

**Evaluating a fee-based product for ABN AMRO Bank based on tokenized securities: a perspective taken from the issuing and investing parties in The Netherlands**

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## Abstract

The business models of (Dutch) banks are under pressure due to regulatory changes because of Basel III adjustments and increased competition in the banking sector. The market shares of banks are decreasing since the rise of fintech companies providing similar services as traditional banks. In this study, we perform an exploratory research on the possibilities for the Dutch bank ABN AMRO in the digital assets landscape, more specifically on the possibility of creating a fee-based product for tokenized securities.

We investigate what the possibilities are for ABN AMRO while also providing value for companies who want to issue securities for financing purposes. We also involved investors in this study to investigate what the benefits can be for them if they would invest in tokenized securities.

To gain more insights we created the following research question: *“How can tokenized securities on DLT protocols be used to generate a fee-based product for a bank while also creating value for the issuing and investing parties in The Netherlands?”*

We answer this research question on the basis of five sub-questions that are answered and discussed in separate chapters. We investigate and answer these five sub-questions according to different research methods.

To gain a better understanding of how tokenized securities work, we have conducted a structured literature review. The information that we gathered from the structured literature review is then used to describe the functionality of tokenized securities on distributed ledger technology. This structured literature review is also used to list their advantages and disadvantages when using them, we complement the advantages and disadvantages with a cost-benefit analysis to prove price reduction.

Interviews are held with investors and issuers to gauge their opinion about the possible usage of tokenized securities. These interviews are analyzed according to the Gioia method to gather better insights.

Next, currently issued tokenized security case studies are used to investigate how those tokens leverage smart contract technology to add value to both investors and issuers. This complements the investigated literature. Besides, we can find out what already is accomplished and what potentially is possible in the field of tokenization of securities.

In the last sub-question we focus on the break-even approach of ABN AMRO for a fee-based product for tokenized securities. A dataset is provided by AAB, consisting of predictions about the potential issuance volume, expenses and income. These data are analyzed to calculate different break-even points.

The findings of our study lead to the conclusion that tokenized securities on DLT are a viable option for companies to finance their businesses. Also, investors seem to benefit from this product due to many advantages eventually outweighing the disadvantages. This is also proven by the case studies we analyzed on their smart contract functionality. The interviewees however are more conservative and want more knowledge about the subject and proof that trusted institutions will adopt tokenized securities.

ABN AMRO Bank can break even on this new fee-based product in the foreseeable future according to our calculations, but only if the predicted growth rates are realized.

All in all, it seems that a fee-based product for tokenized securities is a viable addition to the portfolio of ABN AMRO bank in order to counter the experienced threats on their business model.

## Preface & Acknowledgements

This study is a master thesis assignment that is part of the curriculum of the master Digital Business & Analytics of the University of Twente within the domain of Business Administration. For this thesis assignment, it is usual to conduct research internally for the University of Twente or to collaborate with a company to investigate a matter of their concern. I got the opportunity to cooperate with ABN AMRO Bank to investigate the landscape for tokenized securities.

Before this research, I spoke with several ABN AMRO Bank employees to talk about a possible graduation subject. Eventually, Martijn Nuijt assigned me to my company supervisor Martijn Siebrand.

I want to express my gratitude towards Martijn Nuijt for giving me this opportunity and for his guidance from time to time. Besides him, I want to thank my primary company supervisor Martijn Siebrand for his time and guidance over the past six months, without his case study on tokenized securities and knowledge this master thesis would not be the way it has become.

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At last, I want to thank a few people from my inner circle who always supported me during my academic years. To begin with, my amazing parents who always provided a listening ear when I was stuck or needed to vent my ideas. Without their unconditional support, love, and guidance I would not be the person I am today. If I graduate, I will give them, as promised, a 'part' of my diploma for their efforts during those years.

Besides my parents, there is one person in particular that deserves special thanks, my dear girlfriend Karlijn. After listening to my monologues for dozens of hours about blockchain, cryptocurrencies, investing and tokenized securities, she managed to stay with me and supported me through thick and thin. She always listened to my troubles and gave me the advice, encouragement, and love I needed to continue. Thank you.

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## List of Abbreviations

AAB	ABN AMRO Bank
AFM	Authority Financial Markets
AML	Anti-Money Laundering
ART	Asset-Referenced Token
B.C.	Before Christ
BCBS	Basel Committee on Banking Supervision
CAHR	Centraal Aandeelhouder Register (Central Shareholder Register)
CAPEX	Capital Expenditures
CBS	Central Bureau of Statistics
CCP	Central Counterparty Clearing House
CSD	Central Security Depository
DApps	Distributed Applications
DDoS	Distributed Denial of Service
DLT	Distributed Ledger Technology
DNB	De Nederlandsche Bank
DPoS	Delegated Proof of Stake
EMT	E-Money Token
E.O.M.	End-Of-Month
ETFs	Exchange Traded Funds
EVM	Ethereum Virtual Machine
ESMA	European Securities and Markets Authority
Fintech	Financial Technology
FTE	Full-Time Equivalents
HRM	Human Resource Management
ICO	Initial Coin Offering
IoT	Internet of Things
IPO	Initial Price Offering
IT	Information Technology
K	Kilo (in thousands)
KNB	Koninklijke Notariële Beroepsorganisatie

KYC	Know Your Client
KvK	Kamer van Koophandel (Chamber of Commerce)
LP	Limited Partners
M	Mega (in millions)
MiFID II	Markets in Financial Instruments Directive II
MiCA	Markets in Crypto-Assets Regulation
N/A	Not Applicable
n.d.	No Date
NFT's	Non-Fungible Tokens
NPEX	Nederlandsche Participation Exchange
p.a.	Per Annum
PoS	Proof of Stake
PoW	Proof of Work
RVO	Rijksdienst voor Ondernemend Nederland
S&I	Strategy & Innovation
SMEs	Small Medium Enterprises
STM	Security Token Market
TBA	To Be Announced
U.S.	United States
YOY	Year On Year

## Chapter 1: Introduction

For this master thesis, we collaborated with ABN AMRO Bank (further abbreviated as AAB), more specifically within the department of Strategy & Innovation (further abbreviated as S&I). One of the topics that S&I investigates is what role digital assets can fulfil within the business model of AAB and how this can benefit them. According to the annual report of 2021, AAB wants to be a future-proof bank and they believe that new technologies are a necessity for this. To counter the increasing pressure on their current business model, digital assets are mentioned as a new opportunity for their innovation portfolio (ABN AMRO BANK N.V., 2022). Digital assets are a broad category and in this study, we investigate digital assets in the form of tokenized securities. In short, these are traditional securities such as bonds or stocks that can be issued on Distributed Ledger Technology (DLT). Each tokenized security is represented in the form of a token on a ledger that holds the same rights and values as traditional securities (Benedetti & Rodríguez-Garnica, 2021). This new technology allows the issuance and trading of securities differently with many promising benefits according to the literature.

However, why would a bank such as AAB want to investigate possibilities for these new technologies and techniques? The largest part of ABN AMRO's income is based on the interest income of their loans outstanding. Not only AAB but many (European) banks profit from large loans on their balance sheets (Vouldis & Farne, 2017). However, this business model may no longer be reliable because, since the downfall of the Herstatt Bank in 1974 a committee was established that reformed banking supervision rules. The results of these rules were that banks were more regulated in their operations (Mourlon-Druol, 2015). This committee is called the Basel Committee on Banking Supervision (BCBS) and rolled out Basel I in 1988, a framework for banking standards that was primarily focused on credit risk and the appropriate risk-weighting of assets on a bank's balance sheet (Mourlon-Druol, 2015). In 2004 Basel II was released that tightened the operational playing field of the banks even further and eventually Basel III was released after the financial crisis in 2007-08. The common thread in these accords is to reduce the financial risk of banking operations and it is mainly focused on capital requirements, leverage ratios and liquidity requirements to prevent banks from taking too much risk.

Currently, the BCBS is reforming Basel III and wants to launch the first set of changes in January 2023. In January 2025 the whole package should be implemented and this again has a big influence on banks' operational models. The internal risk models currently being used are then no longer allowed, and a standard risk model should be applied (Tchana, 2022). This could have a negative influence on the number of loans a bank could have on their balance sheet, therefore requiring a change in their banking operations.

A solution to this problem could be to create an opportunity for the capital market to grow and as a bank play a mediating role in this process. According to an internal report from Group Economics of ABN AMRO, the capital market in Europe is much smaller than in the United States of America. There is enough growth opportunity to let this market also flourish in Europe (ABN AMRO, 2021-a). A bank could help business clients by promoting alternative ways of financing in terms of debt or equity-based securities, not taking the form of bank

loans. Securities is a term that we use a lot in this thesis and the definition we use is as follows: Securities are financial instruments that hold a certain monetary value. Broadly categorized, securities can be divided into two types; equity securities and debt securities (some people categorize a third form called hybrid securities but this one is left out in this study). An equity security represents ownership that a shareholder can have of an entity that usually takes the form of shares such as common stock or preferred stock. A debt security on the other hand represents borrowed money that must be paid back to the lender. These kinds of securities often take the form of a bond (such as government or corporate bonds). In the continuation of this study, the term securities are used to describe both types of instruments. It could be the case that some parts are specifically focused on one of the two, this will then be emphasized.

The main idea behind this procedure of promoting alternative ways of financing and accelerating the flourishing of the capital market is to assist companies by issuing securities on DLT. This new technology enables many advantages and opportunities for both issuing and investing parties. Those issued tokenized securities are not part of the bank's balance sheet but part of the issuer's balance sheet because they are not direct bank loans. Therefore there is no requirement for the bank according to the new standard models of Basel III to have a certain amount of capital as a reserve. However, the bank can still earn income by having a fee-based product for tokenized securities wherein they play the mediating role between the issuing and investing parties (M. Nuijt, personal communication, April 2022).

Besides the regulatory pressures that banks experience on their business models in the Netherlands, they also face a shrinking market share. According to a report from Fincog (2020), the amount of Neobanks (digital-only banks) in the Netherlands is 4% and according to the latest figures it is currently standing at 8.6% (Statista, n.d.). The rise of Fintech (financial technology) companies such as Neobanks is causing a decline in the traditional banks' market share. According to a report called; "*Digital Banking seen in 2025*" it is important for the continuity of a bank's business model to develop new digital ecosystems that enable banks to reposition themselves in the banking market and create new business models (Gasser et al., 2017).

One of these new digital ecosystems that AAB is trying to establish to generate value for their stakeholders is tokenized assets. More specifically, tokenized securities which can be issued by corporates/companies and bought by investors.

According to an AAB employee of Strategy & Innovation, this is still a development in its infancy and requires more research to find out what the potentials are for AAB to create a fee-based product around this ecosystem (M. Siebrand, personal communication, June, 2022).

Not only for AAB but also in the academic literature the knowledge and studies on tokenized assets such as tokenized securities are limited. Research has been done on the potential of tokenized assets by Heines, Jung, Dick and Pohle (2021), who concluded that DLT can fundamentally change how value is digitally stored, issued and transferred. Due to the novelty of the topic, there are a limited amount of experts in the field of tokenized securities research. This results in a situation where researchers could potentially have a positive bias towards tokenized assets and the possibilities of these assets (Schletz et al. 2020). The general description of these possibilities is not enough for banks such as AAB to determine the feasibility of this new product. More in-depth research of the advantages and perhaps

disadvantages is necessary to state valid conclusions.

The creation of a fee-based product on tokenized securities could be a solution to the current threats of a Dutch bank such as AAB. Basel III requirements can be circumvented by having fewer assets on the balance sheet and switching to a more service-based business model. In this way, they can still help companies in need of financing by realizing this in the form of debt or equity securities. While also providing new investment opportunities to their clients who are seeking returns on their capital. Besides that, it is also important for a bank to keep continuing innovation and seek out new products and technologies. Tokenized securities on the blockchain are one of these new movements that could change the whole financial industry (Gjelstad-Ditlevsen, Mydske & Skånlund, 2021). Banks such as AAB often have to deal with legacy systems that are accumulated over the years by doing several mergers and acquisitions. New banks such as the neobanks have an advantage by starting from the bottom with newer and more flexible operating systems. Partnering with organizations that can realize the tokenized securities ecosystem is therefore important for a bank such as AAB to compete with the newer generation of banks and fintech start-ups.

### **1.1 Company Description**

ABN AMRO BANK N.V. is a publicly traded company on the Euronext exchange located in Amsterdam (The Netherlands). AAB is the listed holding of the Dutch banking group ABN AMRO created in 2010. This banking group was created because of the financial crisis in 2008. Back then, ABN AMRO merged with Fortis Bank after a large banking group consisting of Fortis, Royal Bank of Scotland and Banco Santander acquired ABN AMRO in 2007 and demerged it later on (ABN AMRO, 2021-b).

The Dutch government bought all shares of the Dutch parts of AAB in 2008 because many banks needed governmental support in the form of a financial injection to survive the financial crisis. The Dutch government bought the shares intending to eventually sell them back to the public when the time was ready and this happened in the end of 2015 when the markets stabilized (ABN AMRO, 2015).

After this initial price offering (IPO) AAB continued delivering their services to their clients and currently have a market share of around 20% in the Netherlands (ABN AMRO, 2022-b). Therefore it belongs to “*the big three*” banks in the Netherlands which together make up 84% of the Dutch banking market. According to their annual report of 2021, they serve 18% of the SMEs in the Netherlands and have around 5 million retail clients (ABN AMRO, 2022-b).

AAB focusses mainly on a few countries within Northwest Europe; they do have some other offices outside of Europe but their core business lays within this area. In The Netherlands and Germany AAB serves besides corporate & institutional, commercial and private clients also retail clients. In the remaining countries, the focus is only on commercial and corporate & institutional banking.

The service they provide is from a range of products such as; payments, loans, mortgages, financial advice and asset management. The majority of their operational income is from; interest income (69%), fees and commissions (22%) and some other sources which are not specified (9%) (ABN AMRO, 2022-b)

To support their business operations they have several group functions such as Finance, Risk Management, Innovation & Technology, HRM, Group Audit, Legal & Corporate Office,

Brand Marketing & Communications and Strategy & Innovation.

In 2021, AAB reported a profit of €1234 million, a big difference in comparison to the loss of €45 million reported in 2020. This increase can be attributed to the fact that the Covid pandemic had less of an impact on society and the economy was recovering because of the removal of certain corona measures. The biggest difference in the annual figures between 2020 and 2021 is the expenses of impairment charges on financial instruments. Which increased a lot in 2020 because of the pandemic and resulted in writing off many assets (ABN AMRO, 2022-b). AAB’s financial position, therefore, recovered significantly in 2021 and this will contribute positively to their purpose

This purpose is realized by their strategy; *‘A personal bank in the digital-age’*. Their strategy is supported by three pillars and in this study, we try to explore the possibilities for future-proof banking. One of the topics for future-proof banking is digital assets to develop new business opportunities for AAB. Examples of these are tokenized securities or digital currencies. But, there are many more possibilities since one can tokenize a wide variety of existing asset classes.

The Strategy & Innovation department is investigating the potential of digital assets. They are currently looking into the issuance of tokenized securities to assist companies in need of financing and provide investors with decent returns. Our exploratory study complements their search for suitable innovative ideas.

**1.2 Research Objective**

Our research objective is to explore how tokenized securities can be used to generate a new income stream for AAB and create value for both the issuing parties and the investing parties.

As mentioned above in the company description, the operating field of AAB is in North-western Europe. In The Netherlands the majority of their clients are served, for around twenty percent of the Dutch population is AAB the first-choice retail bank (ABN AMRO, 2022-b). Besides that, The Netherlands counts according to Central Bureau Statistics (CBS) 2,086 million companies in 2022. A better overview of the distribution of companies and sizes can be seen in the table below.

<b>Amount of employees</b>	1	2-10	10-50	50-250	250-500	500-1000	1000+
<b>Amount of companies</b>	1,660,015	356,255	55,060	11,925	1,755	895	450

Table 1. Distribution of company size in The Netherlands 2nd quartile 2022 (CBS, 2022)

Even though the vast majority of the companies are either self-employed or partnerships, there are still plenty of companies in The Netherlands that possibly could benefit from financing via tokenized securities. This conclusion is confirmed by Van der Wiel et al. (2019) stating that Dutch SMEs are obtaining fewer bank loans compared to their European peers. This funding gap has several reasons but an extensive line of reasoning is required to illustrate the whole picture. Therefore, specific reasons for this funding gap are not part of this study and will not be included. We assume that according to the conclusions of the report from Van der Wiel et al. (2019) a funding gap is present in the Netherlands. This argument is used to prove that there is a large potential market for financing companies via tokenized securities in the Netherlands.

For this particular reason, the scope of our study will be the Dutch market since AAB's market share is the largest in The Netherlands compared to other countries they operate in. We conduct extensive research into the features of tokenized securities, to investigate how these can be used to create value for AAB, companies and investors for using this new way of financing.

### 1.3 Research Question

The research question that we formulated is based on two aspects: To bridge the stated knowledge gap in the motivation of the research about the lack of knowledge on the possibilities of tokenized securities on DLT. Besides that, we try to achieve the research objective: investigate how tokenized securities can be used to create value for AAB, companies and investors. Therefore the main research question is:

*“How can tokenized securities on DLT protocols be used to generate a fee-based product for a bank while also creating value for the issuing and investing parties in The Netherlands?”*

The main research question is divided into several sub-questions that will aid the answering of the main research question.

#### I. How do tokenized securities on DLT protocols work?

This sub-question provides information on how distribution ledger technology works. We explain the concept of tokenization and the usage of smart contracts to manifest the usability of these products. To answer this question we have conducted a structured literature review on tokenized securities and DLT. Based on the selected articles from the structured literature review, we created a theoretical framework which serves as the embodiment of knowledge on this thesis's topic.

#### II. What are the advantages and disadvantages of using tokenized securities compared to using traditional securities?

This sub-question compares the advantages and disadvantages of using tokenized securities on DLT compared to the traditional way of issuing securities as described by us in Chapter 2. This sub-question is answered from two perspectives; issuers and investors. To answer this question we explain first the process of tokenized securities and then we explain the traditional process of securities. In that way, we have a good understanding of how both approaches work. Eventually, we use the articles from the structured literature review to state advantages and disadvantages when comparing both approaches.

#### III. What are the opinions of the issuing and investing parties on the usage of tokenized securities?

We answer this sub-question by interviewing both issuing and investing parties on their opinions about tokenized securities. Issuing parties could be companies in need of financing who seek alternative ways of attracting capital. Investing parties could be retail investors who seek returns and look out for new possibilities. We conducted semi-structured interviews with investors and issuers (companies). These interviews are then analyzed by us according to the Gioia method so that we can conclude on possible consensual opinions. We expect that hence the novelty of the subject and the exploratory nature of this study the

participants are not experts on tokenized securities. Therefore a complementary analysis of case examples is deemed necessary by us, more specifically on the usage of smart contracts that allow the functionality of tokenized securities. We expect that smart contract functionality is important for issuing and investing parties, this is explained and investigated by us in the next sub-question.

IV. What is the added value of smart contract possibilities when utilizing tokenized securities for issuing and investing parties?

In this sub-question, we highlight the features of using smart contracts on DLT protocols. A perspective from both issuing and investing sides gives us a total overview of the potential benefits of this new technology. We examine this by going once again through the existing literature to explore what other studies already wrote on smart contract possibilities. Besides that, currently issued tokenized securities are analyzed by us on how they leverage smart contract technology to add value for investors and the issuers themselves. We will present an overview of what the possibilities are for both perspectives which could be complemented with existing projects.

V. What is the approach of AAB to break even on a fee-based product on tokenized securities?

This sub-question is answered based on the DARE methodology of ABN AMRO and a business case created by the digital assets team. The DARE method consists of five different stages that are called: *Explore*, *Prove Problem*, *Prove Solution*, *Prove they Pay* and *Prove it Scales* (ABN AMRO, 2022). Every new product of ABN AMRO is developed via this method and needs to pass every stage before it gets fully implemented. The S&I department is currently in the Prove they Pay stage and are trying to get approval from the executive board for the Prove it Scales stage. They created a financial template, that is used to breakdown the potential income, expenses and total issued volumes. We use this template to conduct a break-even analysis of a fee-based product for tokenized securities. This question is answered in cooperation with employees of the S&I department of AAB.

## 1.4 Contributions

By answering the research question and sub-research questions, we aim to:

- Contribute to the existing literature on tokenized securities that is scarce at this moment of writing. Since it is a recent development, studies are lacking and more research is needed to increase the knowledge and possibilities around tokenized securities. As mentioned above, not only does this project contribute to the theory of tokenized securities but also aims to the practical application of tokenized securities.
- Generating new ways of financing for companies that need it to fulfil their growth goals or business operations. These new ways of financing could benefit companies by possible reduction of costs and an increase in efficiency.
- Investors will have more possibilities to invest their funds, to diversify their portfolios and have better returns.
- Provide recommendations and insights for AAB on what the possibilities are for them to create a fee-based product for tokenized securities.



## 1.5 Organization of this thesis

This study consists of different chapters that build up the knowledge that we require to answer the main research question. In this section we provide an overview of the organization of this study, Figure 1 illustrates how the study is organized.

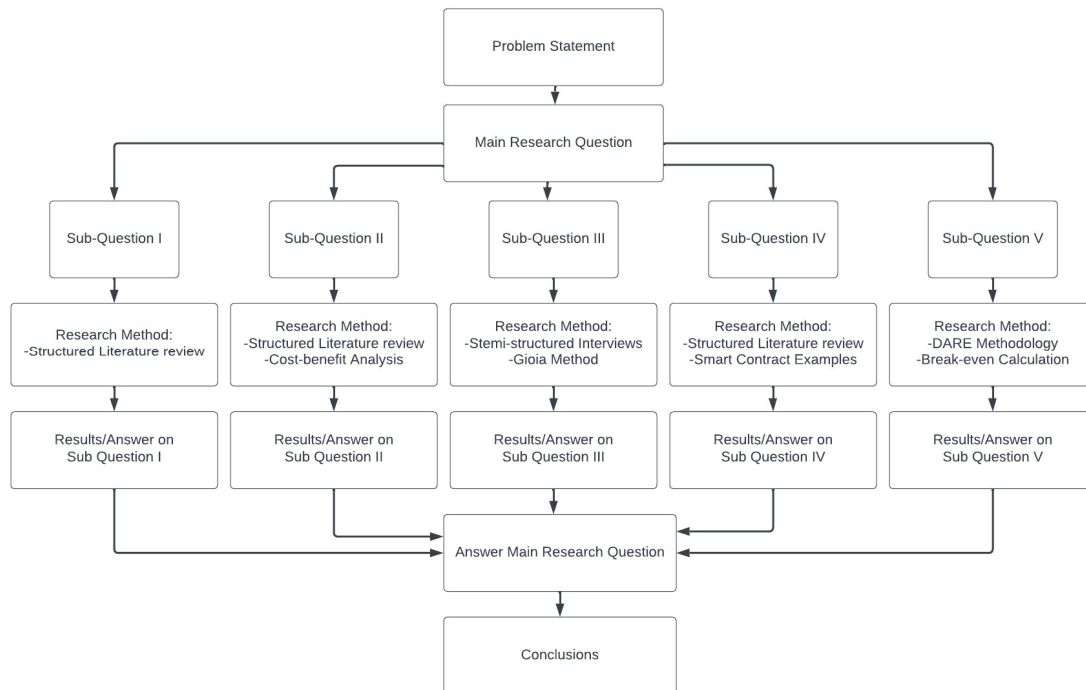


Figure 1. Organisation of the thesis.

We started in the beginning with a problem description, followed by the main research question split up into five sub-questions. These five sub-questions assist in answering the main question because they each provide an answer to a vital part of the main research question. Each sub-question has a specific research method or a combination of research methods that eventually will lead to a result and an answer to that question. By combining these we can answer the main research question, which is then followed by a discussion and conclusion section.

In Chapter 2 we create a theoretical framework to present an overview of existing literature on tokenized securities. This is done according to a specific protocol that can be seen in Figure 2. which is an extensive but critical literature review on the current state of the art on tokenized securities. The structured literature review aids us to provide a clear explanation of how DLT works and how it can be used for creating tokenized securities. According to this information, we answer the first sub-question. Besides that, an overview of the current landscape of issuing traditional securities for companies in the Netherlands is presented to compare tokenized versus traditional.

Chapter 3 consists of an explanation of the used research methods in this master thesis, presented per sub-question. We used several methods to answer the sub-questions and main research question. When we provide the used research methods the study can be replicated by

other researchers and that increases the reliability of the methods chosen.

Chapters 4, 5, 6 and 7 respectively answer Sub-questions 2, 3, 4 and 5. These chapters consist of an analysis according to the described research methods in Chapter 3. In each chapter, we will show the results of these analyses and we will discuss them elaborately in Chapter 8.

In the last chapter of this study (Chapter 8) we give meaning to the results that are acquired in the previous chapters, we discuss the limitations of the study and we recommend future research directions in the field of tokenized securities.

## Chapter 2: Theoretical Framework

In this chapter, we create a theoretical framework to provide more insights on the topic of tokenized securities on DLT and traditional securities. The first part of this chapter explains the notion of tokenization and the technology behind it. Then, we provide a summary of this topic to answer Sub-question 1 of this thesis. Next, we explain the issuance procedure of traditional securities for privately held companies and publicly traded companies. This is done to gather a better understanding of the two different approaches since they are compared later on in Chapter 4.

Tokenized securities are seen as a new technological movement however, the usage of securities such as debt securities in the form of bonds already dates back to 2400 B.C. in a region that we now know as Iraq. These bonds looked like stone tablets with certain engravements that guaranteed payment of an amount of grain by the issuer of the bond (Cummans, 2014). The first equity securities were issued by the Dutch East India Company, the first multinational corporation to ever exist (Petram, 2011). The notion of these traditional financial instruments is not explained because it is assumed that the reader is familiar with the financial products; debt and equity securities. We already described these concepts shortly in Chapter 1. Therefore the focus in this chapter is more on the technological fundamentals of tokenized securities, not on how securities function as a financing mechanism or as an investment product.

### 2.1 Selection of Literature

For creating a theoretical framework to answer the first, second and fourth sub-questions a systematic literature review is done. The query: “tokenized securities” OR “tokenized security” is used in the search option of the Google Scholar and Web of Science database, with the exact phrase and searching everywhere in the article. This resulted in the first selection of 405 articles. These articles were then reviewed by us for not being duplicates, only English-written and for a release date of 2018 - until now. Besides that, the relevance of the title was checked to assess whether or not an article was useful for this theoretical framework. This resulted in a rejection of 351 articles that did not meet the above-described criteria resulting in 54 articles left. These 54 articles have been evaluated by us on their relevance by reviewing the abstracts. This resulted in the exclusion of another 30 articles and the remaining 24 have been read by us and we then determined whether or not to include them in this theoretical framework. This results in the end by using 19 of the 24 chosen articles for this theoretical framework.

The number of articles eventually used is a small collection of literature and some of them are based on whitepapers from existing crypto projects such as Bitcoin and Ethereum. Therefore, the original whitepapers are also used as a source to complement the existing literature.

To explain the principles behind DLT, we used an e-book called: *Internet Computing: Principles of Distributed Systems and Emerging Internet-Based Technologies*, chapter nine: Distributed Ledger Technology (Sunyaev, 2020).

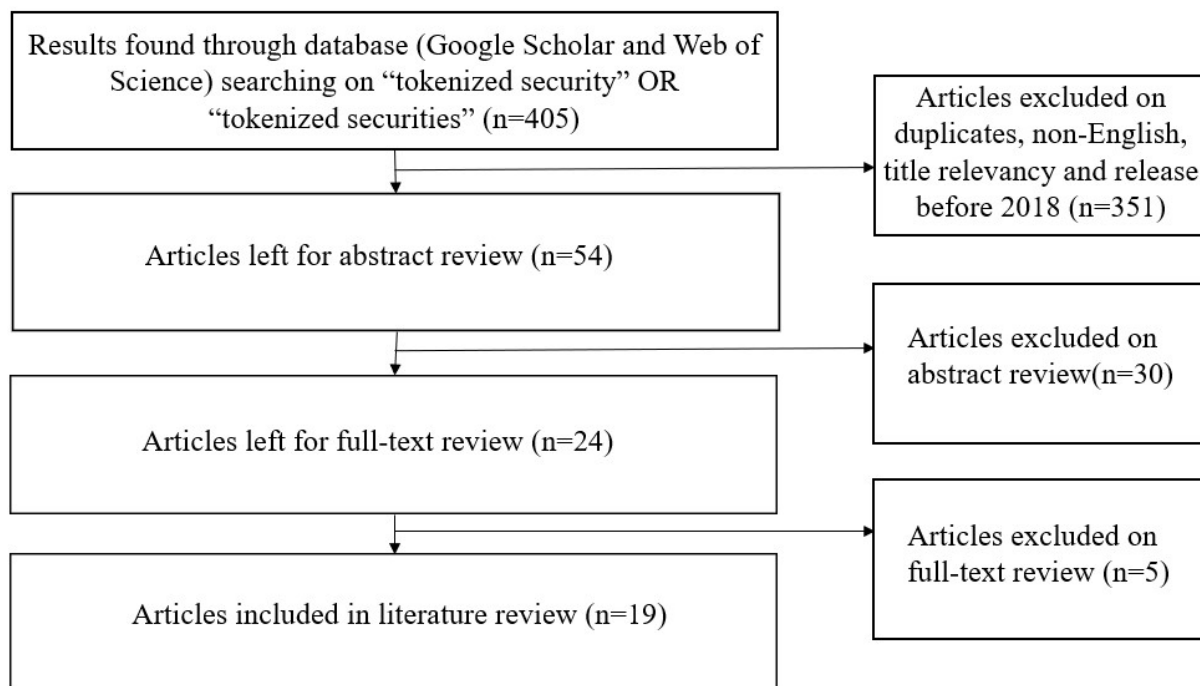


Figure 2. Schematic overview of systematic literature review.

## 2.2 Tokenization of Securities

The term tokenized securities is derived from the concept of digital assets. Nowadays, the term digital assets mean much more than anything that is stored digitally such as videos, logos, websites and many other digital properties (Leiberman & Miryneck, 2019). Digital assets are nowadays seen as digital files of data that are owned and distributed on a distributed ledger. Examples of these are tokenized assets which can be further subdivided into categories such as cryptocurrencies, tokenized securities, tokenized commodities, fungible and non-fungible tokens (NFTs). Each type of asset has its functions and usages but as said before, we focus on tokenized securities. Because, for this financial instrument, AAB wants to explore the possibilities for creating a fee-based product around this new technology.

Tokenized securities are a new type of asset since the rise of DLT. The birth of Bitcoin in 2008 came with a new data-transferring technique which is called Blockchain and Blockchain is built on the principles of DLT. Bitcoin's network needed to exist in a decentralized manner, this means that there is no central authority which distributes or governs Bitcoins. This was a revolutionary feature in the financial industry and the first cryptocurrency was born (Nakamoto, 2008). Bitcoin's primary focus was transferring money and creating a new trusted payment system by distributing trust within a decentralized ecosystem with the so-called distributed ledger (Nakamoto, 2008).

After Bitcoin, many other cryptocurrencies arose and this led to many projects from the first generation that particularly focused on being payment alternatives.

