds left on the smart contract at any stage of product development.

## OVERVIEW AND CURRENT STATUS OF INITIAL EXCHANGE OFFERINGS

### Concept

In 2018, an alternative to the ICO appeared — the Initial Exchange Offering (IEO). This is a new way to attract investment for various companies, where the cryptocurrency exchange is directly involved in the selection of projects, organization and sale of tokens. In fact, the IEO is a new ICO, where the exchange becomes the key marketing partner of the project, and the listing of coins is carried out only a couple of days after the campaign ends. Actually, the cryptocurrency exchange distributes digital assets among interested investors, who are verified users of the trading platform.

There are several advantages [4] of the IEO over the disadvantages of the ICO:

1. The risk of scams for investors is lower. The project is launched at the exchange after profound verification. The exchange rejects a dubious project to keep up its reputation.
2. Listing of new tokens is faster.
3. Redistribution of costs becomes available. According to Autonomous Research, listing an ICO token on a cryptocurrency exchange can cost promoters anywhere between $ 1 million and $ 3 million. An IEO project has lower costs for listing.
4. The financing rate is higher. In the ICO, the primary distribution of tokens may last for several days whereas in the IEO it lasts several minutes or even seconds.

5. Investor returns are higher. The value of a listed token is greater than in primary distribution.

6. There is no need to start another wallet.

7. The investment process is simple: investors need to replenish the balance on the exchange, wait for the token to be sold and place a purchase order.

8. Tokens are traded at the same price. This reduces the likelihood of falling rates for early investors who purchased first.

The main advantage of this approach for organizers is the ready-made base of potential IEO participants from a huge number of exchange users, so the marketing costs for the project team are reduced. Not only the IEO saves money, but also creates a synergistic effect, increasing the effectiveness of token promotion on the market. The primary source of income for stock exchanges are the revenues from the transaction fees (commissions) that are charged for each trade carried out on its platform. The more users and coins are in the listing, the more transactions and, accordingly, higher income from commissions are. Conducting the IEO on its own platform gives the exchange the opportunity to attract new users and offer exclusive coins that are not available on other sites. All this increases the trading momentum and, therefore, the income. Another advantage of the IEO for project developers is the absence of a Gas War since exchanges use their own cryptocurrency to sell tokens instead of Ethereum.

At the same time, all these advantages have some drawbacks. For example, due to the high propagation speed, some investors have no time to place an order and buy tokens of big projects. Nowadays there is a limited number of the IEO, and they are not the main way to finance projects. The reason for the decline in popularity is the unwillingness of exchanges to take on additional work. The mentioned verification procedure is very strict, e.g. there is an obligation to verify the identity. The main stop signals for the project developers is the price for the IEO and the same regulatory and legal problem as in the ICO (only South Korea has released a guideline on IEOs, covering the protection of investors, project development planning, technical materials, compliance, and security issues[6]).

**Market overview**

The examples of successful projects are BitTorrent (BTT) (the IEO took place on January 28, 2019 and attracted more than $ 7.2 million in just 18 minutes), Fetch.ai (FET) (attracted $ 6 mln in 22 seconds) and Cellar Network (CELR). The most well-known and reliable exchanges, providing their users with an opportunity to participate in the IEO [5] are Binance — Launchpad, Huobi — Huobi Prime, OKEx — OK JumpStart, Bittrex — Bittrex International, Kucoin — Spotlight, Coineal — Coineal Launchpad, BitForex — BitForex IEO and Bittrex — Bittrex International IEO. Unfortunately, there is a number of restrictions for exchanges in different countries. For instance, OKEx is not available in the USA, Binance restricts the trading opportunities for Albania, Belarus, etc.

According to the ICObench[7], the top countries conducting IEOs are: Singapore — is on the first place (11 projects, $ 58.8 mln)[8], South Korea — is on the second place (8 projects with the total number of funds equaling to $ 31.8 mln) and the third place belongs to Estonia (7 projects, $ 28.7 mln, but all funds were attracted by one IEO (Windhan Energy[9]). The rest important countries are the USA (6 projects, $ 25.8 mln), Hong Kong (4 projects, $ 65.7 mln — is a leader in total funds raised), the Cayman Islands (3 projects, $ 6.4 mln). In 17 countries there is only one IEO with the total amount of funds of $ 48.8 mln. Despite the fact that in the UK and the UAE there are 3 and 2 projects, zero funds were raised. By April 30, 42 projects were completed; by May 2, 60 IEOs were launched at ICObench and only 47 projects reached the Soft Cap.

[6] Countries and regions that currently ban IEOs: Albania, Afghanistan, Ethiopia, Belarus, Bosnia and Herzegovina, Burundi, North Korea, Congo, The Republic of Guinea, Guinea-Bissau, Canada, Zimbabwe, Cote d'Ivoire, Lebanon, Liberia, Libya, Malaysia, Macedonia, Myanmar, South Sudan, Serbia, Sri Lanka, Sudan, Somalia, Thailand, Trinidad and Tobago, Tunisia, Venezuela, Uganda, Ukraine, New Zealand, Syria, Yemen, Iraq, Iran, Central Africa, Mainland China. Exact source: OKEx (2019). URL: https://medium.com/okex-blog/what-is-initial-exchange-offering-ieo-the-evolution-of-ieo-market-9c7492f06df8 (accessed on 20.08.2019).

[7] ICObench Team (2019). URL: https://icobench.com/reports/IEO_Report.pdf (accessed on 10.08.2019).

[8] The data is contradicted to the CoinSchedule. URL: https://www.coinschedule.com/stats/IEO?dates=Jun%2001,%202019%20to%20Aug%2021,%202019. (accessed on 10.08.2019).

[9] Windhan is an ERC 20 standard based Green Energy Platform which uses blockchain technology to create a more meritocratic next generation of renewable energy assets. For more details follow: https://windhanenergy.io (accessed on 10.08.2019).

