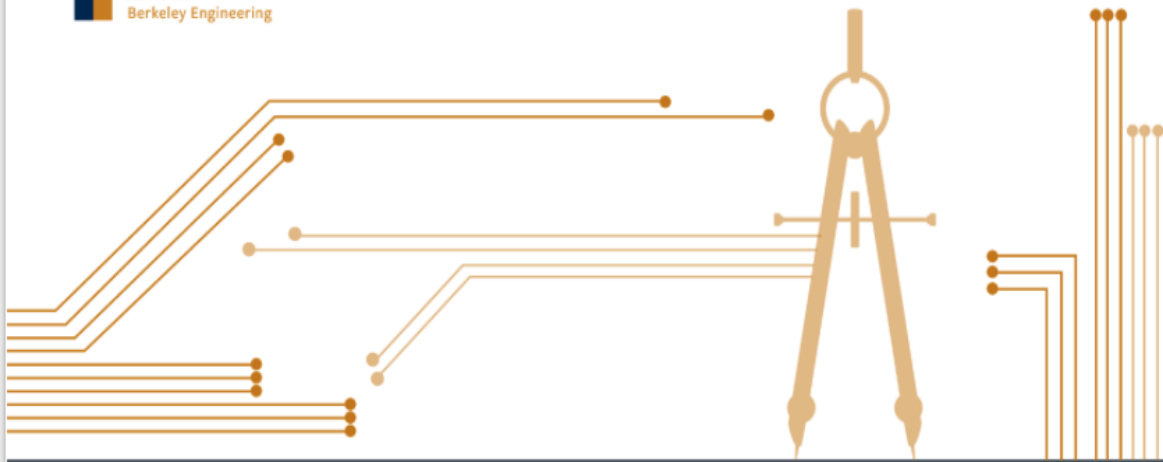Pantas and Ting
Sutardja Center
for Entrepreneurship & Technology
Berkeley Engineering

ICO - An Industry Landscape Study

Oliver Venn, KC Shashidhar, Aji Kurian, Roy Luo, Schuyler Cullen

Berkeley
UNIVERSITY OF CALIFORNIA

Table of Contents

Introduction

An Initial Coin Offering, also commonly referred to as an ICO, is a fundraising mechanism in which new projects sell their underlying crypto tokens in exchange for bitcoin, ether etc. ICOs are a relatively new phenomenon, but have quickly become a dominant source of funds for early stage projects within the blockchain community.

The tokens issued by a company in exchange for funds can be classified into different types, depending on whether they carry a consumptive value or a speculative value as an investment for the buyers.

Security tokens: These tokens provide a share in the value of the enterprise. A buyer holds this with the belief that the company will develop products that will entail an appreciation in value of the company. Depending on the value that is shared, they can provide different assets/rights in the enterprise. For example:
  ● Equity tokens - equivalent of a traditional non-voting share of stock,
  ● Dividend tokens - equivalent of a corporate bond, or
  ● Voting tokens - offers a say in operations, but not always including equity or dividends.

Utility tokens: These tokens are issued to provide rights for purchase or gain access to goods or services within a system where it is honored; draw in small investors, who also happen to be future customers.
  ● Loyalty Tokens: Ex: Kickcity
  ● Discount Tokens: Ex: Promotional codes.
  ● Membership Tokens: Ex: Blockchain Hotels
  ● Service Tokens: Ex: Ether
  ● Preorder Tokens: Ex: Indiegogo

Hypothesis

In this report, we aim to evaluate the hypothesis that ICO will replace current modes of venture capital funding as the dominant funding source for early stage startups. We view differences in marginal cost between ICO and VC driving this replacement. We unpack the hypothesis in this section and assess current evidence to support it.

The financial industry is a series of disruptions. Development capital was borne out of the family wealth of business magnates, VCs were borne out of US legislation[1], ICOs were borne out of blockchain technology. Early Stage VC is currently vital to generating new businesses. However, recent trends in seed and early stage VC funding have declined year-on-year for the past 4 years across every major region[2]. In contrast, ICO funding has shown a positive trend.