In 2015, Buterin and his team launched a new crypto project named Ethereum and this project focused on more features than just transferring wealth. It was a blockchain protocol for building decentralized applications and a platform on which smart contracts, a concept that will be explained further in a sub-section, could emerge (Buterin, 2014). These features paved the way for blockchain applications and led to the origination of many other crypto projects. This movement was accompanied by new financing possibilities in terms of Initial Coin

Offerings (ICOs) with cryptocurrency token sales (Benedetti & Rodríguez-Garnica, 2021). Project developers sold digital coins also known as tokens to investors to gather funds for their operations. These so-called tokens can be seen as an immutable digital representation of an asset (Smith et al., 2019). These tokens can be bought with different types of currencies and represent a certain value (Santos et al., 2020).

Within the domain of DLT and blockchain, there is a distinction between three types of tokenized assets (Smith et al., 2019). The first one is a medium of wealth exchange and a way of storing value, with the umbrella term cryptocurrency such as Bitcoin. The second type of token is a utility token, which represents the right to access a certain service or product that the issuing party will provide. At last, there are security tokens which represent traditional securities on a blockchain as proof of ownership. Every asset type is represented by a token that is added as a data entry on a distributed ledger. This information is stored on the ledger and can be registered and transferred to other participants of the network.

One important remark to make about the tokenization of securities is that there are two possibilities according to Benedetti and Rodríguez-Garnica (2021) They speak of a Security Token and a Tokenized Security, both of which exist on a distributed ledger. However, there is a distinction between the two; a Security Token is blockchain-native which means that it is a newly created security that didn't exist yet in the 'real world'.

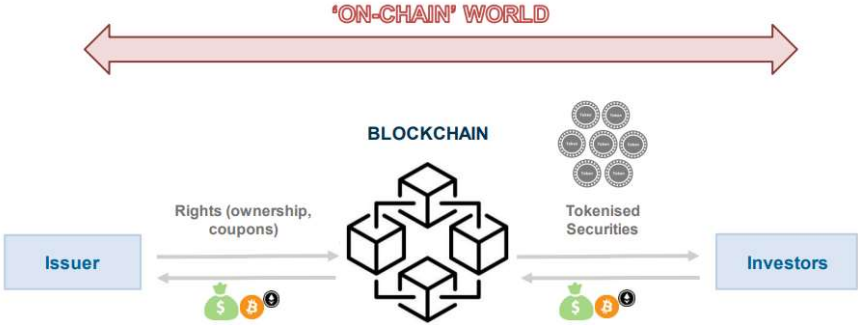


Figure 3. Schematic representation of a native security token (OECD, 2020).

On the other hand, when one talks about Tokenized Security they mean a digital representation of a security that already exists in the 'real world'. This could be an existing security that is held by a Central Securities Depository but is traded on a blockchain. This enables still a lot of advantages but is slightly different from a blockchain-native security. It is more or less a digital twin of the actual security that is already issued and has its value and characteristics (Pietro, 2021).

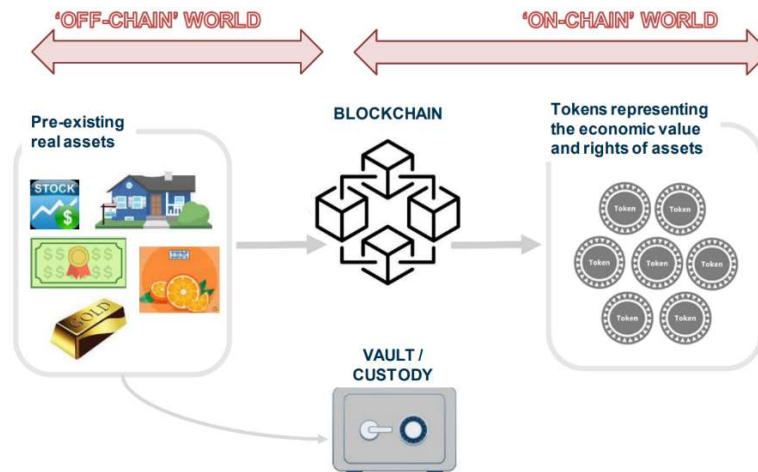


Figure 4. Schematic representation of a tokenized security (OECD, 2020)

In this study, the term tokenized security is used interchangeably with a security token. It is the importance of DLT that makes these types of securities interesting for AAB to create a fee-based product for this. It does not make a difference whether a company has already issued a bond but wants to trade it on the blockchain instead via the traditional way, or that a company is looking for financing and issues its first round of common stock via the blockchain. It is about the technological advantages and how issuing and investing parties can benefit from this. Eventually, the mutual commodity that these types of tokens share is the distributed ledger technology that enables the existence and functionality.

### 2.3 Distributed Ledger Technology

As mentioned earlier the data transferring technique, distributed ledger technology, made the creation and distribution of tokenized assets on the blockchain possible. An important remark to make is that the definitions of blockchain and distributed ledger technology are often used intertwined. However, there is a distinction and this needs to be clarified for a better understanding of the technological fundamentals.

Distributed ledger technology is a solution for a problem that originates from the time of the Ancient Romans. A general from the Ancient Roman army needed to plan an attack simultaneously but his armies were very dispersed among the enemy lines. Sending messages via messengers often led to miscommunications and it was very difficult for him to achieve consensus on the attack. DLT solves this problem by achieving consensus on data in a distributed, trustless and decentralized manner (Pietro, 2021).

Nakamoto (2008) created a new technique based on DLT called Blockchain that works via distributed ledgers. Blockchain is therefore a variation of distributed ledger technology but, distributed ledger technology is not like Blockchain (Kim & Sarin, 2018). To let Blockchain operate in a distributed, trustless and decentralized manner Nakamoto established a protocol called Proof of Work (PoW). The concept of DLT is the foundation of blockchain technology and the protocols that exist on it such as Proof-of-Work (PoW), Proof-of-Stake (PoS) and Delegated Proof of Stake (DPOs). The next sub-sections will explain the key principles of DLT and how they enable the existence of tokenization of assets such as securities.

DLT serves as a distributed database of information that can store any kind of information. Nowadays, does DLT not only apply to cryptocurrencies but it can store additional data related to a certain type of asset. To simplify the explanation below, we use the concept of a *data entry*. However, in the use case of tokenized securities a new data entry can take different forms. Examples are; the issuance of a new bond that is added to the ledger or a transaction of a bond between two parties. The history of data entries is stored on a node and multiple nodes combined are called a ledger which basically is a database of transactions. Each node in the distributed ledger network is a storage device that contains the whole database. The database is replicated across all nodes and each node has the same rights as every other node in the network. The nodes can be separated in the physical world however, the ledger that contains the database is not separated because each node holds the same information. When a request is made in the network to add information to the existing ledger a certain consensus needs to be achieved to accept this request. Only new data can be added to the existing database, existing data cannot be deleted or altered. The acceptance of a new data entry is usually reliant upon a protocol that is determined beforehand. If a certain consensus rate is reached among the nodes a data entry is accepted and added to the ledger.

#### *Public versus Private DLT designs*

The design of a DLT can be in two forms; a publicly distributed ledger or a privately distributed ledger (Sunyaev, 2020). In a public distributed ledger, nodes can join and participate in the maintenance of the distributed ledger and can leave anytime without consequences. There will be no loss of information because every node holds the same database and is updated similarly. Public distributed ledgers have no requirements for registration or acceptance of a node within the network.

On the other hand, there are private DLT designs that consist of a defined set of nodes of which each node is identified and approved by the other nodes in the network. In this design, there is a need of verifying a new node that wants to participate in the distributed ledger. This type of design is usually used if the data that are stored on the ledger should be inaccessible by strangers.

#### *Permissioned versus Permissionless DLT designs*

Besides the choice of creating and using a public or private distributed ledger. The way transactions are validated or consensus is achieved within the network can be determined by a subgroup of nodes. If the validation of transactions is delegated to a subgroup of nodes the DLT design is seen as permissioned. This means that only a (small) selected group of nodes can validate new transactions and participate in reaching a consensus with a result in faster transactions within the network (Sunyaev, 2020). Because of this smaller group of nodes that are able to verify transactions finality can be reached, which means that all nodes come to a certain agreement on the distributed ledger's state.

A permissionless DLT design means that the identity of nodes does not have to be known in the network because every node has the same permissions. This often results in a large number of nodes that can participate in validating transactions. Because of a large amount of nodes transaction finality is impossible to reach, a solution for this is achieving consensus based on probability. In reality, this can take form in solving certain mathematical problems that desire a decent amount of effort that is done by computers. Once a solution is found by a node and broadcasted to all the nodes, the nodes can accept the solution and add the transaction. This kind of consensus-reaching is seen in projects such as Bitcoin and Ethereum.

The way these technique works is resulting in a decentralized peer-to-peer network where the state of the ledger is determined by the consensus of the participating nodes. There is no centralized party that determines the acceptance of transactions and everything is ruled by distributed trust among the nodes. By using this kind of system it makes it possible to remove third trusted parties to validate transactions. By removing several intermediates less coordination is required, costs can be reduced, certain business processes can be automated and accelerated even further, which is viable e.g. tokenized securities.

## 2.4 Smart Contracts

DLT developed further in the latest years wherein the possibilities for smart contracts came to light, this functionality is an important aspect as to why DLT is promising for the issuance of securities (Sunyaev, 2020). In this sub-section, the basic ideas of smart contracts will be explained to understand the potential of it.

The first generation of DLT applications are also called Blockchain 1.0 such as Bitcoin which was mainly focused on transferring wealth in the form of cryptocurrencies (Marisetty, 2022). The second generation of blockchain applications created on DLT allowed the functionality of smart contracts and Ethereum was one of the first projects to release this. According to Buterin (2014) the Ethereum blockchain allows for more complex applications that involve storing and transferring tokenized assets that are being controlled by pieces of code that could be connected to certain rules. This idea originates from a study by Szabo (1997), he mentioned that smart contracts embed contracts for all sorts of properties that are valuable (securities e.g.) and controlled by digital means (nodes in DLT network). The Ethereum blockchain has a virtual machine, called the Ethereum virtual machine (EVM) which creates an environment for smart contracts to be executed. A set of predefined rules can be programmed and when the required conditions of this smart contract are met the transaction will be executed. This method of handling contractual agreements based on programmable software that operates on a DLT is based on three key characteristics: decentralization, autonomy and self-sufficiency (Swan, 2015).

The transactions that are managed by smart contracts on a distributed ledger ruled are not bounded by the limits of the ledger. Smart contracts can communicate with external data services which are called *off-chain* services. When external data are addressed by a smart contract and consequently used on the DLT one speaks of an oracle (Sunyaev, 2020). An oracle is basically a bridge between the environment of the DLT and an external data environment. This data is stored elsewhere but can be required and used within the DLT environment. This technological connection between existing databases and the predefined rules of a smart contract creates lots of possibilities for issuing and transferring tokenized securities without the need for external parties (Sunyaev, 2020).



## 2.5 Traditional Securities

In this section, we explain the processes of issuing traditional securities and investing in traditional securities. As mentioned earlier, the two types of securities that are dealt with in this thesis are equity securities in the form of shares and debt securities in the form of a bond. The scope of his study is within the Netherlands so therefore the process of traditional securities is explained according to the situation and the involved parties in the Netherlands. In the upcoming sub-sections, a distinction is made between two types of companies, on the one hand, companies that are listed on exchanges such as *Euronext* or SME exchanges such as *NPEX* or *nx'change*. In other words, this means that these companies are publicly traded. On the other hand, there are privately held companies that do not have a listing on an exchange but still issue securities, and investors could also invest in these types of companies (in the form of private equity).

Both types of companies can issue a debt or equity security but there are different rules and processes in place when doing so. From the investing perspective, there are also variations and these will be explained as well. The description of these general processes aids in the comparison later on of the traditional process versus the tokenized process. It is not our purpose to go into very much detail on the specific rules and laws that are in place because that is not part of this study. The approach for this sub-section is to map out the stakeholders and key elements of issuing and investing in securities. In the figure below a general overview is given of how the security market value chain looks like for a listed company.

### 2.5.1 Issuance for publicly traded companies

This sub-section is explaining the issuance process of publicly traded companies in a general manner that are listed on an exchange.



Figure 5. Overview of Security Market Value Chain (Pietro, 2021).

There are four primary stages: Issuance, Trade, Post-trade and Asset-servicing. The first one issuance is, as the name already implies focused on the issuing parties. The stages Trade, Post-Trade and Asset servicing are more of an influence on the investors. These will be explained in Sub-section 2.5.2: Investing in publicly traded companies.

#### *Issuance*

When a company wants to list a debt or equity security on an exchange they need to prepare their instrument first. This is done in the form of structuring the product, price setting and risk rating, processes often done by financial advisors such as investment banks. Another important step in this stage is the legal review of a security. According to the European Securities and Markets Authority (ESMA), securities need to adhere to the following elements: Prospectus Directive, Transparency Directive, MiFID II, Market Abuse directive, Short Selling Regulation, Central Securities Depositories Regulation and Settlement Finality Directive. According to the AFM and the DNB in the Netherlands, there are also mandatory KYC and AML rules. The legal part of an issuance is an important part and is often done by bureaus of lawyers or other legal advisors. When the setup and review of the security is

accepted and done, a listing agent can help the company to select the right exchange to be listed on.

Companies in the Netherlands that are large enough can apply for a listing on the Euronext exchange. One of the advantages of being listed at an exchange is that it is often more easy to gather capital by the issuance of securities. However, there are some strict requirements for a listing on the Euronext exchange (KvK, n.d.-a): The company should exist for at least five years, it needs to have an equity of at least five million euros, the total value of stock should be more than five million euros and at last, the company should have generated a profit for at least three years in the past five years

Besides these first financial requirements, each exchange has its own terms & conditions that a company has to adhere to. For Euronext, a list of sixteen obligations for issuers is used followed by an extensive list of required documentation (Euronext, n.d.). Besides these requirements, the costs that are related to getting listed on an exchange are also something that could hold a company back from doing so. To get securities listed and make them transferable, an exchange such as Euronext will charge the company. The costs consist of (KvK, n.d.-b): Admission costs, yearly listing fees, admission costs for a follow-up issuance (if applicable), agency fees, commission agent fees and audit costs of the company's bookkeeping.

For SMEs the Euronext exchange might be a size too big, therefore in 2008 a special exchange was created in the Netherlands which is called the Nederlandsche Participatie Exchange (NPEX). NPEX is also under the supervision of the AFM and the DNB (De Nederlandse Bank) and provides financing for growth companies, this can be done by issuing shares or bonds. The NPEX has other terms & conditions than the Euronext exchange for example and makes a distinction between regular NPEX companies and NPEX growth companies.

Financing via shares or bonds under the regular NPEX rules can be realized based on (Verlaan, n.d.-b): A minimum financing amount of €1,000,000, the company should exist for at least three years of which one is closed with profit and at last the organization should be a solid one that could warrant its continuity.

For NPEX Growth different listing rules apply. NPEX Growth has been created for young and fast-growing companies with a need for financing. Financing only works via bonds and the amount of the bond has to be between €500,000 and €999,500. The starting points for this type of financing are (Verlaan, n.d.-a): Financing via NPEX is between €500,000 and €999,500 with a duration of five years, the company exists for at least one year, there is no profit requirement, there should at least one annual report with a composition statement available, before issuance there should be temporary financial figures that are not older than three months, the company needs a proven track record and at last, the company has a clear growth target.

The fees of the NPEX are less complicated and seem to be lower than Euronext. They charge the following (NPEX, n.d.): A one-time set-up fee of €500, one-time success fee which is 3% of the total issued amount and yearly administration cost of 0.4% on the total listed amount.

When the listing and admission phase is finished and the right exchange has been chosen, a security needs to be stored somewhere safe. This is done in a Central Security Depository (CSD), when a notary has established the existence of a security it is kept at a CSD. In the Netherlands, Euroclear Nederland is responsible for the safekeeping of securities. Euroclear is also responsible for post-trade processes such as clearing and settlement, processes that will be explained in the following sub-sections.

### **2.5.2. Investing in publicly held companies**

In this sub-section, the explanation of the security market value chain continues however the perspective is changing from the issuance parties to the investing parties. After the issuance of a security the first transactions have been done by investors and the phases Trade, Post-trade and Asset-servicing come forward.

#### *Trade*

The issued security is listed on a certain exchange that has been chosen by the issuer. For an investor, it is often not possible to directly buy and sell these securities at those exchanges. A solution for this problem is brokers, which are intermediaries between exchanges and investors. Investors can buy and sell securities that are listed on exchanges in a convenient matter via a broker. Some Dutch banks act as brokers such as ABN AMRO itself, but there are also brokers such as Flatex deGiro who offer similar services. Among those brokers, there are different markets and instruments that a client can use. Investors create an account with a broker, that also requires KYC and AML checks. When they are accepted to the platform they can deposit money and start investing in securities. The prices that an investor sees on a broker platform are often shown in bid-asks spreads that are created by market-makers. These prices show for which amount they can either buy or sell the securities. Market-makers are important intermediaries to guarantee the trading of securities.

#### *Post-trade*

The next stage is the post-trade process that focusses on the clearing and settlement of transactions. When a transaction is done on a broker by an investor the transaction should be recorded and validated first. These transactions are sent to a clearing house that nets out transactions between several parties, and at the end of the day they calculate the margins and the liabilities (Brastad & Stendahl, 2018). As mentioned above, in The Netherlands is Euroclear responsible for the clearing and settlement of transactions in its large clearing house. Once the transactions are cleared at the end of the day, the new balances of each party are created. If one of the involved parties has, for example, created a liability then this needs to be settled with the other party. This is done by exchanging the securities and cash between the involved parties, after this is done transaction finality has been reached. The party that is responsible for this is the CSD and within the Netherlands this is done by Euroclear as well. From the moment an investor buys or sells a security this is usually settled in a timespan of T+2 (which means the trading day plus two days to settle the transaction). An investor does often not realize this because in their broker interface it is shown that they ‘possess’ the security and see a change in their account balance. The existence of all these post-trade processes and parties increases the counter-party risk, which happens when one of the involved parties fails to deliver on their liabilities. This can cause great financial problems in the security market value chain.

### *Asset Servicing*

The last stage contains asset servicing, with distinct steps such as custody, securities lending & collateral management and asset services. The custody of securities is a process that is already discussed and takes place at a CSD.

Securities lending and collateral management are subject that will be left out in this thesis to not overcomplicate things. To make a comparison between traditional and tokenized securities, there is a pure focus on the general aspects. Securities lending and collateral management are not in the scope of this study.

Asset services on the other hand could be interesting in this study as this is part of the investor's perspective. A well-known example of asset services is portfolio management or asset management. An investor could manage their own security portfolio, or contact professional asset managers such as banks to optimize the risk/return rates on their investments. This is another intermediary that sums up the total security market value chain from issuance to trading.

### **2.5.3 Issuance for privately held companies**

Compared to publicly traded companies there are also privately held companies' securities that are not traded on an exchange to acquire capital. However, privately held companies can also need financing and can issue debt or equity securities. The process differs from a publicly traded company and this is shown in the following section.

#### *Issuance of Shares*

For the issuing or transfer of shares certain rules and regulations are in place which requires several parties such as a notary (KNB, n.d.). A notary makes sure that the delivery of shares is legally valid and that the issuing party is authorized to do so.

In the Netherlands, a notarial certificate of issuance is required for issuing new shares. This certificate consists of several characteristics such as the number of shares that are issued, type of shares (with or without voting rights e.g.), name and address details of the company, name and address details of the legal entity or natural person that receives the shares (KNB, n.d.). All these aspects have to be checked by a notary, once they are checked and accepted the notarial certificate of issuance is signed by both the issuing and the investing party.

When the issuance is done the next step is that the shares have to be registered at a shareholder register. This is usually done in an internal register of the company, this process is also done by a notary. Those internal registers are not publicly available and outsiders have no right to access these registers.

In The Netherlands however, a central shareholder register is presented but is yet to be approved by the government. This is called the Central Shareholder register (CAHR). This register contains information about shareholders from private companies and unlisted companies (RVO, n.d.).

At last, the delivery of the shares takes place, hence again a notarial certificate is required for this procedure. The notarial certificate of delivery consists of the same information as the notarial certificate of issuance with the addition of when and how the investor received the rights accompanied with the shares.

These rights are only justifiable when the issuing party acknowledges these rights. Without acknowledgment, the new shareholder is just an owner of the security, and the rights such as

dividend rights or voting rights are not exercisable (KNB, n.d.).

The delivery of shares can be acknowledged in the following manners:

- Acknowledgment in the notarial certificate of delivery by a director or multiple directors if this is necessary.
- A notarial certificate of the delivery is presented and consulted with the company, followed by a signed declaration of acknowledgment.
- Registration of the new shareholders in the shareholders' register.

Acknowledgment is not necessary if the issuing company itself is the only involved party, when securities are repurchased by the own company or when they are issuing securities for themselves.

#### *Issuance of Bonds*

A privately held company could also issue a bond to receive capital to work with. The issuance of a bond is similar to the issuance of shares. There is also a notary required to establish the validity of the issuing party. In the notarial certificate, the characteristics of the bond have to be made clear such as; the maturity date, coupon rate and emission value. The creation of a bond is often done in cooperation with a financial advisor such as a bank to match the financing requirements with the final product. When the bonds are composed, reviewed, accepted and finally bought by investors there is also a requirement for a notarial certificate of the delivery.

### **2.5.4 Investing in privately held companies**

Investing in privately held companies is of course different from publicly held companies that are listed on exchanges. This can be done via private equity funds that are managed by financial intermediaries who connect wealthy investors with the right companies. For SMEs, private investors could be friends and family who buy shares or a bond to support the financing of a start-up company.

In general, there are fewer intermediaries involved as there are fewer rules in place when it comes down to privately held companies. An important reason for this is the prospectus exemption by the AFM that is granted for investments below five million euros, investments with less than 150 participants or when the value of the security is at least 100,000 euros per participant. Nevertheless, a lot of processes still take place at a notary and besides the notary, there are also other parties involved such as legal advisors and financial advisors. So, we conclude that there is still an abundance of intermediaries when investing in privately held companies.

### **2.6 Role of regulations**

Although this master thesis is written on behalf of the master program Business Administration where laws, rules and regulations are not mandatory topics to deal with. We think it is important to provide a short notice on the current stance of rules and regulations considering this novel topic.

In January 2019 the European Securities and Markets Authority (ESMA) created an advice report on Initial Coin Offerings (ICOs) and crypto Assets. Since the increase of ICOs and crypto-related assets, the need for guidelines for consumers was necessary according to the ESMA. In the ESMA report, they describe regulatory implications when a crypto-asset

qualifies as an official financial instrument. When a crypto-asset is qualified as a transferable security, all the EU financial rules apply. Examples of these are Prospectus Directive, Transparency Directive, MiFID II, Market Abuse directive, Short Selling Regulation, Central Securities Depositories Regulation and Settlement Finality Directive. This applies to both issuing and investing parties.

However, ESMA saw a lot of gaps and issues with the existing rules and regulations about crypto assets. On the 24<sup>th</sup> of September 2020 the commission of EU published a proposal that was called “Markets in Crypto-Assets Regulation” (MiCA). This proposal consists of regulations for crypto assets that are not yet covered by existing EU financial laws (European Commission, 2020). According to this proposal, there are four types of crypto assets:

- Crypto assets generally, as a “*catch-all*” category
- Utility Tokens
- Asset-Referenced Token (ART)
- E-Money Token (EMT).

Security tokens that function as existing securities such as companies’ stocks or bonds that are already regulated under EU financial law such as MiFID II do not fall under the MiCA (Hansen, 2021). In June 2022 the European Commission provided the green light for a DLT Pilot Regime that established a set of conditions for; a DLT market infrastructure, limitations on DLT financial instruments and cooperation between DLT market operators and ESMA. This means that the DLT Pilot Regime provides a legal framework for the trading of crypto-assets that qualify as financial instruments according to MiFID II (Deloitte, 2022). Therefore, tokenized securities fall now on European level under the European Securities and Markets Authority (ESMA) which created guidelines for issuing securities. On a national level, there are different national financial supervisory authorities. In The Netherlands, The Dutch Authority for the Financial Markets (AFM) supervises the financial markets and together with the lawmakers, they guarantee a fair and transparent market (AFM, n.d.).

## **2.7 Key takeaways**

The first sub-question: “*How do tokenized securities on DLT protocols work*”? is answered in this sub-section. In the above-mentioned sub-sections, an explanation is given on tokenization, DLT and smart contracts. In the first sub-section, we explained the phenomena of tokenization which means that a certain asset is represented on a distributed ledger in the form of a so-called token. The token is a data entry on the ledger that represents a form of ownership of a specific asset. Securities are the type of assets that are being investigated in this study.

Companies in need of financing can either create new tokens that represent a debt or equity security from their company, or already existing securities can be tokenized and stored on the ledger that represent a form of ownership. The accompanied rights and features could be programmed into this token to guarantee the same features as their traditional version. The tokens on the distributed ledger could be transferred among investors and sold to others who also participate in the network. The issuing party can decide on a public versus private distributed ledger and a permissioned versus permissionless distributed ledger. The benefits and limitations of each type have been explained in the sub-sections above and the issuing party should determine in advance who they want to grant access to their network.

The biggest difference between the tokenized version versus the traditional version is the storing and transferring of the securities that are happening on a distributed ledger. This is further investigated in Chapter 4, where we describe the advantages and disadvantages of tokenized securities.

### Chapter 3: Research Method

In this section, we explain the research methods that are used to answer the main research question and the sub-questions. Each sub-question is explained separately and in the end, we highlight the importance of research ethics. Since tokenized securities and the technology behind them such as DLT and smart contracts are novel subjects in science, the availability of published academic papers is scarce. Therefore, a combination of grey literature (in the form of whitepapers and blog posts) and purely academic literature will be used to get the information that is required for answering the research (sub)question(s).

The purpose of this chapter is to present the research methods chosen per sub-question to guarantee the validity and reliability of this research. By presenting how this study has been conducted we create insights for other researchers and we create opportunities for follow-up research if necessary.

#### 3.1 Research design

As written in the introduction this master thesis aims to answer one main question and five sub-questions. These five sub-questions divide the main research question and allow for a deeper dive per segment. Consequently, multiple research methods are used to answer each question because each question requires a different approach.

In the table below a concise overview is given of the research questions that are going to be answered and the methods that are used accordingly.

Question	Research Question	Method(s) Used	Type of data
Main	How can tokenized securities on DLT protocols be used to generate a fee-based product for a bank while also creating value for the issuing and investing parties in The Netherlands?	-Combination of the answers to the sub-questions	Qualitative Quantitative
Sub-I	How do tokenized securities on DLT protocols work?	-Structured literature review	Qualitative
Sub-II	What are the advantages and disadvantages of using tokenized securities compared to using traditional securities?	-Structured literature review -Cost-benefit analysis	Qualitative Quantitative
Sub-III	What are the opinions of the issuing and investing parties on the usage of tokenized securities?	-Semi-structured interviews -Gioia method	Qualitative Quantitative
Sub-IV	What is the added value of Smart Contract possibilities when utilizing tokenized securities for issuing and investing parties?	-Deductive approach from case studies -Examples from structured literature review	Qualitative
Sub-V	What is the approach of AAB to break even on a fee-based product on tokenized securities?	-DARE method -Break-even calculations	Qualitative Quantitative

Table 2. Overview of research methods per research question.



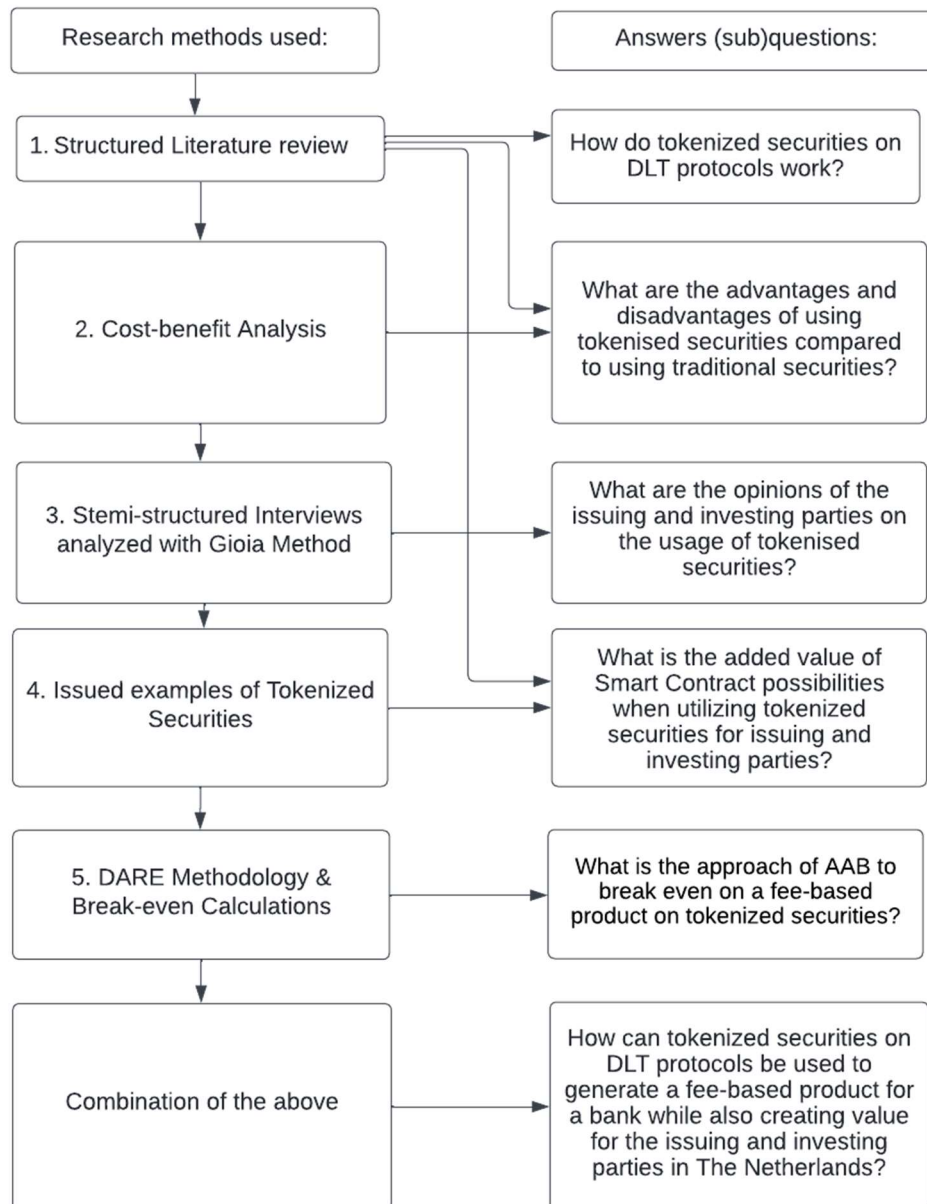


Figure 6. Flowchart of research methodology.

### 3.1.1 Tokenized securities on DLT

To appropriately describe the functionality of tokenized securities on DLT protocols desk research is carried out in the form of a structured literature review. A structured literature review brings the researcher up-to-date on the current state of the art on the subject that is going to be examined (Sutton et al., 1999). The generated and structured knowledge results in the theoretical framework which is the embodiment of knowledge for this master thesis subject.