The biggest IEOs are Percival ($ 35 mln, but only 50% of the Hard Cap reached), Bread ($ 35 mln, 160% of the Hard Cap), CharS ($ 30 mln), GIFTO ($ 30 mln), Windhan ($ 28,7 mln) and ioeX ($ 27,2 mln)[10] (*Table 5*).

Based on the CoinSchedule, the total funds were $ 124.7mln in June 2019, $ 51.8 mln — in July 2019 and $ 9.5 mln — by August 21. The leading industries are shown in *Table 6*.

## OVERVIEW AND CURRENT STATUS OF SECURITY TOKEN OFFERINGS

### Concept

The popular utility tokens used in the ICO have a major disadvantage: investors are not compensated in case of failure of the ICO, since utility tokens are not securities, which leads to the absence of any obligations to create favorable conditions for investors. The solution of this problem is the security token. Security tokens represent real capital in the enterprise. At the same time, such a token is not necessarily tied to a share in the company, it can be used to separate property rights. In fact, they can provide the owner with a number of rights: ownership of shares, periodic dividends, cashflows, payment of debts, voting rights, etc. All these rights are secured by a smart contract. Due to the nature of these tokens, their value is supported by securities, therefore they are considered an investment. The issue of security tokens requires serious regulatory oversight. This oversight leads to the protection of investments and gives investors more rights, thus restoring the balance of power from the point of view of stakeholders. Additional regulation may include tax reporting, compliance monitoring, and additional transparency of information. Failure to comply with these laws by the company may result in severe penalties.

A Security Token Offering (STO) is an initial offer of security tokens. There is a similarity between the STO and the ICO: both of them issue tokens for investors. The main reason for purchasing a security token is dividends or voting rights. The STO ecosystem consists of 4 parts [6]: legal (to ensure that the STO is compliant, a company needs to work within the country's existing regulatory frameworks), an issuance platform (to issue a security token and to attract a range of potential investors, a company may choose to seek out the support of an issuance platform designed for STOs[11]), a custodian and exchanges.

An STO project meets all the requirements of the SEC meaning that the investor's money is protected by law. In the case of a dispute, the investor may file a complaint with the appropriate authority, since this type of token is subject to the securities law. The legal basis of a startup, government control and availability for institutional investors are factors of user confidence in the viability and investment potential of the company. To issue a security, it must be registered with the SEC, which is a complex and expensive process, but there is a way to avoid the laborious process. Since 2012, projects can use JOBS ACT. For example, in the USA, issuers can apply 3 types: Reg S, Reg D, Reg A+ and Reg CF [7]. The disadvantages relate to the cost of the project and the right to invest. Legal support of the STO project, the release of a security token and the development of its functionality will cost higher than in the ICO. Moreover, only qualified investors will be able to participate in the STO. They must have large private capital or be very active in the financial market for a certain period. For example, in Russia it is necessary to conduct at least 10 transactions totaling 300 thousand rubles over the past year; in the US, investors should have an income of $ 200,000 in each of the last two years [8]. Finally, the STO is a very slow procedure, e.g. Overstock's tZERO, which was officially launched in January, has not had an STO pipeline yet. The advantage of the STO is the ability to create "white" and "black" lists of investors, as a result of which they meet the requirements of KYC (know your client) and AML (anti-money laundering). The information transparency requirements increase corporate responsibility, reduce the likelihood of fraud and protect depositors in the event of bankruptcy. This makes the STO similar to the IPO. As a result, this leads to possibility to be presented at NASDAQ [9][12]

[10] ICObench Team (2019). URL: https://icobench.com/reports/IEO_Report.pdf (accessed on 10.08.2019).

[11] Some of the leading STO issuing platforms include Polymath, Swarm, Securitize, Harbor, and Securrency.

[12] Actually, NASDAQ uses blockchain technology when making a margin call through a distributed network among the deposit provider, the recipient, and other intermediaries. The distrib-

*Table 5*

**Token sales by funds raised**

| | Name | Amount Raised (mln $) | Start Date | End Date | Duration (days) | Description |
|---|---|---|---|---|---|---|
| 1 | Tron Game Global | 80 | 16.4.19 | 14.6.19 | 59 | The project that is currently laying the foundation for Internet decentralization about game blockchain |
| 2 | Opiria & PDATA | 18.4 | 11.5.19 | 15.6.19 | 35 | The decentralized marketplace that helps companies collect and analyze consumer data, enabling them to make better business decisions |
| 3 | Wink | 16 | 30.7.19 | 31.7.19 | 1 | Decentralized DApp platform |
| 4 | Azbit | 9 | 1.10.18 | 30.7.19 | 302 | The main objectives of the project are to meet the needs of cryptocurrency projects and users of traditional financial sector services, and to provide access to investment products and to the cryptocurrency markets |
| 5 | Squeezer | 9 | 14.5.18 | 20.6.19 | 402 | A platform that helps software developers build apps easily without tackling the entire blockchain infrastructure |
| 6 | 1irstcoin | 7.5 | 22.7.19 | 11.8.19 | 20 | One of the fastest, safest and most innovative trading site for cryptocurrencies |
| 7 | MixMarvel | 7.2 | 10.6.19 | 10.6.19 | 0 | A global game publishing platform powered by blockchain |
| 8 | Bitsdaq | 6.5 | 9.6.19 | 11.6.19 | 2 | The AsiaGlobal Exchange Network |
| 9 | Ultra | 5 | 16.7.19 | 16.7.19 | 0 | A protocol and platform positioned to disrupt the $ 140bn gaming industry using blockchain technology to allow anyone to build and operate their own game distribution platform or virtual goods trading service |
| 10 | Neutro | 4.7 | 15.6.19 | 31.7.19 | 46 | A protocol solves the trilemma of scalability, security and decentralization, allows for anonymous transactions and eradicates the need for centralized oracles |

*Source:* calculated by the author based on coinschedule.com.