The digital ledger decreases the opportunity cost of fundraising (pitching versus building the product), and scales to millions of investors (the audience of telegram messaging app versus the tens of investors on Sand Hill Road). These changes are important to enabling company births and scaling.

VCs are geographically isolated. Ideas, talent, and market opportunities are not. Companies are now increasingly virtual, and geographic dependencies are less important. There is no reason why funding sources should have geographic structure.

If this assertion is true, then we would expect increased geographic diversity across ICO funded startups versus VC funded startups. This is indeed the case. US-based companies accounted for about 20% of 2017 ICO raises[3] versus 57%[4] of VC raises.

Companies will seek out opportunities for funding that minimize opportunity cost. The opportunity cost of fundraising is high[5] and is not amenable to parallelization. In this document we explain the innovative mechanisms that allow startup companies to communicate their value proposition to investors simultaneously.

If this assertion is true, then we would expect growth in ICO funding over time. Current trends indicate that this is the case. There were 43 ICOs in 2016 totaling $95M, 210 ICOs in 2017 totalling $3.8B, and 224 ICOs in the first quarter of 2018 totalling $6.4B.

---

[1] Small Business Investment Act of 1958
[2] KPMG Venture Pulse Report Q4 2017
[3] http://www.coindesk.com
[4] Pitchbook
[5] http://www.paulgraham.com/future.html

These observations are encouraging. However, we note potential impediments to the sustained adoption of ICOs, in particular the lack of clarity around regulation. We will discuss these considerations in Risks, Regulation and Mitigation.

Technology Background

Blockchain

Tokens are typically issued on a public blockchain. A blockchain is a decentralized public ledger that record all transactions. In a blockchain, instead of relying on a central authority to record transactions, a large number of computer nodes collectively verify and maintain the integrity of all the transactions. All the transactions are linked via cryptographic hash algorithms which make it impossible to alter an individual transaction without compromising the entire network.

The following diagram shows the flow of a typical transaction on a blockchain.
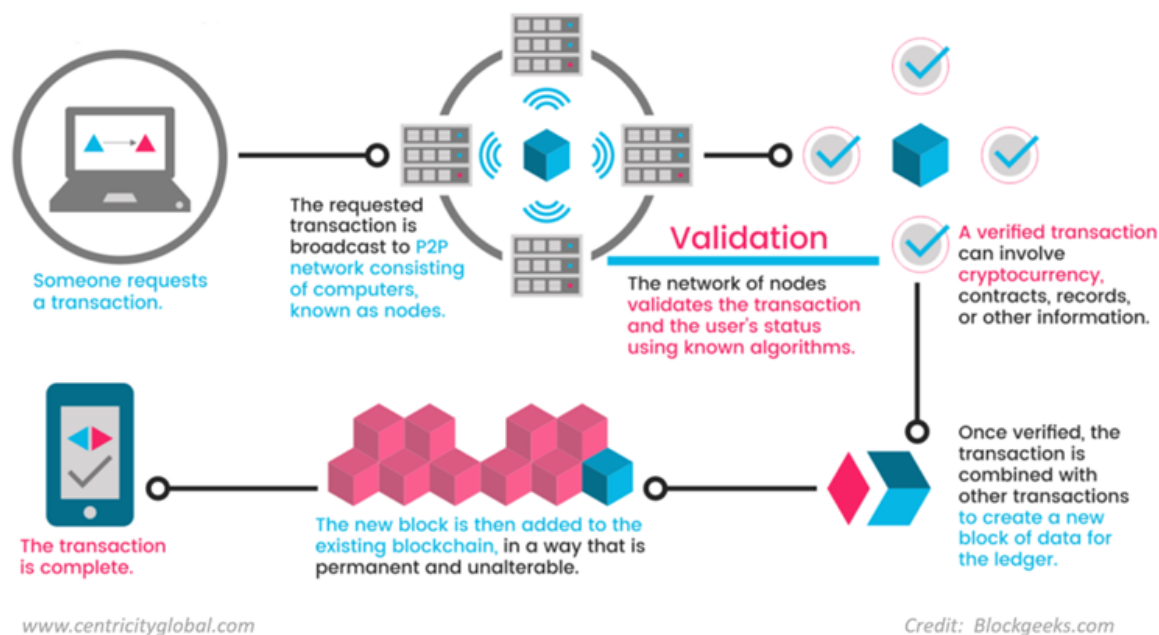
As the diagram shows, once a transaction request is submitted, it's sent to a P2P network comprising of large number of computer nodes. The nodes in the network will verify the transaction and compete for the right to adding it to the blockchain. The winning node will get the reward and this process is called mining. Once the transaction is added to the chain it becomes permanent and cannot be altered in any way.