The protocol for this systematic literature review is already explained in Section 2.1 and Figure 1 gives an overview of what it looks like. After we conducted this systematic literature review and collected the right amount of information, we write the theoretical framework and the notion of tokenized securities is explained. The technological principles that are part of

DLT will be laid out in smaller steps for better comprehension and eventually, the notion of tokenization in combination with securities will be added.

The output is going to be a theoretical framework of how the technology behind tokenized securities looks like. Different sub-sections specify certain attributions that eventually come together to provide an answer to the question; “How do tokenized securities on DLT protocols work?”

We think that using a structured literature review is the right approach to analyze the topic of tokenized securities. Ferreira, Gonçalves and da Silva (2019) did a large systematic literature review on blockchain technology and the accompanying benefits and implications of this technology for business. They concluded that by reviewing the papers they were able to identify new opportunities and new research areas to develop blockchain technology even further. Based on their line of reasoning and way of working this research is deriving to conclusions in the same manner but this time focused specifically on the notion of tokenized securities. The theoretical framework is the basis for answering multiple sub-questions and the information will come back repeatedly.

### **3.1.2 Advantages and disadvantages of tokenized securities**

To answer Sub-question II about the advantages and/or disadvantages of tokenized securities we combine two approaches. The first one that we use is comparing the traditional way of issuing and investing in securities with the tokenized way. This is done by us based on articles that we selected for the structured literature review. In those articles, the researchers state different conclusions when they compared traditional- versus tokenized securities. We check the validity and reliability of these conclusions stated by several organizations and researchers and include them in Chapter 4. Eventually, a concise list of advantages and disadvantages is presented by us to get a clear overview as to why tokenized securities might be a suitable alternative. This list is supported by a cost-benefit analysis that gives clear insight into the possible advantage of cost reduction.

So, in the cost-benefit analysis, we make use of quantitative data that is derived from three case examples that compare a traditional bond issuance with a tokenized bond issuance. By mapping out the stakeholders and associated costs we can compare the case examples on potential cost reduction. Once we have mapped out the stakeholders, a cost analysis is done to analyze how each process (*tokenized vs traditional*) is built up in costs when issuing a security. This is the quantitative part of this section and we combine the cost-benefit analysis with the advantages and disadvantages stated in the literature. By doing so we can conclude on the possible advantages and disadvantages of tokenized securities.

### **3.1.3 Opinions of issuers and investors**

Besides the importance of the current state of the art in the literature on tokenized securities we think it is necessary to get an overview of the opinions from stakeholders as well. To answer the main research question and evaluate how a bank can use tokenized securities in a fee-based product the opinions of the clients are also relevant. Eventually, a product based on tokenized securities will only be successful if issuing and investing parties are willing to use these instruments.

To answer this question we conduct interviews with companies who need financing and investors who seek decent returns. The format of the interview will be a semi-structured one and we prepared ten questions (see Appendix 1) beforehand while also allowing space for

different questions during the interview. Because of the novelty of the subject and the limited timeframe of this study the selection of participants will be based on convenience sampling. We are aware of the consequences of this selection method for the reliability of this study but given the reasons above it is seen as the most realistic approach. Therefore the scope of the companies that are suitable candidates is not too strictly defined. In consultation with ABN AMRO, the minimum amount of financing for a company to fit the requirements is a financing of at least one million euros. For the investors' side, a criterium for the interviewees is determined at investable assets of at least one hundred thousand euros. However, it is not certain whether wealthy clients have an interest in taking part in these interviews to gauge their opinions on tokenized securities. To gather participants for the interviews we created a social media post on LinkedIn with a request to participate in our interviews if one met the selection criteria. Besides using social media, we also used our network to gather suited participants.

We expect that the eventual sample size might be small however since this is a qualitative research approach to answer Sub-question 3 we do not think this is a problem. According to Boddy (2016), even a single sample case can provide sufficient information for research. This statement should be interpreted with caution because it does not apply to all types of research. However, we think that in this study even with a smaller sample we can still derive useful information about the investors' and issuers' opinions. Therefore, for both parties the sample size we aim for is between five to ten participants.

After the interviews are done the answers will be analyzed according to the Gioia methodology (Gehman et al. 2017). Gehman et al. (2017) compared several qualitative approaches for theory building and following their line of reasoning the Gioia method is used for this research. They concluded that if one wants to understand the experiences of the interviewees the Gioia method is a valid approach. So, therefore the Gioia method is used in this research for analyzing the answers of the interviewee to conclude their opinions. In this qualitative analysis method:

- One creates first-order concepts that are based on the answers given in the interviews. Basically, this means that the answers are summarized in a few keywords.
- Then, second-order themes are derived from the first-order concepts to create a higher level of understanding. This means that some of the first-order concepts that cover the same subjects will be grouped.
- Eventually, the second-order concepts are combined in aggregated dimensions, this means that the created themes are once more grouped in dimensions. This reflects the main discussed aspects of the interviewees' answers on tokenized securities.
- The aggregated dimensions are the last step in the analysis and will be used as the recurring thread of their opinion. Each dimension is discussed individually and complemented by quotations from the interviewees. This is the final output of the interviews and it will be divided into two parts; one from the issuing perspective and one from the investing perspective.

### 3.1.4 Added value of Smart Contracts

To answer Sub-question 4 we dive deeper into the functionalities of smart contracts. Smart contracts create value on both the issuing side and the investing side by enabling many possibilities for tokenized securities. This will contribute to the societal relevance of this study for investing and issuing parties. These are respectively (retail) investors that seek decent returns and companies that require financing and want to attract capital. It should be noted that the term “*value*” is rather broad and can be interpreted in various ways. Therefore, in this study, the term ‘*added value*’ is used, which is derived from Wood (1996) on marketing basics. In her study, she listed several definitions of added value in products related to the subject of marketing, we think that her definition of; “*added value is related to features which are core or surround of a specific product*” suits the best for this study. Because smart contracts are eventually part of the fee-based product that AAB wants to launch. This definition will be taken into account when looking for literature or other types of data on smart contract possibilities. Hence again, existing examples of companies or other successful crypto projects that are already using smart contracts will be used. Existing examples could show how smart contracts can add something extra for the users. The existing examples will be derived from the website *STOMarket.com*. This is a website that keeps track of issued tokenized securities and presents, for example, details of the market caps and prices of each issued security. The selected examples are based on a market cap of at least one million dollars. We check for each company if they still exist and we scan their whitepaper/information memorandum to investigate if there is something useful mentioned on smart contracts. Eventually, we use ten companies that issued a tokenized security to assess how they used smart contracts for their financing operations and corporate actions. We created this list and used it, to evaluate possible functionalities as being useful or not and what the potential benefits can be for both the issuers and the investors. Once again, we refer to Bobby (2016), to state that a small sample size in the case of qualitative research should not be a problem for the quality of the research. In the end, we present a clear overview of issued tokenized securities accompanied by an explanation of how these examples prove that smart contracts are valuable.

### 3.1.5 Break-even approach ABN AMRO

To answer part of the main research question about creating a fee-based product it is important to realize how AAB will break even on this new product. The first aspect of the break-even approach is the DARE methodology of ABN AMRO that among other things indicate FTE expenses. This method consists of five different stages: *Explore, Prove Problem, Prove Solution, Prove they Pay* and *Prove it Scales* (ABN AMRO, 2022). Every new innovative idea that could lead to a potential product, needs to pass every stage to convince the executive board to include it in the bank’s portfolio. Each stage consists of several smaller steps and helpful tools that employers could use to evaluate their new concept. The department S&I is currently in the *Prove they Pay* stage and will continue on the *Prove it Scales* stage. For these two stages, the financial projection is important to estimate the financial performance of the new product.

Since the S&I department of AAB is already working on this, their business case which consists of an elaborated data set is used to calculate a break-even point. An article by Shrotriya (2019) provides a clear concept of a break-even analysis. He concludes that a break-even analysis is useful for evaluating new business activities in terms of financial performance. It is a simple, yet effective way of receiving the first impression of a newly

launched product. The business case that is provided by AAB is used to derive data from, we have converted this data to tables of our own that only contain the required information. These tables contain data on the total expenses, income, and issued volume for the period 2021-2027. This information is visualized in several graphs and with the help of Excel polynomial equations are created. We calculate the break-even point for this new fee-based product in three different ways; interpolating, solving second-degree polynomial equations, and solving third-degree polynomial equations. The outcomes of the three calculations are then averaged to see at which total issued volume AAB will break even and at which point in time, this approximately happens.

### **3.2 Research ethics**

As described above, we use several research methods and one of them is interviewing people. If our research involves human beings it is necessary to receive ethical approval from the Ethical Committee of the Faculty of Behavioral Sciences (University of Twente, 2022). Ethical approval is necessary to continue the research and be able to graduate. Since no extraordinary methods are used in this study this study will be perceived as standard by the committee and does not require an extensive assessment (University of Twente, 2022).

Besides the requirements of the University of Twente, this study is also done on behalf of ABN AMRO which also values ethics as very important. In their annual report of 2021 they state Ethics & Integrity as a value-creating topic with a definition as follows; “*Complying with laws and regulations, and acting in a morally correct manner by considering the rights and interest of all legitimate stakeholders*” (ABN AMRO, 2022-b). Since this research is in cooperation with ABN AMRO their definition of ethics will be taken into account and adhered to.

# Chapter 4: Tokenized securities: Advantages & disadvantages

In this section, we answer Sub-question 2: “*What are the advantages and disadvantages of using tokenized securities compared to using traditional securities?*”

In order to compare the two an explanation is provided in Chapter 2 of how tokenized securities are issued and how traditional securities are issued. In this chapter, we provide a list of advantages and disadvantages of tokenized securities compared to traditional securities. For the advantages and disadvantages, there is no distinction made between issuing and investing parties. This is a well-considered choice because there is simply too much overlap in each advantage or disadvantage for both parties.

Tokenized securities are created on distributed ledgers and this technology itself causes already some fundamental advantages. Some advantages are based on DLT and there are advantages created by the actual tokenized securities that can be built on DLT. The same applies to the disadvantages as well. The list is based on articles from the structured literature, some (dis)advantages are mentioned in multiple articles, while others are only mentioned by one of them. We added the references accordingly, to show whether it is concluded by one or multiple researchers. Since literature is derived from the structured literature review the same query and way of filtering is used as pictured in Figure 2. Once we read the selected articles, we wrote down the stated advantages in an Excel file that is presented in Appendix 2. In this file, each mentioned advantage and disadvantage was written down in keywords per article. Once this list was completed, the advantages and disadvantages were grouped to create a more convenient overview. This is done because, in the selected articles, the researchers used often synonyms to describe the same phenomena.

## 4.1 Advantages of Tokenized Securities

In Table 3 we present an overview of nine advantages which we divided into nine created themes. These are then further subdivided into different specific aspects that are associated with each created theme. Each theme has a devoted sub-section where we provide elaborated explanations and examples for better understanding. At the beginning of each theme, the references are listed from which articles the information is consulted. An important remark to make is that many advantages are very interconnected with each other. This causes some overlap when describing several advantages.

<b>Advantages in:</b>	<b>Specific aspects:</b>
1. Improved liquidity	<ul style="list-style-type: none"> <li>• Fractional ownership.</li> </ul>
2. Improved accessibility	<ul style="list-style-type: none"> <li>• Global markets.</li> <li>• 24/7 Trading.</li> </ul>
3. Regulatory improvements	<ul style="list-style-type: none"> <li>• Built-in compliance.</li> <li>• Customizable regulations.</li> </ul>
4. Improved transparency	<ul style="list-style-type: none"> <li>• Reduction in intermediaries.</li> <li>• Auditable history.</li> <li>• Decentralization.</li> </ul>
5. Improved efficiency	<ul style="list-style-type: none"> <li>• Reduction in intermediaries.</li> </ul>
6. Safety improvements	<ul style="list-style-type: none"> <li>• Reduced counterparty risk.</li> <li>• No single points of failure.</li> <li>• Immutability.</li> </ul>
7. Interoperability	<ul style="list-style-type: none"> <li>• Interoperability.</li> </ul>

8. Smart Contracts	<ul style="list-style-type: none"> <li>• Facilitated Innovation.</li> <li>• Automation.</li> <li>• Digital distribution.</li> <li>• Customizable functions.</li> <li>• Atomic Swaps.</li> </ul>
9. Cost reduction	<ul style="list-style-type: none"> <li>• Overhead reduction.</li> </ul>

Table 3. Advantage overview of Tokenized Securities.

**4.1.1. Improved liquidity**

According Benedetti and Rodríguez-Garnica (2021), Brottrager (2019), Gjelstad-Ditlevsen et al. (2021), Hoffmann (2018), Khan et al. (2022), Leiberman and Mirynech (2019), Momtaz (2021), Pietro (2021), Popescu (2020), Schwarz (2022) and Smith et al. (2019) one of the advantages of tokenized securities is improved liquidity. This means that tokenized securities are easier to liquidate compared to traditional securities. If a security is traded in a liquid market it often contains a liquidity-premium, which means that the asset is valued higher compared to illiquid assets which increases the return on investments. The improvement of liquidity of tokenized securities is mainly caused by:

- **Fractional ownership;** tokenized securities can be divided into much smaller parts than regular securities because everything is programmable. An investment that represents one token of 100,000 euros can for example divided into 100 parts so the investment threshold is much lower if you can bring it to 1000 euros. This is also beneficial for the issuer parties to reach out to more investors because there is less investable capital required per investor.

**4.1.2. Improved accessibility**

Leiberman and Mirynech (2019), Momtaz (2021) and Popescu (2020) mention improved accessibility for investors as one of the advantages of tokenized securities. This is realized in multiple ways:

- **Global markets;** distributed ledgers can operate globally and are not bound by physical boundaries. Everyone with an internet connection can join a network and start trading when they are admitted. This is realized by the decentralized nature of DLT, there is no central party that controls the admission (dependent on the ledger being private or public).
- **24/7 trading;** several articles mention 24/7 trading as a big advantage of tokenized securities. Tokenized securities are traded on a network that is always online and accessible because a distributed ledger is always up to date and there is no central party that enables the trading of those securities. This means that compared to the traditional stock market, which is bounded to trading hours, the tokenized market can run 24/7. Several stock markets are only open for around eight hours a day. The fact that tokenized securities markets can run 24/7 causes better incorporation of information into the prices of those securities, such as earnings reports.

### 4.1.3. Regulatory Improvements

Regulatory processes are one of the biggest improvements according to Benedetti et al. (2021), Benedetti and Rodríguez-Garnica (2021), Brastad and Stendahl (2018), Brottrager (2019), Leiberman and Miryneck (2019), Momtaz (2021) and Schletz et al. (2020). Nowadays, regulations such as KYC, AML and MiFID II are very important for financial institutions. To be compliant, the organizations that issue tokenized securities should adhere to these rules. In the past, this has been a burden for banks with a lot of manual reviewing and later on some forms of automation. Tokenized securities however can enable several advantages for regulatory processes:

- **Build-in compliance;** tokenized securities are issued on a distributed ledger that runs by a certain protocol. Blockchains such as Ethereum support smart contract functionality to allow many processes to be pre-programmed in those contracts. One of these things can be compliance issues, if one applies to a network to trade tokenized securities, that person should provide certain identity information. This can be checked instantly with an off-chain dataset that is connected via an oracle to the ledger where the tokenized security is operating on. Within a very short timeframe, there could be a match with a whitelist or blacklist and this will lead to either access or a rejection. There is no need for intermediaries to check whether a potential investor should be allowed or not, it is programmed which characteristics are admissible and which are not.

Public blockchain networks, where one can freely join and leave could also restrict token ownership and trading via this procedure. When a transaction is intended the protocol could also require some form of verification which is instantly checked via a smart contract. If there is no valid match the trade is denied and there is no exchange of assets.

- **Customizable regulations;** because everything is written by code and executed automatically one could alter those codes when changes need to be made. When new rules and regulations come into place, one could alter the rules of smart contracts to guarantee compliance. During the issuance of a security certain rules could be at play but when governments decide to tighten the rules this could easily be altered in the smart contract to adhere immediately to the new rules. Customizable regulations could also result in customized securities that take dimensions such as; income, location, age and national laws into consideration. Hence the programmable and customizable nature of smart contracts the possibilities are endless.

### 4.1.4. Improved Transparency

Another advantage that is pleaded for in Benedetti et al. (2021), Benedetti and Rodríguez-Garnica (2021), Brastad and Stendahl (2018), Brottrager (2019), Gjelstad-Ditlevsen et al. (2021), Hilary and Liu (2021), Hoffmann (2018), Khan et al. (2022), Mazzorana-Kremer (2019), Pietro (2021), Popescu (2020), Schletz et al. (2020) and Smith et al. (2019) is the improvement of transparency. This is mentioned in almost every paper because this advantage can be attributed to DLT. In public networks, one could freely join a network and by doing so a copy of the ledger with all the transactions is provided. Besides that, there are many smart contract checkers on the internet where one could follow transactions that have been done on a public network. This causes advantages in several aspects compared to the traditional way of transferring securities.



- **Reduced intermediaries;** the usage of smart contracts allows the removal of trusted intermediaries, these are no longer necessary because the smart contracts handle the transactions. Fewer intermediaries mean that the value chain becomes shorter and this increases transparency for the security market. The securities are transferred directly between two parties and no intermediary is required to fulfil the transaction because the trading rules are embedded in the smart contract. This is a very transparent way of trading because there are only two parties involved.
- **Auditable history;** by recording all the transactions on a public distributed ledger the transactions are visible to the participants. They are stored in a distributed manner across the globe and every node is always up to date. Every transaction is traceable and all the information that is required for an audit is available on the ledger.
- **Decentralization;** the decentralized nature of DLT and blockchain increases transparency because there is no central party that is pulling the ropes. This is also related to the reduction in intermediaries as explained above. Since there is no need for a trusted intermediary because the trading rules are established in smart contracts. Everyone that participates in the network has a copy of the ledger and can consult the transactions at any time.

#### 4.1.5. Improved Efficiency

According to Benedetti et al. (2021), Benedetti and Rodríguez-Garnica (2021), Brastad and Stendahl (2018), Brottrager (2019), Gjelstad-Ditlevsen et al. (2021), Hilary and Liu (2021), Khan et al. (2022), Kim and Sarin (2018), Leiberman and Miryneh (2019), Mazzorana-Kremer (2019), Momtaz (2021), Pietro (2021), Popescu (2020), Smith et al. (2019) and Subramanian (2019) are efficiency improvements one of the most promising benefits in the tokenized security landscape. Several processes are responsible for this improvement:

- **Reduction in intermediaries,** faster clearing & settlement and instant transactions; as mentioned above in the transparency section, reduced intermediaries increase transparency in the trading process of securities. But, it also improves the transfer speed and efficiency because of faster settlement and clearing. We explained these processes before in Chapter 2 to make clear that these processes are required to finalize a transaction. The entire trading process of a tokenized security runs on a DLT and this means that clearing and settlement are unified in one ecosystem. This enhances the trading speed because there are no separate parties that need to communicate with each other. Everything is programmed and payment versus delivery happens instantly when the right requirements within the smart contract are met. After a consensus is achieved within the protocol the transaction is finalized and recorded on the ledger for both parties.

#### 4.1.6. Safety Improvements

Another important advantage are safety improvements of tokenized securities compared to traditional securities. This can be attributed to several factors of DLT, smart contracts and tokenized securities. These are claims are backed up by research by Brastad and Stendahl (2018), Hilary and Liu (2021), Hoffmann (2018), Kim and Sarin (2018), Mazzorana-

Kremer (2019), Popescu (2020), Schletz et al. (2020), Schwarz (2022), Smith et al. (2019) and Subramanian (2019).

- **Reduced counterparty risk;** counterparty risk is usually a common risk in the traditional security market. By having multiple intermediaries there is a plausible chance that one of them fails to deliver the promised obligation. Besides the risk of default, all the intermediaries should trust each other for secure and streamlined trading. Smart contracts solve this problem by only transferring the promised assets between buyer and seller when all the requirements are met. It is programmed within the protocol that an exchange of goods only happens when both parties can meet their obligations. This reduces the likelihood of default to zero because it is impossible that the smart contract will trigger when there are insufficient funds.
- **No single points of failure;** since DLT operates in a distributed manner where multiple devices contain the same ledger there are no single points of failure. The decentralized nature guarantees the continuity of the system because there is no reliance on one particular party. This improves the resilience of a database, physical shocks such as earthquakes can demolish the storage of a single dataset. DLT is separated between nodes which are physically separated from each other and operate independently when one breaks down.
- **Immutability;** another aspect of DLT and blockchain that improves safety in the network is the immutability of transactions. Immutability means that it is impossible to change a transaction once it is validated in the network. Once a transaction is recorded in the chain of previous transactions it can no longer be changed. In the academic literature, the word tamper-proof is often used to describe this. Transactions that are stored on the ledger are immutable and therefore tamper-proof, this contributes to the solution of the double spending problem. Once a transaction is recorded the money has been spent and it cannot be spent another time. This guarantees extra safety for investors and issuers because every transaction that is validated cannot be altered or withdrawn.

#### 4.1.7. Interoperability

The characteristics of DLT in combination with smart contracts communicating with oracles (off-chain datasets) allow interoperability. Interoperability means that different devices, datasets and software can communicate and that information is not bounded to a certain 'silo'. This is a breakthrough in the financial service industry because many systems are bounded to certain platforms and cannot communicate. These legacy systems are not built for interoperability and retain therefore the need for intermediaries because every party is responsible for a certain part in the whole process. The advantages of interoperability in a tokenized security network are described by studies from Benedetti et al. (2021) and Momtaz (2021).

#### 4.1.8. Smart Contracts

Many of the above-mentioned advantages come down to one particular aspect of tokenized securities namely: Smart contracts. These programmable contracts trigger automatically when the right conditions are met and remove trust problems between parties and could streamline many processes. Sub-question 4 of this master thesis investigates in particular the added value that smart contracts can have for investing and issuing parties. Below a short list of advantages will already be provided, but a later chapter will encapsulate them all. These advantages are derived from Benedetti and Rodríguez-Garnica (2021), Brottrager (2019), Hilary and Liu (2021), Kim and Sarin (2018), Leiberman and Miryneck (2019), Pietro (2021), Santos et al. (2020), Schletz et al. (2020), Schwarz (2022), Smith et al. (2019) and Subramanian (2019).

- **Facilitated innovation;** smart contracts allow communication between multiple parties and systems. They can tap into off-chain datasets to read required information for certain actions. In combination with Internet of Things (IoT, this is a phenomenon where sensors can transfer information to operating systems to alter their actions) real-time information can be used to communicate and base transactions on. An example of this application can look like this: The daily energy output of a solar park can be measured with IoT devices that transfer real-time data to a database. Based on the solar park's data, a dividend can be paid out to investors at the end of the day when the solar park owners know how much energy is produced.
- **Automation;** this advantage is also mentioned before and is the key element of smart contracts. A lot of rules can be programmed into the contracts that do not require manual actions. The issuance of a security with accompanied trading rules only has to be programmed once and the smart contract can run forever.
- **Digital distribution;** distribution rules of payouts can easily be programmed into a smart contract. The payout of dividend for a share or the interest for a bond could be programmed with clear if-then rules based on certain requirements. Once these requirements are triggered the smart contract activates the payout function. This creates an instant transfer to the wallet of the investors without the need for a third trusted party that usually validates transactions.
- **Customizable functions;** a smart contract is created by code and can be customized according to the demands of the issuing party. Their token can for example represent a share which has a right for dividends but not for voting rights, to keep the decisive power within the company. This can easily be programmed into the token and operates automatically.
- **Atomic Swaps;** this concept is created to streamline the transfer of tokens between different blockchains. With an atomic swap, one can transfer a tokenized security for another tokenized security that is stored on a different ledger without converting it to fiat first. It allows that two digital assets are simultaneously traded across different blockchains within a certain time frame. When both parties accept the conditions of the trade, it is executed by a smart contract and recorded on the ledger.

#### 4.1.9. Cost Reduction

Another advantage of tokenized securities, that is mentioned in almost every article of the structured literature review is cost reduction (Benedetti et al., 2021; Benedetti & Rodríguez-Garnica, 2021; Brastad & Stendahl, 2018; Brottrager, 2019; Gjelstad-Ditlevsen et al., 2021; Hoffmann, 2018; Khan et al., 2022; Leiberman & Miryneh, 2019; Mazzorana-Kremer, 2019; Momtaz, 2021; Pietro, 2021; Schletz et al., 2020; Schwarz, 2022 & Smith et al., 2019). This is an interesting advantage for the issuing and investing parties because it applies to both the issuance and the investing processes. The main reason for cost reduction comes down to one element and that is the reduction of the number of intermediaries required in the security value chain. During the issuance of a security, a wide variety of parties are involved in the traditional process who want to benefit from the issuance. Every party involved charges a fee for services and the more parties are involved the higher the costs will be.

- **Overhead reduction;** the decrease in intermediaries reduces the issuance and investing costs significantly. The process of issuing tokenized securities can be automated to a large extent and this saves many costs. Besides that, clearing and settlement parties are no longer necessary since these processes are embedded in the smart contract. Custodians are not necessary because the investors can hold their assets on a ledger. Trading fees are dependent on the protocol on which the securities are stored. These are often much lower compared to trading fees via a broker. In the cost-benefit analysis, three examples of traditional bond issuance are compared with a tokenized issuance and the latter resulted in a cost reduction.

#### 4.2 Disadvantages of Tokenized Securities

Besides the many advantages that DLT creates and the fact that it enables the creation of tokenized securities, there is of course a flip side of the medal. These disadvantages are not mentioned in every article, it should be kept in mind that researchers might be biased about all the benefits tokenized securities create. Some disadvantages presented in the literature are listed below. They are grouped under the same categories as the advantages but for the category interoperability and cost reduction no disadvantages were mentioned, so these are left out.

Disadvantages in:	Specific aspects:
1. Decreased Liquidity	<ul style="list-style-type: none"><li>• Limited adoption.</li><li>• Liquidity implications due to instant settlement.</li></ul>
2. Accessibility	<ul style="list-style-type: none"><li>• Higher bid-ask spreads.</li></ul>
3. Regulatory Implications	<ul style="list-style-type: none"><li>• Legal complications.</li><li>• Manual compliance.</li></ul>
4. Transparency	<ul style="list-style-type: none"><li>• Undesired transparency.</li><li>• Lack of privacy.</li><li>• Black box effect.</li></ul>
5. Efficiency	<ul style="list-style-type: none"><li>• Scaling problems.</li><li>• Lack of standardization.</li><li>• Garbage in, garbage out.</li></ul>

6. Safety Issues	<ul style="list-style-type: none"> <li>• Front running.</li> <li>• Transaction finality.</li> <li>• Attacks.</li> <li>• Hard Forks.</li> <li>• Duplicate infrastructure of security trading.</li> </ul>
7. Smart Contracts	<ul style="list-style-type: none"> <li>• Coding errors.</li> </ul>

Table 4. Disadvantages overview of Tokenized Securities.

#### 4.2.1 Decreased Liquidity

The improved liquidity effects of tokenized securities that are promised in the articles should be nuanced to some extent. There are several reasons why this improved liquidity might not be as promising as presented e.g. by Brastad and Stendahl (2018), Brottrager (2019) and Leiberman and Mirynech (2019):

- **Limited adoption;** when DLT and tokenized securities are not widely adopted in the financial service industry there is a possibility that the size of the secondary market is much smaller than expected. This causes a reduction in liquidity and the market price of the securities could fall enormously when there are no investors. This promised liquidity pool might therefore not yet exist and is highly dependent on the wider adoption of all the involved organizations in the financial service industry.
- **Liquidity implications due to instant settlement;** since DLT and smart contracts enable instant settlement of transactions the money is required upfront. If there are insufficient funds available the smart contract will not trigger and deny the trade. In the traditional process, many trades are handled by a Central Counterparty Clearing House (CCP). This party nets out all transactions for the market participants and therefore reduces liquidity requirements. When at the end of the trading day the balance is wrapped up the actual payments according to the netting outcomes need to happen. This system is created to provide as much liquidity as possible to the market and is not possible with instant settlement due to smart contracts (Brastad & Stendahl, 2018; Leiberman & Mirynech, 2019 & Brottrager, 2019)

#### 4.2.2 Accessibility

The improvements in accessibility of the markets and the enabling of trading 24/7 have one particular disadvantage according to Momtaz (2021):

- **Higher bid-ask spreads;** a disadvantage of enabling 24/7 trading is extended trading hours. In the traditional security market, trading only happens during the opening hours of an exchange which are based on the times of a regular working day. If 24/7 trading is possible there is always an opportunity for investors to trade securities. However, people are not tied anymore to a specific time frame in which they can trade so therefore, trading activity becomes more dispersed during the day. This results in higher bid-ask spreads because the bid and ask prices deviate further compared to the traditional condensed trading hours. When bid-asks prices are deviating further it is more difficult to establish the right market price for a security. Usually, market-makers provide small bid-ask spreads during traditional trading hours and pre-post market price creating is done by auction trading to create a certain safety net for investors. This is not possible with 24/7 trading since the market is always open, and

liquidity is varying more during the day which increases the volatility of the security's price.

#### 4.2.3 Regulatory Implications

The development of new financial instruments such as tokenized securities requires development in the regulatory field as well. However, the development of new regulations for new technology is often lagging. This causes regulatory uncertainty and this might be a disadvantage for tokenized securities.

- **Legal implications;** the legal status of tokenized securities is not clear in all countries. In Europe, it is part of the regular security law but since it is traded via DLT it might be the case that there are different rules at stake since many intermediaries are left out. This uncertainty could slow down further development because people might hesitate to participate in these new financial products (Brottrager, 2019; Schletz et al., 2020).
- **Manual compliance;** according to Brottrager (2019) compliance could be added to tokenized securities. However, it takes a significant effort to create a compliant tokenized security. This is confirmed by Hoffman (2018) that the creation of a whitelist is a tedious job that has to be adjusted manually when updates are required. Smart contracts communicate with an off-chain database and this information should be checked manually and changed accordingly when required. According to them, the built-in regulatory framework is not as convenient as it sounds.

#### 4.2.4 Transparency

Transparency is seen as a big advantage for the issuance of securities but especially the trading of securities. Within a public ledger, everyone can see the history of transactions with precise details of each transaction. For a private ledger, one needs granted access but when one participates in a private ledger all transactions are also visible to all participants. This causes three disadvantages according to the literature because not everyone is an advocate of this increased transparency.

- **Undesired transparency;** within the financial service industry, there might be organizations that view the transparent nature of DLT as undesired. Since all transactions are visible in a public ledger, the secret and thoughtful trading strategies of an investment firm are accessible by everyone. Many asset managers see this as a huge disadvantage when trading securities via DLT (Benedetti et al., 2021 & Khan et al., 2022).
- **Lack of privacy;** every transaction within a ledger is embedded in the chain of transactions and because of its immutable nature, it cannot be removed. In many countries, there are specific regulations for privacy such as the right to be forgotten. The nature of blockchain is not compliant with these rules because it is sometimes impossible to get rid of those transactions (Hilary & Liu, 2021).
- **Black box effect;** DLT and blockchain remove the required trust between parties because of the transparent nature of DLT and the usage of smart contracts. However, every party that is involved in tokenized security trading should have “meta-trust” in the system according to (Hilary & Liu, 2021). This means that they have to trust the technological fundamentals without understanding them thoroughly.

