

Security Token Offerings in the startup funding ecosystem

A comparison to other startup funding models, and forecasting STO adoption

> Master's Thesis by

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Abstract

The focus of this thesis is exploring the currently emerging startup funding model called *Security Token Offering* (STO). Startups are becoming increasingly important globally. Often fueling these startups' growth is external funding, which is available in a variety of forms and sizes. The study is interested in comparing traditional and non-traditional funding models with STOs, and evaluating if primary and secondary data indicate wider adoption of this model in upcoming years.

Investigating this question is based on a pragmatic research philosophy, where a mixture of positivist and interpretive philosophies blend. The approach is also mixed, first using a deductive framework to set boundaries for the study, identify what to investigate, compile data and form a hypothesis. Then, a more inductive approach takes over during the primary data collection, analysis, and discussion. The exploratory study follows a case study strategy.

Bootstrapping, Angel investments, Venture capital, IPOs, Rewards-based crowdfunding, Equitybased crowdfunding, ICOs, and STOs were identified as important funding models to investigate further in the literature review. After providing summaries on each model, a graph was plotted where STOs were considered to be an ideal funding model for mid-stage startups. Venture capital, Equitybased crowdfunding, ICOs, and IPOs were then identified as potential competitors or substitutes for STOs. These models were compared in a funding model where both startup and investor perspectives were considered, and the hypothesis was formed that STOs appear to be a viable funding model for a large number of mid-stage startups, especially for those who can't or don't want to pursue venture capital funding.

Primary research was conducted to view stakeholder perspectives in-depth and collect qualitative data which would help forecast later adoption of STOs. The results show a somewhat inconsistent image, yet the general perception is altogether positive. In contrast to academia, more concerns and issues were identified, and STOs were believed to be applicable for a less widespread audience than anticipated, in approximately 2 to 5 years.

The study contributes to research by exploring opportunities and concerns relating to STOs from a stakeholder perspective and compares this model to existing ones in a structured way, while also pointing to several areas where future research should be conducted.

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Chapter 1 - Introduction

1.1 Motivation and problem statement

Startup companies are becoming increasingly important globally. According to Startup Genome's report, between 2016 and 2018 the startup ecosystem has created around \$2.6 trillion in value worldwide, exceeding the annual GDP of the United Kingdom. Furthermore, venture capital firms have invested over \$220 billion in 2018 alone (Startup Genome, 2019). Startups have an increasingly important role in economic growth and employment, with young companies having higher job creation rates than large and mature ones (Gornall & Strebulaev, 2015; Sharchilev et al., 2018).

Nevertheless, startups need to fuel their own growth potential, to enable expansion of their physical resources, and to have higher output creation capacity. Not only do they need to grow, but they also struggle with low survival rates due to many factors such as *liability of newness* (Abatecola & Uli, 2016). To ensure their operations, future growth and raise their chances of survival, many startups try to attain funding. Thus, money tends to be one of the prominent resources that startups rely on to succeed (Paschen, 2017).

The ecosystem of startup funding is constantly changing. Significant shifts arose in the past decade through alternative funding methods (Block et al., 2018; Paschen, 2017), for example through the mainstream adaptation of crowdfunding and the appearance of blockchain-based funding models. Several "traditional" funding models have been present for decades or centuries (e.g.: initial public offerings, venture capital), yet new models' popularity is highly volatile, and are uncertain to remain viable ways for funding startup operations. This paper is mainly interested in how one of these new funding phenomena, by the name of *Security Token Offerings*, will evolve.

There are several reasons why researching this funding method can be beneficial. Kranz et al. (2019) define token sales as a new blockchain-based peer-to-peer way of raising capital, where cryptographic tokens are issued and sold. The authors argue that token sales are an interdisciplinary phenomenon that academia from the fields of computer science, economics and law are similarly interested in, since these token sales differ from traditional crowdfunding or entrepreneurial finance methods in significant

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ways, hence resulting in growing academic literature in multiple disciplines. Utility tokens and Security tokens are the main contributors of token sales. Utility tokens, through initial coin offerings (ICOs), have had explosive growth and downfall in popularity, in terms of companies being involved and the volume of capital raised through this funding method, which resulted in a bubble during 2017-2018 (Stolbov, 2019).

Security tokens are believed to be a solution to ICO issues, providing firms and investors with capabilities that ICOs can't (Ante & Fiedler, 2019). The market forecast predicts great significance to STOs, for example, Han et al. (2019) estimates the STO market to be worth \$2 trillion by 2030. Despite the optimism for future growth, there are serious contemporary issues preventing the adaption of STO in certain countries. Since the first STOs appeared in late 2017, but some more complex types of this funding model only at the end of 2018, there are several new questions to analyze and study (Myalo & Glukhov, 2019). It is also worth noting that the majority of capabilities that STOs offer have still not been adopted by real-life successful use cases. There is also a lack of qualitative research on the topic, for example, analyzing the attitudes and understanding of STOs in the eyes of stakeholders. Nevertheless, some academic literature already identified STOs as an economically viable alternative way for startups to raise capital (Pazos, 2019). Out of all potential research topics, this paper is mostly interested in exploring this funding model, assessing and predicting the future viability of security token offerings by comparing them to other, traditional and non-traditional, startup funding models and by investigating the stakeholders' feelings toward STOs.

1.2 Research question, Objectives and Scope

Taking the above statements into account, the following research question was formed:

How does the comparison of Security Token Offerings to traditional and alternative startup funding models forecast its viability and adoption?

Answering the following sub-questions will be considered objectives of the study, and will play a crucial role in order to give an informed answer on the above research question:

- How do STOs fit into the startup funding ecosystem?
- How do the startup funding ecosystem stakeholders perceive STOs?

The scope of the paper is quite broad, due to its exploratory nature. New insights and data confirming & rejecting information regarding STOs, or funding models that can be considered alternatives or competitors to STOs is considered useful. Other funding models, and relationships of these models to STOs will only be considered in-scope until they aren't classified to be non-alternatives or competitors. When considering the adoption of STOs, the paper is interested in the question of *if* STOs will ever get adopted by wider audiences, and *when* this might happen, however this thesis is not concerned about answering *how STOs* will become more widely used. Highly technical details are also out of scope.

1.3 Structure

Chapter 1 is mostly interested in initializing the topic and research question, objectives and the scope of the paper. Chapter 2 is aimed at introducing the theoretical underpinnings of STOs, while Chapter 3 describes the paper's methodology. The fourth chapter gives a literature review of current academia. Chapter 5 assesses a funding matrix that was constructed based on secondary findings and constructs a hypothesis. Chapter 6 will inform readers about the results of primary research. The seventh chapter will consist of an in-depth discussion of the findings, and evaluate its relation to the hypothesis and research question. Chapter 8 will conclude the limitations and proposed topics for future research. Chapter 9 concludes the paper. References and Appendices are available in chapters 10 and 11.



Figure 1: Structure summary – own creation

Chapter 2 - Preliminary and theoretical underpinnings

The following chapter aims to introduce background knowledge, theories, and context that will help to interpret the remainder of the paper more efficiently.

2.1 Defining startups

Defining what a startup company is, is far less straightforward than expected, due to endless definitions circulating in academic and business contexts. Marmer et al. (2011) combined definitions from Steve Blank and Eric Ries, and created a summary as follows: "Startups are temporary organizations designed to scale into large companies." Furthermore, they expand the definition by stating that "Early-stage startups are designed to search for product/market fit under conditions of extreme uncertainty. Late-stage startups are designed to search for a repeatable and scalable business model and then scale into large companies designed to execute under conditions of high certainty." Contrasted with the European Startup Monitor, written by Kollmann et al. (2017), the authors here categorize companies as startups who adhere to three characteristics: they are younger than 10 years, feature innovative technologies and/or business models, and aim for significant sales and/or employee growth. From a more practice-oriented standpoint, Paul Graham (2012), co-founder of Y-Combinator, distinguishes startup companies as small businesses that are designed to grow fast and identifies growth as a pointer on a compass, which indicates how the companies should make their decisions and where they should be headed.

2.2 Growth

The previous definitions all acknowledged and put emphasis on growth, also referred to as scaling. It can therefore be concluded that growth is, or should be, a key objective for startups. Growth can mean a number of different things, for example, more employees, sales, or even a larger user base, improved product recognition or more resources. Regardless of how the term "Growth" is conceptualized by a startup, to achieve desired goals money is usually needed, since it helps and enables firms to improve the speed of execution and to invest in better resources (human or physical), resulting in the firms reaching the desired goal faster. Once a certain amount of growth is achieved over a time horizon, often in a span of years, companies tend to become more self-sustaining, by capitalizing on the opportunities

that they have found and validated (Blank, 2013). This is when they start to yield financial returns for shareholders.

2.3 Lack of funding, a barrier to growth

The NSBA's 2017 End of Year Economic Report (2018) uncovers some insightful statistics that relate to the mentioned statements. Around 44% of startup companies fail during their first four years of operation. When asked about challenges, 20% of startups replied that lack of available capital is a significant challenge, while the cost of technology (11%), paying for health insurance benefits (32%), economic uncertainties (32%) and employee salaries (14%) were also among the top challenges. Furthermore, over 30% of startup companies believe that if capital availability is a problem, then they are unable to grow their business and expand their operations. Giardino et al.'s (2015) paper also concluded the importance of funding for startup companies. Out of the top challenges, "Acquiring Initial Funding" was found to be the third most pressing issue. As the study summarized, based on conducted interviews, reaching the "Break-even" point is crucial to keep a business running. Funding is what helps many startups reach this point. In short, at least some sort of funding is a necessity for startups to operate, thrive and achieve growth. This is where investors' significance comes into play since they are the ones providing the funding, and thus enabling growth. At its core, startup funding is a tradeoff between startup equity and capital (usually cash), between a startup's founders and investors.

2.4 Investors, enablers of growth

There is no set definition for the term "Investor". There may be significant differences between investors, in aspects such as motivation, risk tolerance, and usefulness. For example, Angel investors invest with their own money, while venture capitalists invest using capital available in a fund. Retail investors could be everyday people, investing low sums into small projects. When plotting investors on a risk/ reward matrix, trends can be identified between different categories of investors. For example, venture capitalists tend to take higher risks on average, compared to angel investors, as they are looking for higher returns as well, and are driven by different motivations (Nielsen, 2017). Furthermore, in some countries, being an "accredited" investor has requirements and benefits, and non-accredited investors can't legally invest in certain financial instruments. In other words, investors are highly heterogenic. As a rule of thumb, compared to more traditional investors, startup investors are seen to be taking high-risk, high-return investment opportunities, in hope of exponential growth and future payouts.

Chapter 3 - Methodology

The paper's methodology follows the structure presented as the "research onion" by Saunders et al. (2008). Several ideas and sources were considered from Saunders et al.'s work, when summarizing the methodology of the paper.



Figure 2: Research Onion - Saunders et al. (2008)

3.1 Research philosophy

"Pragmatism", a research philosophy where the research question determines epistemology, ontology and axiology (Saunders et al., 2008), is the closest research philosophy that would describe this paper's development of knowledge, and nature of such knowledge. The epistemology identifies more with positivism's law-like generalizations, (Remenyi et al., 2014) because such generalizations are often needed, and made from observable data and facts. This aids the study with setting boundaries and a framework in which the study can move freely, yet still follow a logical and rational path, while also determining if certain topics are outside the scope of the paper. Nevertheless, subjective meaning and social phenomena also provide acceptable knowledge when answering questions, especially in such topics as startup funding which are heavily dependent on specific conditions and circumstances, and shouldn't be considered inferior (Saunders et al., 2008). Also, a critical view on positivism is heavily needed when looking at the nature of reality, ontology, to answer the research question fully. To realize the complexity and often chaotic nature of the real world is essential, and this paper will mostly rely on interpretivism's philosophy and social constructivism to do so (Saunders et al., 2008).

Simply put, the mechanisms of "*how*" a funding model might get adopted is so complex and subjective that it is only possible if the study understands the differences between stakeholders and their needs and expectations, thus relying more on interpretivism. Nevertheless, setting the main determinants and getting to the point of raising the question of "*how*" can be better achieved by following positivism. In essence, this duality is present because the study believes that choosing one philosophy to answer this research question most appropriately is unrealistic (Saunders et al., 2008), and particular sub-questions should be answered using the most appropriate philosophies. The axiology of this paper is pragmatic since it believes that the values of the researcher are crucial when making sense of results, and what might be considered important findings by this study might have different interpretations by those with other values. Therefore, both subjective and objective points of view should be considered. Fortunately, pragmatism enables us to focus on the ultimate task of answering the research question in the most appropriate task of answering the research question in the most appropriate way, using flexible philosophies at different stages of the study (Saunders et al., 2008).

3.2 Research Approach

Similarly to the research philosophy, a mixed research approach characterizes this study. The identification of the research question, the literature review and the formulation of a hypothesis follow a more deductive approach. Deduction was chosen for the first part of the thesis because a wealth of literature is available regarding existing funding models, where key factors could be identified that aided later comparison and the construction of a funding matrix (Creswell, 2007; Saunders et al., 2008). It is important to note that the data collected after defining a hypothesis is qualitative in nature, and collecting it is done with a mixed approach where induction plays a larger role, hence the overall combined approach. This qualitative data leads to theory formulation based on the data collected, yet is interconnected with the previously formulated hypothesis. The inductive approach is also important to comply with strict deductive frameworks and testing (Saunders et al., 2008). The results and conclusion of the study provide qualitative data that is based on human meaning and real-life context, therefore it is closer to induction. Ideally, propositions for future research will later be further explored, and could also be transformed into quantifiable variables and tested scientifically.

3.3 Research design

The study's nature is exploratory by design. Robson (2002) explains that such a study would seek out what is happening, search for new insights and ask new questions relating to the phenomenon in question. The paper attempts the previously mentioned, and also tries to understand a field in more depth, through a search of the literature and by interviewing stakeholders in the field (Saunders et al., 2008). Studying the topic is done with a flexible approach, where new findings can potentially deter the researcher's focus, while also constantly narrowing it with the progression of time (Adams & Schvaneveldt, 1991).

This paper follows a case study strategy, as it studies a contemporary phenomenon within its real-life context, which has blurred boundaries (Robson, 2002; Yin, 2003; Saunders et al., 2008). Furthermore, it is specifically concerned with deeply understanding the context and the stakeholders' perceptions of the phenomenon (Morris & Wood, 1991). Realizing the heterogeneity in startup funding stakeholders (e.g.: founders, investors) and their needs, a multiple-case approach seemed appropriate, which could predict patterns in new findings and give a more rounded understanding (Saunders et al., 2008). Aiding this is triangulation, where quantitative data from the literature review and qualitative data through interviews become interconnected. Claiming that this study uses a sequential mixed method research approach is debatable, as quantitative data are not collected primarily, they are simply collected from existing literature, combined, restructured, repurposed or evaluated in a unique perspective through a newly formed funding matrix, which does lead to a novel viewpoint. Nevertheless, qualitative data is then primarily collected through and analyzed qualitatively, building onto the previously mentioned quantitative data. Due to limitations in time, the study's understanding of the phenomenon can be considered to view opinions and data from a particular point in time, therefore labeling it cross-sectional seems appropriate (Saunders et al., 2008).

3.4 Methodology in practice

For this sub-chapter, please re-visit *Figure 1*, found in Chapter 1 (pg. 3). The aim is to build an understanding of the topic of startup funding models and security token offerings, first by viewing broader, overarching topics and theories such as startup growth cycles, and identifying the most relevant funding models to further analyze. Then, the literature is systematically reviewed with a narrower focus, with the goal of finding criteria that serve as points of comparison between funding models.

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Each funding method was to be summarized after reading relevant literature, articles, and reports regarding it. As the literature review progressed, an iterative system developed. This cycle consisted of information search, learning about the most important characteristics/themes, finding quantitative data points for such themes, and revisiting previous sections with the new learnings and data points in mind, and expanding those. This iterative system, starting from broad theory exploration leading to specific or compiled data point identification, was present at the macro and micro level of the literature review alike.

For the learning phase, databases and academic publication search engines such as, but not limited to, Google Scholar and ScienceDirect were used, as well as company and market reports and occasionally non-academic articles. Since some funding methods are lacking academic research due to their newness, or are highly technical in nature, non-academic sources could serve as a compass or simplified summaries, and point to keywords or themes to further discover in academia.

Such a review process has led to the identification of some recurring themes that became "necessary" to review when summarizing funding methods. Covering these "necessary" topics consisted of answering the following: (1) How to define or explain this funding model? E.g.: a definition or an explanation of what this funding model consists of (2) Why is it important to talk about it? E.g.: it is a widely used funding model for startups? (3) What are the model's advantages and disadvantages? E.g.: higher liquidity for investors.

Further information that was considered important or interesting was also included in the summaries, for example, technological background or debated topics, therefore the summaries were not limited to answering the above-outlined questions, but answering those was considered a necessity.

The literature review was also expected to give an overview of what STOs are, how and why they developed, and how they compare and relate to other funding models. A chronological exploration of how alternative funding models developed in parallel to developing technology gave insight into how and why STOs arose. Furthermore, during this exploration, theory of startup funding comparison criteria and adoption theory has also been reviewed, and a graph was created to show STO's current place in the startup financing cycle. This graph, based on the existing literature, pointed to the specific funding models that STOs should be directly compared with, in order to fulfill the research question of this study.

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The comparison between funding models was made using a set of criteria that formed a matrix. The points of comparison were hand-picked from academic comparisons subjectively, as there was no evidence that any mix of comparison criteria outranks others, and all academic comparisons used different criteria. Different stakeholder viewpoints were considered, in order to give a well-rounded comparative snapshot of startup funding models of today, that is to be compared to security token offerings. Although the heterogeneity of startups should be considered, and therefore making generalizations should be made with caution, the matrix indicates that for certain startups STOs seem to be the best choice for fundraising. This statement was at the core of the hypothesis that was formed, based on the findings of the funding matrix. In order to fulfill the research question, adoption theory was to be compared to data in the matrix, and further qualitative data was needed to form a clearer picture of STO perception and adoption.