This diagram shows the following fundamental properties of a blockchain:

- Decentralization. There's no single centralized authority and hence no single point of failure.
- Transparency. The transaction records are publicly available on all the participating nodes. And the history is immutable.
- Programmable. The recipient of transaction is not only human, but also smart contract which is essentially some code. The transaction could trigger the code to be executed.

These are the properties that make blockchain the ideal platform for issuing tokens.

Token Issuing

When a company decides to issue a token, they can either build their own blockchain or use one of the existing blockchains. Each has its own pros and cons. Building your own blockchain is a much bigger undertaking so a lot of companies choose the latter approach. In this approach, you essentially create a custom token that conform to the underlying platform. The token is defined in the form of a smart contract. The contract records the token ownership, defines the token distribution logic and so on. On top of that, the smart contract is available to the public so it can be easily audited.

However, in the whole process of issuing a successful ICO, the technical component of creating smart contract is just a relatively small part. The success largely depends on what happens before and after deploying the smart contract. The following diagram shows a non-exhaustive list of tasks needed for a typical ICO.
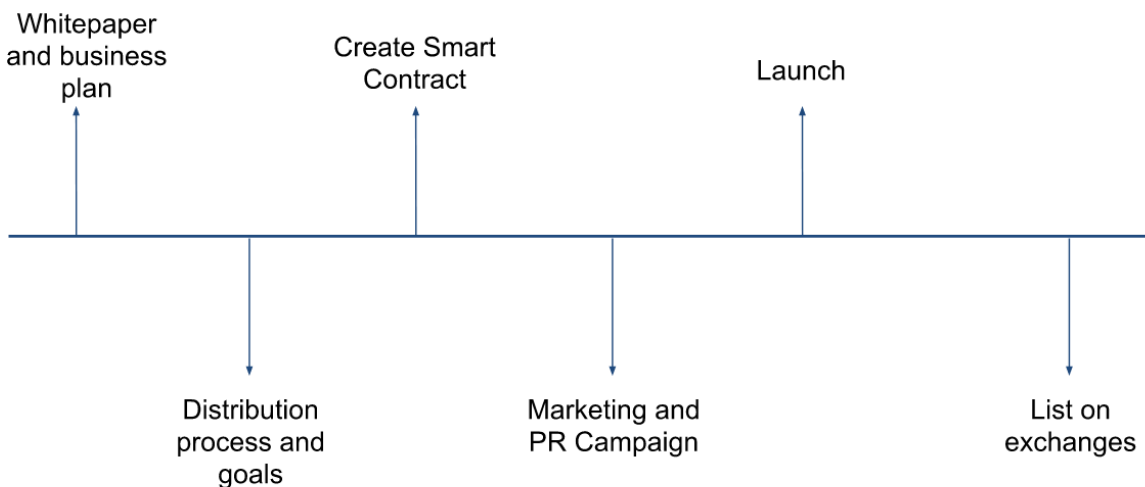
- White paper and business plan. This contains the description of the technological, commercial and funding principles of your campaign. It's crucial to do your best to present the material simply and comprehensively to your readers. The white paper also includes the intentions and achievements you are envisioning from the project, ways of cooperating with users, the latest market news, and specifications on technological token implementation with the product in terms of economics. The white paper should be

---

presented in a website along with funding team and other additional information that gives investors confidence on the project.