#### 4.2.5 Efficiency

Efficiency is one of the key elements of DLT and tokenized securities. However, the usage of DLT creates also some disadvantages according to the literature:

- **Scaling problems;** a well-known critic is the scaling problems DLT and blockchain experience. This is often mentioned as a huge disadvantage compared to traditional systems. Due to these scaling problems, many blockchains have limited capacity in the number of transactions they can handle (Benedetti et al., 2021).
- **Lack of standardization;** the terms blockchain and DLT are often used interchangeably and this is done because these are umbrella terms for a variety of protocols. Currently, there are multiple blockchains and protocols to choose from to create a tokenized security ecosystem on. Each blockchain and protocol have different advantages and disadvantages in terms of speed, reliability, costs, etc. Because of this, there is still limited adoption of one particular blockchain/protocol because there are still so many uncertainties about each project. Only when one or just a few reliable protocols are adopted across the globe, interoperability is possible and true efficiency can be achieved (Hilary & Liu, 2021).
- **Garbage in, Garbage out;** this disadvantage is not only applicable to DLT or blockchain but to a variety of software programs. However, due to the immutable nature of DLT, the data input should be correct because modifying the data is quite impossible dependent on the protocol. It is inefficient when a smart contract is triggered by a human mistake and this eventually cannot be reversed and requires enormous computational power to reverse this (Schletz et al., 2020; Hilary & Liu, 2021).

#### 4.2.6 Safety Issues

The promising safety effects that tokenized securities on DLT and blockchain should have, are countered in some articles with several arguments. These are based on how safe tokenized securities on DLT actually are compared to the safety advantages that many advocates plead for.

- **Front Running;** this concept means that an antagonistic trader tries to beat a trade initiator with incoming information on the trade. In the traditional market, this is done by high-frequency traders who have faster access to information and scan the offering book for purchases or sales. Because of their immensely fast action speed, they could beat a trade initiator to buy or sell a share with a very minimal margin. In the traditional market, this can be done because buy and sell orders arrive immediately at an exchange. In DLT this is different because transactions are sent to a pending pool of transactions before they are finalized (dependent on the protocol in use). Some protocols work with transaction fees that are based on the amount of gas that is required for a transaction, gas refers to the computational effort the transaction requires. An example of a protocol that uses gas fees is Ethereum, the more gas you are willing to spend the faster your transaction goes through. Traders can benefit from this procedure by scanning the pending transactions list and buying or selling the security with a small margin but increasing the gas usage. This prioritizes their trade because the protocol is built that way and puts the other party on hold. The rules around these trading methods are not yet defined and create to a lesser extent an unsafe trading environment (Benedetti et al., 2021).

- **Transaction finality;** when transaction finality is achieved the data cannot be reversed and this is interesting for criminals when they manage to steal one's assets. When they get access to your assets and transfer them to their wallet it is impossible to withdraw these transactions. Besides that, the wallet addresses are not tied to a personal identity and therefore make it difficult to pursue juridical actions against the criminal (Benedetti et al., 2021). Hence the decentralized nature of the system there is no central party responsible who could refund the transaction.
- **Attacks;** dependent on the protocol that the distributed ledger is running on there could be safety threats in the form of attacks. According to (Benedetti et al., 2021) there are attacks possible in the form of a 51% attack. This means that one party gets control over 51% of the network and can alter the history of transactions. In theory, this is possible, however, it requires tremendous computational power when Proof of Work is used or enormous capital when Proof of Stake is used. Another attack that could happen is a DDoS attack which is an abbreviation for distributed denial of service. This is realized by sending out a lot of requests to the service network to disrupt the functioning of the system. It can be slowed down or completely shut down if the system cannot handle the incoming requests (Abhishta et al. 2019). During the trading process of tokenized securities on DLT, someone could imitate many bogus orders to disrupt the validation protocol and the continuation of security trading on that specific network.
- **Hard forks;** this is a concept when a distributed ledger diverges and two different transaction histories are created by accident. The accidental or intentional creation of a hard fork will be left out in this thesis since this requires a quite complicated and extensive explanation. The point to make is that when a hard fork happens and two separated versions of the ledger are created the tokenized security is duplicated as well. There are now two versions of this asset which represent proof of ownership. This causes a dilemma as to which tokenized security is the original one and represents true ownership. A consensus should be reached among the involved parties to assess which ledger should be picked as the right one to continue on (Benedetti & Rodríguez-Garnica, 2021).

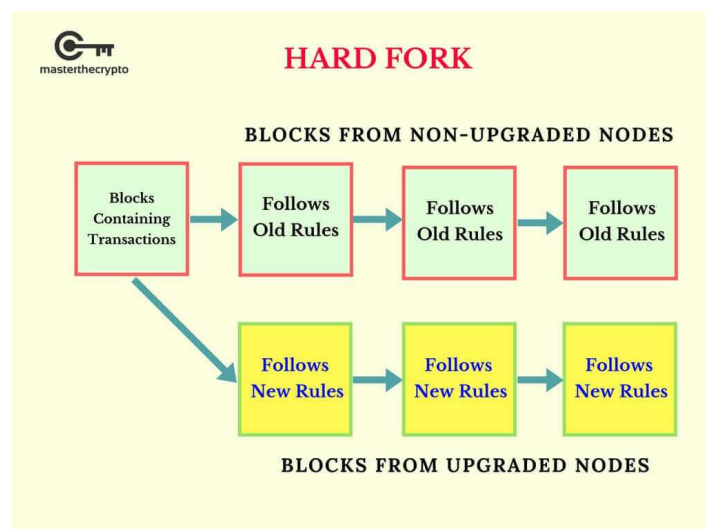


Figure 7. Schematic overview of a hard fork (Aziz, 2019).



- **Duplicate infrastructures of security trading;** in case of tokenizing existing securities there are two infrastructures that enable the trading of those securities. This can be a risk when the tokenized variant is not properly built. The financial service industry will likely go through some experimenting phase to experiment with all the technological features. It is therefore sensible to not abandon the old trading system immediately because random problems can arise with tokenized securities that make use of this new DLT (Smith et al., 2019).

#### 4.2.7 Smart Contracts

The attractiveness of DLT is the enabling of smart contract technology that causes many advantages. However, since this is a very nascent technology there is a disadvantage at play (Schletz et al., 2020). When the smart contract code contains an error there is no double check and the transfer will be executed anyway. This cannot be reversed so the code should be checked thoroughly before going live.

#### 4.3 Cost-Benefit Analysis

The aforementioned cost reduction aspects in Sub-section 4.1.9 are very promising and interesting for companies that want to issue debt or equity securities. The reduced issuance and trading costs are also beneficial for investors who pay eventually lower investment fees and therefore receive higher returns. In the collected literature of the structured literature review, there is only one particular study that provided a cost comparison between the traditional and tokenized issuance of a security. Khan et al. (2022) compared the issuance costs of a 500 million dollar Sukuk (the Islamic equivalent of a bond). We aim for a more elaborated comparison than just one study and therefore included two articles that fell out of the scope of the structured literature review. Cashlink and Fiona (2020) compared the issuance costs of a 50 million euro bond and Haahr et al. (2019) compared the issuance costs of a 100 million dollar green bond. In the table below we provide an overview of the bond characteristics:

	<b>Green Bond</b>	<b>Sukuk</b>	<b>Regular Bond</b>
<b>Amount</b>	\$100m	€500m	€50m
<b>Term of the bond</b>	20 years	7 years	7 years
<b>Coupon rate</b>	N/A	4.75%	N/A

Table 5. Details of the issued bonds.

### 4.3.1 Green bond

In the report of Haahr et al. (2019) an extensive comparison table is provided for the issuance of a 100 million dollar green bond that included the following costs:

<b>Issuance processes</b>	<b>Traditional Issuance</b>	<b>Tokenized Issuance</b>
Structuring, price setting, risk rating	\$1,000,000	\$20,000
Legal Review	\$100,000	\$40,000
Investor whitelisting and matchmaking	\$500,000	N/A
Internal review and green classification	\$50,000	\$20,000
Third party validation and green benchmarking	\$50,000	\$5,000
Registration and listing	\$15,000	N/A (if sold on an exchange)
Brokerage and sales	\$1,500,000	\$40,000
Payment and settlement	Opportunity cost: \$84,0000	0
Custodianship	\$350,000	\$2,000 (DLT dependent)
Data gathering (full lifecycle)	\$1,200,000	\$350,000 (Included IoT devices)
Data aggregation (full lifecycle)	\$400,000	\$115,000
Reporting (full lifecycle)	\$1,200,000	\$100,000
<b>Total</b>	<b>\$6,449,000</b>	<b>\$692,000</b>

Table 6. Traditional vs Tokenized issuance costs comparison (Haahr, 2019).

According to their cost comparison, they expect a cost reduction for the issuance of a green bond of around \$5,757,000:

$$\$6,449,000 - \$692,000 = \$5,757,000$$

When dividing the cost difference between the traditional approach and the tokenized approach with the traditional costs we come down to a relative cost reduction of almost 90 percent.

$$(\$5,757,000 \div \$6,449,000) * 100 = 89.27\%$$

An important remark to make is that they assume the issuance of a green bond, this comes with additional costs such as green classification, green benchmarking and excessive data gathering, aggregating and reporting. These extra costs are not in place by the issuance of a regular bond. The almost 90 percent price reduction is therefore a very optimistic conclusion.

### 4.3.2 Sukuk

In the report of Khan et al. (2022) who compared the issuance of a 500 million dollar Sukuk a less elaborated pricing table was provided. They compared the issuance between the traditional way and the issuance on a public blockchain called Ethereum and with a private/consortium blockchain. The total costs per issuance type are:

	<b>Traditional Issuance</b>	<b>Tokenized issuance on public Ethereum</b>	<b>Tokenized issuance on private blockchain</b>
<b>Total costs ( Fees and expenses paid upfront + issuance price)</b>	\$7.2M	\$3,7M	\$3,4M

Table 7. Traditional issuance vs Tokenized issuance (Ethereum) vs Tokenized issuance (consortium) (Khan et al., 2022).

The first tokenized procedure was built on Ethereum. According to their cost comparison, they expect a cost reduction for the issuance of a Sukuk via public Ethereum of \$3.5 million.

$$\$7,200,000 - \$3,700,000 = \$3,500,000$$

When dividing the cost difference between the traditional approach and the tokenized approach via public Ethereum with the traditional costs we come down to a relative cost reduction of 48.6 percent.

$$(\$3,500,000 \div \$7,200,000) * 100 = 48.6\%$$

The second tokenized procedure was built on a private blockchain, better known as a consortium. According to their cost comparison they expect a cost reduction for the issuance of a Sukuk via a private blockchain of \$3.8M.

$$\$7,200,000 - \$3,400,000 = \$3,800,000$$

When dividing the cost difference between the traditional approach and the tokenized approach via a private blockchain with the traditional costs we come down to a relative cost reduction of 52.8 percent.

$$(\$3,800,000 \div \$7,200,000) * 100 = 52.8\%$$

If we then average the two methods we come down to an average cost reduction of 50.7 percent when choosing for a tokenized issuance versus a traditional issuance.

$$(48.6\% + 52.8\%) \div 2 = 50.7\%$$

This is still a high cost reduction for companies who want to issue a debt security but it is less promising than the almost 90 percent mentioned by Haahr et al. (2019).

### 4.3.3 Regular Bond

Finally, we include a report by Cashlink and Fiona (2020) who compare the issuance of a 50 million euro bond. This is a regular bond issuance and they compare the traditional issuance procedure with the tokenized issuance procedure. During their analysis they separated four different phases in the issuance process; Pre-issuance, Primary Market, Custody & Asset Servicing and Secondary Market. They concluded that during the pre-issuance phase there is no cost reduction possible because costs incurred are dependent on legal aspects. It depends on the legal resources, time and the required documents that are necessary for a security issuance. The figure below shows the cost build-up and visualizes that there is no cost difference in the pre-issuance phase.

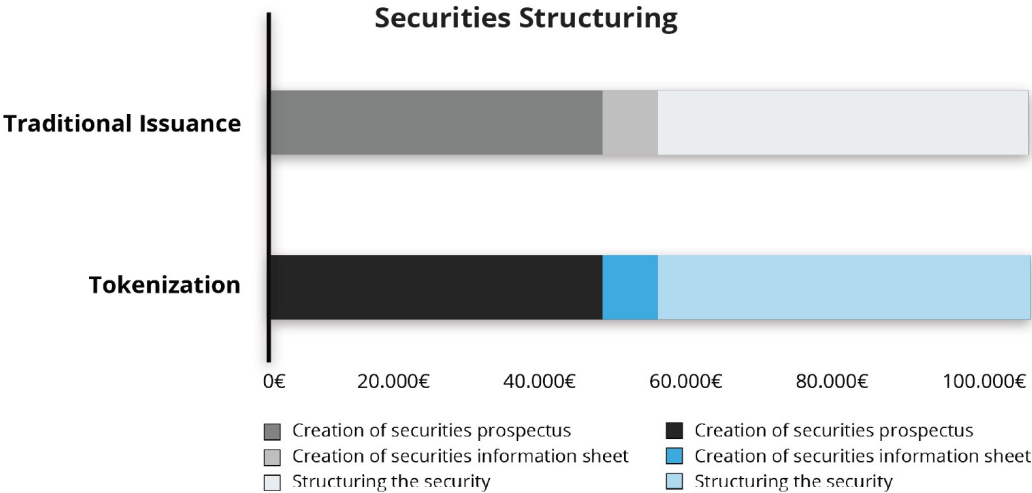


Figure 8. Pricing overview for the pre-issuance phase (Cashlink & Fiona, 2020).

In the next phase; primary market, they estimated a cost reduction between 14 and 68 percent for the tokenized procedure. The majority of the cost savings could be attributed to the efficiency of the issuance service. During the tokenization process, the issuing party is not dependent on an issuance agent or an investment bank. The figure below shows the cost build-up and visualizes the cost difference for the primary market phase.

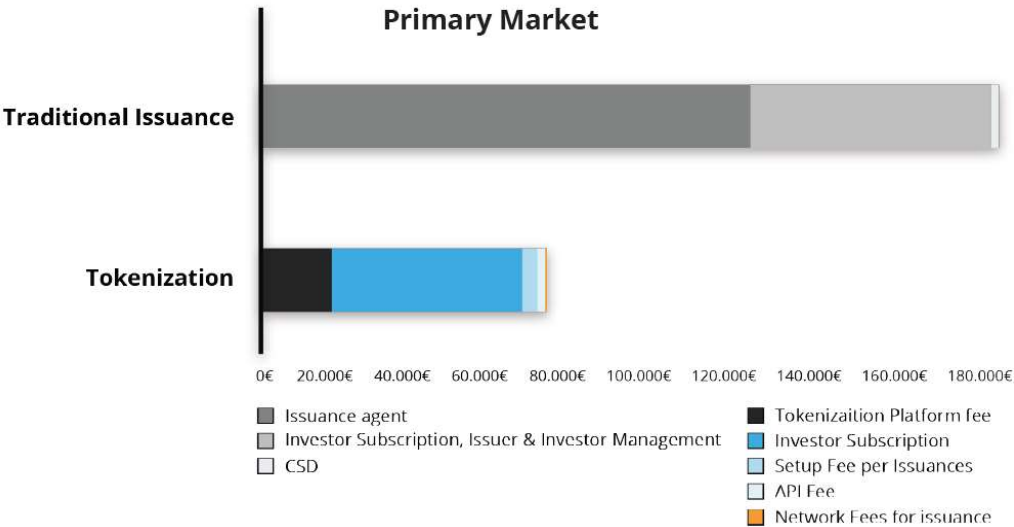


Figure 9. Pricing overview for the primary market phase (Cashlink & Fiona, 2020).

The custody phase is another phase wherein the tokenized procedure is expected to be less expensive than the traditional procedure. Cashlink and Fiona expect a cost reduction between 33-64 percent. The majority of this reduction can be attributed to lower custody fees for digital wallets. The figure below shows the cost build-up and visualizes the cost difference for the custody phase.

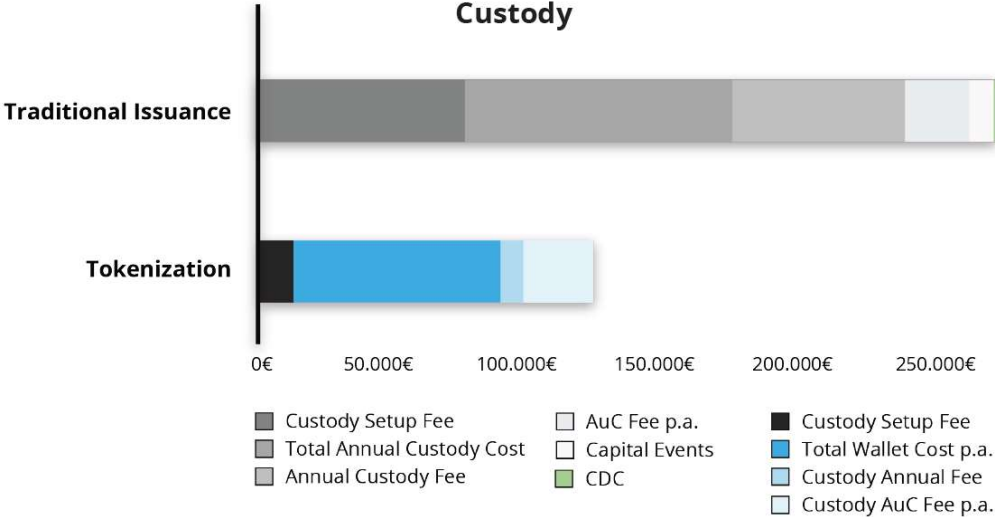


Figure 10. Pricing overview for the custody phase (Cashlink & Fiona, 2020).

At last, they describe the secondary market phase where the trading happens. They estimate cost reductions between 17-50 percent, which is realized primarily by the reduction of intermediaries during the trading process. The figure below shows the cost build-up and visualizes the cost difference for the secondary market phase.

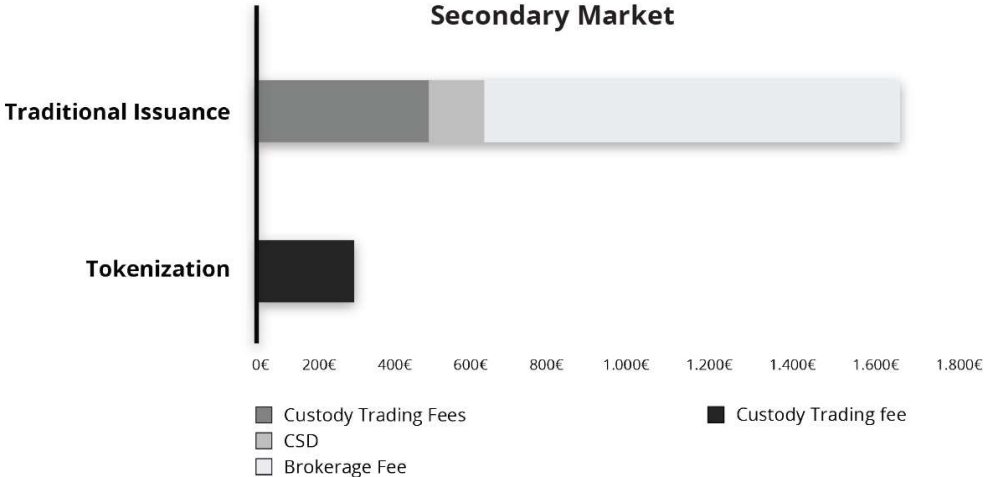


Figure 11. Pricing overview for the secondary market phase (Cashlink & Fiona, 2020).

Eventually, they conclude on a total cost reduction of €757,950 when issuing a bond via the tokenized procedure. Unfortunately, they do not provide exact numbers on the cost differences, only the figures are shown with the costs on the x-axis. These numbers are a bit hard to interpret but according to their calculations, the tokenized issuance procedure is 42.6 percent cheaper compared to the traditional procedure. At the beginning of their report, they estimated total cost savings between 35-65 percent. The eventual conclusion of a reduction in costs of 42.6 percent is in line with their expectations. Cashlink and Fiona’s case study shows

also that issuing tokenized securities leads to a cost reduction compared to traditional issuances. However, it shows a smaller cost reduction than the two other examples in Sub-sections 4.3.1 and 4.3.2.

**4.3.4 Summarised**

The issuance examples of a regular bond, green bond and Sukuk give us an impression of potential cost reductions by issuing via the tokenized procedure. Unfortunately, not every case example is described in the same level of detail on the ongoing costs. Besides that, they are only case examples of issued bonds which fall under the category of a debt security. We also include equity securities in this study, however, due to the novelty of the topic no examples have been found by us on equity securities such as regular shares. Although, it can be concluded from the aforementioned examples that the issuance of tokenized bonds is indeed cheaper than the traditional issuance procedure.

	<b>Green Bond</b>	<b>Sukuk</b>	<b>Regular Bond</b>
<b>Cost reduction in %</b>	Case example: 89.27%	Ethereum: 48.6% Consortium: 52.8% Average: 50.7%	Estimations 35-65% Case study: 42.6%

Table 8. Summarized overview of price reductions in percentages

The most optimistic estimation is around 90 percent and the more conservative estimation is around 40 percent. This shows that there is no clear consensus yet about the potential cost reduction of tokenizing securities. However, research shows that there is great potential for cost reduction via the tokenized procedure, especially for the issuing parties.

**4.4 Key takeaways**

By analyzing the selected articles based on the structured literature review, we created a concise list of advantages and disadvantages. The purpose of this chapter was to establish the difference and possible advantages and disadvantages of tokenized securities compared to traditional securities. After reading the selected articles a list of possible advantages and disadvantages was created in Excel. These advantages and disadvantages were eventually (if there was an overlap between them) grouped into specific themes, to create a more convenient overview.

As shown in Table 3 there were nine themes for the advantages. These were then further specified in certain aspects to complement the created theme. Each theme is explained in a sub-section, in these sections we clarify which articles we used to derive the advantages from. In this way, we show what specific aspects we grouped to create this theme. Besides, we provide a short explanation that the researchers of the chosen articles used as reasoning as to why these are advantages. These are the created themes with accompanied aspects:

- **Improved liquidity**, due to fractional ownership.
- **Improved accessibility**, due to the creation of global markets and 24/7 trading.
- **Regulatory improvements**, due to built-in compliance and customizable regulations.
- **Improved transparency**, due to a reduction in intermediaries, auditable history on the ledger and decentralization.
- **Improved efficiency**, due to once again a reduction in intermediaries.

- **Safety improvements**, due to reduced counterparty risk, having no single points of failure and immutability of data entries.
- **Interoperability**, due to usage of DLT/blockchain.
- **Smart Contracts**, due to innovation it facilitates, automation of procedures, digital distribution, customizable functions per issuance and atomic swaps.
- **Cost reduction**, due to a reduction in overhead.

For the disadvantages, the same approach was used but there were fewer themes created because there were fewer disadvantages mentioned in the literature. The seven themes that were created for the disadvantages are presented in Table 4. We once again connected specific aspects to each theme to explain further why these are disadvantages. The articles where the disadvantages were mentioned are listed in separate sections to present how we came to these conclusions. These are the created themes with accompanied aspects:

- **Decreased liquidity**, if wider adoption is lacking and due to instant settlement of transactions on the ledger.
- **Accessibility**, more accessibility could lead to higher bid-ask spreads during the day.
- **Regulatory implications**, due to legal uncertainty and possible manual maintenance.
- **Transparency**, in the form of undesired transparency, lack of privacy and black box effect.
- **Efficiency**, could not be achieved due to scaling problems of DLT/blockchain, lack of standardization and garbage in garbage out problem.
- **Safety issues**, due to front running, transaction finality being unclear, attacks on the network, hard forks in the chain and a duplicate infrastructure of security trading.
- **Smart Contracts**, that could possess coding errors that lead to detrimental errors.

In short, there were more advantages mentioned in the literature than disadvantages. However, these researchers could be biased to look only for the advantages while doing research. It is difficult to establish how these advantages and disadvantages in theory will develop in practice, once tokenized securities on DLT are widely adopted. In Chapter 6 we discuss some case study examples, that could provide some insights into how these advantages are brought to life when using smart contracts for tokenized securities.

To complement this chapter on advantages and disadvantages a cost-benefit analysis is done on three case studies that analyzed the potential cost reduction of tokenizing a bond. Each price comparison is presented and calculations were done to establish a price reduction in percentages. The three case studies varied from optimism about the possible cost reduction for bond issuances:

- **Green bond**; this case study predicts a price reduction of almost 90 percent.
- **Sukuk**; this case study compared two options, one via Ethereum and one via a Consortium resulting in an average price reduction of around 51 percent.
- **Regular bond**; this case study stated an estimated price reduction between 35-65 percent, their final example came out at a price reduction of 42.6 percent.

Although the different case studies vary in relative cost reduction, they do show that the issuance costs for a bond can be reduced drastically when using the tokenized approach.

This is backed up by research articles we used from our structured literature review. The majority of the articles stated that cost reduction is an advantage as a consequence of overhead reduction.



## Chapter 5: Opinions: Perspective Issuers and Investors

In this chapter, we provide an answer to Sub-question 3: “*What are the opinions of the issuing and investing parties on the usage of tokenized securities?*”

As described in the research methods section, we answer this question on the basis of an analysis of semi-structured interviews. These interviews were eventually conducted by us with two investors who had an investable capital that was one hundred thousand euros or more. On the issuance side, we conducted one interview with a company that already issued share certificates with an amount exceeding one million euros. The expectations were unfortunately met that not many people wanted to participate in an interview. Therefore the sample is lower than the initial amount that we anticipated. These interviews were held according to a semi-structured approach, the questions that were created in advance are shown in Appendix 1. However, during the actual interviews, we deviated from the questionnaire if necessary to acquire useful information. If the participants agreed to a recording the interviews were recorded and transcribed afterwards. We have done this for the two interviews with investors and these transcripts are shown in Appendices 3.1 and 3.2. We held the interviews in Dutch because this was the mother tongue of the participants, we translated them to English afterwards to make them suitable for this study.

The interview with the company on the issuance side was not recorded. However, during the interview, we wrote down the answers in key words and created a summary afterwards. In Appendix 3.3 a summary of the questions asked and the company’s answers are provided by us. This interview was also held in Dutch and has been translated into English.

After we created the transcripts and the summary, we analyzed their answers according to the Gioia method. This method is used to gain a better understanding of the interviewees’ opinions on tokenized securities. The purpose of the Gioia method is to create a codebook that provides better insights into the interviewees’ answers. The first step is to write down empirical indicators which are literal quotations of the interviewees’ answers. These empirical indicators are then coded into first-order categories that summarise the empirical indicator in a few keywords. Those first-order categories are then labelled with a second-order theme that combines multiple first-order categories into one specific theme for the subject. Eventually, we coded those second-order themes into three overarching dimensions that encapsulate all the information from the previously created codes. An example of how this works is shown below.

- **Empirical indicator:** starts with a quotation from the interviewee:  
*“There can be no demand for an ETF at a certain point in time, say, while the price will remain indexed at a certain point how do you get rid of it?  
Let’s say, if you ever want to sell a large part of your portfolio if you have built up a really good portfolio over the long term, what about liquidity of the share ? (S.v.D., lines 185-189)*
- **First-order category:** the quotation is summarized into a category: *Liquidity problems.*
- **Second-order themes:** the category is grouped with other created categories such as; lack of knowledge and rebalancing portfolio and this leads to the theme: *investment barriers.*
- **Overarching dimensions:** the theme is then grouped with other themes such as; investment plan and this lead to: *current investment experience.*

The created codebooks of the investors' interviews are visible in Appendix 4 and for the issuer in Appendix 5. In the first sub-section, we discuss the outcomes of the investors that eventually lead to their opinions. In the second sub-section, we describe the outcomes of the issuer and consequently the conclusion of its opinions.

## 5.1 Opinions of Investors

The investors' codebook exists of three dimensions: 1. Current investment experience, 2. Stance on tokenized securities and 3. Obstacles for technology embracement. These will be discussed one by one to eventually come down to a conclusion on the interviewees' opinions.

### Current investment experience

This dimension captures any relevant information for the interviewees' investment plan and the investment barriers that they currently experience. Both investors have a different investment plan: *"that plan took shape in a slightly more conservative long-term plan that I really intend to stick to for decades, and that is actually that I put a fixed amount every month, partly in ETFs at the moment"* (S.v.D., lines 80-82) and: *"Yes, so that's a bit, but I haven't actually done anything myself yet, so I've had everything invested by ING so far"* (W.H., lines 54-55). Besides these investments they have also invested in digital assets, more specifically they devoted a small portion of their portfolio in cryptocurrencies: *"Yes, at the moment, apart from cryptocurrencies, which is a much smaller part than my investments in ETFs, it is all ETFs, so no individual shares"* (S.v.D., lines 100-101) and: *"I have, now say something like € 250 in Bitcoin, but it's nothing serious. And well, I do follow the news, but I'm not really an investor in it yet"* (W.H., lines 166-167).

Their investment barriers vary from having a lack of knowledge: *"Since I don't consider myself someone who knows enough about it, I just don't want to get into that just yet"* (S.v.D. line 123), or not wanting to invest time in doing research: *"I can just put it away now, so actually, the barrier is that I don't want to invest the time in doing the research"* (W.H., lines 240-241). One of the interviewees mentioned more barriers such as: *"one is for example about balancing, rebalancing your portfolio"* (S.v.D., lines 173-174) and: *"Let's say, if you ever want to sell a large part of your portfolio if you have built up a really good portfolio over the long term, what about liquidity of the share?"* (S.v.D., lines 185-189). While the other interviewee was focusing on: *"I looked it up, yes, but I was mainly afraid of making too many costs"* (W.H., line 203).

So, the current investment barriers that they are dealing with are focused on having a lack of knowledge or not wanting to put the time in to acquire the knowledge. Besides that, one of the interviewees experiences barriers in portfolio rebalancing and possible liquidity problems when he wants to sell his investments in the far future.

### Stance on tokenized securities

This dimension captures any relevant information for the interviewees' knowledge of tokenized securities, perceived (dis)advantages and how they see tokenized securities versus traditional securities. Both interviewees were not very familiar with tokenized securities in advance: *"I had heard of tokens in the landscape of cryptocurrencies, where they also often tokenize cryptocurrencies I think you have some kind of token of that currency, but beyond that actually quite unknown"* (S.v.D., lines 257-259) and: *"No, but I could imagine it myself"* (W.H., line 300). One of the interviewees mentioned: *"I have to say that I don't necessarily understand or understand the difference with what is the difference with a traditional stock"*

(S.v.D., lines 279-280). While the other interviewee had somewhat of an idea of what the difference is and what possible advantages could be: *“It seems to me that the transaction costs are very clearly visible in advance, so that is very insightful. It also seems to me that the trades themselves become a lot more transparent, so that your manipulation could be seen coming sooner, perhaps”* (W.H., lines 340-342). The other interviewee compared it to a traditional stock that can only be traded on a stock exchange: *“the token is tradable on blockchain technology. Ultimately or useful at least, useful compared to traditional and traditional a share of ASML that you can only trade on the stock exchanges of those we know”* (S.v.D., lines 307-309).