*Table 6*

**Industries by amount raised and token sales**

| Industry | % of market by amount raised | % of market by token sales |
|---|---|---|
| Payments | 44.4% | 8.7% |
| Marketplace | 11.6% | 8.7% |
| Gambling & Betting | 11.3% | 8.7% |
| Finance | 8.5% | 13% |
| Trading & Investing | 7.5% | 8.7% |
| Infrastructure | 7.4% | 8.7% |
| Gaming &VR | 3.9% | 4.3% |

| Industry | % of market by amount raised | % of market by token sales |
|---|---|---|
| Social Network | 1.5% | 4.3% |
| Privacy & Security | 1.4% | 8.7% |
| Drugs & Healthcare | 0.8% | 4.3% |
| Recruitment | 0.8% | 4.3% |
| Data Analytics | 0.5% | 4.3% |
| Communication | 0.3% | 4.3% |
| Commerce & Advertising | 0.1% | 8.7% |

*Source:* calculated by the author based on coinschedule.com.

or NYSE [10]. There are several characteristics which will strengthen STOs: credibility, micro-investments traded as securities, ownership of underlying assets, high success rate[13], low fees, etc.

According to Chain Partners Research, the security token market forecast is positive: the market will grow to $ 2,000 billion in 2030 with a 59% CAGR between 2019 and 2030, as well as institutions that will be involved in the security token market after 2025. Moreover, security tokens may be divided

uted network of Nasdaq is based on Po W. The established private equity market trading system utilizing Nasdaq Linq is based on private blockchain.

[13] (2018). URL: https://hackernoon.com/will-2019-be-the-year-of-the-sto-understanding-stos-security-tokens-market-potential-over-icos-4d2502227220 based on Source: InWara's STO database. (accessed on 21.08.2019).

*Table 7*

**Top 7 Token sales by funds raised (STO)**

| | Name | Amount Raised (mln $) | Start Date | End Date | Description |
|---|---|---|---|---|---|
| 1 | Bolton Coin | 67.83 | 20.8.18 | 28.2.19 | The platform generates cumulative gains from tangible luxury markets such as gold and diamond mining, and real estate, integrated by eco-sustainable energy |
| 2 | UniCrypt | 8.412 | 21.1.19 | 21.5.19 | The IT company with experience in providing high-performance crypto-mining infrastructures and solutions for customers and clients |
| 3 | SocialRemit | 7.203 | 1.4.19 | 31.5.19 | The platform designed to provide emerging projects with financial and technological tools based on blockchain |
| 4 | GG World Lottery | 6.113 | 1.7.18 | 28.2.19 | First government-regulated national and global online lotteries with the True Random Number Generator technology and blockchain based transparency. The licenses are already secured in 12 countries. It received a lifetime revenue share in form of quarterly paid dividends. |
| 5 | Equitybase | 5.831 | 10.2.19 | 10.5.19 | The platform is designed to reduce entry barriers for issuers to launch security tokens on blockchain. |
| 6 | Faba Invest | 4 | 18.4.18 | 30.6.19 | The venture capital company that invests in viable projects through our STO, where Faba becomes an equity shareholder. |
| 7 | TapJets | 1.5 | 15.3.19 | 13.8.19 | Available for US Accredited Investors and non-US investors worldwide. |

*Source:* calculated by the author based on ICObench and Inwara.

into financing startups and asset backed security tokens (ABST). The last one is similar to ABS (Asset Backed Security) and leads to involving the blockchain in the securitization process. According to the research, estimated ABST market volume in 2030 will be $ 1,900 billion, which accounts for 38% of the ABS market volume in 2018 (the total ABS market volume is $ 4,900 billion based on SIFMA and S&P 500).

### Market overview

By March 20, 2019, 122 STOs were already completed, raising $ 512 million, almost equal to the amount raised by ICOs in January and February 2019[14]. 54 Security Token Offerings are currently listed and ongoing. Only 12 out of 328 STOs launched so far have failed (3.65%) [11]. In total, the STO raised $ 1258 million.

According to the Security Token Network[15], in Q1 of 2019, the USA had 40.7%[16] of the market share with 61 STOs, the UK has 8% (12 projects), the European Union (without the UK) had a total of 27 offerings (the details about top 7 STO is shown in *Table 7*). The share of the Asian region is 5.3%, which is very small, given the fact that the leading crypto exchanges (Binance, Huobi and OKEx) are registered and work from Asian countries (*Table 8*). A possible explanation is that this region has been still focusing in ICOs. At the same time, the appearance of the Asia Security Token Alliance (ASTA) may be a signal of changing Asian involvement into STOs. According to the InWARA's report[17], worldwide the number of STOs showed rapid growth in 2019, growth in Q1 2019

[14] The ICObench Analytics team (2019). URL: https://coin360.com/blog/ico-market-review-and-trend-analysis (accessed on 17.08.2019).

[15] Security Token Network (2019). URL: https://token.security/stn/article/analysis/state-of-the-security-token-ecosystem-part-1-security-token-offerings-q1–2019/ (accessed on 18.08.2019).

[16] The total number of STOs in the Security Token Network research is 150.

[17] InWara research team (2018) URL: https://www.inwara.com/report (accessed on 17.08.2019).