3.5 Data collection

Due to the size of the startup ecosystem, as well as limitations in time and resources, selecting samples was deemed necessary when collecting data. Conceptualizing who to collect data from, and select as a *case* was done through non-probability sampling, therefore subjective judgment played a role. More specifically, a combination of quota sampling, purposive sampling, and heterogeneous sampling was used (Saunders et al., 2008). The study considered it important to collect data from (1) startups who are in different stages of their journey, (2) to hear from both entrepreneurs who are looking for funding and who have already attained funding, (3) to see investor viewpoints, and to (4) collect data from a firm that is currently preparing for an STO. Denmark, Hungary, and Germany-based participants were selected who could fulfill one of the above criteria, in order to reduce the time and resources needed to conduct the data collection phase. These locations seemed attractive due to the network of the author.

The technique used for data collection was one-to-one non-standardized semi-structured interviews, based on theory from Saunders et al (2008), Healey (1991) and Healey & Rawlinson (1993, 1994). A list of themes and questions were prepared prior to the interviews, yet there was space left for improvisation and going off-track. The specific case companies in mind had an overlap between questions, however custom queries were raised to them, meaning that different questions were asked from founders who are in the process of raising capital from investors or founders who already have funding experience (Saunders et al., 2008; Myers & Newman, 2007). It can be concluded that the conversations followed an interview guide (section 11.1 in Appendices chapter). Several potential pitfalls

introduced by Myers and Newman (2007) were attempted to be avoided, including artificiality, lack of time and constructing knowledge. The authors' summary of Goffman's (2016) dramaturgical model was used to outline and prepare the main concepts of interviews beforehand and contributed to the design of the interview guide. An initial pilot test was conducted, which served to highlight flaws, limitations, and weaknesses of the interview design (Turner III, 2010). Nevertheless, data collected from this pilot test was later used, as the interview provided valuable information.

3.6 Transcribing

The website Otter.ai was used to transcribe interviews in real-time. The platform allows the interviewer and interviewee to view the speech being transcribed into written text during the interview. Otter.ai does not only transcribe the text but also creates an audio file that can later be played back, with the relevant words being highlighted on the website. This allows for easy modification of the text, in case the auto-transcription is incorrect. The platform also allows the finalized interviews to be downloaded into .txt format. These files were then converted into Microsoft Word files and kept for later reference and use. For more information on transcripts, please refer to section 11.2 in the *Appendices* chapter (Ch 11).

3.7 Data sources

Overall, 9 interviews were conducted, yet only 7 were found to contain new insights which deemed important for the study. Therefore, the thesis moved on with using 7 interviews, 4 out of which were conducted with entrepreneurs or startup employees, and 3 with investors or individuals who worked as an investor before.

All interviews lasted 30-60 minutes, and all interviews were recorded using either a mobile device or a laptop. In cases where it was possible, interviews were conducted in-person, by the interviewer visiting the interviewee in their office, however in some cases this wasn't possible or convenient, due to the interviewee being abroad. In these cases online communication was initiated, most often on the messaging platform called Skype, which has a built-in feature to record conversations to video or audio files. All interviews were treated as case studies, and each interview was summarized in the *Results* chapter (Chapter 6). A list of data sources can be found in the Appendices in section 11.3 (Chapter 11).

3.8 Data analysis

The following process was created to extract valuable information from interviews and analyze the data. All documents and notes related to data analysis were stored electronically and backed up to cloud storage for later use. To access the relevant files, please refer to section 11.4 in the *Appendices*.

3.8.1 Coding and theming

After the transcripts were finalized, and the incorrect auto-translated text was corrected, the interviews were revisited. Anonymizing every interview was an initial task, by replacing every name or identifying factor in interviews. Each sentence, expression or paragraph that seemed to be important in terms of the scope and research question of the study was copied into a Google Sheets file. In most cases, the copied units were individual sentences. If several sentences were connected, the pasted quotes were placed next to each other. If there was no connection, then the quotes were placed in separate rows under each other. Next to the quotes a column for a "Short summary", "Keywords" and "Further notes" was provided. This helped with summarizing, categorizing and unitizing data later. An example can be seen below:

Short summary	Keywords	Further notes	Quotes/snippets		
Overall skeptical perception of Crowdfunding, due to unsuccessful examples and low quality of startups who don't fulfill VC requirements	crowdfunding, investors, VC, skepticism, concern		Let's first start with the crowdfunding platforms, because I think essentially the underlying hypothesis behind all this is that companies are willing to raise money from private investors or from private investors who want to feel a little bit like they're in shark tank. My general view on crowdfunding platforms is rather negative	So I think that you always have, like in many cases, have some kind of adverse selection going on there that those companies are raising money on crowdfunding platforms that didn't manage to get money from professional investors, from VCs.	there's a lot of negative examples from Kickstarter companies but also from equity crowdfunding platforms such as companies where it's just not going as well and where private investors have been betrayed by private companies.

Figure 3: Coding example - own creation

The next step was to recognize relationships and develop categories for these quotes. Template analysis was used as the primary procedure to organize data. What this entailed is an inductive and deductive approach where a number of predetermined themes were taken from the study's previous sections, relating to categories like adoption criteria (e.g.: relative advantage) or funding model evaluation factors (e.g.: non-financial benefits), and other newly found inductive themes were also identified and measured, in order to find new relationships, themes, and patterns (Saunders et al., 2008; Cassell et al., 2014). In general, for interviewees where a startup approach was observed, a general section was created, with factors such as location and startup stage. Another category for current or past fundraising, with factors originating from the comparison points from the funding matrix (e.g.: time-required) was also constructed. The remainder of the categories were observed in STOs from several

viewpoints, including adoption, and other categories. This allowed for inductive results to emerge and spark the imagination of the researcher, once these previously undiscovered aspects were labeled with keywords. An almost identical structure was created for investor interviews, but the past/current fundraising category was replaced with themes relating to VC in general. As the analysis continued, more and more connections were made between codes. For example, the category of "Concerns" was created for perceptions referring negatively to STOs. These references were then later condensed to subcategories inside concerns. For example, "High costs" or "Lack of trust", when several similar concerns were worded differently but were referring to the same phenomenon. All concerns and opportunities were then viewed from the aspect of how often and in what interviews they appeared.



Figure 4: Snippet of "Concerns" - own creation

A simplified version of Miles & Huberman's (1994) "Data display and analysis" was initiated to reveal connections between data. For example, an interdependent connection between concerns was found.



Figure 5: Linked concerns data display snippet - own creation

3.8.2 Case studies

Once the main categories were identified, and the most important quotes were labeled, categorized and observed, the short summaries were used as a backbone to create the case studies of each interview. Essentially, the summaries were grouped together in a way to make a logical flow of all information available to the reader in a structured form. Most of the discovered relationships between data points were already included in the narrative form of case studies.

Chapter 4 - Literature review

4.1 Startup funding cycle

Berger & Udell's (1998) "Financial Growth Cycle of Small Business" summarizes the sources of when and where startup companies typically inject capital from. The most important factors in this model are *firm size, firm age and information available about the firm.* The model distinguishes startup companies into several categories: small-sized, young firms with little or no track record, small-sized, quickly growing or medium-sized firms with some track record and larger firms who are older and have an extensive track record. Their model summarizes how the ideal startup funding methods change as firms mature and change their needs, and guides readers through the most typical vehicles of startup funding, for example, angel finance and venture capital (Gregory et al., 2005).



Figure 6: "Financial Growth Cycle of Small Business" - Berger & Udell (1998)

Salamzadeh & Kesim's (2015) model is similar in many ways. The authors group startups into three stages: Bootstrapping stage, Seed stage and Creation stage. Salamzadeh & Kesim describe how these three stages typically attract certain, yet different, types of fundraising and tasks.



Figure 7: Three stages of startups - Salamzadeh & Kesim (2015)

Another, a widely used graph is the *startup financing cycle* that many online publications use, including websites like Wikipedia and business-related publishers. The original source of this graph was not found, yet some references were made to this graph in more academic settings, for example in Gillain's (2016) paper.



Startup Financing Cycle

Figure 8: Startup Financing Cycle - unknown





Figure 9: EY Startup financing cycle - EY (2013)

All models resemble similar funding models and similarly divide the lifecycle of startup funding into separate stages. Based on the above models, the paper has decided to construct its own interpretation of stages involved in startup funding, and select the most commonly reappearing funding models, that will be more closely inspected later in the chapter. Being able to fit STOs or other missing funding models visually into the ecosystem by the end of the next chapter is also a key objective. In category (1), from now on referring to these companies as "Early-stage startups", the most common funding source is defined either as "Initial Insider Finance" (from now referred to as "Bootstrapping"), and "Angel Finance". Category (2), from now on referred to as "Medium- stage startups" mostly are funded by "Venture capital". These firms now have some track record that indicates high growth and financial return potential. Category (3), referred to as Later-stage startups, where "Public Equity" is a popular financial solution, which refers to listing on the stock market, also known as "Initial Public Offering" (IPO). This summary is far from extensive, with many funding options being overlooked, such as traditional bank loans, startup accelerators or private equity. Summarizing these chosen funding options, collectively

referring to them as *traditional funding models*, and seeing the advantages and disadvantages from different stakeholder viewpoints can give room to understand why newer funding options appeared, and where they are positioned in such graphs.

4. 2 Traditional models of startup funding

4.2.1 Bootstrapping

Many believe that the term bootstrapping, in its financial sense, originates back to Bhide's (1992) article, where he described this process as "... launching ventures with modest funds". Horváth's (2018) literature review of bootstrap finance compiled numerous similar definitions, with one definition standing out. Winborg & Landström (2001) defined this process as "...the use of methods for meeting the need for resources without relying on long-term external finance from debt holders and/or new owners". What makes this definition informative, is that it focuses on one of the biggest advantages of bootstrapping, the non-existence of debt to other stakeholders/investors. A great bootstrapping example could be Patagonia, a greatly profitable apparel company, who has never taken external funding to this day, according to publicly available data, and has been operating since 1974. On the other hand, Patagonia can hardly be considered a startup company by today's standards, and achieving this self-sustaining financial status was achieved a long time ago. Another, more recent startup example, who became famous for their bootstrapping efforts was GoPro. While the firm has taken venture capital since and is currently listed on the stock market, GoPro was bootstrapped for almost a decade. In a very informative interview by Ouimet (2012) with GoPro's founder, Nick Woodman describes some advantages and disadvantages of bootstrapping, and why they chose to fund their own operations. Woodman starts by saying that an obvious disadvantage is the resource constraints, and mentions that this could have a negative impact on the speed of company growth. A main advantage he mentions is the lack of pressure and control from investors, who could influence a founder's way of running their own business. This is believed to be crucial in the beginning phase of a company. Another advantage is the "total creative freedom", where investors can't rush a founder to make decisions. In other words, the biggest advantage seems to be related to more control over the company. In GoPro's case, after 9 years of operation, the company decided to take external funding from a variety of venture capital firms. Woodman argues that this decision was made to add experience to the company's leadership by hiring more experienced executives. This was possible by leveraging the new investors' extensive networks, which eventually led to the company scaling quicker. Thus, another disadvantage could be the lack of knowledge and a network of investors. Finally, a significant advantage could be that GoPro was able to negotiate favorable terms with the venture capital company. This was mostly due to the company's financial health and the lack of an early investor who wishes to influence venture capital negotiations for personal gains.

4.2.2 Angel investors

Wong et al's. (2009) paper "Angel finance: the other venture capital" gives a great overview of what angel investors do and who they are. Acknowledging the variety of definitions, Wong et al. (2009) define angel investors as high-net-worth individuals who invest their own money into small or medium-sized companies. Furthermore, the authors emphasize the heterogeneity of angel investors and point out that many of them are established entrepreneurs or wealthy individuals such as doctors or lawyers. Due to such heterogeneity, it can be difficult to generalize the characteristics of such investors. Sohl's (2019) analysis of the angel market sheds light on some data that shows the significance of angel investing. According to the report, the total angel investments in 2018 were over \$23 billion, this sum was allocated to around 66,000 entrepreneurial ventures, where more than every third companies' seed or start-up phase fundraising had angel involvement. This would bring the average deal size to approximately \$350,000 in exchange for 12.1% equity, which values the companies to around \$2.9 million dollars on average. EBAN's (2017) report shows that in Europe the average Angel investment per business angel in 2017 was €25,400, and the average investment per company was €182,000, considerably lower than in the USA. Also, 63.9% of all early-stage investments made into European startups were made by angels. Nielsen (2017), who is also a business angel, adds that the timing for angel investors is typically after the idea phase, however most angels don't require high revenue or a big user base, making them usually the first investors into companies. Nielsen also elaborates on the heterogeneity of angels and describes how ideally an investment between startup and angel should be about much more than exchanging cash for equity. In a beneficial match between a startup and an angel, the angel will also contribute with his/her time and knowledge about the industry, which is often the industry where the angel already built or sold a company, and provides access to their extensive networks. Nevertheless, this support may be limited in cases, and the roles and expectations from both sides can be unclear. In exchange for money, angels in most cases take equity, and with equity, they take voting rights and control over the company. Unfortunately, in some cases, entrepreneurs agree to terms that can harm them in the future, for example making a startup unattracted to venture capital firms if angels already own a large proportion of the company early on.

4.2.3 Venture capital

Gompers & Lerner (2005) described "Venture capital firms" as companies who finance high-risk, potentially high-reward enterprises, by purchasing equity. The authors define "Venture capitalists" (often referred to as VCs) as the people who are in charge of running these firms and doing tasks such as monitoring the progress in the firms they invested into, helping out as board members, giving access to their networks of consultants, lawyers or bankers, and evaluating potential future investments. From a slightly more practical approach, Nielsen's (2017) summary adds endless useful insights into understanding this funding vehicle. Nielsen describes that in most cases, only a fraction of the available funds available for VCs to invest, are provided by the founders and managers (often labeled "Partners") of the VC firm, and that the remaining sum is often raised by bigger corporations such as pension funds. Therefore, VCs are not risking their own capital when making investments, allowing for a different compensation system to drive their motivation. As a general rule, VC compensation is based on two streams of income: management fees and carried interest. Management fees are usually taken as a fixed percentage of the fund's capital, around 2 percent, and are there to cover salaries and other traditional ways of compensation, for example travel expenses. Carried interest, similar to a performance fee, is a share of the profits the fund makes when investments outperform a set hurdle rate. In short, carried interest is where VCs have the opportunity to make extraordinary returns (Nielsen, 2017).

According to KPMG (2019), 2018 was a record year for VC. In the last quarter of 2018 alone, 3,048 deals were made in VC globally, raising a sum of \$63.9 B dollars. Furthermore, global median deal sizes, for seed investments, Series A, Series B, Series C, and Series D+: 1.0, 7.5, 17.0, 30.1 and 50.0 Million dollars, respectively, on average. The median pre-money valuation for firms were, in the same categories, respectively: \$6.7 M (12.9%), \$20 M (27.3%), \$60 M (22.1%), \$124 M (19%) and \$375 M (11.76%). The numbers in the brackets indicate the estimated equity percentage that the startups had to exchange for the capital, based on a calculation of deal size/post-money valuation (post-money valuation was estimated at pre-money valuation + deal size). The report also categorizes the prior numbers to angel/seed, early-stage and late-stage sections, with global median averages of \$1.1 M, \$5.5 M and \$11.5 M, respectively. Contrasted to Fundz's (2019) data, Series A investments in the USA averaged \$13.3 M, with an average pre-money valuation of the startups at \$22 M. Inserting these figures into the previously mentioned formula, this data would indicate that an average startup raising a Series A round would give approximately 37.7% of equity in exchange for the \$13.3 M capital, much higher

than KPMG's data suggests. Looking at further estimates, and taking into account that sources vary significantly, entrepreneurs should expect to give up around 20-25% of equity to VCs per funding round (Nielsen, 2017; Young, 2009; Thiel & Masters, 2014). Abdullah's (2018) data suggests that a median of 53% of the company is VC owned at the time of going public, with 15% founder ownership remaining. This is the case because equity is given to VCs at each funding round. The remaining equity is divided into a variety of stakeholders (e.g.: employees) and stock options. VC is one of the most important funding vehicles for startups, as they are one of the only sources of funding that can provide enough capital for "extremely" high growth, allowing firms to compete globally with already established companies. The funded startups also become key drivers to today's economic growth and employment, with 28% of all U.S. IPOs being made by VC backed companies since 1979 (Gornall & Strebulaev, 2015).

As summarized by Nielsen (2017), VC firms only typically invest in companies that have the potential to sell for hundreds of millions to billions of dollars, due to their business model of carried interest. As a rule of thumb, VCs would like a company to grow in value at least 10-15% per year. This leads to the first disadvantage of this funding vehicle, as only very few companies qualify for VC funding criteria. Most companies don't compete in multi-million dollar markets, therefore they don't seem attractive enough to VC firms. Nielsen (2017) further calculated that only around 0.1% of new startup companies receive funding from VCs. In contrast, Mulcahy's (2013) data also suggest a number lower than 1%, however, he only views the U.S. market. Andreessen, founder of a prestigious VC firm, explains in an interview (Stanford Graduate School of Business, 2014) that only about 20 of 3000 applying startups receive a cheque from them, bringing success rate to around 0,7%. Nevertheless, the global average is expected to be slightly higher. DocSend's (2015) data outlines that VCs spend the most time viewing slides of startup pitch decks relating to "Financials", "Team" and "Competition", and least on "Market size", "Problem" and "Solution". The report also indicates that only 58% of successful pitch decks had a "Financials" section, due to many early-stage startups lacking financial results and projections. Interestingly, VCs don't have a requirement for financial performance when investing, considering the company is capable of massive growth in the future, and many VC backed startups are still unprofitable when conducting an IPO. Furthermore, in many cases, the unprofitable firms outperform profitable ones in IPOs (Pitchbook, 2019; Clark, 2019; Molla, 2019). Nevertheless, VCs still conduct rigorous due diligence before investing, alongside other criteria that vary based on individual VC firms (Drover et al., 2017; Šimić, 2015; Cumming & Schwienbacher, 2018). Klonowski (2007) indicates that due diligence is often paid by the VC firm, partly to secure the fund from scams, yet this sum is deducted from the invested amount if a deal is made.

A heavily debated topic is the non-financial resources made available by VC firms to startups. Examples of this could be help in management, exposure to investor networks and mentoring. Mulcahy (2013) argues that VC support shouldn't be expected, as many firms don't provide much guidance, and will vary based on individual VC firms. Drover et al. (2017) summarize the inconsistency in both measuring and evaluating the impact of non-financial help and efforts of VC firms. Prior research has found a positive correlation to VC help and increased growth, value and likelihood of startup survival, however just as many studies show little to no correlation. Referring back to Mulcahy (2013), since there is no consistency in the form and type of help that a startup can expect from VCs, it is hard to calculate with this factor when considering VC benefits. Finally, since VCs are often on the board of directors for several startups simultaneously in their portfolios, their attention and capacity to understand individual startups' needs and challenges to a level as the startups' founders and executives can be limited. Literature considered one of the potential issues of VC from the investor side to be liquidity (Cumming et al., 2005; OECD, 2019).