However when asked a question about the possibility of a tokenized security having a risk-premium one of the interviewees mentioned: *“But I don't necessarily see a reason why you would have that more with a tokenized security than with a classic security”* (S.v.D., lines 432-434) and the other: *“So no doubt that will be a little higher, so maybe you can go from 5% to 7% or so...”*(W.H., line 608). They both see lower investment fees as a potential benefit: *“I can imagine that an environment arises where you ultimately pay less fees. And yes, if you have an investment strategy for the 30 years and you want to buy something every month, that is a big factor”* (S.v.D., lines 512-514) and: *“So maybe you could cut that cost by 2.5% and then have the cost, to 1-2% or 1% if you do it on the blockchain”* (W.H., lines 597-598).

When we dive deeper into the possible perceived advantages of tokenized securities by the interviewees, the opinions started to deviate from each other. One of them mentioned advantages like safety and decentralization: *“But, I personally think that in the end if it's thought through and implemented in a good way it could be safer for a retail investor like me for example”* (S.v.D., lines 563-564), *“I think the financial institutions that we now use as people who have a certain influence and who have certain power. And in theory they could do things that a blockchain cannot, for example, because it is controlled by a lot of people”* (S.v.D., lines 565-567). The other interviewee has a different opinion on the topics of safety and decentralization: *“I think safety and that's dangerous, I think”* (W.H., line 749) and *“Oh, but also, I think so, right. Let's say grandfather of 80, let's also join the blockchain it is very easy again. If there is no party in between or ING, they happen to have that blockchain code, which is somewhere in your information [...] I think that just like all that is now a danger, it might become even easier to scam Grandpa out of his pension. Because you already see a lot of how great knowledge is already on that [...] I don't think that would reduce that, so I see that as a big disadvantage, also that it should actually be a better solution for that”* (W.H., lines 760-762; 772-773; 784-785). For decentralization, he mentioned: *“I think it also becomes easier to manipulate, because there is not such an exchange as a kind of police behind it, so to speak”* (W.H., lines 353-354), so for W.H., safety and decentralization are perceived disadvantages.

They both however did mention transparency as a perceived advantage: *“And transparency is perhaps one of them, yes, certainly”* (S.v.D., lines 605), *“I do indeed think the costs and suppose, we put all the securities on the blockchain, then it will of course also be very good, insight into whether manipulation is taking place”* (W.H., lines 718-719) and *“Then you can see very well, what, or people shouting something whether they have an interest in it, huh? And that seems a lot fairer to me in the bigger picture, also for the consumers who invest”*

(W.H., lines 730-731).

When it comes down to perceived disadvantages they mentioned different aspects, one of them thinks it is difficult to establish valid tokens from scam tokens: *“I expect that it is also difficult to check that for every token share that is out there to check whether there is also a real share against it, I think”* (W.H., lines 377-378). While the other interviewee focusses more on the possibility of longer transaction times: *“Things that I have encountered, for example with trading cryptocurrencies and sending Bitcoin to people or whatever, is that it can sometimes take a long time before transactions are completed or are. So of course not the case with every cryptocurrency, but there are...”* (S.v.D., lines 630-632).

In the end, they both admitted their doubts about tokenized securities: *“So I still find it a bit difficult to judge, just because I wouldn't know exactly the list of pros and cons of one or the other”* (S.v.D., 796-797) and: *“I wonder what the added value or added value of, for example, an ASML share on the blockchain instead of a product, so that you can always trade instead of a project on the ASML. The same effect that you then had on the stock exchange”* (W.H., lines 545-548).

So, they do see potential advantages but also potential disadvantages when it comes down to investing in tokenized securities. We want to make clear that according to the interviewees, their knowledge is lacking on the subject to assess its functionality and possible benefits. One of them, however, mentioned safety, decentralization, transparency and cost reduction as advantages but, (possibly) longer transaction times as a disadvantage. While the other interviewee mentioned cost reduction and transparency as advantages but, safety and decentralization as disadvantages. We can conclude that there is no clear consensus on this topic between the two interviewees' opinions.

### **Obstacles for technology embracement**

This dimension captures any relevant information about the interviewees' uncertainty for changing towards tokenized securities, the wider adoption of it, perceived challenges for the adoption and their associations with blockchain technology. Their trust in blockchain/DLT is differing because one of the interviewees is positive and mentioned: *“I think it has already proven itself in some sense when it comes to cryptocurrencies themselves. And I think that would be a pretty good indicator before it could work for the tokenized securities as well”* (S.v.D., lines 330-331) while the other interviewee is a bit more conservative: *“I'm still a bit hesitant about the blockchain technology to see if it can be cracked or something, or whether there are some kind of exploits that people can't foresee yet because computers are not fast enough for that”* (W.H., lines 398-400). This is also mainly dependent on which blockchain is chosen: *“I think I would consider it the moment it is on one, even on a chain that it is still there, on an Ethereum for example I would rather consider it than on another”* (W.H., lines 482-483) or if certain institutions start adopting blockchain: *“As you look purely at the technology of blockchain, I think I would trust it and certainly, certainly I think if the authorities known to people start to implement something like this”* (S.v.D., lines 350-351), *“I think if ING were to do that, then many more concepts have already shown that it works, so I don't think I would switch to another bank”* (W.H., lines 648-649).

Their concerns for the adoption and usability of blockchain/DLT are caused by associations that blockchain/DLT have with cryptocurrencies. According to the interviewees experienced these technologies some flaws in the past: *“If you know it less well that you then also hear*

*that there is all of a sudden a hole, a hole in it, an exploit in that code or somewhere, then of course you run so much more risk and then I think yes, then you know risk is difficult” (W.H., lines 496-499) and: “And maybe there is also an important thing, maybe also, now people still just have a lot of association with when it comes to blockchain, blockchain, I think people mainly know about cryptocurrencies.*

*Yes, and of course cryptocurrencies also have a certain image” (S.v.D., lines 838-840).*

Besides that, they experience uncertainties of why they would want to change to such a system and this new way of investing: *“So and well, in retrospect I think that is easier to determine to look like yes, that is indeed a good one, isn't it. it's very safe. Only I don't think I would do it, simply because you think that I then, perhaps, would rather be a bit more conservative in that regard, that I then have a central party that guarantees that security” (W.H., lines 525-527) and: “Uhh yeah, for me there must be some major reason why I would want to change, change or buy it through, that way, versus the way I do it now and the way I do it now me very easily. And I trust, say, the party where I am indeed doing the Giro in this case, where I am doing it at the moment. So, say, suppose the option exists now and it could. Then I wouldn't see any reason at the moment to really start using it right away and leave the other thing for what it is” (S.v.D., lines 394-398).* By having insufficient knowledge and education on the subject it is difficult for them to find a reason to change.

According to one of the interviewees, there is probably a small group that is immediately interested in this: *“Yes for that reason actually I think you might see that there is always of course always early adopters and more innovative companies or retail investors who dare who are already curious and who are always looking and on the smaller edges that you can find” (S.v.D., lines 745-747).* For the general public he thinks that it comes down to: *“Yes, yes, I think it's just going to be really, really important eventually if you, yes, if you want companies or yes companies, institutions, people or retail investors themselves to want to make good use of it, or use it at scale will make it especially important to think carefully about: How do we bring it to the people or how do we introduce it to them”.* While the other interviewee sees preferably a golden mean between using blockchain/DLT and a centralized way of working: *“I think it, the use, I think it's a nice one they're super nice techniques, But I think it, that the technique can also be used in a more centralized way and that there's kind of eh, that in 10 years that maybe you can go more into a kind of hybrid form and that that's more of the golden mean that people have to find and I'm curious if that will actually happen” (W.H., lines 804-807).* Based on their answers both of the interviewees are not very confident that choosing tokenized securities on DLT/blockchain is the right way to pursue. They lack confidence in the security of the technique but when it is adopted by large institutions they are somewhat more positive. Eventually, it comes down to acquiring more knowledge on the subject and educating investors to make a well-considered choice.

## **5.2 Opinions of Issuers**

The issuer's codebook exists of three dimensions; 1. Financing approach, 2. Stance on tokenized securities and 3. Obstacles for technology embracement. These will be discussed one by one to eventually come down to a conclusion on the issuer's opinion. The interview of the issuer was not recorded, we created a summary afterwards so therefore there are no literal quotations to back up certain statements of the interviewee.

### **Financing approach**

This dimension captures the reason for their current chosen financing method. This is

summarized as: *“The reason why we opted for financing via NPEX is because it is a somewhat more professional approach compared to crowdfunding, which is more in line with the objectives of GW. In addition, a certificate from NPEX is tradeable, which creates liquidity for the investor. From the company's point of view, the cost of capital is considered to see what is attractive in terms of financing. In which CAPEX based decision-making is also mentioned, which is important for their way of financing”*(G.W., lines 41-46). According to this answer, the company kept the investors’ interests in consideration while also looking at their own financial needs. This came down to a public listing on the NPEX exchange, a SME exchange in the Netherlands.

### **Stance on tokenized securities**

This dimension captures any relevant information about the interviewee’s knowledge of tokenized securities and perceived (dis)advantages when they would change to this way of financing. According to the interviewee: *“Tokenized Securities are a new concept for them. Heard of Blockchain before to do something with it at the time to be able to trade energy. If the energy network is not in balance due to too much supply and too little demand, something has to be done. By setting up rules via blockchain, there could be efficient transfers to create a market for this”* (G.W., lines 69-72). The perceived advantages when using tokenized securities are according to the interviewee dependent on: *“If the digital world and money takes off and it can start to scale there are certainly advantages such as: Large market, which also means a liquid market because there is more money in circulation, the tradability of your investment goes up, greater demand and of course greater offer. Larger market is an advantage so that you can sell your position as an investor”* (G.W., lines 157-161), from the company perspective: *“The earning model of NPEX is difficult to estimate, for example, the current fees may be lower. But something around 1% will probably remain, perhaps for half the money”* (G.W., lines 179-180). This means that for the issuing costs they expect a reduction of 50% but only if scalability is a fact.

### **Obstacles for technology embracement**

This dimension captures any relevant information about the requirements for changing towards tokenized securities and the perceived outlook on DLT/Blockchain. The consideration to change to this alternative is dependent on: *“In order to choose this method, the interests of the investor need also to be taken into account, in particular; affordability, security of supply and sustainability are important. If these principles can be guaranteed, they find it interesting to do it this way”* (G.W., lines 87-91). However, when it comes down to trust in DLT/blockchain the interviewee mentioned: *“Too few real projects, many pilots, not yet a big movement, so that it is not yet really trusted and widely used”* (G.W., lines 102-103). When we asked the interviewee about DLT/blockchain being the future as a trading ecosystem, the interviewee was somewhat hesitant: *“Difficult to make a clear statement about this, the interviewee does expect that digital money will take off like a digital euro. Whether the actual financial markets will run on this is no statement made for”* (G.W., lines 142-143). Eventually, the interviewee does think that there is a lack of knowledge among the general public when it comes down to tokenized securities: *“It is still a concept to explain before people want to go into business with this”* (G.W., line 157). However, the interviewee does think that: *“People who want to move forward, early adopters and young people who are interested in this may have investment appetite”* (G.W., lines 115-116). This is in line with the answers of one of the investors, there might be investors who seek new alternatives but the

majority of the investor population might require more information to invest in tokenized securities.

### 5.3 Key takeaways

After analyzing the transcripts of the interviewees according to the Gioia method, three overarching dimensions were created that encapsulate the content of the interviewees' opinions. The most important aspects per dimension are listed below.

- **Current investment experience;** based on their answers the investors have a conservative investment plan that consists mainly of ETFs or Index funds. They do possess some tokenized assets in the form of cryptocurrencies, however, tokenized assets in the form of securities were very new to them.
- **Stance on tokenized securities;** because of their lack of knowledge, it was difficult for them to make a good assessment as to why to invest in tokenized securities and why it would benefit them. Doubts about DLT/blockchain technology are mentioned several times. However, the two interviewees were contradicting each other in their opinions on safety and decentralization. One of them saw it as a positive aspect while the other was more at ease with a central way of working. He thought that transitioning to this system will come with risks such as elderly people who lack the knowledge to use such a new system
- **Obstacles for technology embracement;** the lack of knowledge and the need for education were made clear several times by both of them. Before transitioning to tokenized securities they both want to know what they are dealing with. Only if bigger institutions adopted these products they were more likely to use these products and believe in the validity of DLT/blockchain technology.

From the issuer's perspective, one company was interviewed about tokenized securities. The overarching dimensions are listed below and the most important aspects per dimension are mentioned.

- **Financing approach;** the interviewee explained their financing methods that were based on: cost of capital considerations and considering the interests of the investors when choosing a financing instrument.
- **Stance on tokenized securities;** tokenized securities were for the interviewee an unfamiliar topic and therefore it was difficult to assess for him what the possibilities could be. It could be beneficial for both the investor and the company as costs could be reduced. However to pursue this way of financing there should be several guarantees for the investors and those are safety, sustainability and guarantee of delivery. Only if these three aspects could be realized it would be a suitable alternative. The most promising effect could be the enhancement of a liquid market. This is according to the interviewee beneficial for the investor as it is easier to sell their investment and for the issuer who could collect more funds for financing business operations.
- **Obstacles for technology embracement;** the interviewee does mention some obstacles for blockchain and DLT due to a lack of big projects. There might be some early adopters that are interested in tokenized securities, however, according to the interviewee, it is still a concept to explain.

All in all the interviewees are kind of neutral on the topic since a lot is still unclear. There are potential benefits but education and wider adoption are prerequisites before they would want to utilize tokenized securities.



## Chapter 6: Smart Contracts: Added value for Issuers and Investors

Throughout Chapter 4 several advantages have been discussed for tokenized securities. The majority of the benefits are realized by one concept in particular: Smart contracts. In Chapter 2 we explained smart contracts work and why they are promising in the financial service industry. It removes the need for trust among involved parties in the security value chain because it relies on a self-sufficient operating system. In this section, there will be some form of overlap about the advantages of smart contracts that are mentioned in Chapter 4. These advantages are derived from scientific articles and are mostly based on hypothetical situations since the tokenized security market is not fully developed.

We think it is relevant to add practical examples to establish the added value for issuing parties and investors right now. This information is required to answer Sub-question 4: “*What is the added value of Smart Contract possibilities when utilizing tokenized securities for issuing and investing parties?*”. To answer this question we provide a short recap of the advantages of smart contract usability. In addition, we present practical examples from already issued securities with active smart contracts to complement the academic state of the art.

### 6.1 Smart contract functionality & advantages

Smart contracts are contracts created by code that are triggered automatically when the right conditions are met. This means that when the prerequisites are present the contract will execute and for example, transfer an  $x$  amount of tokens to another party. Because smart contracts are coded, they work with binary decisions; either execute the contract or not. This removes trust problems between parties and streamlines many processes that usually require manual controls by a third trusted party. The list below is a short recap of highlighted advantages of smart contracts.

- **Facilitated innovation;** smart contracts allow communication between multiple parties and systems. They can tap into off-chain datasets to read required information for certain actions. In combination with Internet of Things (IoT, this is a phenomenon where sensors can transfer information to operating systems to alter their actions) real-time information can be used to communicate and base transactions on. An example of this application can look like this: The daily energy output of a solar park can be measured with IoT devices that transfer real-time data to a database. Based on the solar park’s data, a dividend can be paid out to investors at the end of the day when the solar park owners know how much energy is produced.
- **Automation;** this advantage is also mentioned before and is the key element of smart contracts. A lot of rules can be programmed into the contracts that do not require manual actions. The issuance of a security with accompanied trading rules only has to be programmed once and the smart contract can run forever.
- **Digital distribution;** distribution rules of payouts can easily be programmed into a smart contract. The payout of dividend for a share or the interest for a bond could be programmed with clear if-then rules based on certain requirements. Once these requirements are triggered the smart contract activates the payout function. This creates an instant transfer to the wallet of the investors without the need for a third trusted party that usually validates transactions.

- **Customizable functions;** a smart contract is created by code and can be customized according to the demands of the issuing party. Their token can for example represent a share which has a right for dividends but not for voting rights, to keep the decisive power within the company. This can easily be programmed into the token and operates automatically.
- **Atomic Swaps;** this concept is created to streamline the transfer of tokens between different blockchains. With an atomic swap, one can transfer a tokenized security for another tokenized security that is stored on a different ledger without converting it to fiat first. It allows that two digital assets are simultaneously traded across different blockchains within a certain time frame. When both parties accept the conditions of the trade, it is executed by a smart contract and recorded on the ledger.
- **Public available:** Another advantage that was not mentioned in any of the articles in the structured literature review is that smart contracts can be examined on several websites. We think that this is also an important advantage to add to this list. Websites such as *etherscan.io* and *polygonscan.io* track all the transactions on those protocols. When clicking on a specific transaction one can look at the smart contract that executed that transaction. One could read the specific line of code that is used and by which rules the smart contract operates. This is very transparent compared to the legacy systems of traditional securities that are operating behind closed doors.

## 6.2 Case Studies

The advantages according to the literature sound very promising but due to the novelty of the subject, there should also be an investigation into the current state of the art of smart contract usage in tokenized securities. In this sub-section, we describe several case examples of issued tokenized securities that leverage the usage of smart contracts in their debt or equity security operations. The purpose of these examples is to show what the added value of smart contracts is for both issuers and investors.

### 1. Mt. Pelerin (Mt. Pelerin, n.d.)

Mt. Pelerin is a new Swiss bank that wants to create a fully regulated and compliant bank on blockchain technology. Their issued tokenized security is an equity security in the form of a share, with a total issued market cap of around \$4,187K (STM, n.d.-f). The goal of Mt. Pelerin is to tokenize the entire balance sheet of the bank by using smart contracts. Examples of these products can be loans and deposits that are issued on the Ethereum blockchain. By issuing them on Ethereum, smart contract technology can be used to execute transfers.

Loans can for example be automated by setting up contractual relationships within a smart contract to sell and transfer loans. The rules that are embedded in this smart contract are enforced by the smart contract itself because it is programmed within. Those contracts could be sold and transferred to other parties because it is an actual contract that state e.g. what the principal is, the interest rate is, and what the default measures are (Mt. Pelerin, n.d.). Creating a liquid market for these loans creates added value for investors who are not bound by a loan obligation but can sell them when they need the money. The party that received the loan is not hindered by this because the rules and arrangements are staying the same within the smart

contract only the owner of the contract changes.

Another example that is mentioned in Mt. Pelerin's whitepaper are deposits that can be put in specific funds that offer certain interest rates. Smart contracts are used again to set up predefined rules on the offered interest rates at a specific time interval over a certain amount of money. This reduces the costs for clients and creates higher saving returns on their deposits.

Once Mt. Pelerin has received the required licenses they want to apply their Bridge Protocol to fiat currencies to tokenize euros, Swiss francs, and many other currencies. This is the first step of creating tokenized assets and the protocol aims to support the lifecycle of a token for actions such as different voting methods without the use of proxy tokens, dividend distribution, freezing of tokens (necessary for updates or swaps), seizing of assets (if imposed by the court), dependent restriction of transferability of amounts (AML regulations), conditional rights (voting, dividends) and full support for KYC compliance processes such as e.g. whitelisting.

The financing of this new bank is also done by tokenized securities, they offered equity securities in the form of shares that investors can buy to facilitate the development of this company. This shows that the company owners successfully gathered funds for their financing purposes. In this example, it is not only the tokenized security itself that creates a lot of added value for investors but also the products that this bank tries to create.

## **2. 22x (22X, 2018)**

This company's tokenized security is representing 30 Silicon Valley start-ups in several domains such as; blockchain, machine learning, data mining, marketing, transportation, health, and legal & insurance technology. 22x has invested in 30 different companies and by buying the 22x tokenized security an investor could profit from the underlying companies. The tokenized security has been issued on the Ethereum blockchain and uses a smart contract to manage the tokens. 22x's issued tokenized security is an equity security in the form of an LP (limited partners) Fund Interest, with a total issued market cap of around \$1,028K (STM, n.d.-a)

By using smart contract technology the 22x securities are locked for a predefined period and are released upon the date embedded in the smart contract. This gives the company an advance of a guaranteed funding amount at the beginning of its business. Once the tokenized securities are unlocked they are tradable by the investors on the secondary market. The tokens are sent to the investor's wallet and they are responsible for keeping their wallets and tokens safe. Another aspect of smart contract technology that they use is token redemption. Once an investor wants to cash out the 22x tokens for fiat currency the money is automatically sent to the investor's bank account. The tokenized securities need to be taken out of circulation and are sent to a separate wallet that cannot be accessed in the future, this process is called token burning. By this process, the circulation of tokens is balanced once a cash-out happens because the tokens are taken out of circulation, which increases the value of the other tokens. This procedure is beneficial for investors because it creates scarcity of the token which is usually tied to an increase in value.

### 3. Bitbond (Bitbond, 2019)

Bitbond is a business lending platform that finances SMEs and start-ups via loans. As the name implies it is a bond that is tokenized and issued on the Stellar Blockchain. Bitbond receives funds from investors who distribute it to business owners that apply for a loan at Bitbond. The business owners transfer monthly repayments to the investors consisting of an interest rate of 1% per quarter (4% p.a.). The BB1-Token is the so-called tokenized security of Bitbond and entails a smart contract that is issued on the Stellar Blockchain. Their issued tokenized security is a debt security in the form of a bond, with a total issued market cap of around \$1,654K (STM, n.d.-b). After ten years the BB1-Token will reach its maturity and will be bought back at a face-value of €1 per token.

The smart contract is programmed in a way that it represents the payment obligations. It uses “if-then rules”, if the right predefined conditions are met, the payment is automatically transferred to the token holder. This is done according to the agreed maturity date, whereby the claims that arise from the bond contract are executed by the smart contract.

This benefits the investors by being able to trust and guarantee the automatic payments that will be transferred only if the conditions are met. The obligations are established in the smart contracts and are coded beforehand and will always trigger if the right conditions are met. For the issuers, it reduces the costs of financing by making it an automated procedure with less overhead involved.

### 4. T-rex Token (Tokeny Solutions, 2019)

The T-rex Token is the token that the company Tokeny uses to issue securities and manage their lifecycle with. The company provides a wide range of services such as compliant issuances, transfers, custody, and asset management on the blockchain for both issuing and investing parties. Their standardized token can be used for different companies to issue their own securities on their platform. They realized the financing of Enegra Group Ltd. with an equity security token that represents 100% of their equity in the form of ordinary shares (Enegra, n.d.). They have an issued market cap of around \$14,232M (STM, n.d.-d). The so-called T-rex token uses smart contract technology to automatize many processes. Below is a short description of the names of various smart contracts that are used for the T-rex token lifecycle.

- *OnchainID*: This smart contract is set up for a user to be able to interact with the security tokens. It holds the accompanied keys and claims that belong to the token. As the same implies it is the ID of the user on the platform of Tokeny.
- *Identity Registry*: This smart contract stores all the identity addresses of approved investors for each issued security token. It is a dynamic whitelist of identities that could be altered by the issuer agent. When investors are registered in this dataset it means that they have passed KYC and other required checks to be an eligible investor.
- *Claim verifier*: This smart contract is used to check the claims that belong to a specific onchainID. When a transfer is initiated by a certain onchainID this smart contract validates if the claims for this user are correct (user has e.g. passed KYC verification). Only when this smart contract replies TRUE the initiated transfer of token ownership is approved.
- *Trusted Claim Issuers Registry*: This smart contract stores all onchainIDs of all the credible claim issuers for a specific security token. The investors must have claims

that are signed by the claim issuers that are embedded in this smart contract to be allowed to hold the token.

- *Trusted Claim Topics Registry*: This contract is a continuation of the previous smart contract it stores trusted claims for a specific onchainID. However, in this contract, it is noted per topic that the investor has claims for.
- *Compliance*: This smart contract is used to set all the rules tailored to a specific security token offering. These rules need to be adhered to, throughout the lifecycle of the token and define everything that the issuer wants to include. Examples are; accepted countries for token ownership, maximum token circulation, and maximum tokens hold per investor. For each transaction, this contract is triggered and only if TRUE is returned the transaction will be approved.
- *Transfer Manager*: This smart contract is combining the previously mentioned smart contracts each time when a transaction is initiated. It combines all collectible data and verifies the conformity of the transaction. When the right information is returned and everything is accepted the transfer is successful.
- *Additional smart contracts*: Besides the obligatory processes that are required to be compliant with the rules and regulations for trading security tokens. There are more processes in place such as corporate actions for example, dividend payments, and voting. These processes could easily be programmed in additional smart contracts to automate the payment of dividends or the collection of votes during a shareholders meeting. Even the payment of taxes could be handled by a smart contract by automatically deducting the taxes from the dividends and transferring them directly to the tax authorities. According to Tokeny, can all these processes adjusted to the needs of the issuer.

To conclude, the common ground that these smart contracts have is the automation of a lot of tedious and sometimes manual processes in the traditional security value chain. By being able to program the rules beforehand and work with if-then procedures that collect data from different points the manual actions are removed from the processes. This creates a lot of added value for issuers who pay much less for an issuance and investors profit from the lower investment costs.

## **5. Blossom's Sukuk (Blossom Finance, 2019)**

Blossom is a venture capital fund that focuses on the Islamic finance market for halal investments. Its platform helps with the financing of start-ups with micro-investments to increase development in poorer countries that have limited access to financial institutions. The Islamic equivalent of a bond is called Sukuk, this financial instrument is issued via Blossom to collect funds for startups' operations. Blossom Finance calls it a SmartSukuk issued on the Ethereum Blockchain, which allows smart contract functionality. A small microfinance institution from Indonesia called BMT Bina Ummah has raised 710 Million Indonesian Rupiah (\$50K) on Blossom's SmartSukuk platform via a Sukuk which is a debt security. The smart contract handles a lot of processes for this Sukuk. Examples are; managing the assignments, records, calculations, and payments that belong to the Sukuk. This creates an indelible audit trail for every transaction which increases the transparency of the Sukuk for every investor.

Even though Blossom uses Ethereum which is a public Blockchain, only approved Ethereum wallet addresses are allowed to invest. This requirement is checked by the smart contract, it

will only accept inbound transfers from approved investors. To become an approved investor one need to pass the identity verification and pass the other layers of permission. By automating these in a smart contract, which can only execute if the right conditions are met, the process is accelerated for many investors. The incorporated approval in the smart contract guarantees the issuers that they adhere to the rules and let only compliant investors participate.

## **6. ReitzbZ (reitzbZ, 2018)**

The investment bank BTG Pactual launched its first security token that is backed by Brazilian real estate hence the name of the project ReitzbZ. This RBZ token leverages blockchain technology and smart contract technology for its functionality. The issued tokenized security of BTG Pactual is an equity security in the form of a share that pays out dividends with a total issued market cap of around \$3,000K (ReitzBZ, n.d.) The white paper of ReitzbZ does not mention the explicit functioning of the smart contract but they mention one important aspect of KYC and AML. Every potential investor will be checked according to the KYC and AML policies. This is embedded in their smart contract and will be reviewed when an investor wants to purchase or trade the RBZ token. If the investor is not allowed to do the transaction, the smart contract could freeze the funds, cancel the transaction or redeem the tokens. This is programmed into their smart contract to guarantee only applicable investors could participate in their market. By utilizing smart contracts the issuers guarantee compliance with the rules and regulations for KYC and AML. This is beneficial for them and also for the investors as they know that they are only trading with approved investors without negative consequences.

## **7. Inx Limited (Inx Limited, 2020)**

Inx is a platform that offers trading and listing of digital assets such as cryptocurrencies and digital securities. During their IPO they sold INX Tokens to accumulate cash for their operational activities. These tokens are issued on the Ethereum blockchain and leverage smart contracts to support certain actions in the token lifecycle. Their issued tokenized security is an equity security in the form a revenue-sharing principle, with a total issued market cap of around \$71,734K (STM, n.d.-e). Besides being a security token it is also a utility token on their crypto trading platform. The INX Token can be used to pay trading fees when buying or selling cryptocurrencies on their platform. Besides, the INX token has the following feature:

- One of the functions that the INX token uses in its smart contract is a whitelist database that consists of approved investors. When an investor wants to participate in the offering they need to be identified through KYC/AML procedures. Once they have a verified wallet address to receive INX tokens they could start trading. If during a transaction either the sending or the receiving address is not present in the whitelist database the transaction is declined. This means that the distributed ledger of the INX token will not be updated.
- In addition to the whitelist database, the INX Token smart contract also has a lock-up function. This means that the issuer can lock a certain amount of tokens for a specific timeframe. Once this is realized the wallet owner could not use these locked tokens for trading. This measure could be used when one did violate certain rules and regulations

or when the issuer wants to lock the funds for a specific timeframe to guarantee sufficient funds for their operations (e.g. first-year lock-up period).

- Another feature of the INX Token smart contract is that the issuers encrypt personal information in the token smart contract. Only the issuing party has a private key that could decrypt this information if this is required for specific reasons.
- The INX Token smart contract provides a maximal supply of 200M INX tokens and allows fractional ownership of up to eighteen decimals.
- Once the INX Token smart contract is launched, there are technical features of this contract that cannot be changed one-sided. This is done to prevent the company from adjusting the features of the INX token for its own benefit.
- It also allows a one-sided transaction of the issuing party from a third-party wallet under very specific circumstances. During a situation when an investor for example lost their private keys or when their keys got stolen. If something happened like that, the issuing party could upon orders from the court revoke the INX token transaction and sent the tokens to a new wallet.

These features add value for issuers by automating and securing a lot of compliance procedures. For investors, it adds value to have the certainty of a replacement of stolen or lost funds in a new wallet. Besides, there is a certainty for the investors that there is a maximal supply to prevent inflation of the token. At last, there is a possibility for fractional ownership to lower investment thresholds.

## **8. RealT (RealT)**

RealToken is a system for tokenizing real estate properties in the United States. The company behind this is called RealT and they have listed hundreds of properties varying from as low as \$53K to more expensive properties of around \$1,286K (STM, n.d.-g)). These tokenized properties can be bought by investors and these possess the same legal rights compared to owning 'traditional' real estate properties. The RealTokens are issued on the Ethereum blockchain and allow fractional ownership of a property. Because of this, the investment threshold is lower for a lot of retail investors that can now benefit from investing in real estate on a smaller scale. RealT uses smart contract technology to guarantee compliance with U.S. securities law and to disable the possibility to transfer or change the amount of RealTokens in a wallet without the right approval.

According to RealT there is another breakthrough established by leveraging smart contract technology, which is daily rent disbursal. The smart contract allows a daily rent distribution to the RealToken holders compared to a lump sum payment at the end of each month. A wallet that holds all the incoming rent payments distributes every day via the smart contract,  $1/30^{\text{th}}$  of the assigned stablecoin to the token owners. The wallet never runs out of funds because it is already replenished with new monthly rent payments before all the pay-outs are done. This is a huge benefit for the investors who see a daily income stream from their real estate investments which enhances their liquidity significantly.