*Table 8*

**Number of STOs and total amount raised by industry and country**

| Industry | Number of STOs | Amount raised (mln $) |
|---|---|---|
| Finance | 37 | 261 |
| Trading & Investing | 31 | 86 |
| Real estate | 28 | |
| Investment | 23 | 173 |
| Cryptocurency | 18 | |
| Blockchain | 15 | 41 |
| Mining | 15 | 27 |
| FinTech | 15 | 154 |

| Country | Number of STOs | Raised amount of funds (mln $) |
|---|---|---|
| USA | 113 | 598 |
| Singapore | 12 | 21 |
| UK | 24 | 19 |
| Switzerland | 26 | 155 |
| Russia | 10 | 48 |
| Estonia | 10 | 57 |
| Germany | 9 | 16 |
| Canada | 7 | 98 |
| Cayman Islands | 6 | 45 |

*Source:* calculated by the author based on Tokens-Economy.com and Inwara.com.

was 130% (Q1'18–14 offerings, Q2'18–26, Q3'18–25, Q4'18–20, Q1'19–47).

## FINAL COMPARISON TABLE OF THE ICO, DAICO, IEO AND STO [11][18]

In order to summarize all information in sections 1–4, Table 9 is presented. By qualitative and measurable characteristics, this table allows investors and projects to simplify the selection process. Based on the great study by Ruben Merre [12], the advantages and disadvantages of the ICO, DAOICO, STO, and IEO have been systemized by main agents (investors, issuers, and exchange/platform) (Table 10).

## CASE STUDY OF PROJECTS

In the previous study [3], the main empirical results on the ICO success factors showed that in all 3 models for determining success, the significant variables are: Ethereum volatility, the ICO duration, a bonus, a White Paper and KYC, team size, number of experts and advisors. The majority of these factors are the external decision of the team and the project management. In order to understand the motives of the team better, the case study method was used. The results are compared by the ICO, IEO, and DAICO.

## EOS ICO AND FILECOIN. SCAM PROJECT

The EOS ICO is the most successful project (based on the amount of funds raised) and is still considered to be thriving. The EOS was able to attract more than $ 4 billion and provided an alternative to Ethereum. The product of the venture is the software that creates a self-sustaining blockchain, capable of processing up to a million various transactions per second, free and easy to implement. It is based on the Ethereum platform where all applications are developed. The ICO was conducted from June 26, 2017 and ended on July 11, 2017 in the U.S. with a token price of $ 0.99. The price of an EOS token by the end of June 2019 was stable, $ 7, while the ROI was 522.22%. The project has 4.1 points in the ICObench rating. In June 2019, 157 people were employed by the project. The EOS ICO was founded by Block.one firm, a software company operating since 2016. The ICO has never had the KYC procedure. Brendan Blumer, the CEO of the EOS, has only 20k followers on Twitter, and 330k followers on the EOS. The CEO had 11 years of work experience when the project started, though it was not connected to blockchain. However, the publicity, in this case, plays a minor role, since the EOS ICO team consists of those who had been involved into blockchain for a long time, therefore, they all have enough experience to be professionals in this field. The ICO is registered in the Cayman Islands, restricting the USA from participation. Moreover, the idea of the project is a novelty and it has an excellent representation

[18] (2019). URL: https://steempeak.com/coingecko/@culgin/ico-sto-and-ieo-which-one-will-dominate-2019 (accessed on 24.08.2019).

*Table 9*

**Differences and similarities between the ICO, DAICO, IEO and STO**

| Criteria | ICO | DAICO | IEO | STO |
|---|---|---|---|---|
| Definition | Crowdfunding by issuing a utility token/coin | The synergy of the DAO and ICO makes ICOs more secure as investor funds are available in a more controlled way. | A modified version of the ICO. Crowdfunding by issuing a utility token/coin by exchanging cryptocurrency without the first ICO step | The type of digital "securities" comparable to the IPO |
| First start date | Early 2013 | Mid 2018 | Early 2017 | The end of 2017, evolution to ETO* at the end of 2018 |
| Fundraising is conducted at | The token issuer website | Similar to the ICO | The exchange platform | The token security platform |
| Crowdsale counterparty | The project development team | The project development team and the mechanism for the investor control | The cryprocurrency exchange | The security token issuer brokered via an STO platform |
| Smart contract managed by | The startup conducting the token sale | Similar to the ICO | The cryprocurrency exchange | The token security platform |
| AML/KYC needed by the token issuer | Yes, it can vary between different projects. Each investor must go through the special KYC/AML verification process provided for by the project. | Each investor must go through the special KYC/AML verification process provided for by the project. | Not necessarily – the exchange conducts AML/KYC on its users. KYC/AML is done on the exchange, so existing exchange account holders do not have to go through it again. | KYC/AML is done on the platform, so existing platform account holders do not have to go through it again. |
| Marketing | The marketing budget needed for funding companies is significantly high, the project will have to invest many resources in order to get the attention of the public | Similar to the ICO | The token issuer can tap on the exchange reach and users. Joint marketing with the exchange | The token issuer has to market to individual investors. It may be possible to provide extra marketing via the platform. |
| Screening required before a startup can launch a crowdsale | No – anyone can launch an ICO (in a country where it is legal) | Similar to the ICO | Yes – the exchange screens the company before it allows it to raise funds on its platform | Probable none |
| Automatic token listing after crowdsale | No – the startup has to reach out the exchange to list its tokens. Not immediate. Listing fees to be negotiated with each exchange. | Similar to the ICO | Yes – the exchange where the IEO list is conducted. The exchange listing is immediate. Included in IEO fees. | Depends. If the selected STO platform is also the exchange, then it is likely to be immediate. |
| Difficulty to set up | Easy | Easy | Medium | High |
| Fundraising cost | Low | Low | Medium | Medium |
| Investor protection | Low (limited) | Medium | Limited-Medium | Strong |
| Investor accessibility | High | High | Low-Medium | Low |
| Regulation level | Low (but the is an improvement) | Low | Low-Medium | High |
| Governance level | Low | Medium-High | Medium | High |
| Liquidity | Medium | Low-Medium | High | Low |
| Centralization level | Relatively centralized | Relatively decentralized: decisions on funds are made by a voting system, thus are democratized. In fact, there is no centralized team that makes all decisions. | Relatively centralized | Relatively centralized |
| Fees | No | No | Fiat fees/ exchange commissions | No |
| Gas | Depends on the choice of a platform and the network load | Depends on the choice of a platform and the network load | Not required | Depends on the choice of a platform and the network load |
| Speed | Several months | Several months | The highest (from weeks to seconds) | Up to a year |

*Source:* calculated by the author based on [11, 12] and steampeak.com.