Another, often forgotten drawback of the fundraising process is the required time. There are varying data among sources, yet consensus seems to be that the process often takes longer than expected and is heavily dependent on factors such as the industry the startup operates in location, or the startup founders' experience (Bruno & Tyebjee, 1985). For example, an entrepreneur who has already raised external funding will find an angel or VC much easier than a first-time entrepreneur. DocSend & Eisenmann (2015) has studied 200 companies looking for VC funding, and found that on average entrepreneurs had to contact 58 investors, took 40 meetings, raised \$1.3 M and took over 12 weeks to close the deal, but for every fifth startup, this process took over 20 weeks. According to Cremades (2019), successful VC fundraising usually takes somewhere between 3 to 9 months and approximates the process to 6 months. In these six months activities such as pitching, calls, meetings, document editing and cash wiring happen. Cremades also points out that this is not a one-time activity, as fundraising happens every 12-18 months on average. Considering that fundraising is a full-time activity, usually for the founders or executives of a startup, opportunity costs can be considered very high, as founders can't fully contribute to other tasks in the meantime.

4.2.4 Initial Public Offerings

Nelson (2003) summarizes this funding option's characteristics promptly. An Initial Public Offering ("IPO") is a firm's first public offering of their stocks, on secondary equity markets like the NYSE or NASDAQ. This organizational milestone is a voluntary and strategic decision made by (formerly) private companies, which changes the future governance and ownership structure of the firms. IPOs allow firms to access a "substantial cash infusion", therefore raise capital, but prohibits them to choose their new investors/owners. The process of conducting an IPO is very complex, and companies usually have to partner with an investment bank, file documents to local authorities, create a prospectus to show the company's vision and current status (Nelson, 2003). Furthermore, they must decide how much of the company's shares and voting rights they are willing to offer to the public, and how much they are planning to retain. While determining how much capital they wish to raise, a lengthy valuation process takes place, which ends with the company communicating how much their shares will initially cost on the markets (Wallstreetmojo, 2019). Based on research from Nanda & Rhodes (2013), the average age of a startup at IPO, between 1980-2004, was 4.7 years, with a pre-money valuation of \$208M. These startups have, on average, raised 42 M USD prior to their IPO. EY's (2018) data indicates that during 2018 there were 1,359 IPOs that raised aggregate proceeds of \$204.8 B, signaling an average IPO raise/proceed to be roughly \$150 M. EY's (2018) "Guide to going public" describes many case studies on why companies would IPO. Two relevant cases for motivation should be mentioned: 1: for highgrowth companies IPOs can secure funds to enable innovation, growth, and internationalization. 2: for VCs, IPO as a way to "exit". The term "exit" refers to a point in time where the created value of a firm/startup can be realized, for example by returning capital to early investors (Pisoni & Onetti, 2018). Typical startup exits are through mergers & acquisitions (Joffe & Ebersweiler, 2018), yet IPOs can be seen as exit strategies, as the owners can often sell off their shares to the public in exchange for cash. It is worth noting that there is heavy regulation regarding selling off shares, for example for founders soon after the IPO, and are not always allowed (known as the lockup period). Nevertheless, a unique characteristic of an IPO can be its dual nature of being a fundraising vehicle and an exit strategy at the same time.

Gathered by a selection of sources, a non-exhaustive list of potential benefits of IPOs contain: access to significant capital, liquidity for owners wishing to enhance personal wealth, better brand recognition which might lead to higher valuation and countless other benefits, improved financial capabilities, for example through the expanded ability to borrow, less dilution and the power to attract and motivate employees in new ways. A similarly non-exhaustive list of disadvantages could include the rigorous time, effort and cost requirements to carry out an IPO, which are expected to be 12-24 months and 10-15% of the gross proceeds offering of the capital, which averages from 7 to 70M USD. The company information is often compiled into a long document called a "prospectus", which also needs to contain two or three years of financial statements. Also, increased accountability and transparency requirements, increased demands and pressure to deliver from investors, corporate governance duties, lost control due to new investor voting rights, and reduced flexibility can be seen as further disadvantages (EY, 2018; KPMG, 2015; RSM, 2018; Ritter, 2003; Bhabra & Pettway, 2003; Lowry et al., 2016; PWC, 2017).

4. 3 Newer ways of funding

As stated previously, the past decade has seen many new fundraising models appear. The following models are those that already exist, however, they aren't represented in previously referred to funding-cycles or models, mostly due to their newness.

4.3.1 Crowdfunding

Over the past decade, the phenomenon of "Crowdfunding" has become a viable and popular option for startups to raise capital. This new funding vehicle occurs when an entrepreneur raises capital from a large audience, yet the individuals who invest typically contribute with very small amounts (Belleflamme et al., 2014). There are several different types of crowdfunding, which include rewards, donation or equity-based crowdfunding (Meyskens & Bird, 2015), and some sources consider Initial Coin Offerings (ICOs) to be the fourth (Seres, 2018). The prior refers to what the contributors get in exchange for their investment. For example, in equity-based crowdfunding, an investor would receive equity of a firm in exchange for his/her investment, while in rewards-based crowdfunding, it would typically mean a free product or early-access to a service. Donation-based crowdfunding is less relevant to this paper, as it is most commonly relevant for charitable organizations, and not-for-profit startup companies. Reports indicate that the crowdfunding market is valued at over 10 billion USD, and is expected to rise to almost 30 billion USD by the end of 2025, led by such platforms as GoFundMe, IndieGoGo and Kickstarter (QY Research, 2019).

According to QY Research (2019), there are approximately 19 times as many reward-based crowdfunding campaigns as equity-based ones. Collins & Pierrakis (2012) believe that those backing

equity-based campaigns are solely motivated by extrinsic financial motives, while rewards-based campaign backers also have intrinsic non-financial motives. A wider audience, due to a broader sense of motivation can be one factor for such a difference. Hemer (2011) also brings up intrinsic factors that motivate people to back crowdfunding campaigns, such as satisfaction from funding community-driven, social or meaningful projects, personal identification with certain projects' themes and enjoying contributing to innovation. However, he also plots the process complexity of backing different types of crowdfunding campaigns, and equity-based campaigns are seen as the most complex ones, while rewards-based campaigns seem fairly simple to support. Cholakova & Clarysse (2015) argue that these two types of crowdfunding attract different types of investors, yet in both cases the primary motivation comes from the financial or utility-driven aspect of the campaign. Therefore, the authors believe that in rewards-based campaigns the backers are primarily pledging to receive the promised compensation for their investment, yet secondary motivation may arise easily from a wide variety of factors. Considering the infamous quote that "9 out of 10 startups fail", which is accepted by many researchers in the field (Krishna et al., 2016) as well as the public, since receiving tangible, reward-based compensation in exchange for cash seems like a logical step, and might contribute in part to the difference in the number of equity vs reward-based campaigns. Further research is needed to find additional and more reliable reasons for explaining the phenomenon. Mollick (2014) claims that startups initiating crowdfunding can have secondary goals as well, and draws on the example of how a startup called "Pebble" was unable to raise VC at first, however after a successful crowdfunding campaign they were able to show demand for their product from customers, which enabled the company to raise VC after the campaign ended. He further acknowledges that crowdfunding has further non-financial benefits for startups, for example the inherent marketing and publicity advantages that can add great value to new companies.

Reward-based crowdfunding seems like a promising option for entrepreneurs at first, since founders don't need to give up equity in exchange for cash. Once taking a closer look at the statistics, some warning signs appear. Reward-based campaigns have a complex pricing system, with two main options for fundraisers, based on the most popular platforms' pricing pages: all-or-nothing campaigns, where companies can only keep the raised capital if they have exceeded an initially set financial goal, or flexible pricing when fundraisers can keep the amount raised even if they didn't reach an initial set financial goal. Typically platforms charge higher campaign fees for flexible pricing than all-or-nothing pricing, and fundraisers should also calculate with transaction and transfer fees. Data also indicates that crowdfunding is more applicable for "micro-projects", raising \$1,000 or less. Kickstarter.com (2019), the currently most popular crowdfunding platform in the world, share their lifetime statistics on their official

website publicly. Approximately 460,000 campaigns were launched since 2009, with about 170,000 being successful in reaching the funding goal. Out of the successful campaigns about 140,000 (+80% of successful campaigns) raised under \$20,000. Only about 6,000 campaigns (~3,5% of successful campaigns; ~1% of all campaigns) raised between \$100,000 - 1M and only 379 campaigns (~0,08% of all campaigns) thus far have raised over 1 million USD. Some categories of projects dominate successful fundraising. For example, out of the campaigns that raised \$100,000 - 1M, over 79% of them were in one of these three categories: "Games", "Design" and "Technology". Over 92% of the campaigns that raised over \$1M were in the same three categories, with "Games" being the most dominant. It can be concluded that reward-based crowdfunding is most appropriate for startups who wish to raise capital under \$100,000 since the chances of raising more are around 1% or less, depending on the financial goal. Furthermore, raising capital over \$100,000 in other categories than the three above mentioned is drastically lower. Evaluating these statistics, it can be concluded that this form of fundraising seems most appropriate for consumer-facing startups who are early-stage, most likely in their bootstrapping phase, or for those who wish to avoid raising capital from an angel investor.

Equity-based crowdfunding became available to the mainstream public in 2012, when the US passed the JOBS Act, which legalized equity crowdfunding, and made it easier for founders to raise capital from a large group of individuals, without having to file for an IPO (Mollick, 2014). A whole new audience gained access to owning equity in startups, including unsophisticated investors, with minor regulations on how much they are allowed to invest. A trivial advantage of such fundraising, apart from those mentioned in general for crowdfunding, could be the lack of individualized investor control, due to investor equity being fragmented. Other advantages could be no dilution of power, gaining feedback from the market, or gaining global advocates (Valanciene & Jegeleviciute, 2013).

Another advantage, as described in literature, is the possibility to leap the "equity gap" issue, which occurs, for example, when a startup would need more capital than available from a business angel, but less than how much a venture capital firm would normally minimally invest (Hagedorn & Pinkwart, 2016). Finally, it could be a great funding alternative for those startups who don't fulfill the specific requirements of VC firms. While this route of fundraising seems to incorporate many advantages, statistics show a somewhat different picture. In the US, during 2018, 732 companies have been able to raise around \$75.8 M through equity crowdfunding (Crawford, 2019). Compared to other funding options, this market seems to be significantly lower. When viewing other sources, for example, Staista's (2019) Fintech report, we can find an estimate of a \$3.8 B market size, yet it is still small compared to VC or IPOs.

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Predicting the average capital raised per campaign isn't straightforward due to a lack of reliable global market report. Nevertheless, this paper considers an average raise to be approximately \$600,000, which is based on figures from North American and European platform statistics (Neiss & Crowdfund Capital Advisors, 2018; Scott, 2019; Statista, 2019; Ralcheva & Roosenboom, 2019). Pinpointing average equity offered in exchange for capital is also challenging, yet Ralcheva & Roosenboom's (2019) data suggests 11-14% seems like an accurate educated guess. The authors also see a 44% success rate, based on 2171 campaigns that they analyzed. The requirement to comply with regulations is definitely present, however, it doesn't seem to exclude many startups from participating (Clark, 2019; Startengine, 2019).

Furthermore, since 2011 out of all companies in the UK who have attempted equity crowdfunding campaigns, only around 0.5% have been able to make an exit, and thus give returns to their investors. Another major issue seems to be illiquidity (Estrin et al., 2018; Walthoff-Borm et al., 2018; Signori & Vismara, 2017). Combined with the high-risk factor and years of uncertainty, before the firms can generate returns for investors, doesn't seem to generate an anticipated formula (Marble, 2018). When comparing protection of investors from scams, equity crowdfunding can be categorized as medium on the spectrum (Cummings et al., 2019; Siegel, 2013). Adding liquidity to this model could eliminate many of the anticipated issues. Garleanu & Pedersen (2007) discuss that low liquidity results in raised effective risk in positions, as it takes longer to sell these securities. While investing into startups carries a high-risk factor, liquidity could also allow investors to speculate on their positions, and realize returns from their investments by trading equity (Simsek, 2013).

Another issue with crowdfunding campaigns is the time and resources required to launch. Literature ties the probability of success with startups' ability to signal preparedness and their careful planning, which enables them to set achievable goals and rapid execution after successful crowdfunding (Mollick, 2014). Neiss & Crowdfund Capital Advisors (2018) surveyed 485 equity crowdfunding campaign owners, out of which only 16.7% replied, supposedly those successful outnumbering unsuccessful fundraisers. The average startup spend was \$16,878, raising \$319,404 on average. The startups have spent on average 3 employees' 241 hours collectively to achieve the above-mentioned funds. Other sources mention varying amounts of time of completion, as some authors don't consider preparation time. A small campaign is estimated to take around 4-6 weeks, while fundraising over \$1M can easily last over half a year (StartEngine, 2019). While it can be concluded that this amount of spending on a campaign, which included marketing, transaction legal and other costs, is relatively low compared to more regulated

fundraising (e.g.: IPOs), many startups don't manage to raise their anticipated amount of funding, and paying for the campaign costs typically needs to happen before launching the campaign, which several startups can't afford due to resource constraints. Since there is a positive correlation between time and money spent and money raised (Neiss & Crowdfund Capital Advisors, 2018), startups might feel obligated to invest significant amounts of capital into a risky campaign. Compared to scheduling a meeting with an angel investor or VC, this cost seems daunting for many new firms. When raising higher amounts, and thus needing to comply with more regulations (e.g.: Reg A+) then these costs and the time required is likely to be much higher, especially for those raising over \$1M (StartEngine, 2019).

4.3.2 ICOs and Blockchain

Initial Coin Offerings (ICOs) allow firms, organizations and entrepreneurs to raise funds by issuing blockchain-based "tokens" in exchange for cash. Theoretically, the majority of these tokens are meant to be used as utilities (Myalo & Glukhov, 2019), and can be traded online (Adhami et al., 2018). Fisch (2019) summarizes that a differentiating factor from other types of crowdfunding is the presence of distributed ledger technology (DLT), in most cases specifically blockchain technology. Fisch also mentions that in many cases the issued tokens represent a currency within the company's own ecosystem. This could be an example of how these tokens represent utilities. Consequently, ICOs are only a funding option for ventures that are tied to DLT or blockchain technology in one form or another and are mostly cryptocurrency projects, as otherwise, the tokens wouldn't be able to represent utilities. Since tokens represent utilities, no equity is given in exchange for cash.

The ICO market is highly volatile. According to reports from PWC (2018; 2019), in 2013 less than \$1 M was raised through ICOs, while this number was already over \$250 M in 2016. 2017 seemed to be a breakout year when over \$7 Bn was raised, however this was easily trumped in 2018, when in the first 5 months alone over \$13 Bn was raised, and ended at \$20 Bn at the end of the year. When analyzing the first 5 months of 2019, this number dropped back to \$3.63 Bn, which already includes all Security Token Offerings (STOs) as well (PWC, 2019). Defining the average funding round size for an ICO will greatly depend on the chosen year. Using the same data from the PWC (2018) report, we can see that in 2017 a total of 552 ICOs raised \$7.043 Bn, which would value an average funding round to around \$12.8 M. During the first five months of 2018 this number was \$25.5 M, but later that year the remainder of ICOs brought back this average to \$12.3 M. When looking at more recent numbers we can see that this average is moving further down. In October 2019 the average funds raised per project was \$7.6 M

(ICOBench, 2019). Based on these numbers, an ICO could be compared to a mid-stage VC funding round, such as a Series A or B round, but the most successful ICOs can be compared later stage rounds or IPOs, in terms of funds raised.

Similar to the quick rise in popularity of ICOs in 2017, a steep downfall has recently characterized the market. Since the second half of 2018 ICO activity has plummeted, and ICOs are disappearing, and evolving into similar yet different funding methods (IEOs and STOs). Market reports illustrate the abovementioned points clearly. For example, ICOBench's (2019) August report shows that during this month a total of \$112.5 M was raised, which compared to August 2018's \$631.7 M seems like a considerably lower number. When taking into account that the above number (\$112.5 M) also includes all IEO activity, this number shrinks to around \$73.1 M. Furthermore, ICOs predominantly fail to raise any funding. In the month of August 2019 98 ICOs ended, and over 73% of them didn't raise any funds (ICOBench, 2019). Similar numbers characterize other months in 2019, and can be considered comparable.

Adhami et al. (2018) originate ICO advantages into three main categories, all of which trace back to the involvement of DLT technology, and in most cases Blockchain technology. The first category points to the advantage that blockchain not only reduces costs of raising capital but also helps to avoid intermediary (e.g.: crowdfunding platform) and payment agent (e.g.: credit card company) fees. The second category of advantages are due to the open-source development environment, inherent network effects and decentralized nature of this technology. Finally, the issue of illiquidity is solved by the fact that tokens can be easily traded on secondary markets. Myalo & Glukhov's (2019) further describe the advantages of marketing help, credibility and expertise, if the token is listed on an exchange. According to Momtaz et al. (2018) and Adhami et al. (2018), the after-market liquidity of most tokens, offering 24/7 trading, is a key benefit that when compared to VC or traditional crowdfunding, clearly outperforms other funding models.

Crosby et al. (2016), describes blockchain as a *distributed* database of records of all transactions shared and executed by participants. Each of these transactions have to be verified by the consensus of the majority of these system participants. Furthermore, data put into this public database (or ledger) cannot be erased later, and each transaction/event has a verifiable record. It is important to mention that the technology has both financial and non-financial use-cases (e.g.: healthcare, government, supplychains), which will likely be disrupted during the next years. Hooper (2018) describes that the five most prominent advantages of this technology that can be adopted are greater transparency, enhanced security, improved traceability, increased efficiency & speed and reduced costs. These findings seems to have significant overlap with Adhami et al.'s (2018) proposition, enabling firms to reap the benefits of blockchain technology when raising capital, and other non-financial benefits. The currently biggest challenges of the technology is the lack of know-how knowledge, data governance and privacy-related unanswered questions (Kamble et al., 2019).