## **9. Curzio (Securitize Markets, 2019)**

According to themselves, Curzio is a ‘finance leading independent financial newsletter publishers’. It provides investment research and investment analysis for individual investors. They try to reach as many subscribers as possible for higher revenues and to scale up their business they needed more capital. With their STO (security token offering) they try to raise between \$3-\$12M to fund the strategic expansion. Their token is called the CEO token and is issued on Ethereum and supported by smart contracts. The issued tokenized security is an equity security that represents an equity stake in the firm, with a total issued market cap of around \$5,477K (STM, n.d.-c). Curzio’s white paper does not describe smart contract functionality in full detail however, there are some aspects to mention:

The CEO token is issued by Securitize a company that offers issuance services for tokenized securities. Their token is constructed conform the necessary rules and is therefore compliant with the regulations. It takes into account the investors' limits, lock-up periods, secondary trading restrictions, and other compliance aspects such as location, etc. Besides these aspects, the token is also accommodated with functions such as customized dividend distribution to token holders. This creates compliance certainty for the issuers and dividend pay-out certainties for investors.

## **10. C3 bullion (Securitize Markets, 2022)**

C3 Bullion is a company that mines gold, processes it, and creates certified gold bars that are backed by the C3B token. An investor can buy a C3B token, and with the money C3 Bullion can mine gold, refine and certify it and eventually keep custody over the produced certified gold. Token holders can redeem their tokens for physical gold at the end of the contract. The C3B token will be issued on Ethereum and allows smart contract functionality to streamline certain processes. The token is not issued yet but C3 Bullion aims for a capital raise of \$20,000,000 via their token that represents an equity security in the form of a share (Securitize Markets, 2022).

By having smart contracts C3 Bullion can run distributed applications (DApps) without fraud, extra control, zero downtime, and without third-party interference.

More specially, only approved investors can participate in the network, and therefore there is no requirement for third-party interference because this is automatically done by the smart contract. Another aspect that C3 Bullion uses smart contracts for is to record the gold certificates and manage the transfer of those certificates within their own supply chain. In this way, the whole supply chain becomes transparent from the mine of origination to the refinery to eventually the custodian. This is a benefit for the investors to see the whole history of their gold and enhances the trust that it is actually real certified gold in which they invest. For the issuers, this system is also beneficial to be transparent in a much quicker and more efficient manner compared to the old ‘traditional’ systems while also increasing the investors’ trust. Eventually, when the certified gold is created, investors can redeem their tokens to receive the equivalent of certified gold for the number of tokens they hold. A smart contract is once again used to accept the redemption of the tokens (if the contract duration is ended) and consequently the tokens are destroyed.



### 6.3 Key takeaways

The above-mentioned case studies show how currently issued securities leverage smart contract functionality to add value for both the issuers and the investors. These case studies do not display all the functionalities that are described in the literature but due to the novelty of the subject, this is in line with our expectations. However, we do think that the case studies present clear ideas of what is possible at this moment already. In this sub-section a short recap will be given about the added value of smart contract functionality for each case example:

- **Mt. Pelerin's smart contracts** add value for investors who can resell their smart contract loans on a secondary market to guarantee liquidity. For the client who received the loan this is also an added value that their loan is continued even though the original originator wants to get rid of it. The rules and agreements are embedded in the smart contract and remain the same. Besides that, investors receive higher returns on their deposits because smart contracts automate the fund selection and this reduces a lot of costs for the investor.
- **22x's smart contracts** add value for issuing parties by locking the aggregated funds from investors for a specific time. This is done with a smart contract and the funds are released once the predetermined time has passed. This gives the issuing party a guaranteed starting fund to finance their operations.
- **Bitbond's smart contracts** add value for investors who receive automatic interest payments via a smart contract once the companies pay back their principal plus interest. This is also adding value for the issuer because of this automated procedure the costs are reduced drastically.
- **T-rex Token's smart contracts** add value for issuers in particular because of their standardized way of working. The common ground that their smart contracts have is the automation of many tedious and manual processes. By using if-then procedures and call functions in their code they can derive data from different places and combine it in a very fast and instant manner. This reduces the costs for a security issuance drastically and also realizes low maintenance costs. These low issuance costs and maintenance costs are then automatically related to lower fees for investors. Another aspect is their built-in compliance so in that way, the issuer knows for sure that they do business with approved investors.
- **Blossoms Sukuk's smart contracts** add value for both investors and issuers by automating processes to accelerate a lot of transactions. The built-in compliance also guarantees that the issuer adheres to the rules and regulations and let only compliant investors trade. The smart contract also creates an indelible audit trail for every transaction which increases the transparency of the Sukuk for every investor.
- **Reitbz's smart contracts** add value for the issuers by guaranteeing compliance with the rules and regulations for KYC and AML. This is beneficial for them and also for the investors as they know that they are only trading with approved investors.
- **Inx Limited's smart contracts** add value for issuers once again by automating and securing a lot of compliance procedures. From the investors' perspective the smart contracts add value by being able to replace stolen or lost funds in a new wallet. Besides that, the smart contract guarantees that there is a maximal supply with fractional ownership.
- **REALT's smart contracts** add value for investors to allow fractional ownership in real estate. Real estate requires usually a large starting capital to acquire a property.

Besides that, RealT's smart contract guarantees compliance with U.S. securities law which is very beneficial for the issuer. Next to that, the smart contract is also able to disable the possibility to transfer or change the amount of RealTokens in a wallet without the right approval, this adds value for both issuers and investors to guarantee a safe market.

At last, the smart contract of RealT can pay out daily rent disbursement. This is a huge benefit for the investors who see a daily income stream from their real estate investments which enhances their liquidity significantly.

- **Curzio's smart contracts** add value for the issuers by having built-in compliance in their security. The contract takes into account the investors' limits, lock-up periods, secondary trading restrictions, and other compliance aspects such as location, etc. Besides that, the smart contract is also able to pay out customized dividend distribution to token holders and this adds value for investors by having dividend certainty.
- **C3 Bullion's smart contracts** add value for investors to invest in a company that mines gold and refines it to certified gold with a relatively small investment. The supply chain is made transparent via a smart contract to see which steps the gold undertook. This adds value by creating trust in the investors that their gold is real. On the other side does it create value for the issuers who can automate and proof the certified gold's history.

## Chapter 7: Reaching a break-even point

*Because of confidentiality reasons is Chapter 7 not included in this report.*

## Chapter 8 Discussion & Conclusion

In this chapter, we discuss and highlight the key findings of this study. First, we present a short recap of the purpose and motivation of this study followed by the central research question. The central research question is answered on the basis of several sub-questions. Consequently, these are shown and we discuss the results of each sub-question. Eventually, we discuss the practical and theoretical implications of this study. In the end, the limitations of the chosen research methods are discussed by us and we provide recommendations for future research.

### 8.1 Discussion of key findings

The purpose of this research was to investigate the features of tokenized securities to explore how these can be used to create value for AAB, companies (who can issue securities), and investors when using this new way of financing. We mean by creating value for AAB how they could use tokenized securities as a fee-based product that was innovated by the S&I department. The current business model of AAB is under pressure due to Basel III reformations and increasing competition by fintech companies. To stay relevant in the banking market, banks need to develop their product and services hence the development of a fee-based product for tokenized securities. The success of this new product is also dependent on investors and issuers who want to use this. Therefore, an investigation into the benefits of tokenized securities and what it could mean for investors and issuers is also done. Besides that, the current literature on tokenized securities is scarce and this thesis tried to complement the literature by evaluating the features, possible (dis)advantages, and Smart Contract functionality of tokenized securities.

To answer all of this we created the main research question to acquire more insights: *“How can tokenized securities on DLT protocols be used to generate a fee-based product for a bank while also creating value for the issuing and investing parties in The Netherlands?”*

This question is answered based on five sub-questions that are answered in separate chapters. In this section, the sub-questions are revisited in sequential order to highlight the key findings per question. The first sub-question that was defined helped us in getting a better understanding of how tokenized securities work hence the question:

#### *I. How do tokenized securities on DLT protocols work?*

Tokenized securities are securities such as shares or bonds that are tokenized and issued on a distributed ledger. The phenomenon of tokenization means that a certain asset is represented on a distributed ledger in the form of a so-called token. The token is a data entry on the ledger that could represent a form of ownership of a specific asset. The accompanied rights and features could be programmed into this token to guarantee the same features as their traditional variant. The tokenized securities on DLT could be transferred among investors and sold to others who also participate in the network. The issuing party can decide on a public versus private distributed ledger and a permissioned versus permissionless distributed ledger. This new technique comes along with different features and possibilities in the landscape of

securities. The next question is created to compare the tokenized way of working with the traditional way, hence the question:

## *II. What are the advantages and disadvantages of using tokenized securities compared to using traditional securities?*

We created specific themes to combine certain advantages as shown in Table 3. Each theme and corresponding aspects are elaborately explained by us in different sub-sections in Chapter 4. The created themes for the advantages of tokenized securities came down to:

- Improved liquidity due to fractional ownership.
- Improved accessibility due to the creation of global markets and 24/7 trading.
- Regulatory improvements due to built-in compliance and customizable regulations.
- Improved transparency due to a reduction in intermediaries, auditable history on the ledger, and decentralization.
- Improved efficiency due to once again a reduction in intermediaries.
- Safety improvements due to reduced counterparty risk, having no single points of failure, and immutability of data entries.
- Interoperability due to usage of DLT/blockchain.
- Smart contracts due to the facilitation of innovation, automation of procedures, digital distribution, customizable functions per issuance, atomic swaps, and cost reduction due to a reduction in overhead.

For the disadvantages, the same approach was used but we created fewer themes because there were fewer disadvantages mentioned in the literature. However, each theme and corresponding aspects are elaborately explained by us in different sub-sections in Chapter 4. The created themes for the disadvantages of tokenized securities came down to:

- Decreased liquidity if wider adoption is lacking and due to instant settlement of transactions on the ledger.
- More accessibility could lead to higher bid-ask spreads during the day.
- Regulatory implications due to legal uncertainty and possible manual maintenance.
- Transparency in the form of undesired transparency, lack of privacy, and black box effect.
- Efficiency could not be achieved due to scaling problems of DLT/blockchain, lack of standardization, and garbage in garbage out problem.
- Safety issues due to front running, transaction finality being unclear, attacks on the network, hard forks in the chain, a duplicate infrastructure of security trading.
- Smart contracts that could possess coding errors that leads to detrimental errors.

To complement the analysis of advantages and disadvantages we also did a cost-benefit analysis. We analyzed three case studies on the potential cost reduction when tokenizing a bond. These case studies do show that the issuance costs for a bond can be reduced drastically when using the tokenized way.

We think that eventually, the advantages could outweigh the disadvantages, and cost reduction is beneficial for companies who want to collect funds for financing purposes.

Besides that, the reduced costs for issuers could be calculated further to the investors who profit from lower investors' fees and possibly higher returns. Although this sounds very promising in theory this study also wanted to investigate the opinions of future users such as investors and companies that issue securities. Therefore we created Sub-question 3:

*III. What are the opinions of the issuing and investing parties on the usage of tokenized securities?*

To acquire insights into the opinions of issuing and investing parties we conducted three interviews. After analyzing the transcripts of the interviewees according to the Gioia method, we created three overarching dimensions that encapsulate the content of the interviewees' opinions. The consensus among the interviewees is that they lack knowledge on the subject and therefore it is difficult for them to make a good assessment as to why to invest in tokenized securities and why it would benefit them. In their opinion, it was difficult to make clear what the actual difference is between a tokenized security and a traditional security. Since this unclarity, they would rather not switch to tokenized securities due to doubts about DLT/blockchain. They are a bit familiar with this technology due to their investments in cryptocurrencies and interest in blockchain. However, they were contradicting each other in their opinions on safety and decentralization. One of them saw this as a positive aspect while the other interviewee was more at ease with a central way of working (if one party would guarantee his possessions). If large institutions adopted these products they were more likely to use these products and believe in the validity of DLT/blockchain technology. However, until then they want more information on the advantages and disadvantages.

From the issuers' perspective, one company was interviewed by us about tokenized securities. Tokenized securities were an unfamiliar topic and therefore it was difficult for the interviewee to assess what the possibilities could be. It could be beneficial for both the investor as for the company when costs could be reduced. However, to pursue this way of financing there should be several certainties for the investors, those are safety, sustainability, and guarantee of delivery. Only if these three aspects could be realized it would be a suitable alternative for financing their operations, according to the interviewee. The most promising effect could be the enhancement of a liquid market. This is according to the interviewee beneficial for the investor as it is easier to sell their investment, as for the issuer who could collect more funds for financing.

The added value of tokenized securities is therefore hard to assess by the interviewees and the next sub-question tries to entangle this. It focusses on the '*holy grail*' of tokenized securities: Smart contracts. The possibilities of smart contracts are investigated in this sub-question in a more elaborated matter. This leads to the following sub-question of what the added value could be for issuing and investing parties:

*IV. What is the added value of Smart Contract possibilities when utilizing tokenized securities for issuing and investing parties?*

We examined ten case examples to assess the added value of smart contract functionalities in tokenized securities. In Chapter 4 we already presented a list of smart contract advantages, however, by using case examples we investigated the practical implications. In Chapter 6, we presented the ten companies and explained how their smart contracts function and how they

leveraged this technology to add value to issuers and investors. The way in which this is realized is closely related to the advantages that we found in the literature. This proves that the advantages stated in the theory could in reality add value for issuers and investors (see Chapter 6 for more details).

Besides adding value to issuing and investing parties, we also want to explore how this new fee-based product could add value for AAB. The purpose of this new fee-based product is to generate new income streams that lead to higher profits for the bank. However, to become profitable on a new initiative, a company needs to break-even first. We analyze this break-even point in the next sub-question:

*V. What is the approach of AAB to break even on a fee-based product on tokenized securities?*

Because of confidentiality reasons is this sub-section not included in this report.

## **8.2 Practical implications**

Now that the key findings of each sub-question are listed and reviewed, we can present the practical implications of this study. This applies to Sub-questions 3,4 and 5 because in these sub-questions the focus is more on practical components compared to Sub-question 1 and 2. The first sub-question that is outlined for the practical implications is Sub-question 3:

*III. What are the opinions of the issuing and investing parties on the usage of tokenized securities?*

The findings on this question show some points of attention for AAB to keep in consideration when rolling out their fee-based product for tokenized securities. The investors highlight that they need more education, promotion, and reasons as to why they would invest in tokenized securities. This shows that investors are perhaps not ready for this new movement and are hesitant to spend their investable capital on this way of financing. Even though the investors see also positive aspects of tokenized securities, the concept remains rather vague for them and they want more proof of successful issuances. However, when they were asked a question about the possibility that a third trusted party that they use for investment purposes would change to DLT/blockchain, they would accept this. The guarantees and safety of a central party are important for them and this is something that AAB could leverage as they are seen as a trusted bank.

On the side of the companies that could issue tokenized securities, a somewhat similar opinion was gauged. Their methods of financing are based on cost of capital calculations and according to the interviewee, it was hard to tell if the costs of financing would decrease for them. The fees of the currently used exchange could potentially be halved by their estimates but it remains uncertain what the new fees will be. Besides that, it is important for them to take the interests of the investors into consideration. Without investors, there is no financing possible via tokenized securities. The possibility of an improved liquid market when using tokenized securities sounded very promising to the interviewee. This was beneficial for the interviewee's company because they could collect more funds since investors are more willing to invest in liquid assets. It is therefore important to investigate if the promised advantages for both investors and issuers could be realized when this way of financing is used.

*IV. What is the added value of Smart Contract possibilities when utilizing tokenized securities for issuing and investing parties?*

The key findings on this question show that using tokenized securities as a financing instrument is useful for issuers and investors. This is realized via efficiency gains in the financing and investing processes. By automizing many procedures or guaranteeing compliance with the security laws by built-in compliance in the token. Investors benefit from fractional ownership and increased accessibility. These examples prove that the theory is applicable right now and issuing and investing parties can already benefit from this technology. AAB could use these case examples to inform their clients of the possibilities and persuade them of the added value tokenized securities provide.

*V. What is the approach of AAB to break even on a fee-based product on tokenized securities?*

The three break-even calculations show different outcomes when a break-even point can be achieved. After averaging the three outcomes we come to one break-even point that is based on AAB's financial forecast. This information is useful for AAB because they can see how fast they will break-even on this new product and perhaps adjust their strategy. If in reality, the predicted issued volume is lower than expected they could lower their fee percentage to accumulate more clients. Besides that, they can spend some money on marketing campaigns to accumulate more clients. By adjusting these income and expenses factors they can adjust their strategy to their preference. However, if the promised benefits are as prosperous as presented in the literature, the issued volume should easily be realized.

### **8.3 Theoretical implications**

Besides the practical implications of this study, there are also some noteworthy theoretical implications. As stated at the beginning of this study, there was a lack of literature on tokenized securities. More specifically, on the advantages and disadvantages when using tokenized securities as a financing instrument. These advantages and disadvantages were mentioned scattered among different articles but to our knowledge, a clear overview of the subject was lacking in the literature. However, before diving into advantages and disadvantages we first wanted to gain some more insights into how tokenized securities work.

*I. How do tokenized securities on DLT protocols work?*

The answer to this question adds to the existing literature on how tokenized securities on DLT protocols work. There is no novel information created by answering this question, but for our understanding of the subject, it was important to include this question. We learned a lot on the subject of tokenized securities and how DLT works. To assess the second sub-question a certain level of understanding of the topic is required.

*II. What are the advantages and disadvantages of using tokenized securities compared to using traditional securities?*

The literature gap on the concrete advantages and disadvantages of tokenized securities is partially filled with the addition of this sub-question. The structured literature review protocol selected a decent amount of articles that mentioned anything positive or negative on tokenized securities. By reviewing them one by one and writing down all the mentioned advantages and

disadvantages a well-funded assessment has been done. The established themes allow a quick impression of the advantages and disadvantages. Combined with the specified corresponding aspects that we assigned to each advantage or disadvantage, it gives a clear understanding of why they can be seen as an advantage or disadvantage.

In short: (1) this study expands the literature on the advantages and disadvantages of tokenized securities. (2) We investigated the opinions of investors and an issuer that could use tokenized securities in the future. Besides that, (3) we presented case examples of currently issued tokenized securities that used smart contract technology. These examples prove that it is possible to add value for investors and issuers with smart contracts and tokenized securities. Eventually, (4) we calculated a promising break-even point for AAB on their fee-based product at a certain amount of issued volume, at a certain point in time.

#### **8.4 Limitations and future research**

We are aware that this study has some limitations. The first limitation we want to discuss is concerning the structured literature review. During our literature search, only free available academic platforms were used because some platforms require a subscription or one-time payment to get access to an article. Since there was no financial compensation provided for this research, only free available platforms have been used by us. If we would have had access to more articles of perhaps higher quality we could consequently improved the quality and completeness of our structured literature review.

Another limitation of the included literature is that the majority of researchers mainly wanted to investigate the benefits of tokenized securities. This could lead to biased research and biased outcomes where advantages are more predominantly present compared to possible disadvantages. Nevertheless, we tried our best to include all the mentioned disadvantages and elaborate on them the same way we did for the advantages.

Next, we thought that the ideal sample for the interviews was somewhere between five to ten participants per category. Based on the conclusions of Boddy (2016), we did not foresee problems with a smaller sample size when conducting qualitative research. However, when the participants' gathering phase ended, there were only two investors and one company that wanted to participate. This is a much smaller sample size than anticipated, even though it is a qualitative approach, the sample size is quite limited. Therefore could the interviewees' opinions that are established be biased and selective due to the small sample. Besides the size of the sample, the thresholds to participate based on investable capital or required financing were quite low. To gain insights on multiple levels, different types of clients should be investigated.

The last limitation we want to highlight is the financial forecast of the development of tokenized securities issuance volume. This dataset was provided by AAB and was used for calculating breakeven points. The accuracy of the forecast is hard to determine because of the novelty of the subject. Therefore it could be the case that the calculations are not accurately reliable. It was required to make several assumptions about the developments, and it could be the case that the growth rates are deviating from reality.

For future research more research is required on the advantages and especially the disadvantages of using tokenized securities. The disadvantages should also be investigated thoroughly to make a well-considered decision for pursuing this way of financing. Besides that, the opinions of investors and issuers should be gauged with larger samples.



Eventually, these are the people who create the market and provide capital. Without a large market, there is a smaller possibility for AAB to sell this new fee-based product. Future research should dive into the needs of the customer and try to minimize their concerns about change. The success of the product depends on the willingness to invest or issue tokenized securities. It is recommended to speak with different types of investors with different investable capitals. The same applies to investors who could issue tokenized securities, interviews with different company sizes are useful to gather better insight into their needs.

## **8.5 Conclusions and Recommendations**

According to our findings about (1) how tokenized securities work on DLT, (2) what their potential advantages and disadvantages are, (3) what the opinions of issuers and investors are, (4) how currently issued examples prove practical use cases and (5) the promising outlook for AAB on breaking even on a fee-based product. We conclude that AAB can be a suitable connecting party that brings together companies that demand financing and investors who seek decent returns. Within their network, they have partners who can arrange the infrastructure and custody for tokenized securities.

The fact that AAB as a central party is involved in this development is reassuring for investors according to the interviews. The interviewees mentioned that only if bigger institutions would adopt such a new method of financing, they are willing to invest in this. Their lack of knowledge and hesitant attitude towards tokenized securities is something that AAB should take into consideration when implementing this. Not only the investors but also the companies that issue tokenized securities need to be included in their decisions. Together these parties create the market which AAB eventually could profit from, the total amount of issued volume creates their earning model.

Therefore, do we think that the opinions of the interview participants have to be taken seriously by AAB. It should be considered carefully how to eventually implement this product to guarantee the safety of the investment.

The case examples of already issued tokenized securities do look very promising. The usage of Smart Contracts increases the added value for investors and issuers. This is related to the advantages such as cost reduction and efficiency. AAB should monitor their current pilot phases and try to speak with many investors and companies who could issue a tokenized security. The size of the current capital market is enormous and if only a fraction could be tokenized this would create a great business opportunity for AAB to step in. The education of potential clients about this way of financing and convincing them of the advantages are important for the success of this market.

The case examples do show that not only the issuers but also the investors could profit from this. It could solve the problems that AAB is experiencing with its current business model. While also providing an opportunity for companies to bridge the funding gap, and create new investment opportunities for investors who could see a decent return.

### **8.5.1 Personal opinion**

After conducting this research, we are convinced that tokenized securities could have huge potential in the financial service industry. The technological aspects of DLT/blockchain provide a very safe and efficient infrastructure to trade on. The most promising aspects for society, are better accessibility to more investment opportunities and for companies to have a cheaper and easier way of arranging their financing. This is a positive contribution to the funding gap that many companies experience in the Netherlands, especially for SMEs. It is important for companies to have enough opportunities to collect capital for their operational

activities. Tokenized securities can solve this by creating a new ecosystem that is easily accessible with efficient procedures to gather funds.

Investors on the other hand, could profit from fractional ownership to invest in new sectors that usually require higher starting capital. We think that their investment opportunities and experiences could also improve significantly by investing via tokenized securities.

If we connect AAB with investors and issuers that use tokenized securities as financing instrument and investment instrument, we expect a prosperous future for every involved party.

## References

- A. Abhishta., R. Joosten., S. Dragomiretskiy., & L. J. Nieuwenhuis. (2019). *Impact of Successful DDoS Attacks on a Major Crypto-Currency Exchange*. 27th Euromicro International Conference on Parallel, Distributed and Network-Based Processing (PDP). IEEE, pp. 379–384.
- ABN AMRO. (2015). *Why has ABN AMRO been listed on the stock exchange?* Abnamro.com. <https://www.abnamro.com/en/news/why-has-abn-amro-been-listed-on-the-stock-exchange>
- ABN AMRO. (2021-a). *Future of Banking series: Capital Markets Union & Banking Union*. PowerPoint presentation by department Strategy & Innovation.
- ABN AMRO. (2021-b). *Onze geschiedenis*. Abnamro.com. <https://www.abnamro.com/nl/over-abn-amro/product/onze-geschiedenis>
- ABN AMRO. (2022-a). *We innovate together*. Abnamro.com. <https://www.abnamro.com/en/about-abn-amro/product/we-innovate-together>
- ABN AMRO. (2022-b). *ABN AMRO Bank N.V. Integrated Annual Report 2021*. [https://downloads.ctfassets.net/1u811bvgvthc/62067Em47HIFTg3hGxdQHY/3fcd6a3ac35ba44be18fad01cc84b7c0/ABN\\_AMRO\\_\\_\\_\\_\\_Integrated\\_Annual\\_Report\\_2021.pdf](https://downloads.ctfassets.net/1u811bvgvthc/62067Em47HIFTg3hGxdQHY/3fcd6a3ac35ba44be18fad01cc84b7c0/ABN_AMRO_____Integrated_Annual_Report_2021.pdf)
- AFM. (n.d.). *Information by the AFM for consumers*. Wwww.afm.nlfrom <https://www.afm.nl/en/consumenten>
- Aziz. (2019, August 3). *Guide to Forks: Everything You Need to Know About Forks, Hard Fork and Soft Fork - Master The Crypto*. Master the Crypto. <https://masterthecrypto.com/guide-to-forks-hard-fork-soft-fork/>
- Boddy, C. R. (2016). Sample size for qualitative research. *Qualitative Market Research: An International Journal*, 19(4), 426–432. <https://doi.org/10.1108/qmr-06-2016-0053>
- Buterin, V. (2014). *Ethereum Whitepaper* [Whitepaper]. Ethereum.org. <https://ethereum.org/en/whitepaper/>
- Cashlink, & Fiona. (2020). *Cost Disruption in the Issuance Market Why Tokenization outperforms traditional securities issuance*. <https://cashlink.de/en/cost-disruption/>
- CBS. (2022, May 13). *Bedrijven*. Centraal Bureau Voor de Statistiek. <https://www.cbs.nl/nl-nl/visualisaties/dashboard-bedrijven#A-U>

- Cummans, J. (2014, October). *A Brief History of Bond Investing*. BondFunds.com.  
<http://bondfunds.com/education/a-brief-history-of-bond-investing/>
- Deloitte. (2022, June 3). *DLT Pilot regime released: how EU is preparing for tomorrow's digital securities market* | Deloitte Luxembourg | News. Deloitte Luxembourg.  
<https://www2.deloitte.com/lu/en/pages/financial-services/articles/dlt-pilot-regime-out-now-eu-digital-securities-metaverse.html>
- European Commission. (2020, September 24). *Proposal for a Regulation of The European Parliament and of The Council on Markets in Crypto-assets, and amending Directive (EU) 2019/1937*. Europa.eu. <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52020PC0593>
- Euronext. (n.d.). *Voorwaarden die van toepassing zijn op de toelating tot de notering en/of de verhandeling van schuldbewijzen op een Europese markt geëxploiteerd door Euronext*.
- Ferreira, J. P. M., Gonçalves, M. J. A., & da Silva, A. F. (2019). A Systematic Literature Review in Blockchain: Benefits and Implications of the Technology for Business. *Advances in Intelligent Systems and Computing*, 405–414.  
[https://doi.org/10.1007/978-3-030-16181-1\\_38](https://doi.org/10.1007/978-3-030-16181-1_38)
- Fincog. (2020, August 17). *The Next Generation of Banks*. Fincog.nl.  
<https://fincog.nl/publications/14/the-next-generation-of-banks>
- Gasser, U., Gassmann, O., Puschmann, T., Hens, T., Leifer, L., & Zhao, L. (2017). *Digital Banking 2025*.  
<https://www.alexandria.unisg.ch/253962/1/Digital%20Banking%202025%20FINAL%20Version.pdf>
- Gehman, J., Glaser, V. L., Eisenhardt, K. M., Gioia, D., Langley, A., & Corley, K. G. (2017). Finding Theory–Method Fit: A Comparison of Three Qualitative Approaches to Theory Building. *Journal of Management Inquiry*, 27(3), 284–300.  
<https://doi.org/10.1177/1056492617706029>
- Haahr, M., Foster, K., Blakstad, S., Blakstad, B., Suratpipit, Y., Allen, R., & Haglund Lang, L. (2019, September 24). *Blockchain: Gateway for sustainability linked bonds*. Www.sustainablefinance.hsbc.com; HSBC & Sustainable Digital Finance Alliance.  
<https://www.sustainablefinance.hsbc.com/mobilising-finance/blockchain-gateway-for-sustainability-linked-bonds>
- Hansen, P. (2021, January 12). *New Crypto Rules in the European Union – Gateway for Mass Adoption, or Excessive Regulation?* Stanford Law School.

- <https://law.stanford.edu/2021/01/12/new-crypto-rules-in-the-eu-gateway-for-mass-adoption-or-excessive-regulation/>
- Heines, R., Jung, R., Dick, C., & Pohle, C. (2021). *The Tokenization of Everything: Towards a Framework for Understanding the Potentials of Tokenized Assets*. Conference: PACIS 2021 Proceedings.
- Hendriks, Y. (2022). *DARE Methodology*. PowerPoint Presentation.
- RVO. (n.d.). *Centraal aandeelhoudersregister (CAHR)*. Ondernemersplein.kvk.nl.  
<https://ondernemersplein.kvk.nl/invoering-centraal-aandeelhoudersregister/>
- KvK. (n.d.-a). *De naamloze vennootschap (nv)*. KVK. <https://www.kvk.nl/informatiebank/de-naamloze-vennootschap-nv/>
- KvK. (n.d.-b). *Effectenbeurs*. Ondernemersplein.kvk.nl.  
<https://ondernemersplein.kvk.nl/effectenbeurs/>
- London, B. (2022, October 25). *Personal Communication*.
- Marisetty, V. B. (2022, March). *Blockchain: The Business Case* [lecture recording]. University of Twente.
- Mourlon-Druol, E. (2015). *Trust is Good, Control is Better: the 1974 Herstatt Bank Crisis and Its Implications for International Regulatory Reform*. *Business History*. 57. 1-24. doi:10.1080/00076791.2014.950956.
- Nakamoto, S. (2008). *Bitcoin: A Peer-to-Peer Electronic Cash System* [Whitepaper]. *bitcoin.org*, <https://bitcoin.org/bitcoin.pdf>
- KNB. (n.d.). *Uitgifte en overdracht van aandelen*. Notaris.nl.  
<https://www.notaris.nl/ondernemen/bestaande-onderneming/aandelen-uitgeven-en-overdragen>
- NPEX. (n.d.). *Wat zijn de kosten voor u als ondernemer?* NPEX  
<https://www.npex.nl/financien/tarieven/>
- Nuijt, M. (2022, April) *Personal Communication*.
- Petram, L. O. (2011). *The world's first stock exchange: how the Amsterdam market for Dutch East India Company shares became a modern securities market, 1602-1700*. Eigen Beheer.
- Shrotriya, V. (2019). *Break Even Analysis – The Concept and It's Utility*. ResearchGate.  
[https://www.researchgate.net/profile/Vikas-Shrotriya/publication/337465115\\_Break\\_Even\\_Analysis\\_-\\_The\\_Concept\\_and\\_It](https://www.researchgate.net/profile/Vikas-Shrotriya/publication/337465115_Break_Even_Analysis_-_The_Concept_and_It)
- Siebrand, M. (2022, June). *Personal Communication*.