* The ETO is an equity token offering. The main definition is a token which functions as a traditional stock asset, represents the ownership of a third-party asset or a venture and takes their value from the success or failure of this property. The real analogy is stocks, futures, and options contracts. URL: https://www.bitcoinmarketjournal.com/equity-token (accessed on 24.08.2019).

in the White Paper. The ICO design was also non-trivial, meaning that Block.one made a one-year uncapped token sale, at the same time launching the EOS VC to attract big investors such as Tomorrow Blockchain Opportunities, Galaxy Digital LP, FinLab AG, etc. The marking company was aggressive. Block.one 'made a public relations splash, hosting numerous informational sessions, sponsoring post-conference receptions, giving out free t-shirts and even advertising on a Times Square jumbotron.' [13] The EOS tokens are expensive in comparison to the initial price; it provides employment for more than 150 people and raises more than $ 4 billion during the token sale. Although the right choice of industry influenced the EOS development, the professionalism of the team, the well-considered design of the ICO and the PR campaign allowed the long-term success of the project.

Filecoin allows anybody to create decentralized data storage, meaning that users can share storage on the server in exchange for Filecoin token called Fil. The ICO was registered in the U.S. During one day on August 10, 2017, 200 million tokens were sold for $ 0.75 each, raising a total of $ 257 million. The Fil average cost was estimated at $ 8.73 with the ROI of 1064% in June 2019, though it was rated only 3.1 points on the ICObench. The project was founded by Protocol Labs team who had a big experience in blockchain technology. Filecoin was able to raise $ 52 million during the pre-ICO, and during the second round $ 135 million out of $ 205 million were raised in only one hour. Filecoin accepted US Dollars, Bitcoin and Ethereum. Except for a professional team, Filecoin had conducted a grandiose advertising strategy, where the price of the token at the start of the ICO was $ 1 and rose with every next investment[19]. Thus, investors were rushing to participate as early as possible, attracting attention to the project. Moreover, Filecoin implemented strict entry policy — only investors with an income of $ 200 thousand or more had a right to join. This regulation provided a significant advantage to the business later when Securities and Exchange Commission forced all ICOs to introduce registration laws. According to LinkedIn[20], 77 people are employed in the project. Despite the fact, that Filecoin ICO ended in 2017, in the previous case study of Filecoin [14] in 2018, the authors mentioned that FIL tokens have not yet been delivered to investors. Filecoin futures were traded on Gate.io and Lbank since December 13, 2017, and the futures prices provide an estimate of the value of the underlying FIL tokens. With the sharp decline in prices (from $ 27.66 to $ 3), mirroring that of the overall crypto market since late 2017, the recent prices of Filecoin imply that its $ 200 million outstanding tokens have a fair market value of approximately $ 600 million, substantially more than the $ 206 million that they were sold for in 2017.

Among the disadvantages of the ICO, we have already noticed that the concept of regulation is opposite to the concept of cryptocurrency decentralization, resulting in the regulation paradox. Regulation is impossible without centralization of information, categorizing, creating limits, whereas decentralization means substituting controlled systems with algorithms. This creates a fundamental conflict as regulation minimizes risks at the expense of loss of individuality, while cryptography, on the opposite, is unable to decrease risks, but enhances individual power of users [15]. One of the most famous scam ICOs is the OneCoin case.

OneCoin is a fraudulent ICO founded in Bulgaria, the so-called 'classic Ponzi scheme', meaning that earlier investors were paid funds by more recent investors to attract further attention of the public. Therefore, this scam was not easily comprehensible for individuals, even though the official website contained many misprints and errors and no White Paper was published. The venture positioned itself as an analogue of the Bitcoin system, also, offering an educational resource for finances in cryptocurrency. OneCoin caught attention of many experts and governments which quickly identified it as the Ponzi scheme and 5 countries — Thailand, Croatia, Bulgaria, Finland and Norway — even warned public of the risks that the ICO was posing. In 2016, Chinese authorities investigated the scheme and withdrew $ 30 million from several investors that had been caught [17]. The obvious sign of a fraudulent scheme was the fact that OneCoin offered centralized transactions with their private blockchain, while the cryptography was based on decentralization and it

[19] URL: https://icobench.com/ico/filecoin (accessed on 30.06.2019).
[20] URL: www.linkedin.com/company/protocollabs/about/ (accessed on 30.06.2019).