The disadvantages and downfall of ICOs originate to two prominent themes: scams and utilities. Due to blockchain technology, ICOs are disintermediated and deregulated (Andrés et al., 2019), meaning that anyone, including the general public, can create an ICO campaign, or purchase and invest into tokens (Preston, 2018; Benedetti & Kostovetsky, 2018). Combining deregulation with issues such as information uncertainty, capital misallocation, weak legal protection, and systemic risk, ICOs became a vehicle for scammers and opportunists to run scams, for example, pump and dumps (Zetzsche et al., 2017). The barriers to entry for launching an ICO can be considered low, and by some non-existent in both financial or non-financial regards. Only a white paper and website was needed as tangible parts of ICO projects, and after creating a token and launching on an exchange the company was ready to raise funding without any audit, standards or verification (Adhami et al., 2018; Brummer et al., 2019). On the other hand, several sources give summaries of inherent costs and a lengthy procedure that startups should calculate before initiating ICOs. For example, Polygant's (2019) summary concludes that there are significant costs for creating the project concept and white paper, legal, financial, technological, listing costs, and costs of offering the token, which can easily add up to over \$100,000 - \$500,000 in total costs, depending on the project. The estimated length of the process is 6-8 months. Zhai's (2018) article estimates that projects can run around \$300,000, and last for 3-6 months. The degree to which ICOs were fraudulent depends on the source viewed. For example, Liebau and Schueffel's (2019) study found only 2.2% of their sample group to be fraudulent, whereas they refer to an industry study claiming that 80% of ICOs are scams. Due to the high number of fraudulent cases investors have become more cautious and unmotivated, and investor protection can be considered very low (Zetzsche et al., 2017).

Another issue is related to the classification of utilities and securities. There should be an emphasis on the fact that an archetypical token buyer is expected to be a future customer in most cases, as the majority of ICOs issue "utility" tokens. The reality is that most buyers are speculating on movements in the value of tokens, attempting to make profits (Howell et al., 2018; Lipusch, 2018). Oversimplified, if these tokens and coins serve as investment vehicles, they shouldn't be considered as utilities, and securities law and regulation should apply to them (Preston, 2018). In reality, regulators are having

trouble defining ICOs with current legal frameworks, in many countries (Dell'Erba, 2017). In early 2018 regulatory bodies, as well as banks and major legal and advisory firms, began to scan ICOs more carefully, and scrutinize fraudulent ones (Preston, 2018; Zetzsche et al., 2017). Increased regulation, while providing a layer of protection against fraud, might eliminate advantages of ICOs for those startups who comply with them. For example, if ICOs truly offer utilities, then investor interest will likely decrease. Proposals for updating securities law in several countries, including the US has been made (Preston, 2017; Dell'Erba, 2017; Zetzsche et al., 2017).

4.3.3 IEOs

Initial Exchange Offerings (IEOs) appeared in 2017 in order to tackle some issues of ICOs including risk and liquidity (Myalo & Glukhov, 2019). IEOs are a type of ICOs, where tokens are offered on partnering exchanges, instead of directly to investors. The risk factor of scams is lowered by the due diligence carried out by the exchanges who issue the tokens, yet scams might still appear. Another advantage is the instant liquidity of the tokens, as they are made available on exchanges. Formerly, many fraudulent tokens/coins never released their offerings on exchanges after raising capital, making their tokens completely illiquid (Beedham, 2019). LeewayHertz (2019), a blockchain development company, describes that exchanges often charge a listing fee, and might take a percentage of sold tokens. On the other hand, exchanges are often incentivized to help with the marketing of IEOs, adding promotional value in exchange for fees. LeewayHertz also mentions advantages such as platform-customer-access, ease-of-use, legal protection and speed. Finally, LeewayHertz gives examples of wildly successful IEOs, including BitTorrent who raised \$7.2 M in 15 minutes after launching their offering, and Fetch.Al who raised \$6 M in 22 seconds. According to Myalo & Glukhov (2019), 95% of ICO, and therefore IEO, projects regard utility-based tokens. Thus, IEOs can be considered an improved version of ICOs, yet are challenged to motivate investor activity, and a solution is needed where security-based tokens are exchanged in return for capital.

4.3.4 STOs

Ante & Fiedler (2019) describe Security Token Offerings (STOs) as "blockchain-based tokens that represent a security, as defined by the relevant jurisdiction." The act of offering security tokens is described by the above-mentioned authors as selling traditional financial instruments (e.g.: debt, revenue sharing rights, equity) in a tokenized form. Furthermore, the authors describe these offerings as a better fit for companies and investors, because it fulfills needs that ICOs (or other fundraising
vehicles) couldn't. An example that Momtaz et al. (2019) give is "Equity tokens", which are a subset of security tokens, and can be viewed as a modern version of stocks, where the corporate ownership and voting rights are recorded on the blockchain. In exchange for purchasing these equity tokens, purchasers receive a percentage of the token-issuing firm's equity while also enjoying blockchain technology's benefits.

Several advantages seem to characterize STOs. Blockchain technology, and its previously mentioned advantages are present. For example, Adhami et al.'s (2018) paper would suggest non-financial benefits, such as network effects or the open-source project development environment, or decentralization. Also, the tokens can be fractionalized, meaning that each token can be divided into many smaller pieces as well (Gryglewicz et al., 2019). This would allow people to gain ownership of assets that they wouldn't normally be able to. For example, a famous painting that costs \$100 M wouldn't be accessible to most investors, however if a token is split into a million fractions, then anyone with \$100 can become part-owner of the painting.

A topic not sufficiently discovered in STO literature is its capability to provide fundraising capabilities for non-DLT focused companies. In theory, any company can STO, as the tokens aren't needed to be used as utilities (e.g.: keys, discounts) on the issuer's platform. Ante & Fiedler (2019) mention that ICOs are typically for startups in the blockchain ecosystem, and later when describing STOs they mention that any company can STO, however no further mention or comparison is made regarding this aspect. Although further research regarding this advantage is needed, it inherently opens up blockchain-based fundraising to a much larger audience. Another advantage is the nearly endless opportunities for usecases. According to Subramanian (2019), the appearance of smart contracts made it possible to issue completely unique financial instruments or flexible ones on the blockchain. He further acknowledges that some existing financial vehicles, for example the Simple Agreement for Future Equity (SAFE) which is a popular startup funding contract, can be implemented on the security token architecture with the smart contract functionality. Security against fraud, regarding the transactions and investments into companies, is another key advantage of STOs when compared to ICOs. Supervision by regulatory authorities and further regulation, such as tax reporting, compliance monitoring or information openness, are requirements of STOs, and failure to comply can lead to serious and expensive consequences (Myalo & Glukhov, 2019). This adds an extra level of credibility and security to this funding vehicles, and induces confidence in investors.

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Disadvantages of STOs described in the literature mostly originate from two main categories: legal and resource-based issues. Securities are defined differently depending on the country, yet taking the US as an example and paraphrasing from the SEC (James, 1933), security can mean any note, stock, debt, interest, etc., or any familiar investment instruments. Once an investment is considered a security, it is subject to regulation, often by bodies like the Securities and Exchange Commission in the US (Preston, 2018). In the US the company offering the security is expected to register it, along with information including financial statements, company management and description of the security. The Howey test is often used to determine if an investment is an investment contract, and thus a security (FindLaw, 2019). That being said, jurisdiction around the world differs greatly, and what might seem illegal in one country could be perfectly legal in another. In many countries, like the US or Russia, only accredited investors can legally invest in STOs (Myalo & Glukhov, 2019), whereas other countries, for example, Lichtenstein, offer retail investors the opportunity to buy securities through STOs (Neufund, 2019). Subramanian (2019) believes that regulatory uncertainties could lead to slower adoption, and mentions that several countries, for example, Switzerland and Malta, are working on blockchain and smartcontract based securities laws. Several corporations, for example, the Bank of Lithuania (2019), have also released guidelines to STOs, which aim to help companies who wish to go down this path of fundraising. Furthermore, corporations have started to create guiding principles for STO regulation, for example, the DTCC (2019) who have published their guiding principles for post-trade processing for tokenized securities, which suggest global standards. TokenizEU (2019), an advisory firm that "helps companies to tokenize assets in the European Union" has created a summary table of European countries' national rules, and advocates that the five most suitable countries for issuing STOs in Europe are Estonia, Lichtenstein, Malta, Switzerland, and the Netherlands. There are some online concerns and criticism towards the status of finding solutions to currently grey or unsolved legal questions. Hosp's (2018) article highlights several concrete legal questions that seem unclear to the author including transfer rights, complaints, and exchange deposit handling. The author further acknowledges that in 2018 there were barely any advancements in solving such legal issues. Since there have been live STOs and some successful ones, it can be said that Hosp's questions were solved in certain countries, however, the question remains if these questions were solved in a manner that would provide a solution for a wider range of use cases, in different countries.

Another disadvantage considered could be the resources required to conduct an STO. Because there are very limited amounts of STOs carried out to date, it is difficult to propose an average cost and time required to prepare and carry out. Nevertheless, comparing it to other funding models seems possible.

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Myalo & Glukhov's (2019) comparison indicates that for STOs the release of the token, development and legal support costs will aggregate to an overall higher cost than for an ICO. The firm isn't required to have strong prior financial history or statements, but security tokens need to be backed by real assets. Finally, in terms of speed, the authors estimate an average ICO to take "several months", whereas for STOs this is expected at "up to a year". In comparison, the IPO process is expected to take around 1.5-2 years (Jones, 2018). When compared to an IPO, STO speed and costs are lower, yet many questions of liquidity, volatility and risk come into account, which are difficult to compare due to limited data on STO success and a changing infrastructure. Fitzner Blockchain Consulting's (2019) guide to STOs indicates that total upfront costs will total at around \$100,000 - \$250,000, comprising of legal, administrative, marketing and many other types of fees. ChainPlus's (2019) estimate of inherent costs also outlines a required budget of approximately \$100,000, or more, yet this budget will defer on the target amount to be raised. If these estimates even vaguely resembles reality, then almost no early-stage startups will have the option to choose this funding method, and STOs will only be an option for medium or later-stage companies. Contrary, Alwin.io's (2019) analysis predicts this cost to be considerably lower, around \$8,000 - \$20,000.

Ante & Fiedler (2019) predict that having high liquidity for security tokens, similar to ICOs, would create a great selling point by providing benefits such as 24/7 trading opportunities and no need for brokers/ custody solutions, due to DLT technology. This would inherently encourage investors to partake more in investing into security tokens. According to an interview conducted by Coinisseur.com (2019) with a startup founder currently conducting an STO, a current requirement by prospectus and capital market laws is that companies cannot let their tokens on unregulated exchanges. Many cryptocurrency exchanges, sometimes partnering with stock exchanges, and even startups are busy at work to become regulated exchanges (Ante & Fiedler, 2019). Some notable players who are at the forefront of this space are the Gibraltar Stock Exchange, OpenFinance Network, tZero, LXDX, Desico, LCX and SIX, some of which seem to be just months away from launching (Molé, 2018; Sandner, 2019). According to BlockState (2019), there are currently 6 platforms that offer operational, regulated trading services, and 47 to be working on similar solutions. Overall, liquidity of such tokens is currently low, yet this might drastically change by this paper is finalized and submitted. Current news and development in regulations seem to indicate that (lack of) liquidity is a short-term issue that security token issuers need to overcome. Backing this expectation is Berlin's STO platform called Neufund, which is already live, and promises to solve issues of liquidity and transparency for investors, while also offering a very affordable and straightforward, low-effort way for startups to tokenize assets, automate legal work and fundraise through STOs (Neufund, 2019). Regardless of the platform being live and accessible, it is hard to evaluate which of these promises are fulfilled, because the platform has only 1 campaign that ended as of today, apart from its own fundraising.

The market size of STOs is uncertain, as there is a considerable disconnect between different sources. Stocheck.com's (2019) data, last updated 29th November 2019, indicates that out of 82 projects launched there were 28 sales closed raising a total of \$265,661,363. Out of the 28 closed sales, 15 were successful (~54% success rate), raising on average \$3.7 M. Further data in this report shows that financial services dominate the industry in where the most money was raised, and also shows that the US-based STOs have been able to raise by far the most money. Further data comes from the report's questionnaire with 711 participants who indicate that the reason for not participating (more) in STOs include reasons such as lack of liquidity, not being accredited investors, lack of high-quality projects, lack of trust, lack of higher ROI and regulatory uncertainties. Blockstate's (2019) Global STO Study, with data up to June 18, 2019, also indicates that financial services-oriented STOs dominate the industry. Furthermore, they found that 75% of STOs are based on equity, 15% asset-backed and 10% debt. Also, data indicates that smaller STOs are more often successful, for example, 89% of their target funding was raised for STOs aiming for \$1M - \$5M, whereas this number was only 24% for companies aiming for \$20M - \$50M. Overall, the study's numbers seem to indicate an average success rate of roughly 48%, if all funding categories are weighted equally. Since each category likely isn't populated equally, this success rate is only speculative and added by the author of the thesis. The main difference compared to the previous study was that Blockstate calculated that \$953 M was raised by 124 STOs (\$7.7 M average raise). In contrast, PWC's (2019) report indicates that from late 2017 to the end of 2018, around \$442 M was raised through this funding model. Myalo and Glukhov (2019) describe that, based on data published on Coin360.com on March 20, 2019, 122 completed STOs have raised over \$512 M (\$4.2 M average raise). Based on the above numbers, we can conclude that an average STO, in terms of funds raised, is similar to a Series A raise. Myalo and Glukhov's further source from Inwara (2018) found that project failure rate is only 3.6%, which is not in line with other reports' data, as other databases approximate this to be closer to 50%. No reliable data has been found while conducting this analysis indicating an average amount of equity offered by companies to investors, in exchange for their capital. PWC's (2019) report forecasts a "positive development" in STO activity, expecting that regulations will start to support STOs more. Han et al.'s (2019) market forecast predicted in February 2019 that by 2030 the STO market size will grow to \$2 trillion, with an average 59% CAGR. Graeme Moore, marketing executive at Polymath said in an interview (Perlebach, 2019) that "In 5 years there

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will be \$10 Trillion of Security Tokens". Despite such optimism, the forecasted rapid growth should be taken with a grain of salt. For example, TokenizEU's (2019) October 2019 article makes claims such as "Not much has changed in the last six months" or "There aren't too many exciting STOs out there" and "it's a regulated market and nothing happens quickly".

4.4 Adoption theory

The research question aims to predict the technology's viability and adoption rate in the future. Understanding adoption theory is therefore crucial and could also help the study to measure factors are aimed toward understanding STOs' future success, identify adoption barriers and give insights into blindspots of the comparison to other models. STOs and adoption theory will be closely analyzed and linked in the *Results* and *Discussion* chapters, where the following models will be viewed in connection to STOs.

4.4.1 TAM model

The technology acceptance model (TAM) by Davis (1985) is a classical model aimed at understanding the user-acceptance of information systems. Due to the heavily technical nature of the chosen funding vehicle, the TAM model can be used to understand the factors affecting the adoption of STOs. TAM suggests that a major dependant of a *user actually using the system* (or not) is highly connected to the *user's overall attitude* towards using it. This overall attitude is expected to be based on the system's *perceived usefulness*: "the degree to which an individual believes that using a particular system would enhance his or her job performance", and *perceived ease of use*: "the degree to which an individual believes that using a particular system would be free of physical and mental effort". Perceived ease of use is believed to have an effect on perceived usefulness, as higher ease of use can result in more productivity, which increases usefulness. System design features are believed to directly influence both ease of use and usefulness, but only indirectly influence attitude. Please find illustration of the model in Chapter 11 (Appendices) in section *11.6*.

4.4.2 UTAUT model

The Unified theory of acceptance and use of technology (UTAUT) (Venkatesh et al., 2003) is a unified acceptance model, that is created by empirically comparing eight acceptance models, including the TAM model, and formulating the UTAUT model based on the comparison. The UTAUT was empirically tested

by the authors and was found to outperform the original models that it was based on. The authors expect four constructs to be important factors when evaluating user acceptance and usage behavior: *performance expectancy (" as the degree to which an individual believes that using the system will help him or her to attain gains in job performance"*) - found to be the strongest predictor of intention, *effort expectancy ("the degree of ease associated with the use of the system"*), *social influence ("the degree to which an individual perceives that important others believe he or she should use the new system"*), *and facilitating conditions ("the degree to which an individual believes that an organizational and technical infrastructure exists to support use of the system"*). The model also distinguishes moderating variables: *gender, age, experience, voluntariness of use*. Behavioral intention is believed to be a result of the above constructs and is expected to have a significant influence on the usage. Venkatesh et al., (2003) further acknowledge that *attitude toward using technology, self- efficacy,* and *anxiety* are not determinants of intention.



Figure 10: UTAUT model - Venkatesh et al. (2003)

4.4.3 Diffusion of innovations (DOI) model

Rogers (1995) introduced the Diffusion of Innovations model. According to the author, diffusion ("the process by which an innovation is communicated through certain channels over time among the

members of a social system") is believed to be a topic of interest, as in many cases getting a new idea adopted, even if that new idea has significant advantages, is very difficult. The book's sixth chapter is concerned about the contributing factors to the rate of adoption ("the relative speed with which an innovation is adopted by members of a social system"). Rogers (1995) claims that the most important variable when studying the rate of adoption is the perceived attributes of innovations, which is believed to account for 49-87% of the variance in the rate of adoption. The perceived attributes of innovation are relative advantage ("the degree to which an innovation is perceived as being better than the idea it supersedes"), compatibility (" the degree to which an innovation is perceived as consistent with the existing values, past experiences, and needs of potential adopters"), complexity (" the degree to which an innovation is perceived as relatively difficult to understand and use"), trialability (" the degree to which an innovation may be experimented with on a limited basis"), and observability ("the degree to which the results of an innovation are visible to others"). The model found other variables that help to determine the rate of adoption, such as the type of innovation-decision, type of communication channels, the nature of the social system, and the extent of change agents' promotion efforts, yet these variables contribute less to the overall variance of the rate of adoption. Furthermore, Rogers (1995) also argues that adoption follows a bell-shaped curve when based on frequency, and follows an S-shaped curve when looking at the number of cumulative adopters.