- Statista. (n.d.). *Neobanking - Netherlands | Statista Market Forecast*. Statista.  
<https://www.statista.com/outlook/dmo/fintech/neobanking/netherlands>
- Sunyaev, A. (2020). *Internet Computing: Principles of Distributed Systems and Emerging Internet-Based Technologies*. Springer. <https://doi.org/10.1007/978-3-030-34957-8>
- Sutton, A. J., Jones, D. R., Abrams, K. R., Sheldon, T. A., & Song, F. (1999). Systematic Reviews and Meta-Analysis: A Structured Review of the Methodological Literature. *Journal of Health Services Research & Policy*, 4(1), 49–55.  
<https://doi.org/10.1177/135581969900400112>
- Swan, M. (2015). *Blockchain: Blueprint for a New Economy*. O’reilly Media., Sebastopol.  
<http://ebookcentral.proquest.com/lib/mit/detail.action?docID=1929181>
- Szabo, N. (1997). *The Idea of Smart Contracts*. [www.fon.hum.uva.nl](http://www.fon.hum.uva.nl).  
<https://www.fon.hum.uva.nl/rob/Courses/InformationInSpeech/CDROM/Literature/LOTwinterschool2006/szabo.best.vwh.net/idea.html>
- Tchana, A. (2022, March 14). *Banking institutions should prepare now for Basel IV regulations*. KPMG Luxembourg. <https://blog.kpmg.lu/banking-institutions-should-prepare-now-for-basel-iv-regulations/>
- University of Twente. (2021). *Master Of Science in Business Administration MSc BA Thesis Manual*. University of Twente.
- Verlaan, C. (n.d.-a). *Financiering tussen de € 500.000 en € 999.500 – NPEX Growth*. NPEX.  
<https://www.npex.nl/financieren/npex-growth/>
- Verlaan, C. (n.d.-b). *Financiering vanaf € 500.000*. NPEX. <https://www.npex.nl/financieren/>
- Van Der Wiel, K., Dubovik, A., & Van Solinge, F. (2019). *Dutch SME bank financing, from a European perspective*.  
[https://www.cpb.nl/sites/default/files/omnidownload/Policy%20Brief%20SME%2009072019\\_0.pdf](https://www.cpb.nl/sites/default/files/omnidownload/Policy%20Brief%20SME%2009072019_0.pdf)
- Vouldis, A. T., & Farne, M. (2017). *Business models of the banks in the euro area*.  
<https://doi.org/10.2866/386225>
- Wood, L. M. (1996). *Added value: Marketing basics?* *Journal of Marketing Management*, 12(8), 735-755. doi: 10.1080/0267257X.1996.9964450

## References Structured Literature Review

- Benedetti, H., McKeon, S., & Pfiffer, C. (2021). Blockchain Trading and Exchange. In R. Rau, R. Wardrop, & L. Zingales (Eds.), *The Palgrave handbook of technological*

- finance* (pp. 337–368). Springer Nature Switzerland AG. [https://doi.org/10.1007/978-3-030-65117-6\\_14](https://doi.org/10.1007/978-3-030-65117-6_14)
- Benedetti, H., & Rodríguez-Garnica, G. (2021). *Tokenized assets and securities*. <https://ssrn.com/abstract=4069119>
- Brastad, J., & Stendahl, P. (2018). *Blockchain in Financial Markets and Intermediation*. Norwegian School of Economics.
- Brottrager, J. (2019). *Trading securities on the blockchain*. TU Wien.
- Gjelstad-Ditlevsen, P. E., Mydske, M., & Skånland, A. H. (2021). *Blockchain-based Finance: How Asset Tokenization can transform the Financial Industry*. Norwegian University of Science and Technology.
- Hilary, G., & Liu, L. X. (2021). Blockchain and Other Distributed Ledger Technologies in Finance. In R. Rau, R. Wardrop, & L. Zingales (Eds.), *The Palgrave handbook of technological finance* (pp. 243–268). Springer Nature Switzerland AG. [https://doi.org/10.1007/978-3-030-65117-6\\_10](https://doi.org/10.1007/978-3-030-65117-6_10)
- Hoffmann, M. (2018). *Decentralizing the Issuance and the Exchange of Tokenized Securities on the Ethereum Blockchain*. Aalto University School of Science.
- Khan, N., Kchouri, B., Yattoo, N. A., Kräussl, Z., Patel, A., & State, R. (2022). Tokenization of sukuk: Ethereum case study. *Global Finance Journal*, 51. <https://doi.org/10.1016/j.gfj.2020.100539>
- Kim, S., & Sarin, A. (2018). Distributed Ledger and Blockchain Technology: Framework and Use Cases. *Forthcoming, Journal of Investment Management*. <https://doi.org/10.2139/ssrn.3373347>
- Leiberman, B., & Mirynych, D. (2019). *Digital assets: The era of tokenized securities*. J.P. Morgan Center for Commodities at the University of Colorado Denver Business School.
- Mazzorana-Kremer, F. (2019). Blockchain-Based Equity and STOs: Towards a Liquid Market for SME Financing? *Theoretical Economics Letters*, 9(05), 1534–1552. <https://doi.org/10.4236/tel.2019.95099>
- Momtaz, P. (2021). *Security Tokens*. <https://ssrn.com/abstract=3865233>
- Pietro, M. (2021). *The Impact of Blockchain and DLT Enterprise Tokens on Business Processes - Analysis of Applications of Different Use Cases in Major Industries*. Politecnico Di Milano School of Industrial and Information Engineering.
- Popescu, A.D. (2020). Transforming Capital Markets by means of Financial Digital Assets. *Revue des Sciences Politiques*, 68, 109-119.

- Santos, D., Sanfins, M. A. dos S., Nacif, P. L. D. S., & Nascimento, A. (2020). The token economy assets for the blockchain era global 2020. *Global Media Journal*, 19(37):1.
- Schletz, M., D. Nassiry, and M.-K. Lee. (2020). Blockchain and Tokenized Securities: The Potential for Green Finance. *ADB Working Paper 1079*. Tokyo: Asian Development Bank Institute. <https://www.adb.org/publications/blockchain-tokenized-securitiespotential-green-finance>
- Schwarz, M. (2022). Blockchain-based tokenisation: Status and implications of early design decisions. *Journal of Securities Operations & Custody*, 14(2). 171-182.
- Smith, J., Vora, M., Benedetti, H., Yoshida, K., & Vogel, Z. (2019). *Tokenized Securities & Commercial Real Estate*. MIT Digital Currency Initiative. <https://dx.doi.org/10.2139/ssrn.3438286>
- Subramanian, H. (2019). Security tokens: architecture, smart contract applications and illustrations using SAFE. *Managerial Finance*, 46(6), 735–748. <https://doi.org/10.1108/mf-09-2018-0467>



## References Smart Contract Case Studies

- 22X. (2018). *22X Fund / One Token Thirty Startups* [Whitepaper].  
[https://df6qdu189jtscloudfront.net/sto/manualsync/142beba6a5c6-22X\\_\\_\\_Whitepaper.pdf](https://df6qdu189jtscloudfront.net/sto/manualsync/142beba6a5c6-22X___Whitepaper.pdf)
- Bitbond. (2019). *Securities Prospectus of Bitbond Finance GMBH, Berlin*.  
<https://www.bitbondsto.com/files/bitbond-sto-prospectus.pdf>
- Blossom Finance. (2019). World's First Primary Sukuk Issuance on Blockchain Closes.  
*Blossomfinance.com*. <https://blossomfinance.com/posts/worlds-first-primary-sukuk-issuance-on-blockchain-closes>
- Enegra. (n.d.). *Enegra | Global Commodity Trading | Blockchain Commodities*.  
[www.enegrargroup.com/](http://www.enegrargroup.com/).
- INX Limited. (2020). *Inx Limited Digital Assets Listing & Trading Prospectus*.  
[https://www.sec.gov/Archives/edgar/data/1725882/000121390020023202/ea125858-424b1\\_inxlimited.htm](https://www.sec.gov/Archives/edgar/data/1725882/000121390020023202/ea125858-424b1_inxlimited.htm)
- Mt Pelerin. (n.d.) *Bringing the Entire Bank on Chain for Better, Fairer Banking* [Whitepaper]. Mt Pelerin Group SA. <https://www.mtpelerin.com/docs/mt-pelerin-white-paper.pdf>
- ReitBZ (n.d.). *Digital Asset Token Backed by Brazilian Real Estate*. [reitbz.io](http://reitbz.io).
- Reitbz. (2018). *White Paper* [Whitepaper]. [reitbz](https://reitbz.io/whitepaper.pdf). <https://reitbz.io/whitepaper.pdf>
- RealT. (n.d.). *Legally Compliant Ownership of Tokenized Real Estate* [Whitepaper]. RealT.  
[https://realt.co/wp-content/uploads/2019/04/RealToken\\_White\\_Paper\\_US\\_v01.pdf](https://realt.co/wp-content/uploads/2019/04/RealToken_White_Paper_US_v01.pdf)
- Securitize Markets. (2019). *Financing Curzio Research with a Security Token Offering (STO): Case Study*. Securitize. [https://www.curzioequityowners.com/wp-content/uploads/docs/FinancingCurzioResearchWithASecurityTokenOffering\(STO\)\\_CaseStudy.pdf](https://www.curzioequityowners.com/wp-content/uploads/docs/FinancingCurzioResearchWithASecurityTokenOffering(STO)_CaseStudy.pdf)
- Securitize Markets. (2022). *Confidential Private Offering Memorandum of C3 Capital, Inc. DBA C3 Bullion*. C3 Bullion, Inc. <https://sec.report/Document/0001827424-21-000003/sub3.pdf>
- STM. (n.d.-a). 22X Fund Token | 22X Price. *Stomarket.com*, [stomarket.com/sto/22x-22x](http://stomarket.com/sto/22x-22x). Accessed at 9 Oct. 2022
- STM. (n.d.-b). Bitbond Token Token | BB1 Price. *Stomarket.com*, [stomarket.com/sto/bitbond-bb1](http://stomarket.com/sto/bitbond-bb1). Accessed at 9 Oct. 2022
- STM. (n.d.-c). Curzio Equity Owners Token | CURZ Price. *Stomarket.com*, [stomarket.com/sto/curzio-research-curz](http://stomarket.com/sto/curzio-research-curz). Accessed at 9 Oct. 2022

- STM. (n.d.-d). Enegra Token | EGX Price. *Stomarket.com*, [stomarket.com/sto/enegra-group-egx#about](https://stomarket.com/sto/enegra-group-egx#about). Accessed at 9 Oct. 2022
- STM. (n.d.-e). INX Token | INX Price. *Stomarket.com*, [stomarket.com/sto/inx-limited-inx](https://stomarket.com/sto/inx-limited-inx). Accessed at 9 Oct. 2022
- STM. (n.d.-f). MPS Token Token | MPS Uniswap Price. *Stomarket.com*, [stomarket.com/sto/mt-pelerin-mps#about](https://stomarket.com/sto/mt-pelerin-mps#about). Accessed at 9 Oct. 2022
- STM. (n.d.-g). Home. *Stomarket.com*, <https://stomarket.com/>. Accessed at 9 Oct. 2022
- Tokeny Solutions. (2019). *White Paper T-REX (Token for Regulated EXchanges)* [Whitepaper]. Tokeny Solutions. <https://tokeny.com/wp-content/uploads/2019/12/Whitepaper-T-REX-Security-tokens.pdf>

## Appendices

### 1. Semi-Structured Interview Questionnaire

This questionnaire is used to gather more insights to answer Sub-question 3:

*What are the opinions of the issuing and investing parties on the usage of tokenized securities?*

#### Questions for investing parties:

1. Can you tell me in short what your current experience is in regard to investing in securities?
2. Have you ever heard about tokenized securities?
3. Do you know the difference between tokenized securities and ‘traditional’ securities?
4. Would you ever invest in tokenizes securities, why or why not?
5. Do you have faith in distributed ledger technology/blockchain as a future trading ecosystem?
6. What is an important consideration when you invest in a certain security?
7. What is the estimated return you think to make on a tokenized security?
8. Would you expect that tokenized securities have a risk-premium because of their novelty?
9. Do you think that trading securities on distributed ledger technology/blockchain is the future?
10. What kind of (dis)advantages do you think that tokenized securities have over traditional securities?

Is there anything else you would like to add on your opinion about investing in tokenized securities?

#### Questions for issuing parties:

1. Can you tell me in short about the companies financing needs?
2. Which financial instruments are currently used for financing?
3. Have you ever heard about financing via tokenized securities?
4. Do you know the difference between tokenized securities and ‘traditional’ securities?
5. Would the company consider to issue a tokenized security as a financing method, why or why not?
6. Do you have faith in distributed ledger technology/blockchain as future a trading ecosystem?
7. Do you think that there is investors’ appetite for tokenized securities?
8. Would you transfer the trading of current issued securities of the company to distributed ledger technology/blockchain?
9. Do you think that trading securities on distributed ledger technology/blockchain is the future?
10. What kind of (dis)advantages do you think that tokenized securities have over traditional securities?

Is there anything else you would like to add on your opinion about issuing tokenized securities?

## 2. Overview in Excel of advantages & disadvantages per author(s)

(Benedetti et al., 2021)	(Benedetti & Rodríguez-Garnica, n.d.)	(Brastad & Stendahl, 2018)	(Brottrager, 2019)	(Gjelstad-Ditlevsen et al., 2021)
<b>Advantages</b>	<b>Advantages</b>	<b>Advantages</b>	<b>Advantages</b>	<b>Advantages</b>
1. Efficient in Settlement and clearing	1. Increased efficiency	1. Efficient Settlement and clearing	1. (Near) instant settlement	1. Increase transparency
2. Reduced trading costs	2. Reduced cost	o Reduced costs	o Automatisation via Smart Contracts	2. Increased fairness
3. Increased Transparency in regard to voting and governance	3. Enhanced transparency & Security	o Audit trails	2. Improved liquidity	3. Cost reduction
4. Reduced regulatory burdens	4. Better compliance & traceability	2. Increased efficiency in reconciliation and verification	o Fractional ownership	4. Time reduction
5. Interoperability	5. Improved liquidity	3. Streamlined compliance such as KYC	o Broader investor base	5. Improved liquidity
	6. Facilitated innovation	4. Reduced counterparty risk	3. Automatisation of compliance	6. Faster and cheaper transfers
			4. Reduced costs	
<b>Disadvantages</b>			5. Overhead reductions	
1. Front running		<b>Disadvantages</b>	6. Increased transparency	
2. Transaction Finality dependent on protocol		1. No instant settlement due to liquidity implications		
3. Attacks			<b>Disadvantages</b>	
4. Scaling problems			1. Legal implications	
5. Hard Forks			2. Compliance added is still a huge effort	
6. Undesired Transparency			3. No wide adoption lower liquidity	
<b>Regulatory</b>	<b>Regulatory</b>	<b>Regulatory</b>	<b>Regulatory</b>	<b>Regulatory</b>
<b>Cost reduction</b>	<b>Cost reduction</b>	<b>Cost reduction</b>	<b>Cost reduction</b>	<b>Cost reduction</b>
<b>Improved Transparency</b>	<b>Improved Transparency</b>	<b>Improved Transparency</b>	<b>Improved Transparency</b>	<b>Improved Transparency</b>
<b>Improved Liquidity</b>	<b>Improved Liquidity</b>	<b>Improved Liquidity</b>	<b>Improved Liquidity</b>	<b>Improved Liquidity</b>
<b>Improved Accessibility</b>	<b>Improved Accessibility</b>	<b>Improved Accessibility</b>	<b>Improved Accessibility</b>	<b>Improved Accessibility</b>
<b>Efficiency</b>	<b>Efficiency</b>	<b>Efficiency</b>	<b>Efficiency</b>	<b>Efficiency</b>
<b>Smart Contracts</b>	<b>Smart Contracts</b>	<b>Smart Contracts</b>	<b>Smart Contracts</b>	<b>Smart Contracts</b>
<b>Interoperability</b>	<b>Interoperability</b>	<b>Interoperability</b>	<b>Interoperability</b>	<b>Interoperability</b>
<b>Safety</b>	<b>Safety</b>	<b>Safety</b>	<b>Safety</b>	<b>Safety</b>

(Hilary & Liu, 2021)	(Hoffmann, 2018)	(Khan et al., 2022)	(Kim & Sarin, 2018)	(Leiberman & Miryneck, 20)
<b>DLT advantages</b>	<b>Advantages</b>	<b>Advantages</b>	<b>DLT advantages</b>	<b>Advantages</b>
1. Visibility	1. Fully transparent	1. Reduced transaction costs	1. Smart contracts	1. Digital distribution
2. Aggregation	2. Auditable share history	o By disintermediation	o Automatisation	2. Built-in compliance
3. Validation	3. Increase liquidity	o By automation	2. No double spending	3. Global investors
4. Automation	4. Reduction in overhead	2. Improved transparency	3. Faster transactions	4. 24/7 trading
5. Resiliency	5. No single points of failure	3. Shortend liquidity requirements		5. Instant trades
				6. Quicker and cheaper deal execution
<b>DLT disadvantages</b>	<b>Disadvantages</b>	<b>DLT advantages</b>		<b>Disadvantages</b>
1. Lack of Privacy	1. Potential manual maintenance in processes such as KYC/AML	1. Transparency		1. No promised liquidity pool
2. Lack of standardization		2. Immutable data		
3. Garbage in, Garbage out		3. No need intermediaries		
4. Black box effect		4. Smart Contracts		
5. Inefficiency		5. Decentralized transaction settlement		
		6. No single point of failure		
<b>Regulatory</b>	<b>Regulatory</b>	<b>Regulatory</b>	<b>Regulatory</b>	<b>Regulatory</b>
<b>Cost reduction</b>	<b>Cost reduction</b>	<b>Cost reduction</b>	<b>Cost reduction</b>	<b>Cost reduction</b>
<b>Improved Transparency</b>	<b>Improved Transparency</b>	<b>Improved Transparency</b>	<b>Improved Transparency</b>	<b>Improved Transparency</b>
<b>Improved Liquidity</b>	<b>Improved Liquidity</b>	<b>Improved Liquidity</b>	<b>Improved Liquidity</b>	<b>Improved Liquidity</b>
<b>Improved Accessibility</b>	<b>Improved Accessibility</b>	<b>Improved Accessibility</b>	<b>Improved Accessibility</b>	<b>Improved Accessibility</b>
<b>Efficiency</b>	<b>Efficiency</b>	<b>Efficiency</b>	<b>Efficiency</b>	<b>Efficiency</b>
<b>Smart Contracts</b>	<b>Smart Contracts</b>	<b>Smart Contracts</b>	<b>Smart Contracts</b>	<b>Smart Contracts</b>
<b>Interoperability</b>	<b>Interoperability</b>	<b>Interoperability</b>	<b>Interoperability</b>	<b>Interoperability</b>
<b>Safety</b>	<b>Safety</b>	<b>Safety</b>	<b>Safety</b>	<b>Safety</b>

(Mazzorana-Kremer, 2019)	(Momtaz, 2021)	(Pietro, 2021)	(Popescu, 2020)	(Santos et al., 2020)
<b>Advantages DLT</b>	<b>Advantages</b>	<b>Advantages</b>	<b>Advantages</b>	<b>Advantages</b>
1. Blockchain-based shareholder lists better than paper document or centralized storage media	1. Interoperability	1. Increase liquidity	1. Improved transparency	1. offer financing without voting rights
	2. Settlement speed	o Fractional ownership	2. More accessibility	
	3. 24/7 trading	2. Add certain rights to tokens	3. More liquidity	
	4. Instant settlement	3. Blockchain enables the issuance of securities for companies without intermediaries	o 24/7 exchanges	
	5. Cost reduction	4. Real-time Settlement	o No geographical barriers	
<b>Advantages</b>	6. Improved liquidity	5. Greater transparency	o Fractional ownership	
1. Reduced costs	o Fractional ownership	6. Greater efficiency	o Broader investor base	
o low-cost equity registration	7. Built-in Compliance	7. Autonomous capital management	4. Efficient asset management	
o lower transaction and transfer costs	<b>Disadvantages</b>	8. New markets	<b>DLT advantages</b>	
2. Instant transfers	1. 24/7 trading leads to higher bid-ask spreads during less busy hours (could be countered with fractional ownership)	9. Cost reduction	1. Better security	
3. 24/7 trading		10. Lower information asymmetry	2. Higher speed	
4. Less overhead			3. Decentralised	
5. Increased transparency				
6. Faster settlement				
7. Improved liquidity				
<b>Regulatory</b>	<b>Regulatory</b>	<b>Regulatory</b>	<b>Regulatory</b>	<b>Regulatory</b>
<b>Cost reduction</b>	<b>Cost reduction</b>	<b>Cost reduction</b>	<b>Cost reduction</b>	<b>Cost reduction</b>
<b>Improved Transparency</b>	<b>Improved Transparency</b>	<b>Improved Transparency</b>	<b>Improved Transparency</b>	<b>Improved Transparency</b>
<b>Improved Liquidity</b>	<b>Improved Liquidity</b>	<b>Improved Liquidity</b>	<b>Improved Liquidity</b>	<b>Improved Liquidity</b>
<b>Improved Accessibility</b>	<b>Improved Accessibility</b>	<b>Improved Accessibility</b>	<b>Improved Accessibility</b>	<b>Improved Accessibility</b>
<b>Efficiency</b>	<b>Efficiency</b>	<b>Efficiency</b>	<b>Efficiency</b>	<b>Efficiency</b>
<b>Smart Contracts</b>	<b>Smart Contracts</b>	<b>Smart Contracts</b>	<b>Smart Contracts</b>	<b>Smart Contracts</b>
<b>Interoperability</b>	<b>Interoperability</b>	<b>Interoperability</b>	<b>Interoperability</b>	<b>Interoperability</b>
<b>Safety</b>	<b>Safety</b>	<b>Safety</b>	<b>Safety</b>	<b>Safety</b>

(Schletz et al., 2020)	(Schwarz, 2022)	(Smith et al., 2019)	(Subramanian, 2019)
<b>Advantages</b>	<b>Advantages</b>	<b>Advantages</b>	<b>Advantages</b>
1. Transparency	1. Atomic Swaps	1. Novel forms of fundraising	<b>DLT advantages</b>
2. Traceability	2. Remove counterparty risk	2. More liquid markets	1. Immediate transactions
3. Immutability	3. Cost reduction	3. Tamper proof ownership	2. Timeliness transactions
4. Auditability	4. Fractional ownership	o Immutable ownership record	3. Transactional immutability
5. Efficiency through smart contracts		o Transparent ownership history	4. Smart contracts
6. reduced transaction costs		4. Streamlined transactions	
7. Programmability and regulatory compliance		o Automatic Payments	
		<b>Concrete benefits:</b>	
<b>Disadvantages</b>		1. Fractionalization	
1. Nascent technology		2. Customizability	
2. Regulatory uncertainty		3. Liquidity	
3. Garbage-in, garbage-out		4. Automation (Smart Contracts)	
		5. Cost efficiency	
		6. Settlement Time	
		7. Data transparency	
		8. Structured products	
		9. Accessibility	
		10. Secure recordkeeping	
		<b>Advantages for issuers</b>	
		1. Lower issuance costs	
		2. Acces to more investors	
		3. Improved investors management and information disclosure	
		4. Smart dividend distribution	
		5. Improved secondary trading	
		<b>Disadvantage</b>	
		1. Risky phase of duplicate infrastructures of trading securities	
<b>Regulatory</b>	<b>Regulatory</b>	<b>Regulatory</b>	<b>Regulatory</b>
<b>Cost reduction</b>	<b>Cost reduction</b>	<b>Cost reduction</b>	<b>Cost reduction</b>
<b>Improved Transparency</b>	<b>Improved Transparency</b>	<b>Improved Transparency</b>	<b>Improved Transparency</b>
<b>Improved Liquidity</b>	<b>Improved Liquidity</b>	<b>Improved Liquidity</b>	<b>Improved Liquidity</b>
<b>Improved Accessibility</b>	<b>Improved Accessibility</b>	<b>Improved Accessibility</b>	<b>Improved Accessibility</b>
<b>Efficiency</b>	<b>Efficiency</b>	<b>Efficiency</b>	<b>Efficiency</b>
<b>Smart Contracts</b>	<b>Smart Contracts</b>	<b>Smart Contracts</b>	<b>Smart Contracts</b>
<b>Interoperability</b>	<b>Interoperability</b>	<b>Interoperability</b>	<b>Interoperability</b>
<b>Safety</b>	<b>Safety</b>	<b>Safety</b>	<b>Safety</b>

### 3. Interview transcripts

#### 3.1 Investor interview 1

S.v.D.

19 September 2022

[14:01 – 14:36]

In this transcript, Daan is the researcher and S.v.D. is the interviewee. The first paragraph is the original one in Dutch the second paragraph in italics is the English translation.

1 **Daan:**

2 Ja, Laten we starten. Nou, Het is vandaag dat zeg ik er even bij voor de opname 19 september. Het is  
3 ongeveer twee uur s middags en we zitten hier thuis bij S.v.D.

4 Dag Stan, bedankt voor je tijd.

5 We gaan vandaag een interview houden over nieuw fenomeen, wat heet Tokenized Securities.

6

7 *Yes, let's get started. Well, today it is I'll add that for the recording September 19th. It's about two  
8 o'clock in the afternoon and we're sitting here at home at S.v.D.*

9 *Hi S, thanks for your time.*

10 *Today we are going to do an interview about a new phenomenon called Tokenized Securities*

11 **S.v.D:**

12 Ja.

13

14 *Yes.*

15 **Daan:**

16 Ik stel eerst gewoon een paar korte vragen, of je eigenlijk iets over jezelf kan vertellen? Meer je  
17 huidige investerings ervaring, zeg maar en weet je wat, met gewoon de traditionele effecten, dus meer  
18 aandelen, ETF's, obligaties mocht je alternatieve investeringen hebben, dan mag je die ook benoemen.  
19 Dat is ook interessant.

20 En vervolgens gaan we kijken ja, iets meer focussen op het op het op het nieuwe fenomeen Tokenized  
21 Securities, dus ja, kun je in het kort iets over jezelf vertellen en over je huidige ervaring met betrekking  
22 tot investeren?

23

24 *First I'll just ask a few short questions, can you actually tell us something about yourself? More your  
25 current investment experience, say and you know what, with just the traditional securities, so more  
26 stocks, ETFs, bonds if you have alternative investments, you can name them too. That's interesting too.  
27 And then we're going to look yeah, focus a little bit more on the on the new phenomenon Tokenized  
28 Securities, so yeah, can you tell us a little bit about yourself and your current investing experience?*

29 **S.v.D:**

30 Jazeker, ja ik ben SvD sinds 3 jaar werkzaam in loondienst in een marketingfunctie en daaromheen  
31 bezig als pokerspeler.

32 Ik ben begonnen met beleggen toen ik denk ik, dat was in eerste instantie niet en in effecten. Dat was  
33 toen ik nog op school zat en geïnteresseerd raakte een beetje in cryptocurrencies zoals denk ik heel  
34 veel studenten rond die leeftijd in ieder geval wel overhoren. En nou ja, die markt zoals we weten, gaat

35 een beetje in momenten van hypes en momenten, dat eigenlijk niemand het erover heeft. En Ik ben  
36 ook op zo'n moment dat het meer in een hype periode was geïnteresseerd in geraakt.

37  
38 *Yes, yes I'm S.v.D. I have been working for 3 years as an employee in a marketing position and around  
39 it as a poker player.*

40 *I started investing when I think It wasn't initially in securities. That was when I was still in school and  
41 got a bit interested in cryptocurrencies as I think a lot of students around that age at least do. And  
42 well, that market, as we know, goes into a bit of hype and moments, when no one is actually talking  
43 about it. And I also became interested in such a moment when it was more in a hype period.*

44  
45 **Daan:**

46 Ja

47  
48 *Yes.*

49  
50 **S.v.D:**

51 Kan me herinneren dat ik toen ja, toen ging het nog om paar honderden euro's denk ik daar in ben  
52 gestapt, maar ook wel serieus mezelf meer gaan verdiepen in hoe het nou precies werkte?  
53 Ik was wel voorzichtig met mijn geld steken in dingen waarvan ik niet wist hoe het precies werkte, of  
54 om maar gewoon te proberen.

55 En ja, toen ben ik daar door de tijd heen wat meer aan gaan toevoegen, zeg maar nou ja, gewoon wat  
56 meer bij gaan kopen. En toen 3 jaar later, toen ik ook echt in loondienst wat meer geld ging verdienen,  
57 toen ben ik me wel gaan verdiepen, en wat zijn de mogelijkheden van ook gewoon de traditionele  
58 aandelenmarkt?

59  
60 *I can remember that then yes, then it was still a few hundred euros I think I stepped in, but I also  
61 seriously started to delve more into how it worked exactly?*

62 *I was careful about investing my money in things I didn't know how exactly worked, or just to try.  
63 And yes, over time I started to add a little more to it, say well, just buy some more. And then 3 years  
64 later, when I actually started earning more money as an employee, then I started to delve deeper, and  
65 what are the possibilities of just the traditional stock market?*

66  
67 **Daan:**

68 Ja.

69  
70 *Yes.*

71 **S.v.D:**

72 En ook daar wel al beetje een serieus plan voor gemaakt, zeg maar, en uiteindelijk heeft dat plan vorm  
73 gekregen in iets meer conservatieve lange termijn gericht plan waar ik ook echt van plan ben om ja  
74 tientallen jaren aan vast te houden. En dat is eigenlijk dat ik maandelijks een vast bedrag, deels steken  
75 in ETF's op dit moment.

76 En de wat meer conservatieve ETF's, dus die bijvoorbeeld grotere indexen volgen met het vertrouwen  
77 dat ik denk dat de economie over de lange termijn gestaag stijgt of groeit. En ja, met het principe van  
78 compound interest daarover de lange termijn, ja, een mooi reserve mee op te kunnen bouwen. Dat is  
79 een eigenlijk een beetje het idee en het plan en dat doe ik nu dan twee jaar volgens mij, twee jaar,  
80 precies nu. En ja, dat wil ik zo blijven doen. Dat lijkt een beetje als het gaat over beleggen en mijn  
81 investeringen mijn historie tot nu.

82 *And I've already made a bit of a serious plan for that, so to speak, and in the end that plan took shape*  
83 *in a slightly more conservative long-term plan that I really intend to stick to for decades. And that is*  
84 *actually that I put a fixed amount every month, partly in ETFs at the moment.*  
85 *And the more conservative ETFs, for example those that track larger indices with the confidence that I*  
86 *think the economy is steadily rising or growing over the long term. And yes, with the principle of*  
87 *compound interest on this in the long term, yes, to be able to build up a nice reserve. That's actually*  
88 *kind of the idea and the plan and I'm doing that now for two years I think, two years, right now. And*  
89 *yes, I want to continue to do that. That seems a bit like when it comes to investing and my investments*  
90 *my history until now.*

91

92 **Daan:**

93 Nee, Ja, duidelijk.

94 Dus begrijp ik goed dat de meerderheid van je belegd vermogen in ETF's zit?

95

96 *No, yes, clearly.*

97 *So do I understand correctly that the majority of your invested capital is in ETFs?*

98

99 **S.v.D:**

100 Ja op dit moment dan buiten de cryptocurrencies om wat maar wel veel kleiner gedeelte is dan mij  
101 beleggingen in ETF's is het allemaal ETF's dus geen losse aandelen,

102

103 *Yes, at the moment, apart from cryptocurrencies, which is a much smaller part than my investments in*  
104 *ETFs, it is all ETFs, so no individual shares,*

105

106 **Daan:**

107 Nee oké, dus geen losse aandelen, oké

108

109 *No okay, so no separate shares, okay*

110 **S.v.D:**

111 Daar heb ik wel over nagedacht om dat te doen ooit, alleen ook dat is dan weer zoiets waar ik me echt  
112 graag heel erg ver in wil verdiepen voordat ik losse aandelen aan ga kopen.