*Table 10*

**Advantages and disadvantages for issuers, investors and exchanges of the ICO, DAICO, IEO and STO**

| Agent | Type | Advantages | Disadvantages |
|---|---|---|---|
| Issuer | ICO | ▪ All funds raised are available to the project team at the end of the fundraising round. The team can immediately start working and spending all resources<br>▪ No extensive disclosure requirements for the fundraiser | ○ Funds raised are inherently volatile (due to the market instability and the absence of the real provision of cryptocurrency)<br>○ Increasing legal uncertainty and regulatory scrutiny (e.g. by US SEC)<br>○ Full reward / funds are available from the very beginning, which leads to demotivation of the project team to continue working on the project<br>○ Scam projects results in lowering the reputation of the whole market and legitimate projects are unable to raise sufficient funds<br>○ Many projects struggle to maintain the token value and exchange listing |
| | DAICO | ▪ The improved trust mechanisms can increase the interest of more qualified (and quality) contributors / investors who might otherwise (e.g. in the case of a regular ICO) stay away<br>▪ Management of funds and roadmap of the project are done jointly with contributors/investors, which increases the quality and decreases the risk for a less experienced development team | ○ Involvement of contributors/investors has the opposite (negative) effect on the level of freedom.<br>○ The project team depends on the basic voting system, which determines periodically issued investment funds for the project.<br>○ Since depositors / investors play a decisive role in decision making, there is a risk that they make decisions based on emotions, based on the price of the token, and not on the created value of the project. Their emotions, as well as their education in the project should be managed by a development team |
| | IEO | ▪ Decreased costs due to sharing marketing costs with the exchange<br>▪ Access to expertise (exchange listing, marketing, smart contract logic, etc)<br>▪ Additional credibility to the project since the exchange risks its reputation in the listing project<br>▪ Convinient in countries where ICOs are forbidden | ○ Increased costs. The exchange charges high listing fees; even higher than for ICOs, the token marketing costs are considerable.<br>○ Token issuers bear the cost of what are considered benefits for the exchange and the investors (e.g. in the case where investors get a discount on a specific exchange) |
| | STO | ▪ Expansion of a number of companies: off-chain companies (start-ups, private equity) can now be connected to the global cryptoeconomics, dying for the sake of security tokens, rather than utility tokens<br>▪ Lower transaction costs compared to the traditional investment process<br>▪ Clear framework and procedures to ensure thorough due diligence and regulatory compliance throughout the listing process | ○ Potentially higher share valuation carries the risk of higher volatility.<br>○ Despite the fact that STOs typically take regulation into account as much as possible, it remains a new concept that carries its risks of unforeseen surprises |
| | ICO | ▪ ICOs have provided incredible returns at an early stage<br>▪ Custody is possible without intermediaries<br>▪ Limited regulatory audit<br>▪ Same level of anonymity is feasible for cryptocurrencies such as BTC, ETH<br>▪ Contributors/investors are usually the first users of the (utility) token. Unlike holding shares in a company whose products can never be used by an investor / investor, tokens can be more tangible than securities | ○ Failure to fulfill promises at the end of the ICO. Investors still care about their money and are constantly looking for news.<br>○ 'Gas wars' are very real<br>○ No audit increases risks, thus, investors typically have to do their own due diligence leading to investment in low-quality projects<br>○ ICO stages typically include pre-ICO rounds when privileged investors can buy at a discount, diminishing the potential returns for later-stage investors<br>○ Lack of mechanisms to protect investors |

*Table 10 (continued)*

| Agent | Type | Advantages | Disadvantages |
|---|---|---|---|
| | DAICO | ▪ The risk of a scam project is reduced since investors decide (due to the voting rights) when to release the funds via the DAICO tap mechanism. Also, investors can vote for a refund of the remaining finances if the project fails.<br>▪ Voting system leads to the decentralized team<br>▪ Reducing the risk of '51% attack' as the amount of funds that gets released from the Smart Contract is limited and strictly controlled. Even if it happens, the amount is limited to the tap release | ○ Contributors could completely disengage by putting all their trust in the DAICO concept and therefore believe that they do not need to participate in voting and resolutions, which weakens the security of the mechanism.<br>○ In investing, there is usually a psychological aspect. Participants must be properly trained to make informed decisions for the project. This potentially increases project risks in volatile markets.<br>○ If developers have many tokens, they have majority in control and management and potentially have to convince a small percentage of contributors/investors |
| | IEO | ▪ 'Scamming' becomes more difficult: exchanges take the reputational risk of listing a 'bad' token, so they are highly incentivized to do a thorough due diligence<br>▪ Risk of 'Gas wars' is diminished | ○ A high percentage of coins will typically be held by a smaller number of investors, resulting in considerable price manipulation risk. It is advised to avoid investing in coins where circulation supply is small and not evenly distributed.<br>○ Contributors/investors that do not have an account on the listing exchange have to sign up on time.<br>○ Centralized exchanges own the private keys of all wallets and complete transactions, or the transaction occurs only on the exchange, and not on the blockchain. Thus, investors do not own their tokens |
| | STO | ▪ Startups/ private equity become more accessible as investments and vice versa blockchain technology allows for more liquidity for startup/PE shareholders<br>▪ Dividends and voting rights become possible<br>▪ Lower transaction costs<br>▪ Contributors are generally more protected on STOs rather than other crypto-funding forms. Also, they get the same legal rights as conventional company shareholder resolutions on-platform for on-chain investors, while off-chain investors can still vote on paper, and both results are merged | ○ The on-chain activity of buying and selling the on-chain issued tokens may influence the inherent volatility of share valuation and, hence, the artificial value of the company at any given period of time. This could be an unwanted side-effect of the higher liquidity online investment/trading platform that conducts the STOs |
| Exchange/ platform | ICO | ▪ Exchanges request high listing fees for projects that want to get more trading volume / access to a wider base of investors, for example, top-level exchanges require several million fees<br>▪ Exchange can thrive on the ICO initial success, by simply listing ICOs that are already in high demand<br>▪ Exchanges can receive discounts on listed tokens, which further increases cash flows | ○ Historically, many of promising ICO projects are just White Paper and almost zero trading volume, leaving the exchange with near-dead, no-value 'shitcoins'. This pushes the exchange to delist tokens in the end. Scams have a negative reputational impact on the exchange |
| | DAICO | ▪ If done correctly, there is no need for an exchange in this set-up | ○ If done correctly, there is no need for an exchange in this set-up |
| | IEO | ▪ New users, capital inflows, increase in trading volume, additional fees (token/fiat/%), market collaboration, synergy effect of doing, joint marketing with the project, coverage, reputation<br>▪ To be able to assess thoroughly whether projects need multi-disciplinary teams for qualitative due diligence | ○ Limited number of people own the majority of token circulation as only a few exchanges are involved; also, people with no account at the exchanges have to sign up in time to be able to participate in the IEO. This increases the risks of price manipulation, including pump and dump schemes |
| | STO | ▪ Once fully verified by regulatory authorities, there are considerable barriers to enter new competing platforms<br>▪ Once multiple projects are listed, the platform can also offer a tokenized fund, through which investors can buy stakes in a more diversified portfolio of several of the listed projects, further enhancing the platform's revenue potential | ○ Many steps are required from a platform to get to the point where it is completely legal and regulatory verified by relevant supervising authorities. Once achieved a confirmed quality status and regulatory approval to conduct STOs, this also entails considerable barriers for new platform competitors |

*Source:* calculated by the author based on [12].

was technically impossible to realize what the scam was promising. What is more, the price of tokens in OneCoin was claimed to be determined by the amount mined and not by the supply and demand as in usual cryptocurrencies. Overall, the fraudulence of One Coin was incontestable, but the complex detection of such scams among other businesses allowed to have profits of $ 4 billion out of nothing[21].