Chapter 5 - Comparing STOs to other funding models

5.1 Criteria

Contrasting different funding models have been done numerous times in literature and industry reports. For example, as previously mentioned, Berger and Udell (1998) summarize through their Financial Growth Cycle paradigm how different capital structures are optimal at different points in time for companies. Their model takes factors of firm size, firm age and information available into account when comparing funding models. Due to the study's release date, 1998, their data hasn't been able to incorporate funding models that are currently emerging or already established, for example rewardbased crowdfunding. Another example could be Myalo & Glukhov's (2019) comparison of ICO, DAICO, IEO and STO models using 20 factors of criteria, and another comparison of advantages and disadvantages based on perspectives from issuers (startups/founders), investors and exchanges. This comparison lacks a comparison to more traditional funding methods like angel investment, venture capital or non-blockchain based crowdfunding. PWC's (2019) ICO / STO report briefly compares ICOs. IEOs, STOs and Traditional fundraising (VC/PE and IPOs), however fails to go into depth due to a limited number of evaluation factors and doesn't compare to non-blockchain crowdfunding methods. The above comparisons don't heavily distinguish any funding methods, thus compare all of them to a somewhat even extend. This is highly beneficial to gain an understanding of the overall funding environment, however this paper's aim is to compare STOs to other funding methods, and see its viability based on that, thus putting its usefulness in spotlight. Comparing a single funding method to the remainder has also been done previously. For example, OECD's (2019) Initial Coin Offerings (ICOs) for SME Financing report has a chapter called "ICOs vs. traditional financing channels for SMEs" compares ICOs comprehensively to IPOs, crowdfunding and venture capital. Further in the report, they compile the benefits and limitations of ICOs for SMEs. This gives great guidance on aspects of constructing the comparison.

In short, no current comparison, matrix or graph comprehensively compares STOs to those funding methods in specific that this study identified to compare with, however we have a wide range of comparisons to draw inspiration from. Consequently, a comparison between the most used funding methods and STOs should be conducted in a matrix, in order to see what advantages it possesses, and what disadvantages may prevent STOs from becoming a more widely adopted funding vehicle.

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However, to create valid findings, the right criteria for comparison must be chosen for the matrix. The question of how this matrix should be designed arises.

After analyzing the above comparisons, it can be concluded that the criteria upon which the funding models are compared isn't uniform. This leaves room for some subjective decision-making, in deciding whose criteria to favor when selecting.

An insightful starting point for selecting criteria is Joo et al.'s (2019) quote: "Upon selection of a financing method, the business should take into consideration the time frame, costs and requirements of each method". Their comparison of ICOs and IPOs used the following headings when analyzing: *financial requirements, non-financial requirements, duration, costs, accessibility.* For example, financial and non-financial requirements included points about prerequisites such as a specific pre-tax earning rate in order to qualify for listing on the NASDAQ, or requirements of legal documents as a prospectus. Duration refers to the length of the process. Costs are defined by viewing all costs associated with the fundraising activity, for example, exchange listing fees, legal or advisory fees, creating an online presence, establishing communication networks and everything in between. Finally, accessibility refers to both startups and investors. For example, there is low accessibility in an IPO for startups, as startups almost never fulfill the required financial past performance prerequisites, whereas high accessibility would characterize an ICO from an investor viewpoint, as there are now requirements on who can invest.

Contrasting these to the factors that Myalo and Glukhov (2019) used, we can see significant overlap. For example, criteria such as *difficulty to set up, fundraising cost, investor accessibility, regulation level, governance level, fees* and *speed* are all factors that Joo et al. (2019) would also consider. Myalo and Glukhov's criteria extends the analysis with some more weight on the investor perspective, as criteria such as *liquidity* and *investor protection* are also present, which could prove to be informative, as adoption will also be dependent on investors' evaluation. Furthermore, they review many criteria that are specific to blockchain-based fundraising only, for example, *AML/KYC need by the token issuer, Smart contract managed by* or *Crowdsale counterparty.* This study will choose to incorporate such factors, when appropriate, into larger themes and not compare them individually.

5.1.1 Summary of criteria

Based on the literature review and previous comparisons, the following structure was created for comparison criteria:

Perspective	Criteria	
	0	Market Size
	0	Average capital raised per round
	0	Average equity transferred
General	0	Average capital/equity ratio
	0	Success rate
	0	Ideal stage for participating startup
		is it for early, medium or late-stage companies?
	0	Lack of financial requirements
		 how much financial requirements are required by law
	0	Lack of non-financial requirements
		 Other requirements, e.g.: legal documents)
	0	Affordability
Startup		Does it cost money to initiate?
	0	Accessibility
		Is it realistically accessible to many startups?
	0	Swiftness
		 Length required to carry out fundraising round
	0	Non-Infancial Denents
	0	Accessibility
		Can any investor partake?
Investor	0	Liquidity
	0	Protection against scam

Table 1: Summary of Matrix criteria

5.2 STO Graph

An initial question to ask is, where do STOs fit on the startup funding cycle graph? Answering this question would enable the paper to focus more on a meaningful comparison, where the contrasted models are competing with each other. The following illustration was made, based on the literature review, and the recently outlined criteria.



Figure 12: STOs in the startup funding model ecosystem – Graph - own creation

The graph indicates that STOs are to be compared with IPOs, Venture Capital, ICOs and Equity-based crowdfunding. Comparing STOs with the other, non-mentioned, funding models (e.g.: Angel investment) would also provide meaningful and insightful learnings, however this comparison falls outside the scope of the paper, and also removes obstacles of time and resource concerns. In other words, the paper makes the generalization that founders looking at early-stage funding models wouldn't find STOs a viable option, due to several reasons, including its complexity and inherent costs. For example, since reward-based crowdfunding is popular for projects raising under \$100,000, and raising money through an STO often requires over \$100,000 of capital to be initiated, a completely different type of startup will be the target audience.

5.3 Matrix & analysis

For further information regarding the matrix, please refer to section 11.6 in the Appendices.

Ir	rvesto	or			Sta	rtup			General				Perspective	
Protection against scam	Liquidity	Accessibility	Non-financial benefits	Swiftness	Accessibility	Affordability	Lack of non-financial requirements	Lack of financial requirements	Ideal startup stage	Success rate (%)	Average equity transferred (%)	Average capital raised (\$)	Market size (Global)	Criteria
Medium	Low	High	Low	Medium	High	Medium	Medium	High	End of Early; Medium; Beginning of late	Medium	Medium	Very low	Low	Equity Crowdfunding
High	Very low	Very low	Volatile	Medium	Very low	Very high	High	Very high	End of Early; Medium; Late	Very low	High	Low to Very High - Depends on Stage	High	Venture Capital
Very low	Very high	Very high	Low	High	Very low	Volatile	Very high	Very high	End of Early; Medium; Late	Low	Zero	High	Medium	ICO
Very high	Rapidly changing	High	Low	Low	Medium	Low	Low	High	Medium; Late	Medium	Couldn't find reliable data	High	Very low	STO
Very high	Very high	High	Medium	Very low	Very low	Very low	Very low	Very low	Late	Very high	Couldn't find reliable data	Very high	Very high	IPO

Figure 13: Startup funding Matrix - own creation

5.3.1 STOs vs Equity Crowdfunding

The two funding models are similar in many ways. An equity offering of an STO could be categorized as equity crowdfunding, on blockchain technology. A difference is that STOs can take many forms, and doesn't need to be presented to a crowd, as private-STOs exist, where the offering is only open to a select group of investors.

The "ticket size", average capital raised, is significantly higher for STOs, almost by ten times, depending on the statistics used. Due to the lack of reliable data, the amount of equity offered cannot be compared, however it is important to note that STOs don't need to offer equity in exchange for cash, they can issue debt or voting rights, and endless other financial instruments. Research suggests that the success rate of both models is similar, roughly around 50%.

From the startup's perspective, the two models are fairly similar. In almost every case, STOs require slightly more requirements (both financial and non-financial), yet the cost of conducting fundraising through a standard equity crowdfunding platform is significantly lower. Inherent to this, STOs are only accessible to startups who have \$100,000 - \$250,000 available for upfront costs. Length of carrying out these campaigns is also similar, yet STOs tend to take longer. In terms of non-financial benefits, taking a typical equity-based STO offered to the public as a unit, neither models have high benefits. On the other hand, as previously mentioned, STOs can be private, which is often open to VC funds. In these cases, STOs can take advantage of other non-financial benefits as well.

From an investor perspective, both models seem to be similarly accessible to partake in. Low liquidity seems to be offered in EB crowdfunding, and high liquidity is believed to characterize STOs soon, however this isn't a reality yet. Due to higher regulatory requirements, STOs tend to outperform EB crowdfunding in terms of investor protection against scam.

5.3.2 STOs vs Venture capital

Venture capital seems to be a booming funding model, data suggests it had a record year in 2018. VC funds seems to operate on a wide spectrum, starting from early-stage VCs to late-stage VCs. This means that almost every startup can find a VC fund that might be interested to invest, with varying amounts of capital. VCs tend to ask for approximately 25% of equity per round of fundraising, and this number is unknown for STOs.

From a startup perspective, VC seems to outperform STOs. The financial and non-financial requirements for carrying out fundraising is much lower for VC, and there are limited or no upfront-costs of initiating the VC model, compared to a lengthy and expensive STO process. Venture capital also has the possibility to bring many non-financial benefits into fundraising, for example networks, experience, and know-how. A big difference is the success rate, since only about 1% of startups seem to fulfill VC funding criteria, whereas around 50% of startups who attempt an STO seem to secure funding. This points to the finding that STOs are much more accessible to a wide range of companies, as only the "elite" 1% of firms can secure VC funding.

From an investor viewpoint, STOs seem to outperform VC. Accessibility to funding a specific startup as an investor in VC is only possible if the investor is part of the VC fund that is negotiating with the company, otherwise there is no way to get involved. For STOs, many are offered to the public, or to accredited investors, making it much more accessible to invest in companies through this model. Furthermore, there seems to be a lack of liquidity for VC firms, whereas the nature of security tokens seem to allow for high liquidity. Protection from scams is also higher for STOs, as these offerings are more closely regulated by local authorities.

5.3.3 STOs vs ICOs

STOs can be considered a counter-reaction to "the fall of ICOs", aiming to correct the mistakes of ICOs, and making it more accessible to other startups.

ICOs seem to only be applicable for an "extremely" niche group of startups. These companies are blockchain-oriented startups, where the issued tokens can be used as utilities on the website, and where neither the platform or the token-holders expect to ever make financial gains by selling or trading the tokens. For these companies, fundraising through ICOs seem to be an inferior option. The guarantee of keeping equity in-house, raising slightly more money, faster, cheaper, with basically no financial or non-financial requirements seems to be possible, with approximately the same non-financial benefits received. Although the success rate of these campaigns is 27% instead of STO's roughly 50%, it still seems to be a good option. For any company that doesn't fit into this niche, conducting an ICO is likely to be illegal, and the tokens will probably be categorized by local authorities. In any of these cases, conducting an STO is the only possible option.

Looking at the comparison between the two models from an investor perspective doesn't make sense, as an ICO token can't be legally perceived as an investment, and cannot be bought to make a profit on.

5.3.4 STOs vs IPOs

The two funding models can be considered to be for different aged firms on average, however, there is an overlap where a firm might debate between the two. While the average raise of an STO is around \$5M, this is roughly \$150M for an IPO. STOs don't necessarily require a firm to give out equity, however, data suggests that this is the norm. In case an IPO is prepared and registered, some sort of fundraising happens. In contrast, around half of STOs fail, and no fundraising occurs in these cases.

From a startup perspective, both models seem to require rigorous financial and non-financial reporting to local authorities, for example, the SEC in the US. In these cases, IPOs seem to require even higher requirements, and the process is expected to last even longer. There are higher non-financial benefits of conducting an IPO. On the other hand, the average cost of conducting an IPO is expected to be around \$14.4 M, in case of a \$150M capital raise. Compared to \$100,000-250,000, these costs can seem significantly higher. Inherent to the cost, only a small group of startups seem to be able to consider IPOs a realistic fundraising option.

From an investor perspective, IPOs seem to slightly outperform STOs, due to higher accessibility and liquidity, yet both models seem to have a similar amount of protection against scam.

5.4 Overall assessment and hypothesis

Venture capital, ICOs, and IPOs seem to be viable funding options for a very small percentage of startups. This is due to either the VC firm's selection criteria, regulations and laws for ICOs, and inherent costs. For the firms that these funding models are accessible for, choosing these models might be a good option. For example, from a startup perspective, VC seems to clearly outperform STOs due to non-financial benefits and ICOs clearly require a less tedious fundraising process, while also being much faster to conduct.

Based on the above comparison, STOs seem to be bridging the gap of crowdfunding for firms that are too late stage for an average equity crowdfunding campaign, yet too early for an IPO. This is almost every medium stage firm, who doesn't fulfill VC selection criteria. Furthermore, STOs can be combined with VC, and startups don't need to choose between either. For example, in a private-STO, a firm could receive VC investment, yet still reap the benefits of blockchain technology, smart contracts and potential future liquidity of shares, while also receiving the inherent non-financial benefits of the VC firm.

Hypothesis to test with primary research:

Overall, STOs seem to solve several pain points in the startup funding ecosystem, both from the startup and the investors' perspective, making them a funding model that is considered by this study to be useful, accessible and viable for many medium-stage startup companies.

Chapter 6 - Case studies: Results of primary research

The study continues by conducting qualitative interviews with startups and investors, to verify the above hypothesis and enrich the understanding of the topic to a point where STO adoption can be forecasted based on primary findings.

6.1 Case Company 1

Interview Type	Startup perspective
Startup stage	Early
Location	Hungary
Desired funding	Venture Capital (early stage)
Knowledge about STOs	No knowledge

Table 2: Case Company 1 Intro

6.1.1 Background and current fundraising activities

Interviewee A is is a university professor and co-owner of several startup companies in Budapest, Hungary. To give structure to the interview, he was asked to give answers with his most current startup in mind, which is currently in the fundraising process. In some cases the interviewee provided general perspectives that were derived from his extensive prior entrepreneurial and academic understanding, relating to entrepreneurship and investments. His company, Startup A, is an innovative AI-driven software firm aiming to help online retailers sell more inventory.

6.1.1.1 Evaluation of funding models

The company is currently looking to raise between €400,000 and €600,000, in form of pre-seed venture capital funding. When evaluating funding models, the company has self-reportedly started by determining a ticket size, calculating the required capital to cover development and marketing costs. After this, the evaluation between funding models began. Venture capital seemed to be the winning model, due to several reasons. "in Hungary we typically don't consider other resources", VC seems to

be a dominant funding model in the Hungarian market, yet several considerations have been made regarding other funding models. Loans were eliminated due to the riskiness of the business, state funding seemed to have too many criteria and limitations. Crowdfunding, on top of requiring high upfront effort and cost commitment and the uncertainty of success after campaign launch, was identified to suit consumer-facing startups.

6.1.1.2 Current fundraising

At the time of the interview, the company was in talks with 5-6 VC investors from Hungary and Germany. Up to this point, this fundraising process was considered quite straightforward and free of costs, apart from the time commitment put in, which is estimated at around 100 hours, accumulated by the aggregate efforts of all four founders. Future costs are expected to arise when evaluating terms sheets, when legal costs are forecasted to accumulate approximately €1,000. The total fundraising process is estimated to take around 200-250 hours until finished, which started in late summer, and is expected to last 6-8 months. When selecting a VC, Startup A considers non-financial benefits, and is willing to give up 5-10% more equity if experience, network and know-how are involved in the offering. Otherwise, they aren't willing to give up more than 20-25% equity.

6.1.2 Perception of STOs

Interviewee A had no prior knowledge or understanding of STOs. After listening to a short summary and addressing questions, the interviewee had an overall positive perception of the model. Several factors have been mentioned that can be connected to positive performance and effort expectancy. STOs were perceived to possess the capability to expedite the fundraising process, as well as reduce costs while using a blockchain technology that provides "very decent security". The idea of making the legal process of term sheets and regulations more streamlined and straightforward was also raised, albeit acknowledging the rigorous requirements of this model, for example, preparation of the prospectus. In terms of social influence, interviewee A had no knowledge of anyone in his social circles to be conducting an STO, yet have raised the question of which big company will undertake this model and "be the first big one like a lighthouse that attracts other players into this market". Furthermore, comments were made regarding the lack of knowledge of several stakeholders in the funding ecosystem, including lawyers, investors, and entrepreneurs, who will require a lot of education. Inherently, the model was predicted to be market-ready once a black box solution is available, where stakeholders don't need to understand the technical background of blockchain. In the early stages of this phenomenon, only very

few companies are believed to have this as a potential fundraising option. Barriers to wider adoption will consist of technical problems, challenges, and scandals. Several concerns were also raised, including the issues of liquidity and convertibility. The underlying blockchain technology has also raised concerns in the decrease of trust due to the recent ICO bubble, making people more cautious and risk-averse. Trust, and the lack of it, has been raised several times, due to the non-existence of well-known success stories or global organizations involved with this funding model. The interviewee believes that trust will gradually grow as the first pioneers will give feedback, but it can take several years. Interviewee A believes that this model will need 5 years to get to the hype stage, and another few years (3 to 5) after that to become a widespread funding model. At this point, the technology will be matured and the trust will be built, following a typical technology adoption curve. Overall, the interviewee showed high levels of excitement for STOs, expressing his interest clearly: "This was very, very exciting for me", which resulted in a positive outlook towards STOs.

6.2 Case Company 2

Interview Type	Startup perspective
Startup stage	Medium
Location	Denmark
Desired funding	Venture Capital (Series A)
Knowledge about STOs	Limited

Table 3: Case Company 2 Intro

6.2.1 Background and fundraising activities

Interviewee B is co-founder and CEO of Startup B, with prior experience in pharmacy and working for pharmaceutical firms. Startup B is a healthtech company in the phase of a "scaleup", which was identified as a medium stage startup. The firm has already raised capital twice and is hoping to conduct a further round soon.