- Create distribution process and goals. It should clearly state that how many tokens will be created, what percentages are public tokens and what percentages go to the funding team etc. It should also show the funding goals and a proposed timeline as well.
- Create smart contract. Once the blockchain platform is chosen, a smart contract needs to be developed and deployed to the platform. This can be done by an internal team or contracted to an outside firm with more experience on smart contract. A deployed contract would enable the acceptance of investment.
- Marketing and PR campaign. Similar to an IPO roadshow, the goal of marketing and PR campaign is to drive awareness and create demand for the token. Outreach effort to potential investors, media are needed to generate interest and eventually create FoMO (Fear Of Missing Out) for the token sale.
- Launch. At launch time, investors send another token (Typically ETH or Bitcoin) to the company's wallet address in exchange for the newly issued token. The tokens are recorded in the smart contract of the underlying blockchain platform.
- Listing on exchanges. Although not mandatory, it's essential to make token available on one of the crypto exchanges. It will greatly improve liquidity and also improve investor confidence. Hence an integral part of a success ICO.

Potential platforms

There are many blockchains on which you can create smart contract. However, the ease of using them varies a great deal. In fact, even Bitcoin, the initial blockchain, allows creation of smart contract even though first and foremost it's a concurrency. Just because it's possible to do it doesn't necessarily means it's easy to do it. This gives rise to the other platforms whose sole goal is to make it easy to create smart contract.

So far Ethereum has been the dominant platform on which a blockchain project is setup and an ICO is carried out. It provides the ideal infrastructure and convenient developer toolset. In addition, tokens based on Ethereum can rely on ERC20 which is an unified standard. As of May 2018, there are only 7 out of the top 100 listed tokens are not based on Ethereum based on query on CoinMarketCap on 05/07/2018. The chart below shows how quickly Ethereum came to dominate the ICO platform market.

Share Of ICO'd Assets Built on The Ethereum Blockchain

Based on Data Published On TokenMarket.net/ICO-Calendar
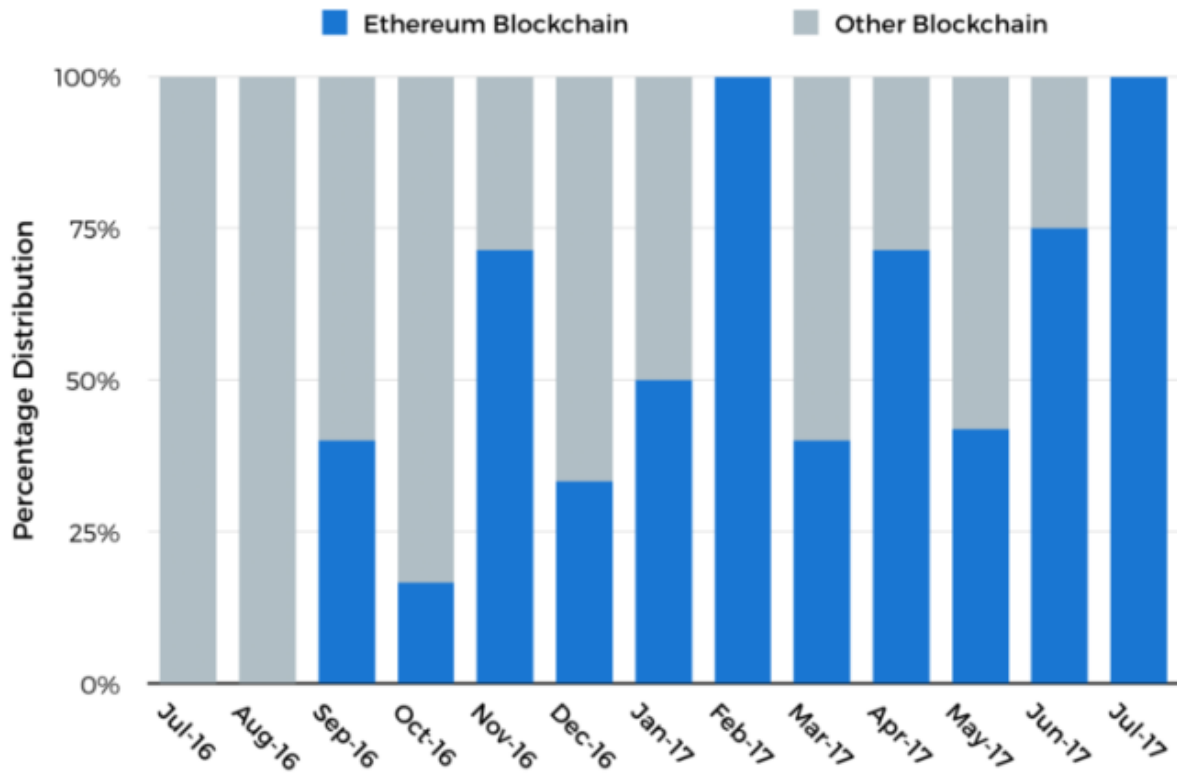
And in terms of token market cap among all tokens, Ethereum platform accounts for more than three quarters of the total market value.