The enormous number of scams resulted in a ban on advertising all ICOs in Google, Facebook, Twitter and Mailchimp that was supposed to protect less informed users. This policy was adopted because social media is the main channel that connects users with the crowdfunding projects and the frauds actively took advantage of it. Though the move to new platforms like LinkedIn happened, it allowed to protect ordinary people from investing in scams[22].

## IEO BITFINEX, SQUEEZER

The biggest IEO that ended until June 2019 is Bitfinex. This project takes the 1st place by the total amounts raised during an IEO totaling at $ 1billion. Bitfinex is the digital asset exchange, margin trading and funding platform, which includes Bitcoin, Ethereum, EOS, Litecoin, Ripple, NEO, Monero and many more cryptocurrencies in its circulation. The Bitfinex IEO started on May 5, and ended only 8 days later; however, in this short period, the issue of tokens called LEO attracted more than $ 100 million from each private company inside and outside the industry and more than $ 1 million from each user, even though it was conducted only on a private basis. The firm never got it to the stage of the public sale. It was founded by a HongKong firm called iFinex Inc, however, launched in the British Virgin Islands. The project has a White Paper and it accepted cryptocurrency called USDT or Tether. Since Tether is a stable coin, which means that it is almost stable and avoids fluctuations unlike Bitcoin and Ethereum. Although the long-term results are vague for the IEO industry, the current results are impressive, and the industry is assessed to be more trustworthy. According to LinkedIn, in June 2019, 188 people were employed in Bitfinex, while on Twitter it had 501k followers[23]. Therefore, the evident advantage of the IEO over the ICO is the presence of existing user base on the exchange platform that allows to raise tremendous investments even on the private sale stage. Even though the process of buying tokens through the exchange is a bit more complicated than a direct sale in the ICO, the pros of the IEO obviously outweigh the cons as the results of the ended ventures are impressive. The market was capable of resolving the problems of ICOs by institutionalizing the market and creating higher security standards, improving the whole industry of investments in cryptocurrencies.

The Squeezer IEO raised more than $ 9 million. The Squeezer IEO was conducted with the help of Bitforex Launchpad. Squeezer is a useful case study because it has a clear and compelling business model. Also, it is important to note that among the 62 IEO projects, the ICObench ratings (4.6 points for the team; 4.7 points for the vision; 4.5 points for the product; the overall evaluation by the experts is 4.6 points and the ICObench rating is 4.1) and the success ratio of Squeezer (92%) were the closest to the median of each index (4.35 points for the team; 4.3 points for the vision; 4.05 points for the product; the overall evaluation by the experts is 4 and the ICObench rating is 3.85; success ratio is 80%).

Squeezer is a platform that helps software developers easily create applications without affecting the entire blockchain infrastructure. The aim of the project is to integrate blockchain into existent business infrastructures, applying a single universal blockchain "connector", which will allow developers to connect to multiple blockchains (such as BTC, ETH, or LTC). So, such a structure allows conducting blockchain transactions without dealing with blockchain development. Squeezer also provides all tools needed by developers to create a serverless app, to attach smart contracts, to test their applications and to quickly deploy production. By means of platforms such as AWS Lambda and Google Functions, Squeezer uses the power of microservices for applications which means that the autoscale feature is enabled by default. Microservices also support automatic

[21] URL: www.onecoin.eu (accessed on 30.06.2019).

[22] Pw C. URL: https://www.pwc.ch/en/publications/2018/how-do-icos-work-en-pwc.pdf (accessed on 30.06.2019).

[23] URL: icobench.com/ico/bitfinex (accessed on 30.06.2019).

recovery and provide for the silent implementation of the cloud service. Squeezer is the first platform that combines the power of microservices with the immutability of blockchain technology. The Squeezer platform will provide developers with the ability to create and deploy application blockchains at several stages directly from GitHub, among other code repositories without setting up any special environment or advanced blockchain skills, which will make the blockchain look more like a database than a complex entity. Additionally, you can have your app deployed in production with just one simple command and without tackling any service configurations.

The Squeezer's token, which uses an SQR symbol, is a utility token because it is used by developers to build and deploy apps on the Squeezer Platform. It is used in the Squeezer Platform to pay for services such as deployments, inbound and outbound transactions or additional team members to collaborate on your project. SQR is an ERC 20 compatible token and is used to access and deploy applications using the Squeezer infrastructure. Squeezer will be similar to PayPal, but for blockchain transactions, it will provide real-time transaction support on different blockchains, currently the fastest integration in the industry (Squeezer Chainkit)[24]. The main use of the ChainKit is to unify the top blockchains interfaces into a single normalized API interface, so one can easily create dApps for blockchains without going into the complex blockchain infrastructure. Currently, the Squeezer platform is working for web projects, but the organization is working on developing connectors so that microservice can initiate an action in the blockchain. As a result, there is no need to create your own token, except to generate funds for the platform.The Squeezer IEO was capped at 30 million SQR tokens, representing 40% of the ultimate supply limit of 75 million tokens. Of the remaining tokens, 30% are required by the Squeezer Platform to ensure the operation of the platform.