6.2.1.1 Fundraising and evaluation of funding models

A pre-seed investment round from a combination of government funding, VC and angel investors was raised, with a ticket size of 3.5M DKK, later raising 5M DKK more. The initial investment was made preproduct, based on a good idea and team, in the fairly short time frame of 2 months, including term sheet procedures, due diligence and finding a suitable legal framework. This process required time and effort commitment from 3 co-founders and preparation of presentation material. Interviewee B made it clear that in the closing stages of a fundraising round, having someone with prior experience or legal help. which can be quite expensive, is a crucial component. Choosing this funding model was initiated in order to receive funds from individuals who are aware of the risks involved with startups, therefore aren't necessarily expecting to receive the money back, and thus taking a risk. When asked about evaluating crowdfunding, Interviewee B stated "I didn't know about that possibility. I was basically just aiming for, you know, the VCs because I thought that was the best possibility". At this stage, not many benefits appeared due to non-financial benefits, and the interviewee stated that at this stage the help/guidance would have been available from other sources as well, at least to the extent that he utilized it. "I mean they always say that they are smart money, but they're not. I mean a lot of them they're leaving the money on the table and then they have a board seat and they try to give you some offers and hiring processes and courses and so on. But, in essence you could get that regardless if you have investors, you can get it somewhere." Nevertheless, if a company can choose, they should look at the VC fund's past performance, network and track record. Furthermore, the interviewee stated that a VC firm usually guides a firm to become more of a professional company, in terms of requiring firms to prepare board meetings, set up reporting mechanisms and so on, which contribute to growth of a company.

A seed round also took place, where 3M USD was raised from three institutional investors, in exchange for roughly 25% equity. This process was "of course more difficult, because then you're at seed stage.", and also took much longer, 6 or 7 months, which can still be considered fast for this kind of fundraising. In order to secure the investment, Startup B had to show the ability to generate income and prove signs of traction, "Suddenly you need to come up with data all the time. I mean, that was a full-time job for a few months". After one of the VC firms showed interest, it was easier to draw in the next, and finally the third party. Once again, non-financial benefits weren't considered to be outstanding, lacking proactive guidance from the VC side. Nevertheless, at this stage and later on, choosing a VC should be dependent on their network, their access, and knowledge to markets, and their ability to follow up with later rounds. In these situations the mentioned, significant costs are related to legal fees, where lawyers ask for

around 30,000-40,000 € for guidance. Startup B is aiming to raise another funding round soon, Series A, with the preference of gaining access to a VC in the UK, who could help with introductions and knowledge.

6.2.2 Perception of STOs

Interviewee B had a limited understanding of the concept, stating that STOs are "basically just a crypto offering of the company". Later in the discussion, it became clear that some aspects of STOs are clear to the participant, yet his understanding of smart contracts, legal and technical characteristics of the funding model were missing. Nevertheless, several valid concerns were raised. Initially, the nature of a company with many shareholders raises many questions in terms of governance and is expected to raise the complexity of fulfilling shareholder needs. Furthermore, this leads to more concerns, for example, the growing need to adequately report company information and data to investors. According to Interviewee B, unless this can be automated, it will scare startups away, as it might easily require fulltime employees undivided attention. Furthermore, the pricing of private companies' tokens might become problematic as well. Educating stakeholders also seemed to be an important aspect and simplifying the involved processes, for example, the step of tokenizing should require only filling out formulas or blanks. A major concern seemed to be the cost of conducting an STO, which would eliminate many startups from trying, as most of them don't have that money available for such purposes. In terms of social influence, the interviewee wasn't aware of anyone in his network who was planning or conducting an STO and thought that his field wasn't ready for adopting this funding model yet, however, forecasted that blockchain-oriented firms and fintech companies will likely be the first movers for STOs, as they have knowledge of the technology. Overall, his feelings toward the funding model is mixed, yet seems to lean toward a skeptical perception, as he believes that it currently isn't driven by a need and "the need right now is maybe not there" until it makes it easier for either the startup or investor side. especially with the upfront cost inherent to this model.

Also some use cases, where the effort or performance expectancy can be estimated as positive, were identified by the respondent. Initially, liquidity of equity was perceived as a positive benefit for VC firms, as in this case, they can more easily get rid of a companies' shares that they don't wish to hold anymore, or which aren't performing according to expectations. High liquidity would allow them to reinvest money and thus fund other high potential firms. Consequently, this would allow more startups to be funded, making it easier for companies to acquire funding. Transparency was also identified as a key benefit.

Also, while Interviewee B doesn't believe that the process of discussing shareholder agreements can be shortened, if it can be put into smart contracts, that has benefits. Similarly, another expected use case is putting terms of legal contracts, such as convertible loan clauses into smart contracts, The interviewee mentioned that establishing companies straight to tokenized form might be beneficial, however, also stated that he would need a better understanding of how the legal side of fundraising can be incorporated into smart contract form. Overall, the respondent's outlook towards STOs can be categorized as neutral.

6.3 Case Company 3

Interview Type	Startup perspective
Startup stage	Medium
Location	Denmark
Desired funding	STO
Knowledge about STOs	Expert

Table 4: Case Company 3 Intro

6.3.1 Background and fundraising activities

Interviewee C is the finance manager and first investor in Startup C, which is a FinTech company in Denmark. His previous work experience is with banking, tax, consultancy, and accounting, and has also become an investor. He can be viewed as an expert on the topic of STOs.

6.3.1.1 Previous fundraising

The company has successfully raised over 13M DKK in the form of an ICO. The ICO process was much longer than expected. With a launch in May 2018, the then "purely-crypto company" expected to close the funding round in August, instead it was only closed in January 2019 with half the amount of the hard cap. This extended fundraising period was affected by the unfavorable market conditions, it was described as the "beariest" markets of the Bitcoin era, nevertheless making this firm the first to successfully close an ICO. The nature of the fundraising was a "private" ICO, which was regulated by the FSA in a way where Startup C wasn't legally allowed to advertise or publicize it, which has caused

many difficulties in the process. Furthermore, the FSA required that each contributor to the ICO had to undergo KYC (Know Your Customer) and AML (Anti Money Laundering) screening. During this process, Startup C had to continuously educate the FSA regarding the topic of ICOs and blockchain, which proved difficult due to the quickly changing blockchain landscape at the time. This form of fundraising was chosen in order not to give away equity, and be able to keep more control of the company. The cost of raising an ICO was paid from initial investor funds and was kept low since the company was able to manage the majority of legal and development costs in-house, however, the extra 5-month length resulted in some employees not receiving salaries until the financials were figured out. Nevertheless, the staff grew from originally five members to around 10 by the end of the ICO close. Apart from the capital raised, without having to give away equity yet being able to keep control, Interviewee C has also mentioned that this fundraising has gotten them significant amounts of free press and interviews.

6.3.2 STO process, experiences, and perception

The company has recently attempted a dual-tranche STO, launching in the US and the EU, which was unsuccessful and the STO was stopped during the live fundraising period. The STO was planned from February 2019 to September, and the campaign was supposed to run from early October to late November, however, it was deliberately ended around midway, as the progress was not going according to expectations. It is important to mention that it was not an equity-based STO, therefore the company wouldn't have sacrificed any equity in exchange for capital. The process was compared to an IPO, in terms of "legal documents and the regulatory stuff", yet the distinction was made that an IPO prospectus can be around 600 pages, while their STO prospectus was only around 150. Only accredited investors in the US were allowed to partake, and only qualified investors in the EU, with a whitelist of 29 places for retail investors. The business side, "tokenomics" and the financials were outlined as the three pillars which are essential to be placed on a solid foundation. The STO was chosen instead of a public ICO because the STO market was expected to grow quicker. The STO market, according to Interviewee C hasn't crashed, but it's making very slow progress and the time of their STO was executed with wrong timing. The regulations are changing fast, which open up issues for startups and require their close attention. Combined with the fact that investors are lacking knowledge relating to the topic of STOs, it is even harder to find people who are willing to commit.

The underdevelopment of the market and facilitating conditions were mentioned as a key driver to the outcome of the campaign, for example no regulated exchanges existed where the tokens could have

been listed. Waiting for regulated exchanges seems to be an aspect that all startups need to wait for, if they expect to fundraise successfully through this model. Regardless, some exchanges are expected to be regulated soon, for example, Binance in Switzerland, which enables security tokens to be combined with IEOs, making them more liquid and attractive to investors. The launch of Facebook's Libra also helps with raising awareness of what STOs are for the mainstream audience, and the interviewee said that this observable use case helped them to answer many questions regarding their own tokens. The process is evaluated to be expensive, and traveling, meeting investors is considered a standard task. This process was difficult with limited funds, thus the team wasn't able to places that are attractive for investors, for example, Silicon Valley. Interviewee C, post-interview via email, has indicated that during the STO preparation phase around 4.5 M DKK was spent, which equates to roughly \$665,000. Interviewee C also mentioned that the funding round would have had better chances of success if they offered equity as well.

Another key issue being described was the complexity of the nature of STOs, and its current requirements. There tends to be an issue of newness, resulting in a lack of knowledge for high net worth individuals and regulators regarding the topic, requiring the company to "spend hours at a time, especially with STOs, informing them actually what it is". Also, Interviewee C described that in their STO the minimum investment value was \$100,000, including AML and KYC requirements, which resulted in interested investors having to fill out six forms and spend a lot of time with upfront tasks, which apparently "put people off". Furthermore, due to the heterogeneity of the legal landscape around the world, companies wishing to STO have to plan wisely where they incorporate their holding companies and where they plan to act. An imbalance between the regulation sophistication was also raised, and an example was made that if your home country regulates security tokens differently, then even if you legally invest in a foreign country, you might run into issues bringing this asset back to your home country, or paying taxes on it might not be straightforward. There seems to be many uncertainties.

In terms of social influence, Interviewee C said that in his network around 35 STOs were attempted, and zero closed, with many not coming close to their soft cap. He expects to see the first successful STOs closing next year, if more money is provided by contributors. Also, he expects that this result is due to overregulation. On the other hand, he has mentioned that money laundering tends to be a real issue, as many people try to clean their money through blockchain-related investments.

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The interviewee gave insightful practical examples of how price is set when trading both on exchanges and "over the counter", and how the local jurisdictions can have different requirements in terms of tax requirements. Furthermore, he noted that taxation will likely be guided in the future, and gave the example that a soon-to-launch exchange in Denmark will have a built-in tax reporting tool, which is usually only relevant once an investor sells the assets.

The company plans to re-attempt an STO soon, this time with a lowered soft cap of only 15 M DKK, as opposed to the original 29M DKK, coupled with the strategy to give away equity, which is believed to attract more investors, making the success of the campaign more likely. Nevertheless, a main advantage of STOs is believed to be the fact that they don't need to give equity in exchange for capital. Currently issued tokens will have the ability to be converted into this newly issued equity token, and tokens will be listed on an exchange, so investors can liquidate their assets.

Interviewee C believes that in around 2-3 years there will be less confusion in the market, leading to higher adoption, more trust, and successful use cases. According to him, currently investors see this as "a cowboy kind of thing", and are waiting to see what regulators do, which is slowing down the process of adoption. Once a "solid set of rules" are in place for all stakeholders (e.g.: startups, lawyers, investors), the adoption will speed up. He further acknowledges that many big businesses already started "pouring millions and millions into that blockchain side". It is important to mention that the interviewee doesn't believe that all assets should or will be placed on the blockchain, as he simply doesn't see the need or a reason for it. Nevertheless, he forecasts that in 10 to 20 years a lot of assets will be tokenized, with smart contracts attached to them. This is different from Startup C's CEO's opinion, who believes most assets will soon be tokenized. Furthermore, STOs were compared to evolving into something like Kickstarter, and describing them as "it can be for anybody if you want to tokenize something", but doesn't believe that it will cannibalize other funding models, such as equity crowdfunding. Interestingly, the interviewee believes that one of the biggest advantages of STOs is that issuers aren't required to give away equity in the process, and mentioned that liquidity in itself shouldn't be the sole purpose to tokenize assets. Overall, his outlook of STOs can be categorized as positive.

6.4 Case Company 4

Interview Type	Startup perspective
Startup stage	Early
Location	Germany
Desired funding	Convertible loans, VC (Seed)
Knowledge about STOs	Informed

Table 5: Case Company 4 Intro

6.4.1 Background and fundraising activities

Interviewee D is the CEO and co-founder of Startup D, which is a technology company set in Berlin. The firm is enrolled in an accelerator program and currently consists of 3 co-founders and a team of 7 people overall. The company hasn't raised money yet but is planning two rounds of financing in the near future, first round with convertible loans in January and February 2020, then a seed round from VCs closing in May.

The convertible loan round is expected to raise around \in 500,000, with a pre-money valuation of 8-10 million from business angels or angel networks. This capital is planned to be spent on hiring new developers, product development and forming a commercialization plan. The seed round is planned to raise \in 2-2.5 M, with a pre-money valuation of \in 12-15 M. Interviewee D expects this process to be rigorous, but nothing special or extremely complex. As of the interview, he has only had to provide pitch decks and had to reply to letters of interest, but nothing binding yet. He expects that later in the process, when due diligence occurs, more legal documentation will be required, and the complexity will be higher. In terms of upfront or inherent costs, the founder described running costs such as office rent and traveling, but nothing "out of the ordinary". He expects to pay for legal costs later in the process, and other costs will likely occur, but he doesn't perceive costs apart from legal to be inherent to fundraising. The company evaluated different funding models, however, they believed that for a high-tech SAAS B2B firm, crowdfunding is not a good option in the traditional sense. They have also looked at crowdfunded angel networks, where a group of angels invests instead of individual ones. Interviewee D mentioned that going with a business angel or VCs is a more rigorous process, yet can provide other benefits than money, for example industry experience, consulting and networks. These aspects, along

with location will be considered when sitting investors into board seats of the company. The interviewee also raised an interesting point regarding the benefit of attracting VCs before the company has a launched product with users and income, as in this case the valuation is more based on the idea and team, otherwise the figures will impact the valuation much more. Startup D has already been contacted by VCs in September 2019, thus the entire process is estimated to take around 9 months, from the first contact to money in the bank.

6.4.2 Perception of STOs

Interviewee D had the second-highest knowledge of STOs out of the 7 interviewees. His understanding of the topic was very much in line with current academia, despite his self-claimed lack of understanding of the technical aspect of this funding model. Overall, a skeptical perception can be summarized, as he mentioned that "I'm not very convinced by the model" and that "it's a fad more likely". His view is closely linked to the lifecycle of ICOs, where he saw the lack of due diligence and the failure/disappearance of funded companies as a major flaw. Interviewee D raised many concerns, and summarized his feelings by saying that STOs will need to evolve into something more similar to traditional funding models, or they will disappear. Another concern raised is the lack of "proof" or successful use-cases. Furthermore, Interviewee D has made the point that most investors have lost trust due to the misuse of ICOs, and blockchain technology also isn't growing at the rate previously expected. He believes that it can be somewhat seen as forcing technology into a system, where there isn't necessarily a need. A comparison with VC has been made many times, claiming that VC firms are more stable financially, therefore often have the ability to fund companies in further rounds, which holds benefits for startups. Furthermore, he believes that the VC model is working relatively well, and there isn't a need for alternatives to it. This is believed to be the case until the risks inherent to STOs weigh more than the benefits. The process itself is believed to be more rigorous due to regulation, and the costs involved are perceived as unnecessarily high, eliminating many early-stage companies from attempting this funding model. The non-financial benefits also seem to outperform those of STOs in his perception, and since VC is a proven concept, it can be researched before a startup attempts this form of fundraising. The thought that companies who can't secure VC funding might be companies who shouldn't be funded was also formed. Furthermore, he expects that many companies who will attempt STOs will be firms who got rejected by VCs. Interviewee D also raised the concern that many opportunists are jumping on this hype, to make quick money, which can lead to issues. When compared to other funding models, traditional crowdfunding was believed to be inferior due to its lower costs, and IPOs were categorized as a funding model for much more mature businesses.

He has also raised a few use-cases where STOs can be considered a viable model. Although he believes that in general VC is expected to be a better choice, in some atypical cases or for some very specific use cases the model might work. An example he brought up is prop-tech (property technology companies), where fractionalizing assets in token form is believed to be a viable idea. He also believes that making this model more compatible with VC would raise its chances of survival. Nevertheless, he believes that such a business would need a solid business plan and an overall good regulatory system to make this a successful case. He also mentioned that the idea itself is good, and might fix the broken system associated with ICOs, but investors should be hesitant before putting in millions into this non-proven concept. In a similar fashion, STOs' liquidity was perceived as a special benefit, one that hasn't been proven yet. In terms of social influence, respondent D knows people who have done ICOs, and one company who is attempting an STO, yet believes that the popularity of such endeavors has decreased.

Interviewee D's forecast for the future is based on how beneficial STOs will prove to be for startups and investors. In case they can prove their need, he believes that in 2-3 years he'll be able to see their real potential, and in an ideal world they will be adopted in 5 years. Overall, his outlook on STOs can be classified as negative.

6.5 Case Company 5

Interview Type	VC perspective
Location	Hungary
Knowledge about STOs	No knowledge

Table 6: Case Company 5 Intro

6.5.1 Background and Venture Capital

Interviewee E is currently working for a startup, however, has previously worked for the Eastern European region's biggest venture capital fund for over 2 years as an investment manager. The

interview mostly investigated his views on STOs from the VC side and was asked about the VC landscape in general.

6.5.1.1 Venture capital landscape

Interviewee E started the conversation by outlining currently pressing issues in VC, in the Eastern European region. Apparently, some VC funds are government-owned and funded, leading to these funds having "too much capital", with not enough startups with good ideas who wish to create something meaningful. This creates an upside-down market where VC funds are competing for the best startups. Furthermore, he explained how the lifecycle of a fund works, and how compensation in VC is provided. Interviewee D also explained that due to "how the business works", it is fine for a VC fund to make 10 investments and see 9 out of them fail, as long as the succeeding one creates enough profit to compensate for the failing ones. Also, he estimated that around 1 in 10 startups who apply for VC get funded in the region, and there are "tons of useless ideas who actually think that they could make a viable business". Interviewee E doesn't seem liquidity as an issue for VC investors.

When asked about alternatives to VC funding, he gave the example of equity crowdfunding, which he thinks is a "great idea", and likes the liquidity aspect of it, as some equity can be traded on certain platforms. A second alternative he mentioned is ICOs, however he stated that he doesn't know of any success stories, which he credits to his lack of information and knowledge in the field. Finally, he mentioned the phenomenon of VC lock-in, meaning that once a startup takes VC investment, they are required to grow, otherwise receiving another round of funding will become very difficult.