Percent Share of Total Market Capitalizations Of Crypto-Assets

Based On CoinMarketCap's CryptoAsset Market Capitalization Table From June 6, 2017

● Ethereum ● Bitcoin ● Nxt ● All Other Platforms
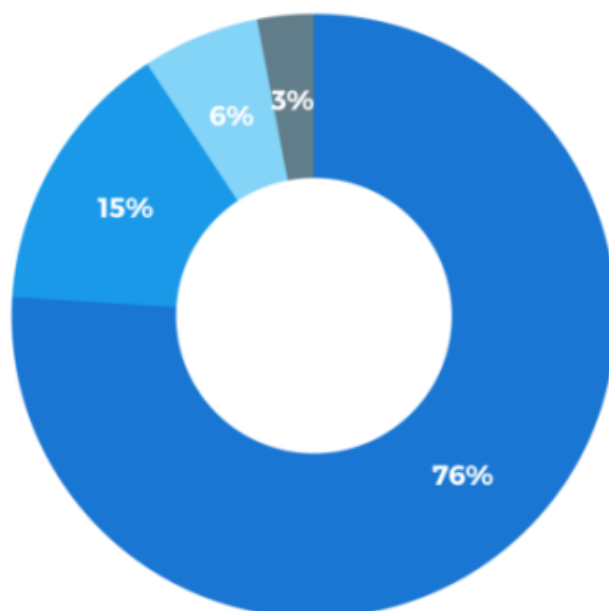
However, even with Ethereum's apparent dominance, there are several alternatives. Many of them aim to address Ethereum's weaknesses. There are currently thirteen other blockchains on which a successfully listed ICO has already taken place. Shown below is the list of other platforms that have tokens on the CoinMarketCap top 100 list.

● *NEO:* NEO can also process transactions much faster than Ethereum. Besides, it uses Proof of Stake (PoS) system for miners to add transactions into blocks, whereas Ethereum uses Proof of Work (PoW) system which is also used by Bitcoin. One of the major drawbacks on PoW system is the massive energy consumption required for network security. And there's growing consensus that the current PoW system will not be sustainable in the long run and improvement needs to be made.

● *Omni:* Omni builds on top of Bitcoin blockchain. It's been around since 2013 and initially was called Mastercoin. It was the platform for the world's first two decentralized crowdsales, Mastercoin and Maidsafe. Tether, which has over 2B market cap as of May 2018, is also issued on Omni.

● *Ardor:* Ardor, according to its official website "is a blockchain-as-a-service platform that will allow people to utilize the blockchain technology of Nxt through the use of child chains. Since all processing will be done on the Ardor main chain, child chain creators won't need to worry about common issues when creating a blockchain as well as

securing it with enough nodes." "Child chains will be able to utilize features currently seen in Nxt such as decentralized phasing, voting, and trading, as well as be able to interact with other child chains on the platform, including IGNIS, the first child chain to be launched."