## BIT.GAME DAICO

BIT.GAME DAICO raised more than $ 6.5 million. The DAICO was conducted with the help of Bitforex Launchpad. BIT.GAME is a useful case study because it has a clear and compelling business model. Also, it is important to point out that among 4 DAICO projects, the ICObench ratings (3 points for the team; 3.4 points for the vision; 2.3 points for the product; the overall evaluation by the experts is 3.1 points and the ICObench rating is 3.2) and the success ratio of Squeezer (36%) were the closest to the median of each index (3.5 points for the team; 3.95 points for the vision; 3.65 points for the product; the overall evaluation by the experts is 3.8 points and the ICObench rating is 4.1; the success ratio is 31%). BIT.GAME Platform is based on DAICOs, and it offers technical support, incubation funds and asset trading for all the innovative, high-potential blockchain game projects. BIT.GAME solves the pain points of the game industry by providing game companies blockchain game solutions and build servers in the blockchain vertical domain digital currency exchange. It will become a link between blockchain and the game conversion chain. BIT.GAME is composed of a vertical area exchange, BIT.GAME solutions and an incubation platform for blockchain games. BIT.GAME EXCHANGE will fully support the interconnection between the blockchain game token, the digital currency and the national legal currency. The PLUS version will also add the Blockchain Game props trading of resources and items, and auction and rental services. BIT.GAME SOLUTION provides the traditional game developers with the blockchain game development solution. The game trading interface of public blockchain is based on Ethereum, QTUM, Achain, TrustNote, Gamechain System, etc., which contain Off-Chain Circulation Solution, Single-Public Blockchain Solution, and Multi-Public Blockchain Solution, and will be seamlessly integrated into BIT.GAME EXCHANGE. The BIT.GAME PLATFORM will not only bring together the public blockchain ecosphere, game developers and investors in order to integrate the three resources, but also share benefits through the PoC Mining Pool and Double Repurchase Program with global game players, as well as exchange users. Moreover, the aim of BIT.GAME is to promote the development of blockchain games through the exchange of tokens, so the participants are no longer limited to only

[24] Squeezer White Paper. URL: https://squeezer.io/docs/Squeezer_White_Paper.pdf (accessed on 30.06.2019).

*Table 11*

**Summary of the Squeezer IEO and the DAICO Bit.Game**

| | Squeezer | BIT.GAME |
|---|---|---|
| Total Token Supply | 187,500,000SQR | 10,000,000,000 BGX |
| Total Token Sale Supply | 40% (75,000,000 SQR) | 40% (4,000,000,000 BGX) |
| Private Sale Supply | 24% (45,000,000 SQR) | 10% (1,000,000,000 BGX) |
| Public Sale Supply | 16% (30,000,000 SQR) | 30% (3,000,000,000 BGX) |
| Initial Circulating Supply | 27% (50,791,761 SQR) | 100% (10,000,000,000 BGX) |
| Public Sale Token Price | 1 SQR = 0.20 USD | 1 BGX = 0.01 USD |
| Private Sale Token Price | 1 SQR = 0.17 USD | 1 BGX = 0.01 USD |
| Public Sale Vesting Period | None | None |
| Token Type | ERC-20 | ERC-20 |

*Source:* calculated by the author based on White Papers and ICObench.

one game, but have international reach. In changing the blockchain game mechanism, BIT.GAME also seeks to redirect the profit chain. BIT.GAME will construct the next generation of decentralized exchange — AIDEX, jointly with Achain, Matrix AI Network based on artificial intelligence and blockchain and blockchain technology. BIT.GAME AIDEX will seek the best combination of decentralization and user experience. Ultimate transaction speed, lower transaction costs, sufficient trading depth, and ample liquidity can be achieved by continuously optimizing user experience based on security and transparency. (*Table 11*).

## CONCLUSIONS, LIMITATIONS AND FURTHER RESEARCH

The ICO market is in crisis, but this method of fundraising will not disappear. To get the ICO out of the crisis, the DAICO first appeared, a new form of attracting investments, and then the IEO. They are the ones who will probably arrange a cryptocurrency Renaissance, which will rehabilitate the mechanics of initial placement of tokens. The analysis showed that the success of a fundraising campaign may be pre-determined by the country of origin and its legislation. Subsequently, the experience of the founders, the marketing campaign and the right strategy are the influencing factors. The only way to avoid ICO scams is to develop the regulation against which it is impossible due to decentralized nature of blockchain. Another significant problem of most ICOs is the inability of the founders to maintain a token in the long run. This can only be solved with the constant development of a project that may be achieved only by the factors already mentioned. Thus, the urgent problems of IEOs have been solved, and IEOs are showing impressive results now. The potential of IEOs is giant as it combines the advantages of the ICO and resolves the challenges that it poses. Moreover, STOs are likely to become extremely popular, because they provide security and open new investment horizons for a security coin. Both IEOs and STOs are more regulated, meaning that the number of failures is going to decrease.

There is no doubt that the blockchain investment sector is still rising. This case study is the most complete overview of new financial innovations in the fundraising. The paper provides the concepts of the ICO, DAICO, IEO and STO and examines in detail, systimazes and identifies the advantages and disadvantages of each method. The analysis of the articles and papers allowed us to formulate the factors and criteria that made it possible to compare the levels of success of various models and to identify the reasons for success. In addition, a project database was introduced, which helped compare the ICO, DAICO, IEO and STO. A critical comparative analysis of four fundraising models will give an accurate summary of the projects. Unfortunately, the biggest limitation of the paper is the research method — the case study. However, such a fundamental theoretical research allows continuing further investigation by means of econometric tools.

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*The article was submitted on 30.09.2019; revised on 14.10.2019 and accepted for publication on 28.10.2019. The author read and approved the final version of the manuscript.*