6.5.2 Perception of STOs

Interviewee E had little to no previous knowledge or understanding of STOs. His initial reaction was that STOs should be a tool for the masses, referring to retail investors, because for successful and respected institutional investors this model doesn't solve an issue, since these institutional investors usually don't have complications contacting the desired startups directly. Also, he acknowledged that equity crowdfunding platforms take commission, and STOs could differentiate by being cheaper, or providing more security. When discussing average ticket sizes in equity crowdfunding and STOs, his perception was that STO ticket sizes are bigger because investors have only a few companies to choose from to invest, due to the model's newness, thus deal sizes are bigger. He also believes that if the process could be automated, it would create great advantages over other models. When comparing to VC, he believes

that the biggest differentiator is the non-financial benefits. VC seems to benefit from knowledge, industry experience and management advice, which crowdfunding models can't compete with. For example, gaining insights from industry experts (e.g.: cybersecurity) or taking an early-stage company to grow to hundreds of employees might be best done with a management team who has done this before, which will be initiated in many cases through the network of the VC. He further distinguishes that in many cases, a startup receiving only money won't lead to the best outcome.

Interviewee E has also raised many concerns. He believes that from an institutional investor side, the benefits coming from blockchain won't be utilized, as investors want to meet the team, and gather as much information as possible, carry out a due diligence process and so on, before they commit to investing. This will likely be unchanged even if startup equity is tokenized. As previously mentioned, he also doesn't feel like liquidity is an issue currently in VC, because selling the stake in a company currently isn't an issue, the issue is more in finding a buyer for stocks that a VC wants to get rid of. The time and capital required to carry out an STO campaign were also criticized, leading to the point that, considering these requirements, only very few startups can afford this fundraising model. Finally, he believes that prestigious VC firms wouldn't want to wait for an STO process, and would ideally just contact the target startup directly and invest as soon as they can.

In terms of social influence, he doesn't know of anyone attempting or planning to do an STO. In terms of forecasting later adoption of the funding model, Interviewee E expects that STOs will need around 2 years to become more mainstream, however, he believes that "they won't take over the world, but they will have their own chunk of the market". He strongly believes that some industries will favor STOs, and some won't. An example he gave was in B2C businesses where marketing and sales expertise are enough, it might become popular, but in industries where expert knowledge in other subjects is beneficial for building the company VC will remain the primary source of funding. His overall excitement and outlook can be summarized as positive and believes that the idea is good, but it is mostly a tool for the public.

6.6 Case Company 6

Interview Type	VC perspective
Location	Germany
Knowledge about STOs	Limited

Table 7: Case Company 6 Intro

6.6.1 Background

Interviewee F is currently working on his own startup, however he has VC experience from various funds in Berlin, Germany. Questions directed to him were asking for an investor perspective, yet his entrepreneurial insights were also often observed.

6.6.2 STOs, VC and Crowdfunding

The interviewee stated that he has no knowledge about STOs, however it later turned out that he did have some information about this model, just didn't know it was called STOs. His perception regarding the topic relates back to the overall negative and skeptical approach to crowdfunding in general. He believes that most of these companies are on such platforms because they couldn't raise funding from institutional investors, usually VCs. Furthermore, he has heard about "betrayals" from fundraising companies, not executing in a way they should. He raises the concern that putting this system onto the blockchain isn't going to change much. Furthermore, he argues that liquidity and other benefits of blockchain aren't going to change the fact that these companies are "bad companies", and from a VC perspective, they shouldn't be funded. He believes that there might be some "hardcore B2C" businesses where it might make sense, but in general it doesn't. Also, the respondent says that startups don't want this liquidity inherent to STOs to exist, as they don't want people to share their shares. He also explained that a connection between a VC fund and a startup is similar to a "marriage", and that investors wouldn't likely sell their shares in startups, because it would ruin the relationship, and could affect their future reputation. So liquidating shares in an invested startup would destroy the trust in the relationship, and in today's market where there is so much funding in VC it would likely not be worth it. Furthermore, he raises the concern that if a company does crowdfunding, it might prohibit them from raising VC funding in the future. And VC funding is perceived to be easier to attain, if the fundraising company is "really good". He brings the example that raising half a million Euros from VCs than from 2,000 private investors. He further distinguishes VCs from other funding models through the non-financial benefits they can offer, for example the network and the reputation. His perception is that STOs should be aimed at VCs, instead of retail investors.

Interviewee F brought up the example of Neufund, a German STO platform, based in Berlin. He recalled several interviews he heard in podcasts relating to this platform and addressed inherent issues. A big concern relates to information asymmetry, since "private investors are not equipped with all the information necessary to make an investment decision". He argues that by the nature of these platforms, companies don't provide enough information. The respondent further argued that he wouldn't be comfortable sharing all information relating to his companies with thousands of people either, that's why he would rather approach a handful of VCs, and the ones who seem to show genuine interest might receive the available and necessary information, but nobody else. Consequently, he believes that STO platforms should aim for institutional investors, instead of aiming for a huge marketplace. He brings the potential use case of STO platforms as "data rooms", similar to platforms such as AngelList, where selected information could be shared with institutional investors, saying that this model could prove to be beneficial. Finally, when asked about future adoption, he said that there are many people who would buy shares in bad startups, and Kickstarter could serve as proof for this, and also a large audience who believes in blockchain technology. But he believes that for this funding model to become meaningful and useful, it needs to somehow attract the "proper startups with purpose", in order to attract the real investors as well. Overall, his outlook can be classified as negative.

6.7 Case Company 7

Interview Type	VC perspective
Location	Germany
Knowledge about STOs	No knowledge

Table 8: Case Company 7 Intro

6.7.1 Background

Interviewee G is a managing partner of a Berlin-based VC fund, focusing on digital healthcare ventures. The fund is considered to be interested in early-stage investments, typically ranging from €500,000 - €3,000,000.

6.7.2 STOs, VC and Crowdfunding

The interviewee had no knowledge of STOs at the request of the interview, however he has made some basic research between the interview request and the actual interview, just to gain some fundamental knowledge of the topic. After slightly touching upon the website of Neufund, which he wasn't familiar with but found promising based on the information he could see in this short amount of time, he was asked about initial thoughts relating to STOs. He mentioned potential benefits of this model, including the flexibility that it may bring to legal and contractual terms in investing, the liquidity of markets, and the potential to fractionalize bigger assets, for example a house in a real estate deal. Interviewee G also brought up some benefits of illiquidity, in the sense that many early-stage startups are valued based on future expectations, and not on current asset value. An example he brought up is, if a market value is present for a company from early on, then it might lead to distractions. For example, if the market value drops, even though there wasn't a significant change in the company, it can put unnecessary pressure onto management. Due to such scenarios, liquidity of shares should be thought out and managed accordingly. Further scenarios were raised where startups might not want high liquidity of their assets, and in general the statement was declared that startups would likely wish to keep a stable shareholder base for their company.

He expects that this model would be interesting in the FinTech sector, and might attract startups there who will be the early adopters, due to their existing knowledge and affinity towards the technological background.

A concern raised is how professional investors would have to go through a change of mind, including how they see security tokens different from the previously failed model of utility tokens, how their money won't be lost, and how smart contracts can prove to have successful use cases for legal aspects of fundraising. This would require a learning curve, and trialability to see that it produces benefits, and how dealing with smart contracts work in practice. Ultimately, it leads to building trust toward the model and the technology behind it. Regarding alternatives to mid-stage VC funding, the interviewee brought the example of "venture debt", which is relatively small in terms of volume compared to traditional funding models. Also, later-stage VC and private equity funds were mentioned, however they have specific use cases. Therefore, interviewee G stated that "So in between, there's actually not so much that you can do about a company that is working well, but being too small for an IPO, and at the same time, not having exceptional growth rates".

The topic of future adoption started by comparison to VC, stating that it will likely merge together later on if STOs prove to be useful. Also, Interviewee G emphasized that VC seems to be a standard and proven model, and a lot of studies seem to validate the fact that entrepreneurs are often looking for smart money, and this isn't likely to change. In terms of equity crowdfunding, Germany seems to have a market where not real equity is offered, making it unattractive for VCs to invest on such platforms. Furthermore, the respondent talked about his perception of how many of the startups on these platforms seem to have issues raising funding from traditional sources, like VCs. He believes that this is a chance for STOs to correct the flaws of current equity crowdfunding platforms. Also, he concluded that "I think it could be something for some use cases where it really makes sense or also for some industries that are already quite close to cryptocurrencies or the crypto world in general", yet stated, "experience tells me to be a little bit hesitant on hoping for, or expecting a quick and massive adoption". Another analogy made in order to emphasize his point that adoption will likely take a long time was that in Europe "many of the investors that could be very big investors in venture capital, like big insurance companies, for example, they still struggle to get behind the concept of venture capital". Overall, his outlook on STOs can be considered neutral.

6.8 Summary of findings

1	Knowledge about the topic (Experience)	3 interviewees had no prior knowledge, 2 had limited knowledge, 1 was informed and 1 had expert knowledge regarding the topic of STOs.
2	Performance and Effort expectancy - Positive	Overall 21 instances of positive perception of STOs were identified during analysis, which could be considered to be related to performance or effort expectancy. These 21 instances were sorted into 12 themes. "Less Effort" (4X), "More Security" (3x), "Less costs" (2X), "Liquidity" (2x), "Ability to fractionalize assets" (2X) and "Opportunity for retail investors" (2X) were the recurring themes.

3	Performance and Effort expectancy - Concerns	Overall 50 instances of negative perception of STOs, referred to as concerns, were identified during analysis. These 50 instances were sorted into 20 themes. "Lack of trust"(5X), "Required time"(5X), "Narrow target audience"(5X), "Liquidity"(4X) "Black box/lack of knowledge"(4X), "High costs"(4X), "Not ready/newness"(4X), "No need"(3X), "High complexity"(3X), "Bad alternative for startups who couldn't raise VC funding"(3X) and "Scams"(2X) were recurring concerns.
4	Social influence	3 interviewees mentioned that they don't know anyone in their networks who are planning or have already done an STO. 1 interviewee has heard about someone who is planning an STO, and 1 respondent has several people in his network who have attempted STOs. The remaining 2 interviewees didn't mention terms that relate to social influence.
5	Facilitating conditions	4 interviewees mentioned that STOs are not ready, or are too new, for wider adoption.
6	Behavioral intention	1 interviewee showed intention to use this funding model in the next few months.
8	Expected rate of adoption (years)	4 interviewees gave specific estimates on the widespread adoption of STOs, these estimates were given on request. The estimated years were 5,5,2,2, averaging to a forecast of 3.5 years.
9	Overall outlook	3 interviewees had a positive outlook, 2 can be considered neutral, and 2 had a negative outlook on STOs.

10	Relative advantage	Please view findings #2 & #3 - Overall mixed feelings
11	Compatibility	5 out of 7 interviewees raised concerns about the lack of trust STOs currently have, 3 out of 7 interviewees have directly or indirectly, suggested that there might not be a real need for STOs, and 4 out of 7 interviewees believe that STOs are too new, or this model is not ready for wider adoption yet. Furthermore, Concerns outnumber positive expectancy.
12	Complexity	3 interviewees made remarks about the highly complex nature of STOs.
13	Trialability	5 interviewees have concerns regarding the required time to conduct an STO, 4 made concerns about high costs.
14	Observability	During the interviews there was 1 comment that can directly be linked to observability, indicating high observability
15	Other	STOs considered alternatives to Equity crowdfunding and VC. Several comparisons were made to ICOs. Apart from 1 interviewee, no comparison was made to ICOs.

Table 9: Summary of findings

Chapter 7 - Discussion

7.1 Interpretation of results

7.1.1 Expectations

In the academic and non-academic sources used to construct the literature review, STOs seemed to be built around a purpose and, in general, expectations seemed to be positive regarding this model. During data analysis, it became clear that concerns outnumber the positive expectations of this form of fundraising. Another expectation of the study was those startup founders, especially the ones with fundraising experience or those who are currently wishing to raise funds, will have a thorough understanding of the currently available funding models, and have a clear comparison between models, knowing why they chose to pursue the one that they have. On many occasions, this was not the case. For example, Interviewee A's quote "in Hungary we typically don't consider other resources" referring to VC, or Interviewee B's "I didn't know about that possibility. I was basically just aiming for, you know, the VCs because I thought that was the best possibility" gave insights that were not expected. The way how ICOs and STOs work seemed to be an unfamiliar topic for most respondents.

As stated in the summary of findings, apart from 1 expert and 1 interviewee being informed, 3 interviewees had no knowledge regarding the topic and 2 had very limited knowledge. Thus, in 5 out of 7 cases, the respondent's understanding of the topic originated from a summary presented by the interviewer. Therefore, information bias occurs, and the responses were often predictable. For example, when the cost of fundraising was mentioned to the interviewee during the summary, it was expected that the respondent will raise concerns about the price of conducting this funding model. As a result of the above, it might be important to value the expert's (Interviewee C) and informed participant's (interviewee D) perception of STOs with more emphasis. Another potential pitfall of an "STO Black Box" was that the opportunities and concerns raised might not be true, due to their limited understanding of the underlying blockchain technology, the most recent regulations or the global infrastructure. Regardless, each interview yielded several new perspectives and thoughts that could be reexamined. Nevertheless, it seems important to revisit the recurring themes in the results, and evaluate if these opportunities or concerns identified can be considered reasonable, based on the literature review.
7.1.2 Comparison to academia

The positively perceived performance and effort expectancy traits, referred to as "opportunities", in the results section seem to be in-line with literature. Some points, for example, "Less Effort"(recurred in 4 interviews), can be interpreted in two different ways. The first option is viewing the current STO process, and expecting that the required effort will be reduced in the future. This is likely to happen, since several services, such as TokenizEU (2019), Neufund (2019) and even bigger corporations like Bank of Lithuania (2019) are entering this sphere, just to name a few. The same applies to the aspect of "Less costs" and "Liquidity" (recurred twice) since most of these platforms aim to lower the inherent costs or help raise liquidity, not just make the required effort lower. When comparing to other funding models, academia also suggests, e.g.: Myalo & Glukhov (2019), that raising funds can be done faster than IPOs, and with such platforms as mentioned above, turnkey solutions might result in less effort and costs needed than when dealing with VCs. Myalo & Glukhov (2019) also touch upon the aspects of "More Security"(recurred 3 times), and "Opportunity for retail investors" (recurred twice). The "Ability to fractionalize assets" (recurred twice) was mentioned by Migos (2019).

Many of the concerns raised by the participants were also in-line with literature. This study considers these concerns as realistic since they align with academia. For example, "Required time" (recurred 5 times), "High costs" (recurred 4 times), "Liquidity" (recurred 4 times), "High complexity" (recurred 3 times) - by the name of "Difficulty to set up", "Scams" (recurred twice) - by the name of "Investor protection", were discussed by Myalo & Glukhov (2019), Ante & Fiedler (2019), Jones (2018), Kamble et al. (2018), Molé (2018), Sandner (2019) and other sources as well indirectly. Several sections of the literature review are dedicated to understanding these issues and seeing their current state. Thus, having these results met the expectations. "Liquidity" could serve as a good example of a term that appeared both as an opportunity, and as a concern. This is the case because while some respondents would view liquidity from an investor's perspective, conceptualizing that investors can buy or sell shares easier and cheaper (e.g.: interviewee A) and see it as an advantage, others viewed a startup's perspective (e.g.: interviewee G), raising the concern that fractionalized ownership due to high liquidity would result in raised reporting responsibilities from a startup, which was seen as negative.

7.1.3 Significant concerns

During the data analysis, it became clear that the remaining concerns, those which weren't clearly discussed in current academia, have a linkage between them. This linkage creates a thread of concerns,

which often relate directly or indirectly to constructs of adoption theory. An expectation made by this study is that eliminating any of these concerns will have an effect on other concerns, most likely lowering their significance as well. It can also be stated that some concerns have more significance than others.



Figure 14: Interconnection of concerns and adoption theory - own creation

The link starts with the "Not ready/Too new" concern, which occurred in 4 interviews. Interviewee C, the only expert out of the respondents, clearly stated that the facilitating conditions of STOs aren't ready yet. This was summarized in the results as follows: "The underdevelopment of the market and facilitating conditions were mentioned as a key driver to the outcome of the campaign, for example no regulated exchanges existed where the tokens could have been listed. Waiting for regulated exchanges seems to be an aspect that all startups need to wait for, if they expect to fundraise successfully through this model." Furthermore, DOI's *complexity* metric can be categorized as a relevant theme, and explains why regulation is an important issue. Inherent to the funding model and the underlying legal regulations and technical solutions being underdeveloped and untested, a "Lack of knowledge" (recurred 4 times) seems to characterize stakeholders of all sorts. A quote from Interviewee D's conversation summary highlights the relationship between these two concerns: "Another key issue being described was the complexity of the nature of STOs, and its current requirements. There tends to be an issue of newness, resulting in a lack of knowledge for high net worth individuals and regulators regarding the topic, requiring the company to "spend hours at a time, especially with STOs, informing them actually what it is".

The rather skeptical assumption was made directly or indirectly by 3 respondents, raising the question if STOs actually solve a real need in fundraising. This study believes that asking such questions is essential, and it's good that it happened, however, it is also important to understand the context of who raised this concern. Interviewee B, who has already raised several rounds of VC funding, Interviewee D, who was approached by several VC firms and is planning to fundraise with them in a handful of months, and Interviewee F, who gave his views as an ex-VC, none of whom seem to be struggling with securing VC funding. As seen in the comparison between funding models, VC could seem like the best funding model for those who can get a hold of it, however this doesn't seem to be a majority of startups. Also 3 respondents raised the concern of STOs being a "Bad alternative for startups who couldn't raise VC funding", meaning that firms who weren't successful at raising VC choose this option in order to become funded. In 2 cases specifically, from Interviewee D and Interviewee F, there seemed to be the perception that such startups shouldn't necessarily be funded at all. Although a very interesting view, this topic is outside the scope of the paper, therefore it will be considered for future research. Nevertheless, it can be used as reference to low/negative performance and effort expectancy.

Another concern raised was the "narrow target audience", who STOs might be ideal for. This concern was raised in 5 interviews. Interestingly, STOs being attractive to a wide range of startups was one of the advantages identified in the literature review, based on Ante & Fiedler (2019), and also this advantage formed part of the hypothesis. Several interviewees believe that only certain type of startups will benefit from this model. For example, Interviewee E predicts that it will be viable for "B2C businesses where marketing and sales expertise are enough", and refers to the fact that VC will stay the primary funding source where know-how regarding more complex topics, such as cybersecurity or AI, is needed to grow further. Based on literature, there seems to be a gap in knowledge, since pre-STOs and private STOs would allow VCs to partake in this newer model of fundraising, and in these cases the startups would receive the know-how as well. Other respondents were more specific, for example Interviewee G, who believes that the Fintech sector will likely be one of the early adopters, due to their technological understanding and affinity. Having a (relatively) narrow audience using STOs will impact social influence, as there will be less influencers who advocate conducting such fundraising.