● *Stellar:* Stellar has no tokens among the CoinMarketCap top 100 list. However, it has been gaining a lot of good press lately. The major advantage of Stellar is scale. It can handle transaction much faster than Ethereum. The average settlement time for Stellar transactions is five seconds whereas in Ethereum it takes 3.5 minutes. Stellar is also cheaper. To make 100,000 transactions with Stellar, it only costs one cent. Ethereum transactions are much more expensive.

Buyer's view

It used to be possible to invest on ICO only if you are very tech savvy investor. [Expand further] Now a lot of that hurdle has been removed. However, there's still some learning curve for regular investors. This is especially true if the ICO they want to invest is not listed on well-known exchanges.

Where investors can buy tokens can be divided into the following categories.

Fiat exchange:
Fiat exchange allows investors to buy tokens with local currencies. These are typically user friendly and doesn't require much learning curve. The tokens supported by each exchange varies but they all support Bitcoin and Ethereum. Due to increased regulatory pressure, more

and more Fiat exchanges started to require tax identification information. And the verification process typically takes a few days and even longer during heavy load.

Crypto to Crypto Exchange:
These are the type of exchanges that one type of token can be exchanged with another. Typically they all support Bitcoin and Ethereum. And some of them also accept local currency so they are also Fiat exchange.

Security brokerage:
With the increasing popularity of cryptocurrency, traditional security brokerages started to pay attention as well. Robinhood has added support of Bitcoin and Ethereum in several states in the US. The reaction is overwhelming and we foresee more brokerages will gradually provide support as well.

Forex brokerage:
Many Forex brokerage also allow trading of crypto tokens. However due to US regulations, most of these Forex firms don't support US clients anymore. They are still legitimate options if you live in the countries that they support.

Go-To-Market Strategy

ICOs are growing in number for the last few years and one of the critical elements of a successful ICO is the marketing strategy. There are two high level categories i.e. what are the steps to launch and how to promote a successful ICO.

Steps to <u>launch</u> a successful ICO

1. **ICO White paper:** The white paper includes information about the project, timelines, milestones, tokens etc. This white paper should tell the story to the potential investors around the business and an estimate on how much value it aims to achieve. There are several benefits with the ICO white paper: it builds confidence and trust with potential investors. A well-written white paper is shared with others, generating a buzz in the market.

2. **Lead Generation:** The typical method to generate interest in the ICO is to create a well-defined website with all the details available to download or consume directly from the website such as white paper, team/founders, roadmaps, presentations, links to social websites, token sale terms, pricing, total token supply etc.

3. **ICO Presale:** The presale helps with funds needed to cover the cost of hosting the ICO, which includes smart contract development, advertising, events to host ICO sale.

4. **Social Media:** To create the awareness for the new ICO, social channels are a good avenue to campaign and allow potential investors to communicate over social channels. Some of the popular social channels are Facebook, Twitter, LinkedIn, Reddit etc.

5. **Community Whitelist:** This helps build initial community of potential contributors interested in investing in the ICO, which enables engagement with personals who are willing to share their personal information for the opportunity to contribute to the ICO.

Steps to <u>promote</u> a successful ICO

6. **ICO Calendar/Listings:** In order to make potential investors aware of the ICO, it's best to list the ICO in the listing sites which helps provide information around current status, hosting country, token type/price, sale start and finish date. ICO listing sites are the ideal way to promote ICO as most investors check daily. A few of the ICO listing sites are ICO Bazaar, ICO Hot List, ICO Alert, ICO Tracker, ICO Champs, COIN schedule etc.

7. **Social Networks:** For a successful ICO, its very important that a level of trust is developed within the community and value it projects to potential investors. There are several social channels to promote ICO however here are few: bitcointalk.org, quora.com, reddit.com etc.

8. **Content & Blogging:** There are professional content writers who review and write blogs about the ICOs. Unless it's popular or holds promise that the ICO will be successful, it becomes harder to get content writers to write blogs. It's essential that the websites are updated periodically with business details, press releases and daily news to investors.

9. **Paid Promotion:** To promote the ICO, marketing is the key to entice the audience to learn about the project and invest in the ICO. On social media, promote posts with striking images or a good video content to reach the potential investors. There are various channels to run the promotion, such as Google Adwords or listing in ad networks like cointraffic.io, coinad.com etc.

10. **Bounty Campaign:** ICO bounties are like rewards (coin) given to individuals who reports bug or who promote the ICO in social channels or communities. The idea behind the ICO bounty is to build the hype around the ICO as well as it could help save the spend with paid promotion and assist in building a loyal community around products or service.

11. **ICO Assessments:** There are times when an ICO is unsuccessful and fails to reach the target sale. There are a few reasons:
    a. Not enough clarity around the product or services
    b. Not enough marketing or promoting ICO
    c. Not enough confidence or belief that the concept would develop into real product
    d. Token might not hold its value short or long term

12. **Insights and Analytics:** To keep the ICO and its interest active, usage data needs to be collected and analyzed. It's important to track and optimize on the leads as well as critical to understand the investor journey to invest or not to invest or what motivates for the investor to invest in the ICO.

Reference: https://qd.ie/how-to-ico-marketing-strategy/

Risks, Challenges and Mitigation

The success of ICOs as a fundraising mechanism hinges on how enterprises deal with a variety of risks. In this section, we outline some well-know risks, mainly regulatory, and discuss possible mitigations before them.

Regulations

In the U.S., Securities and Exchange Commission (SEC) regulates the modalities in which enterprises transact with investors. The mission of SEC is to protect investors, maintain fair, orderly, and efficient markets, and facilitate capital formation. In order for it to achieve this, it requires all enterprises issuing securities to be registered, with few exceptions and must disclose:

- A description of the company's properties and business purpose,
- A description of the security being offered,
- Information about the company's management,
- Financial statements about the company, certified by independent accountants.

SEC uses what is known as the *Howey Test* to determine whether the token is a security or a utility. Howey Test classifies an offering as a security if it meets all four of the following conditions:

1. It is an investment of money
2. There is an expectation of profits from the investment
3. The investment of money is in a common enterprise
4. Any profit comes from the efforts of a promoter or third party

In particular, SEC looks at an investment's substance, rather than its form, as the determining factor for whether it is a security. An important consideration here is the assessment of maturity of the virtual market where the tokens are transacted, rather than on forward looking statements in an introductory white paper.

An enterprise has to make a case based on the rights they grant, the layer of technology where they reside, and the value or utility they provide on the target market/platform. Further, if the utility token does not pass the Howey test, the funds raised might be construed as revenue rather than an investment, which has tax implications.

In the short period that ICOs have been in existence, several cases of irregularities and fraud have already been reported. This has naturally led investors to take recourse either with public or private enforcement. SEC has taken cognizance of this and investigated enterprises issuing ICOs, for example, investigation of TheDAO and cease-and-desist order against Munchee.

Investors for their part have also filed class-action lawsuits against enterprises, for instance, Tezos.

A particular challenge both for the buyers and the sellers of the ICOs is that regulations are not uniformly same across geography. Different regimes are in play in different regions of the world, with the regulatory burden covering the full spectrum from the most stringent to the most liberal. For example, while ICOs stand banned in China, they are welcome with on very liberal terms in Switzerland. US has been seen to take a middle ground so far, with an open view while reviewing to implement strict rules.

Given these are the initial years, much of the risk primarily comes from lack of awareness as to how enterprises should evaluate a viable approach to meet their funding needs and adhere to the regulations that apply to the different choices before them. In this respect, community is establishing standards to self-regulate, best practices to conduct and educating peers, as is evident from initiatives like SAFT, Token Alliance, Virtual Commodity Association, etc.