The above points all contribute to the STO fundraising's "required time" and "high costs", which was perceived as concerns. Academia suggests that this process can take up to a year, and is estimated at around \$100,000 - \$250,000, whereas Interviewee C states that the process took only 8 months, yet the cost was estimated at \$665,000, which included all salaries, office rent, etc., as well as costs related

to the STO itself. Although this is only one example, the process seems to be shorter than academia suggests, and there seems to be an expectation that this process will become even shorter once key turn solutions appear, the cost was much higher than expected. It will be interesting to see how cost will be affected once such platforms and solutions appear. Nevertheless, both costs and length of such campaigns can be considered high, making the trialability aspect of adoption very low. As a direct consequence of only a few startups being able to attempt an STO, a lack of success stories arise, which has an effect on social influence. Success stories were raised by both Interviewee A and Interviewee D, which led to a discussion of the overarching theme of "lack of trust", which was a topic that recurred in 5 different interviews. For example, Interviewee D clearly expressed that his perception is skeptical and he lacks trust until he sees success stories.

7.2 Answers to research sub-questions

Giving an answer to the research question will be provided in the *Conclusion* chapter, however, the discussion will answer the sub-questions raised. The sub-questions are as follows:

- 1. How do STOs fit into the startup funding ecosystem?
- 2. How does the startup funding ecosystem stakeholders' current perception forecast adoption of STOs?

The first sub-question was already answered in the analysis section of the funding matrix. STOs were then conceptualized as a funding option for medium-stage startups who aren't interested in raising, or aren't able to raise, from VC funds. Based on the data found in literature, this would allow for a large amount of very diverse companies to take advantage of this new funding model. After conducting the interviews it can still be stated that STOs are for medium stage companies, however it is conceptualized that its adoption won't be as widespread as previously thought. Either a broader type of startups will start to use it more often, similar to how B2C companies are more likely to conduct and succeed on current crowdfunding platforms, or a very niche group will become main users of STOs, for example blockchain-oriented startups.

Answering the second sub-question isn't necessarily straightforward. Overall, the UTAUT model can be summarized as follows: there are plenty of positive performance and effort expectancy by stakeholders, however the number of concerns outweigh the opportunities perceived. Nevertheless, it can be stated that the emphasis on an opportunity seems to be varied, as the overall perception of STOs is still categorized as positive. Social influence is present in some niches, for example, Interviewee D's network had over 35 attempted STOs, yet there wasn't basically any other social influence for other participants, who work outside the blockchain sphere. Facilitating conditions seem to be a big issue, and poses as one of the biggest barriers of wider adoption, yet both academia and the interview from the expert point in the direction that this issue is only temporary. The overall behavioral intention can be considered very low, none of the respondents, apart from Interviewee D implied that they will either conduct an STO, or will look into the model for more information. Nevertheless, Interviewee D's intention to re-attempt an STO after an unsuccessful campaign gives strong indication that the model is worth pursuing.

The DOI model can be summarized as follows: the question of a relative advantage existing is highly uncertain. In most cases the current perception indicates that respondents don't feel like STOs have a relative advantage over other funding models, however in almost every case the interviewees could conceptualize scenarios where such an advantage will exist in the future. Compatibility is also an issue, due to uncertain regulations, which is a result of an underdeveloped ecosystem and a lack of knowledge from stakeholders. This is directly linked to the currently alarming complexity, due to the underlying technology and legal grey zone surrounding the topic. Observability in itself wouldn't be an issue, as it is easy to track and analyze STO campaigns on various sites, however due to high costs, lengthy required time, and many other concerns, trialability becomes very low. The previously outlined results would forecast a lengthy adoption curve, however most respondents were asked to estimate the time of widespread/mainstream adoption, and the answers average out at 3.5 years. Based on the above, STOs are placed on the following graph as follows:



Figure 15: STOs on the adoption curve – based on graph from Rogers (1995)

When purely viewing the summary of results, one can conclude that the expected adoption will face several barriers, and is forecasted to take a relatively long time. Nevertheless, as previously mentioned, having a closer look at the results in their wider context, a more optimistic conclusion is revealed. If the expectation that concerns are interconnected, and solving one concern can positively affect other concerns than widespread STO adoption is much closer. For example, if the cost of conducting an STO decreased, it would result in higher trialability and observability, leading to higher levels of social influence. A higher level of social influence would encourage those who have no knowledge about the topic to research this funding model, widening the target audience. This would create demand for more platforms who offer better solutions that make the fundraising process require less time. At this point, the loop restarts, eventually leading to more success stories that increase the trust toward STOs.

Chapter 8 - Limitations and future research

8.1 Limitations

Unfortunately, several limitations characterize the study. Inherent to the constantly changing nature of relevant jurisdictions around the world, frequently launching platforms and the new use cases being introduced, it seemed difficult to constantly monitor the newest changes, and make progress with furthering the report.

Another limitation is inherent to the combined lack of time and resources. The study made an effort to include sample interviewees with several different characteristics, attempting to provide an international and rounded perception of STOs, from both entrepreneurs and investors. Nevertheless, the sample size only included stakeholders from 3 countries, all of which are in Europe. In case there was more time and resources available, other countries and continents would have been included, where regulations might be forming differently, resulting in an altered perception of the funding model. Furthermore, conducting interviews with more experts or stakeholders who have a wider understanding of the topic might have provided with an increased amount of insights. Inherent to this, several generalizations were made, which might lead to misleading results.

A key limitation of the study is that the results are heavily based on the interpretation of the researcher responsible for coding and theming the data. This entails that certain phrases might have other meanings than initially thought and that certain quotes were identified as important, while others weren't chosen for later analysis. Also, certain quotes were used in several categories, making the tracking of connections more difficult. Furthermore, what some respondents found to be positive, others might have found as a negative. A similar issue occurred when respondents expressed their opinion on topics where they had no experience, whereas other respondents who had experience in those fields summarized a very different viewpoint.

Lastly, the maximum length of the paper was also limiting in terms of scope and ability to discover related topics. Since the topic is built on several complex pillars, extensive introductions would have made it easier for the reader to comprehend the connections between arguments and themes.

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8.2 Future research

The study is following a topic and a funding phenomenon that can be considered very new. Consequently, endless directions and approaches were possible when initiating the research, analysis and interpretation.

This paper is believed to have contributed to academic research in a number of ways, including a thorough comparison between STOs and other startup funding models, gaining qualitative insights from both startups and investors relating to the topic, and identifying key opportunities and concerns. All of these areas seem to be either underdeveloped or non-existent in current literature, therefore this paper also helped to initiate numerous future directions for potential research.

Several topics were identified by the study as important for future research:

- (1) The options for combining STOs with other funding models, for example, VC. Viewing the
 potential benefits, compatibility, and disadvantages of combining funding models. This might
 lead to a whole new approach regarding the future use of STOs. There is currently no academic
 study on the potential effects of blending STOs with other models.
- (2) The non-financial benefits that STOs can offer, the expected amount of non-financial benefits that VC provides in different stages of funding, and their comparison could serve as an insightful investigation.
- (3) The importance of alternative funding models for mid-stage companies who can't attain further funding from VC firms, and evaluating the need for new models seem to be a topic that requires further attention.
- (4) The interconnectedness of STO concerns, and their ranked importance. Furthermore, the extent to which solving some of these concerns might influence other reactions in the future of STO adoption could help with better predictions.
- (5) An interactive funding matrix, similar to the one that is presented in the study, which could be used by startup practitioners to evaluate which funding model is most appropriate for them, based on their unique capabilities and needs. Giving an adjustable weighting system for the matrix criteria could help forecast potentially fitting models, and add value to startups.

Chapter 9 - Conclusion

The aim of this paper was to explore the funding model called "Security Token Offering", compare it to relevant other traditional and alternative funding models, and view the perception of stakeholders, to draw expectations regarding the model's future widespread adoption.

This was carried out due to a significant gap in the literature regarding the topic, and a vast number of aspects of this funding model are under-researched. The thesis aimed to build a general understanding of STOs to the reader, by introducing other startup funding models as well, more specifically bootstrapping, angel investments, venture capital, IPOs, crowdfunding and ICOs, and finally elaborating on how and why STOs developed as a funding model. After, a funding graph was built, based on the startup funding cycle graph, it was concluded that STOs are to be compared with Equity crowdfunding, Venture Capital, ICOs and IPOs. A funding matrix was put together, and established the hypothesis that, based on secondary data from startup and investor perspectives, STOs prove to be an attractive funding model for a large number of medium-stage startups, especially those who can't attract VC funding. A qualitative investigation was initiated regarding the perception of relevant stakeholders, in order to justify the findings of the funding matrix, and to gather information that could serve as data points to forecast STO adoption. The interviews provided an overall positive perception, yet several interesting findings were made, including the vast amount of concerns, lack of knowledge relating to the topic, and an interconnectedness between some of the most pressing issues.

Overall, the study concluded that viability can be justified and later, wider adoption of the funding model can be expected within 2-5 years. The primary results seemed more skeptical than secondary data, yet an overall positive outlook still can be concluded regarding STOs.

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Chapter 11 – Appendices

11.1 Merged interview guide

Interview outline:

- Estimated length: 30-60 minutes
- Individual interview with startup decision-makers and investors
- Goal:
 - gain insight into startup funding criteria
 - Gain insights regarding the acceptance of STOs, and find data that can suggest barriers of adoption
- Format: semi-structured interviews

Comments:

- Key questions are highlighted with red
- There are highlighted questions, and there are probing questions, in case the highlighted questions don't result in areas/topic insights
- Structure: broad to specific

STO definition if they aren't familiar with this funding model:

"Show two documents first - STO graph and matrix"

- Security token = "blockchain-based tokens that represent a security, as defined by the relevant jurisdiction."
- STO = selling traditional financial instruments (e.g.: debt, revenue sharing rights,
 - equity) in a tokenized form. 75% of STOs offer equity tokens.
- "Equity crowdfunding on blockchain", "Regulated ICO" or "mini- IPO on the blockchain"
- Advantages, disadvantages safer, faster, cheaper, liquid by nature
 - Token benefits: greater transparency, enhanced security, improved traceability, increased efficiency & speed and reduced costs.
 - Safer investments for investors due to regulations, an accessible funding model for medium staged startups
 - Disadvantages
 - Legal, resources cost, time, complexity

- Vesting, smart contracts what they are and why they can be important
- Was initiated to solve the issues associated with ICOs because many of those were illegal, had fundamental issues in the nature of the offerings, there were many scams.
- Process: Create token, comply with relevant jurisdiction, offer tokens to investors (Soft cap, hard cap) if these
- Average raise = Series A size (approx. \$5-7 M)
- Around 50% success rate
- Quite high financial and legal requirements, since it needs to go through the SEC so you need a prospectus
- 100-250K to carry out
- Open to any type of company (who has the money to do)
- Timeframe with planning and execution takes about 1 year.
- Some non-financial benefits
- Investor accessibility is dependent on the country and offering
- High investor protection against scam
- Things in the making: regulated secondary markets
 - Liquidity interesting to see how this will work
- Combine with other models
 - With VC through pre-sale, private sale for example
 - With IEO for liquidity
- Any questions?

Mapping questions: get to know the company, stage, background

- Can you please introduce yourself in a few sentences?
- Can you briefly introduce the startup you're working on?

Prior/Current fundraising: ask from startups

- Has (the company name) previously attempted to raise capital?
 - a. Which funding model did you pursue?

- b. What factors did you consider before choosing a funding model? (e.g.: fast execution, as much money as possible, as little equity diluted)
- c. Why did you choose to pursue that funding model instead of alternatives?
- d. What was your experience during this process?/ can you talk a bit about this process?
 - i. How much capital did you (try to) raise?
 - ii. How much equity did you offer in exchange for the capital?
 - iii. Were there many financial or non-financial requirements that you had to fulfill before you could conduct the fundraising?
 - iv. Were there any costs inherent to raising money? (e.g.: due diligence, hiring a lawyer, marketing)
 - v. Total time required to raise this funding round (e.g.: in months or weeks)?
 - vi. Was it only one person involved in the ?
 - vii. What non-financial benefits did you receive?
 - viii. Was the process rigorous, or was it easy to raise money?
- Are you currently in the fundraising process?
 - a. Which funding model are you pursuing?
 - What factors made you choose this funding model? (e.g.: fast execution, as much money as possible, as little equity diluted, convenience because you know this type of investor, you had previous experience with this funding model)
 - c. Why did you choose to pursue that funding model instead of alternatives?
 - d. Expectations toward this funding round?
 - i. How much capital are you trying to raise?
 - ii. How much equity will you offer in exchange for the capital?
 - iii. Do you need to prepare with financial or non-financial requirements before you could conduct the fundraising?
 - iv. Are you expecting to have costs related to this round of fundraising?(e.g.: due diligence, hiring a lawyer, marketing)
 - v. What is the expected time frame for this funding round (e.g.: in months or weeks)?

- vi. Is it only one person involved in the fundraising?
- vii. What non-financial benefits do you expect?
- viii. Is this fundraising process easy?

VC/ Investor questions:

- Who is it for? Who is it not for?
- Process time (estimated time from planning to money-in-the-bank)
- Process costs (including legal fees, marketing costs, etc.)
- Criteria for selection the approximate percentage of applicants who get VC money
- Non-financial benefits
- Success rate/ expected return
- Average capital offered, average equity taken (outside of hi-ventures)
- Advantages and disadvantages compared to other funding models (is liquidity a big issue)
- Financial and non-financial requirements in the process (e.g.: due diligence)
- Scams?
- Alternatives to mid and late-stage VC?

STOs - User acceptance and behavior - ask from everyone

- 1. Have you heard about STOs before? If no, present information on STOs. If yes, ask Q2
- 2. What are your initial thoughts on this funding model?
 - a. Any immediate concerns that come to mind when thinking about this funding model?
- 3. Performance expectancy
 - a. In what way(s) do you think STOs impact fundraising performance? Faster, better, easier, more flexible etc.
 - i. Make fundraising faster?
 - ii. Raise more money?
 - iii. Increase productivity?

- iv. Easier to do fundraising?
- b. When would you say an STO is worth pursuing?
- c. Can you think of useful use cases?
- d. Do STOs solve a need, either on the startup or investor side?
- e. Who do you think STOs are for, and who are they not for?
- 4. Effort expectancy/Complexity/Ease of use
 - a. Do you think it would be a lot of effort to conduct this kind of fundraising? Why?
 - b. Do you think fundraising through STOs is more or less complex than other fundraising models? Why?
 - c. Do you think this process would have many unexpected challenges, or it would be straightforward?
 - d. Are there any areas of STOs that you believe will be difficult to grasp or understand?
- 5. Investor perspective
 - a. How do you think STOs can impact startup funding?
 - b. Do you think they will complement any funding models?
 - c. Do you think they will cannibalize funding models?
- 6. Social influence
 - a. Do you know anyone who uses/used STOs to raise funding?
- 7. Facilitating conditions
 - a. Do you think the STO landscape is ready for more startups to raise funds this way?
 - b. Do you expect it to become ready in the near future, or are you more skeptical?
 - c. How would you start, if after this interview you decided to pursue an interview?E.g.: hire advisory firm, talk to founder who did it before, talk to lawyer
- 8. Advantages and disadvantages
 - a. What advantages and disadvantages do you think conducting an STO has, compared to more traditional fundraising?
 - b. Which aspects of STOs do you find most interesting/ worth looking into?
 - i. What about the most concerning parts?
 - c. In what aspect would STOs need to be changed for them to become attractive to your firm?

- 9. Rate of adoption areas not covered in other questions
 - a. Trialability
 - b. Observability Do you think you'll follow STO news in the media in the future?
- 10. Other:
 - a. Liquidity
 - b. What is holding most companies from conducting an STO?
 - i. How, when will this be overcome?
 - c. VC and STOs friends or enemies
 - d. Equity crowdfunding and STOs can EC survive?
- 11. Closing remarks
 - a. Did this interview change your views/perception on STOs?
 - i. If yes, how?
 - b. Do you think you'll ever pursue this funding method?
 - i. Why?

11.2 Transcripts

With considerations to the length of the paper, and to reduce printed paper to a minimum, a total of 55 pages of transcripts, from 7 interviews, is made available digitally. The USB drive provided with the additional files has a file named "transcripts.pdf", or the following online, cloud-based link will display the all transcripts:

https://docs.google.com/document/d/1XZkdohMVzjpt3gI8Xun8tjvw5n3llMfh2mBIv9P9CB0/edit?usp=s haring

11.3 Data Sources

Alias	Perspective	Location	Company alias
Interviewee A	Startup	Hungary	Case A
Interviewee B	Startup	Denmark	Case B
Interviewee C	Startup	Denmark	Case C
Interviewee D	Startup	Germany	Case D
Interviewee E	Investor	Hungary	Case E
Interviewee F	Investor	Germany	Case F
Interviewee G	Investor	Germany	Case G

The following table summarizes the data sources of the study.

11.4 Data Analysis file

Insights into the data analysis, and seeing the actual process, is possible by visiting the following link: https://docs.google.com/spreadsheets/d/1E2-EBSPYmJ411brSdvFZK0Q-e_LSj-Rlo--

<u>O aw5sFk/edit?usp=sharing</u> or opening the "Data Analysis RO.xlsx" file (Read-only) that is available on the provided USB drive. The file contains a data display to interconnected concerns, a summary of opportunities and concerns identified by interviewees, and analysis of all seven interviews individually.

11.5 Funding Matrix file

The funding matrix file can be found in the following online, cloud-based location: <u>https://docs.google.com/spreadsheets/d/1QMdaPr_ZZU-OJdQU6O9dha1Vv1uF-</u> <u>YDW4HIWcCJzwQU/edit?usp=sharing</u> or on the USB drive by the name "Funding Matrix RO.xlsx" (Read-only file). Navigating the file at the tab bar will also provide the viewer with the STO graph, and the process from initial brainstorming to matrix brainstorming and drafts, and finally the finished matrix.

11.6 TAM Model

This is the original illustration by Davis (1985) regarding the Technology Acceptance Model