Technical Challenges

Lack of Technology Expertise

While there is abundant interest in taking the ICO route, not many have the required technology expertise to fully understand the technical ramifications of the design choices made in implementing the ICOs. Security is a major hazard and this has already resulted in losses. For example, a third of The DAO's funds were stolen, and it is reported that 10% of the ICO funds raised during 2017 has been stolen.

To mitigate this, several ICO specific platforms have evolved that provide ease of implementation, while providing safeguards on security aspects. Waves, NEM, EOS, are some examples for such platforms.

Another dimension to mitigation is the education of the next generation of engineers in the blockchain and allied crypto technologies. Graduate courses and projects to train students in these technologies is becoming mainstream in the curriculum in several universities across the world and this should help develop engineers with the competencies required in this space.

Scalability of Technology

A key for the success of ICOs is also the scalability of the underlying technology. A useful metric here is the number of feasible transactions per second. For example, Bitcoin offers 10 transactions per second, while Ethereum offers 25 transactions per second. Rapidly improving technology will help drive this, for example, Hedera HashGraph.

References:
- Phil Glazer, Hackernoon articles. January - May 2018.

Examples of Successful ICOs

ICOs are typically raised by companies that are building products that are closely related to the cryptocurrency industry itself or leverage cryptocurrency as a mechanism for payments within the service the company is providing.

What are the ingredients that go into a successful ICO, as measured by total money raised? While ICOs have only been around for a short time we might be able to see a pattern by examining a few of the biggest ones to date.

The biggest ICO has actually yet to happen. Telegram has raised $1.7B across two ICO pre-sales from a total of 175 accredited investors. If the ICO goes according to plan, it will raise up to $7B to build a messaging, file sharing and stable cryptocurrency service with ambitions to be the universal crypto. Telegram, a five year old company, already has a very large messaging application with 200 million users. It is very popular, especially among the cryptocurrency community itself for its strong privacy and decentralized nature. The founding team has a track record of success, having built the very popular Russian social network VK, which was acquired by mail.ru for $1.47B. The technical team has deep roots in cryptography, communication protocols and distributed applications. Early investors are betting on the large scale of the user base and the proven execution capability of the team.

Protocol Lab's $257M ICO of its Filecoin currency is the largest to date. The as-yet-to-be developed service will be a distributed file-storing network promising to enable usage of all the excess disk space in data centers and private user's hard drives. The cryptocurrency will be used to pay for storage. The team is well-respected in the industry, and they've also produced successful projects in the past, e.g. the Interplanetary File System (IPFS), an attempt to reinvent the web as faster, safer and more open. In their ICO pre-sale, they attracted well respected investors, partly by giving them favorable pricing, essentially guaranteeing them a substantial profit on the ICO.

Other similarly large ICOs have grand ambitions and high profile backers, such as Tezos ($232M) offering a "new blockchain that is aiming to be more reliable than Bitcoin or Ethereum".

Successful ICOs are not limited to any one geography. They have spanned the United States, Switzerland, Israel, Japan, Singapore, Germany, and the UK, to name a few.

Resources and Links

- **Regulation**
    - https://www.sec.gov/news/public-statement/statement-clayton-2017-12-11
- **Promotion**
    - https://hackernoon.com/how-to-write-a-good-white-paper-for-ico-tips-and-examples-42d71c3fa4fe
- **Launching ICO or Tokensale**
    - https://bitnewstoday.com/market/ico/how-to-write-a-good-white-paper-for-ico-step-by-step-instruction/
- **Ethereum alternatives**
    - https://captainaltcoin.com/ethereum-alternatives/
- **How Ethereum became the platform of choice for ICO**
    - https://techcrunch.com/2017/06/08/how-ethereum-became-the-platform-of-choice-for-icod-digital-assets/
- **Ethereum vs Stellar**
    - https://www.coinspeaker.com/2018/03/14/stellar-ico-platform-vs-ethereum-ico-platform/
- **Ethereum vs NEO**
    - https://hackernoon.com/what-is-neo-and-what-is-gas-5b9828a1aa65
- **NEO and GAS**
    - https://hackernoon.com/what-is-neo-and-what-is-gas-5b9828a1aa65