113

114 *I have thought about doing that at some point, but that too is something I really want to delve into very*  
115 *deeply before I buy individual shares.*

116

117 **Daan:**

118 Ja, precies.

119

120 *Yes, exactly.*

121

122 **S.v.D:**

123 Omdat ik mezelf niet beschouwd als iemand die er genoeg over weet, wil ik daar gewoon nog niet aan  
124 beginnen.

125

126 *Since I don't consider myself someone who knows enough about it, I just don't want to get into that just*  
127 *yet.*

128



129 **Daan:**

130 Nee, ja, duidelijk en zijn er in die huidige ervaring met je huidige aanpak zijn op bepaalde  
131 moeilijkheden of drempels waar je tegenaan loopt wat betreft je investeringsactiviteiten?

132

133 *No, yes, clear and in your current experience with your current approach, are there any difficulties or*  
134 *barriers you run into in your investing activities?*

135 **S.v.D:**

136 Nee, ik zou zeggen van niet ik heb zeg maar ook gewoon best duidelijk met mezelf afgesproken dat er  
137 een vaste dag is in de maand bijvoorbeeld waarop ik het doe. En er zijn wel dingen waar ik tegenaan  
138 ben gelopen nadat ik zeg maar die strategie hebt vastgesteld en toen daar mee bezig ben gegaan. Toen  
139 ben ik wel nog, natuurlijk blijf je over dingen nadenken, je blijft er een beetje mee bezig en toen zijn er  
140 wel dingen gekomen waar ik later over na ben gaan denken van: Hmm hier had ik voordat ik zeg, maar  
141 deze strategie had bepaalt nu niet persé goed over nagedacht.

142

143 *No, I'd say no, I've just made a pretty clear agreement with myself that there is a fixed day in the*  
144 *month, for example, when I do it. And there are things that I've run into after I, say, established that*  
145 *strategy and then started working on it. Then I am still, of course you keep thinking about things, you*  
146 *keep thinking about it a bit and then things have come up that I started thinking about later: Hmm here*  
147 *I had before I say, but this strategy had determined not really thought about it right now.*

148 **Daan:**

149 Ja. en wat voor dingen waren dat dan bijvoorbeeld?

150

151 *Yes. and what kind of things were those?*

152

153 **S.v.D:**

154 Ja dan moet ik even denken, want, nou één is bijvoorbeeld over het balanceren, het herbalanceren van  
155 je portfolio. Zeg maar, je kiest een, ik heb een verdeling tussen 5 verschillende ETF's of 6 volgens mij  
156 gekozen. En ja daar kies je op het begin voor, maar die verschillen natuurlijk door de tijd heen  
157 onderling heel erg van waarde dus daarna ben ik er pas over na gaan denken van hé, nu is die  
158 verhouding is totaal anders geworden na 6 maanden. Omdat, ja, weet ik veel op mijn Clean Energy  
159 ETF het veel slechter heeft gedaan dan iets anders. Hoe ga ik daarmee om zeg maar was niet waar ik  
160 perse al over na had gedacht, maar ja, probeer het dan op het moment een oplossing bij te vinden die in  
161 lijn ligt met de lange termijn strategie en probeer ik dan zo op te vangen.

162 Maar dat ja, ik zit te denken ook nog een ander voorbeeld kan bedenken.

163 Ja, eentje was bijvoorbeeld over, maar volgens mij heb ik ook nog ooit jou over gesproken dat ik niet  
164 precies wist hoe het nou zat met. Omdat ik wel erachter kwam dat er een groot verschil zit tussen de  
165 klassieke aandelen en ETF's. In de zin van dat een klassiek aandeel is beetje bepaald op gewoon de  
166 waarde is, gewoon bepaald op vraag en aanbod dus de huidige prijs die je ervoor kan krijgen, is daar  
167 daar zijn zeg maar kopers voor en met ETF's is het anders want je volgt een index. Dus toen liep ik op  
168 gegeven tegen de gedachte van, Hé, hoe zit het nou als je uiteindelijk met ja een ETF. Er kan op een  
169 bepaald moment geen vraag zijn naar een ETF, zeg maar, terwijl de prijs wel op een bepaald punt blijft  
170 geïndexeerd hoe kom je er vanaf?

171 Zeg maar, stel je zou ooit een groot gedeelte van je portfolio als je over lange termijn echt een goed  
172 portfolio hebt opgebouwd van de hand willen doen, hoe zit het dan zeg maar met liquiditeit van het  
173 aandeel.

174 Nou, dat zijn dingen waar je een beetje. Ik maakte me daar een beetje zorgen over dat ik dacht van he,  
175 want het is niet, zeg maar hoe klassieke markt werkt in principe. Alleen ja, nou kom je hier achter dat

176 ook opzich gewoon goed geregeld is en Ja, dat zijn een beetje de dingen waar je dan later nog over na  
177 gaat denken of waar je niet echt tegenaan loopt, maar waar je wel nog achteraan wil zeg maar.

178  
179 *Yes, then I have to think for a moment, because, well, one is for example about balancing, rebalancing*  
180 *your portfolio. Say, you pick one, I chose a split between 5 different ETFs or 6, I think. And yes, you*  
181 *choose that at the beginning, but of course they differ greatly in value over time, so after that I started*  
182 *thinking about it, hey, now that ratio has become completely different after 6 months. Because, yes, I*  
183 *know a lot on my Clean Energy ETF has fared much worse than anything else. How do I deal with*  
184 *that, but was not what I had necessarily thought about, but then again, try to find a solution at the*  
185 *moment that is in line with the long-term strategy and then try to cope with it.*

186 *But yes, I'm thinking I can think of another example as well.*

187 *Yes, for example one was over, but I think I once talked to you about it that I didn't know exactly what*  
188 *it was about. Because I did find out that there is a big difference between traditional stocks and ETFs.*  
189 *In the sense that a classic stock is a bit determined on just the value, simply determined on supply and*  
190 *demand so the current price you can get for it, there are buyers for it, say, and with ETFs it's different*  
191 *because you follow an index. So then I ran into the thought of, Hey, what about if you end up with an*  
192 *ETF. There can be no demand for an ETF at a certain point in time, say, while the price will remain*  
193 *indexed at a certain point how do you get rid of it?*

194 *Let's say, if you ever want to sell a large part of your portfolio if you have built up a really good*  
195 *portfolio over the long term, what about liquidity of the share?*

196 *Well, those are things where you get a little. I was a little worried about that I thought hey, because it's*  
197 *not, say, how classic market works basically. Only yes, now you find out that in itself is also well*  
198 *arranged and yes, those are a bit the things that you will think about later or that you don't really run*  
199 *into, but that you still want to say .*

200 **Daan:**

201 Nee, Ja duidelijk. En als je dus, in dit geval heb je verteld dat je dus met name op ETF's focust en wat  
202 is dan voor jou een belangrijke overweging wanneer je een bepaald effect kiest, in dit geval een ETF  
203 bijvoorbeeld om daarin te investeren?

204  
205 *No, yes clearly. And if you, in this case, you have told that you mainly focus on ETFs and what is an*  
206 *important consideration for you when you choose a certain security, in this case an ETF for example*  
207 *to invest in it?*

208 **S.v.D.**

209 Ja, daar heb je dus wel natuurlijk goed naar gekeken toen ik ETF uit aan het kiezen was.

210 Mijn idee was eigenlijk om te beginnen met een beetje conservatieve risico-avers ETF's, als je het zo  
211 zou mogen noemen, want het blijft natuurlijk wel beleggen.

212  
213 *Yes, of course you looked at that carefully when I was choosing ETF from.*

214 *My idea was actually to start with somewhat conservative risk-averse ETFs, if you could call it that,*  
215 *because of course it remains investing.*

216  
217 **Daan:**

218 Ja, ja zeker.

219  
220 **S.v.D:**

221 Met het idee van hè, in het begin wil ik me nog iets meer gaan verdiepen, iets meer kennis opdoen  
222 voordat ik me iets meer ga specificeren, dus ook redelijk algemene ETF's gekozen bijvoorbeeld voor

223 het grote gedeelte van mijn portfolio zit in een ETF die gewoon eigenlijk de wereldmarkt trackt/volgt.  
224 En ik dacht nou tot de tijd dat ik meer weet of mezelf meer heb verdiept, wat er nog niet echt van is  
225 gekomen, hou ik dat wel gewoon zoveel mogelijk aan.  
226 Dus dat was een factor waar op basis waarvan ik heb gekozen. Ja en dan verder, zeg maar het andere  
227 gedeelte van de ETF's ook vooral uitgekozen op oké, waar denk ik dat iets meer op de middellange  
228 termijn zoals gaat over 5, misschien 5 tot 10 jaar de meeste waar zie ik meer potentie in, zeg maar dan  
229 de wereldmarkt. Maar, ja, dat is iets wat natuurlijk een beetje gissen blijft dus, maar daar heb ik  
230 gewoon een keuze in gemaakt wat ook een beetje past bij mijn persoonlijke interesses en waar Ik denk  
231 dat, ja, waar wellicht, goede markt voor gaat zijn en ja, op de middellange termijn.

232  
233 *With the idea of hey, in the beginning I want to delve a little more, gain a little more knowledge before*  
234 *I start to specify a little more, so also fairly general ETFs chosen, for example, for the large part of my*  
235 *portfolio is in an ETF that just actually tracks/follows the world market. And I thought until the time*  
236 *that I know more or have deepened myself more, which hasn't really come of it yet, I'll just stick to that*  
237 *as much as possible.*

238 *So that was a factor that I chose based on. Yes and then on, say the other part of the ETFs also mainly*  
239 *selected on ok, where do I think that something more in the medium term like about 5, maybe 5 to 10*  
240 *years most where I see more potential, say than the world market. But, yes, that is something that of*  
241 *course remains a bit of a guess, but I just made a choice in that which also fits a bit with my personal*  
242 *interests and what I think, yes, where perhaps, there will be a good market for and yes, in the medium*  
243 *term.*

244  
245 **Daan:**

246 Ja, ja, oké helder.

247 Dus dat was dan In het kort eigenlijk een beetje, hè, de huidige aanpak en jouw ervaring tot met  
248 betrekking tot investeren in effecten. Ja, zoals je weet, gaat het interview over Tokenized Securities  
249 wat je in het Nederlands zou kunnen vertalen naar getokeniseerde effecten.

250 Heb je ooit gehoord van Tokenized Securities?

251  
252 *Yes, yes, okay clear.*

253 *So in short that was actually a bit, eh, the current approach and your experience with regard to*  
254 *investing in securities. Yes, as you know, the interview is about Tokenized Securities which you could*  
255 *translate into tokenized securities in Dutch.*

256 *Have you ever heard of Tokenized Securities?*

257  
258

259 **S.v.D:**

260 Nee, Ik had voordat jij mij benaderd voor het interview nog niet echt over gehoord. Ik had wel gehoord  
261 van tokens in het landschap van cryptocurrencies, waar ze ook wel eens vaak cryptocurrencies volgens  
262 mij tokenizen dat je een soort van token hebt van die munt, maar verder dan dat eigenlijk vrij onbekend  
263 mee.

264  
265 *No, I hadn't really heard about it before you approached me for the interview. I had heard of tokens in*  
266 *the landscape of cryptocurrencies, where they also often tokenize cryptocurrencies I think you have*  
267 *some kind of token of that currency, but beyond that actually quite unknown.*

268  
269 **Daan:**

270 En als je zo het verschil tussen Tokenized Securities en de traditionele effecten zou moeten benoemen,

271 waar denk je dan aan? Zeg maar wat, wat zou dan in je opkomen?

272

273 *And if you had to name the difference between Tokenized Securities and the traditional securities, what*  
274 *would come to your mind? Tell me, what would come to your mind?*

275

276 **S.v.D:**

277 Ja, dat vind ik dus lastig. Ik denk dat het te maken heeft met dat, zeg maar een, dat je een token bij  
278 wijze van staat voor een bucket of een bepaalde hoeveelheid van aandelen van een bepaald ja van een  
279 bepaald merk, of hoe, bepaald bedrijf.

280 Alleen ik, ik moet zeggen dat ik niet per se het verschil begrijp of goed begrijp met wat dan het  
281 verschil is met een traditioneel aandeel. Ik kan me voorstellen dat je zeg maar een bepaald, dat je in  
282 een token van ik noem iets ASML staat voor een bepaalde hoeveelheid aandelen of een ja een x aantal  
283 aandelen van ASLM vertegenwoordigd.

284

285 *Yes, I find that difficult. I think it has to do with that, say one, that you have a token to represent a*  
286 *bucket or a certain amount of shares of a certain yes of a certain brand, or how, certain company.*  
287 *Just me, I have to say that I don't necessarily understand or understand the difference with what is the*  
288 *difference with a traditional stock. I can imagine that you say a certain, that in a token of I call*  
289 *something ASML stands for a certain amount of shares or yes represents an x number of shares of*  
290 *ASLM.*

291 **Daan:**

292 Nee, ja in principe zou je gewoon een token ASML zou letterlijk één op één een aandeel van ASML  
293 kunnen zijn, dus ja, dat klopt zeker en het is in feite een ja, het tokenizen betekent inderdaad dus dat je  
294 een aandeel geef je dan een naam als een token en die kun je wel makkelijk uitgeven op bijvoorbeeld  
295 blockchain techniek, net zoals Ethereum dat eigenlijk ook als een soort van token gezien kan worden,  
296 maar wordt ook vaak de term coin gebruikt of net wat dan ook.

297 Maar het fenomeen is dus eigenlijk gebouwd op blockchain en dat heet dan met een verzamelterm  
298 noemen ze het Distributed Ledger Technology zeg maar, dus dat is eigenlijk hè dat Iedereen ledgers  
299 heeft, met zijn allen, samen in een netwerk kan participeren, zeg maar om daar bijvoorbeeld handel te  
300 drijven tussen..., met een bepaalde token.

301

302 *No, yes in principle you could just, a token ASML could literally be one to one share of ASML, so yes,*  
303 *that's definitely right and it's in fact a yes, the tokenizing does indeed mean that you have a share then*  
304 *give you a name as a token and you can easily issue it on, for example, blockchain technology, just like*  
305 *Ethereum, which can actually also be seen as a kind of token, but the term coin is often used or*  
306 *whatever. But the phenomenon is actually built on blockchain and that is called in a collective term*  
307 *they call it Distributed Ledger Technology so to speak, so that is actually that everyone has ledgers, all*  
308 *of them, can participate together in a network, say to trade between them, for example. ., with a certain*  
309 *token.*

310

311 **S.v.D:**

312 Dus dat, ja, dus het grote verschil is dus eigenlijk, denk ik tenminste zoals ik tot nu toe een beetje  
313 begrijp is dat je, de token is verhandelbaar op blockchain technologie. Uiteindelijk of bruikbaar  
314 tenminste, bruikbaar ten opzichte van traditionele een traditioneel een aandeel van ASML wat je alleen  
315 kunt verhandelen op de beurs van die we kennen

316

317 *So that, yeah, so the big difference is actually, I think at least as I understand a bit so far is that you,*

318 *the token is tradable on blockchain technology. Ultimately or useful at least, useful compared to*  
319 *traditional and traditional a share of ASML that you can only trade on the stock exchanges of those we*  
320 *know*

321  
322

323 **Daan:**

324 Precies ja, je verbreedt eigenlijk een beetje de horizon met toegankelijkheid, ook wat je net noemde  
325 met die liquiditeit die dat je die ook zou kunnen verhogen bijvoorbeeld.

326 Als je dit verhaal zo hoort, heb je vertrouwen dat bijvoorbeeld Distributed Ledger Technology of  
327 blockchain, dan heb ik het niet per se over een specifiek project, Maar dat die techniek gebruikt zou  
328 kunnen worden als toekomstig handels ecosysteem, dus dat daar voortaan de, ook de traditionele  
329 markten op draaien bij wijze van.

330

331 *Exactly yes, you actually broaden the horizon a bit with accessibility, also what you just mentioned*  
332 *with that liquidity that you could also increase it, for example.*

333 *If you hear this story like this, do you have confidence that, for example, Distributed Ledger*  
334 *Technology or blockchain, then I'm not necessarily talking about a specific project, but that that*  
335 *technique could be used as a future trading ecosystem, so that from now on the, also run the*  
336 *traditional markets e.g.*

337

338 **S.v.D:**

339 Ik denk dat het zich in enige zin al heeft bewezen als het gaat over cryptocurrencies zelf. En ik denk  
340 dat dat best een goede indicator zou zijn voordat het voor het ja het Tokenized Securities ook zou  
341 kunnen werken.

342

343 *I think it has already proven itself in some sense when it comes to cryptocurrencies themselves. And I*  
344 *think that would be a pretty good indicator before it could work for the Tokenized Securities as well.*

345 **Daan:**

346 Maar zou je die ook vertrouwen als consument zijnde zeg maar, of hoe sta je daar in?

347

348 *But would you also trust them as a consumer, or how do you feel about that?*

349 **S.v.D:**

350 Ik zelf? Ja ik zelf wel, omdat ik denk dat de afgelopen 10 jaar eigenlijk al voldoende heeft bewezen.

351 Dat het systeem van blockchain tot op zekere hoogte vrij waterdicht is, kijk, je hebt altijd natuurlijk  
352 een beetje de kinderziektes en de blind spots waar je, waar mensen al lerend achter komen zeg maar.

353 Er zijn Natuurlijk ook heel veel negatieve dingen ontstaan, maar ik denk dat ik vooral door de flaws  
354 van de mensen te maken had en niet met de techniek zelf, aan de techniek zelf heeft gelegen.

355 Zoals je puur kijkt naar de techniek van blockchain, denk ik dat dan zou ik het vertrouwen en zeker al  
356 zeker denk ik als de voor de mensen bekende instanties zoiets gaan doorvoeren.

357

358 *Myself? Yes, I do, because I think the past 10 years have already proven enough. The fact that the*  
359 *blockchain system is quite watertight to a certain extent, look, of course you always have some teething*  
360 *problems and blind spots where you, which people find out while learning, so to speak. Of course a lot*  
361 *of negative things have arisen, but I think that I mainly had to do with the flaws of the people and not*  
362 *with the technology itself, it was due to the technology itself.*

363 *As you look purely at the technology of blockchain, I think I would trust it and certainly certainly I*  
364 *think if the authorities known to people start to implement something like this.*

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**Daan:**

Ja, precies dat het op grote schaal geadopteerd wordt zeg maar?

*Yes, exactly that it is being adopted on a large scale, so to speak?.*

**S.v.D:**

Ja.

*Yes.*

**Daan:**

Oke, dat sluit eigenlijk een beetje aan bij mijn daarop volgende vraag van, zou je ooit overwegen om te investeren in Tokenized Securities? Dus dan ja, geef je eigenlijk indirect antwoord van mocht het op grote schaal geadopteerd worden, dan zou je daar wel voor open staan.

*Okay, that kind of ties into my subsequent question of, would you ever consider investing in Tokenized Securities? So yes, if you actually give an indirect answer if it was adopted on a large scale, then you would be open to that.*

**S.v.D:**

Uhmhm

*Uhmhm*

**Daan:**

En dan bedoel ik ook met Tokenized Securities zou ook kunnen betekenen dat ze dus je noemt net Clean Energy ETF dat zie die dus ook voortaan uitgeven en verhandelbaar maken op blockchain in plaats van traditioneel via DeGiro of net wat dan ook.

*And I also mean by Tokenized Securities, it could also mean that you just mentioned Clean Energy ETF, so see it from now on issuing and making it tradable on blockchain instead of traditionally via DeGiro or whatever.*

**S.v.D:**

Uhh ja, voor mijzelf zou er dan een belangrijke reden moeten zijn waarom ik het via, op die manier zou willen veranderen, willen veranderen of willen aankopen ten opzichte van de manier waarop ik het nu doe en de manier waarop ik het nu doe, vind ik heel gemakkelijk.

En ik vertrouw, zeg maar de partij waarbij ik het in dit geval inderdaad de Giro, waarbij ik het doe op dit moment. Dus, zeg maar, stel de optie zou nu bestaan en het zou kunnen. Dan zou ik op dit moment geen reden zien die direct om daar ook echt meteen gebruik van te gaan maken en het andere te laten voor wat het is.

*Uhh yeah, for me there must be some major reason why I would want to change, change or buy it through, that way, versus the way I do it now and the way I do it now me very easily.*

*And I trust, say, the party where I am indeed doing the Giro in this case, where I am doing it at the moment. So, say, suppose the option exists now and it could. Then I wouldn't see any reason at the moment to really start using it right away and leave the other thing for what it is.*

412  
413 **Daan:**  
414 Nee, precies  
415  
416 *No, exactly*  
417  
418 **S.v.D:**  
419 Dus er zou voor mij een goede reden moeten zijn om het, om daarin te switchen en dat is een reden die  
420 ik op dit moment nog niet zou zien. Zou kunnen zijn als ik iets meer weet dat die keuze vrij makkelijk  
421 gemaakt is voor mij.  
422  
423 *So, there should be a good reason for me to switch to it, and that's a reason I wouldn't see at this point.*  
424 *Could be if I knew a little more that, that choice was made quite easily for me.*  
425  
426 **Daan:**  
427 Maar ja, nee oke, ja duidelijk.  
428 En denk jij dat het rendement op die Tokenized Securities zeg maar een zogeheten Risk Premium bij  
429 dragen en dat betekent eigenlijk dat het een hoge return zou kunnen geven dan de meer standaard  
430 financiële instrumenten.  
431 Vanwege het feit dat het bijvoorbeeld iets nieuws is, zeg maar of..  
432  
433  
434  
435  
436 *But yes, no okay, yes clearly.*  
437 *And do you think that the return on those Tokenized Securities possess a so-called Risk Premium and*  
438 *that actually means that it could give a high return than the more standard financial instruments.*  
439 *For example, due to the fact that it is something new, say whether..*  
440  
441 **S.v.D:**  
442 Ja, Ik denk dat tenminste hoe ik het zie is dat meer risico gaat vaak inderdaad gepaard met meer yield.  
443 Maar ik zie zelf niet per se reden waarom je dat bij een Tokenized Security meer zou hebben dan bij  
444 een klassiek effect.  
445 *Yes, I think at least how I see it is that more risk often goes hand in hand with more yield. But I don't*  
446 *necessarily see a reason why you would have that more with a Tokenized Security than with a classic*  
447 *security.*  
448  
449 **Daan:**  
450 Ja. Dat is op zich, het is natuurlijk geen, ja dat is, vaak is het inderdaad zo dat je zegt dat hè: higher  
451 risk, higher yield hè? Dus dat je hè, je wil natuurlijk iets meer voor terug en met het fenomeen dat er  
452 iets nieuws is, dat was destijds ook met crypto te zien, hè?  
453 Het was ook weer iets nieuws en mensen hadden hè, hoge verwachtingen ervan met ook wat met hoge  
454 returns gepaard ging. Maar wat je ook terecht zegt, het hoeft niet zo te zijn. Misschien dat een dat een  
455 investeerder denkt dat zo'n Tokenized Security in één keer met een immens hoge rendement opbrengt  
456 dan een, dan een traditioneel effect.  
457 *Yes. That in itself is, of course it is not, yes that is, often it is indeed the case that you say that eh:*  
458 *higher risk, higher yield huh? So that you don't, of course you want something more in return and with*

459 *the phenomenon that there is something new, that was also visible with crypto at the time, huh?*  
460 *It was also something new and people had high expectations of it, that was associated with high*  
461 *returns. But whatever you rightly say, it doesn't have to be that way. Perhaps that an investor thinks*  
462 *that such a Tokenized Security yields all of sudden an immensely high return compared to a traditional*  
463 *effect.*

464

465 **S.v.D:**

466 Ja, zeg maar hoe ik het nu voor me zie is, volgens mij gaat, Zou zo een token stel we houden even het  
467 voorbeeld van een ASML bijvoorbeeld. Dat je een token zou aankopen van een aandeel ASML op een  
468 blockchain. Dat gaat uiteindelijk, op een of andere manier wordt dat denk ik ergens gebackt door een  
469 echt aandeel van ASML lijkt me.

470 En, het verschil met cryptocurrency en waarom ik denk dat er toen een hype is ontstaan en nog steeds  
471 op sommige momenten wel is, is, heeft te maken met andere dingen en dat is denk ik inderdaad dat er  
472 bijvoorbeeld een cap is op het aantal, bijvoorbeeld Bitcoins dat er over de hele spannen van de life time  
473 van Bitcoin uitgegeven gaat worden. Zo'n dingen hadden denk ik veel meer invloed op de hype en het  
474 fear of missing out en dat mensen er snel op wilde instappen.

475 En, ik denk dat het bij een Tokenized Security het heel anders gaat zijn. Omdat het, zeg maar de  
476 waarde van een zo'n token of een asset ligt op een andere plek.

477

478 *Yes, tell me how I see it now, I think it goes, Would such a token suppose we keep the example of an*  
479 *ASML for example. That you would buy a token of an ASML share on a blockchain. It will eventually*  
480 *work, somehow I think it's backed up somewhere by a real share of ASML I think.*

481 *And, the difference with cryptocurrency and why I think there was a hype then and still is at some*  
482 *times, has to do with other things and I think that is indeed that there is for example a cap on the*  
483 *number, for example Bitcoins that will be issued over the entire span of the life time of Bitcoin. I think*  
484 *things like that had a much more impact on the hype and the fear of missing out and that people*  
485 *wanted to jump on it quickly.*

486 *And, I think it will be very different with a Tokenized Security. Because, say, the value of such a token*  
487 *or an asset is in a different place.*

488 **Daan:**

489 Ja, nee zeker

490

491 *Yes, no for sure*

492

493 **S.v.D:**

494 Want uiteindelijk komt het toch volgens mij vanuit ja, de waarde van een aandeel van ASML zelf.

495

496 *Because ultimately I think it comes from yes, the value of a share of ASML itself.*

497

498 **Daan:**

499 Ja, ze zouden kunnen kiezen om bijvoorbeeld te zeggen, van oké, we houden dit traditionele  
500 hoeveelheid aandelen in stand, maar die gaan we voortaan nu alleen nog maar op blockchain traden,  
501 dus dan heb je eigenlijk gewoon een Digital Twin als het ware ervan, gewoon een digitale copy. En ze  
502 zou ook kunnen zeggen, oké, we schrappen alle traditionele aandelen, maar we brengen diezelfde  
503 hoeveelheid uit op blockchain. En dan verkopen ze voor die koers, of we geven de mensen die die  
504 holdings hebben, geven ze gewoon voor de gemiddelde aankoopprijs terug, zeg maar.

505 Ja, dan zeg jij dus dan ja, dan hoeft zo'n risk premium niet per se aanwezig te zijn?



506

507 *Yes, they could choose to say, for example, okay, we will keep this traditional amount of shares, but*  
508 *from now on we will only trade them on blockchain, so you basically just have a Digital Twin of it, so*  
509 *to speak. just a digital copy. And they might also say, okay, we're scrapping all the traditional stocks,*  
510 *but we're issuing that same amount on blockchain. And then they sell for that price, or we give the*  
511 *people who have those holdings, just give them back for the average purchase price, so to speak.*  
512 *Yes, then you say yes, then such a risk premium does not necessarily have to be present?*

513

514 **S.v.D:**

515 Ja, zeg maar, met de economische principes die ik heb aangeleerd zie ik niet perse een reden waarom  
516 dat dan anders zou moeten zijn als het gaat over hè, de potentiële reward of de potentiële return,  
517 waarom die hoger zou moeten zijn dan bij, het veranderen van aandelen op de klassieke..  
518 Een reden zou misschien kunnen zijn dat je geen middelman hebt of geen uh.. Dat is natuurlijk een  
519 groot verschil tussen blockchain technologie en aankopen bij een broker is dat er, je betaalt wel  
520 waarschijnlijk. Ik kan me voorstellen dat er een omgeving ontstaat waarbij je minder fees uiteindelijk  
521 betaald. En ja, als je beleggingsstrategie hebt voor de 30 jaar en je wil elke maand iets aankopen, dan is  
522 dat wel een grote factor.

523

524 *Yes, say, with the economic principles I've learned I don't necessarily see a reason why it should be*  
525 *different when it comes to eh, the potential reward or the potential return, why it should be higher than*  
526 *with, the changing stocks on the classic..*

527 *One reason might be that you don't have a catalyst or you don't uh.. Of course that's a big difference*  
528 *between blockchain technology and buying from a broker is that there, you probably pay. I can*  
529 *imagine that an environment arises where you ultimately pay less fees. And yes, if you have an*  
530 *investment strategy for the 30 years and you want to buy something every month, that is a big factor.*

531

532 **Daan:**

533 Ja, nee klopt.

534

535 *Yes, no correct.*

536

537 **S.v.D:**

538 Denk ik, waar mogelijkheden zouden liggen voor mij als ik moet zoeken naar een reden om voor het  
539 ene te kiezen in plaats van bijvoorbeeld het ander.

540

541 *I think, what possibilities would lie for me if I have to look for a reason to choose one instead of the*  
542 *other, for example.*

543

544 **Daan:**

545 Nee, zeker. Ja, op de lange termijn kunnen die fees toch wel een grote hoeveelheid geld.

546

547 *No certainly. Yes, in the long run those fees can be a lot of money.*

548

549 **S.v.D:**

550 Maar niet per se omdat ik denk dat het aandeel sneller meer waard wordt omdat het ja blockchain  
551 veranderd zou worden dan ten opzichte van bij de klassieke beurs.

552

553 *But not necessarily because I think that the share will be worth more faster because the blockchain*  
554 *would be changed than compared to the traditional stock exchange.*

555  
556 **Daan:**  
557 Ja, nee, helder dankjewel ja, je noemt eigenlijk ook wel meteen wel weer een soort van voordeel hè?  
558 Aan wat je denkt dat Tokenized Securities kan hebben ten opzichte van traditionele effect, hè? Dus dat  
559 er de middelman eigenlijk wegvalt, wat kan resulteren in lagere fees.  
560 Zijn er nog andere voor en nadelen die zo bij jou omhoog komen wanneer je denkt aan Tokenized  
561 Securities, ten opzichte van de traditionele gang van zaken?

562

563

564 *Yes, no, clear thanks. Yes, you also immediately mention some kind of advantage, don't you? What you*  
565 *think Tokenized Securities can have over traditional effect, huh? So that the intermediary actually*  
566 *drops out, which can result in lower fees.*  
567 *Are there any other pros and cons that come to mind when you think of Tokenized Securities, versus*  
568 *the traditional way of doing things?*

569 **S.v.D:**

570 Ja ik zelf wel, ik vraag me dan af, zeg maar of dat ook voor andere mensen zou gelden. Maar ik denk  
571 zelf dat het uiteindelijk, als het, als er goed over na wordt gedacht en het wordt op een goede manier  
572 geïmplementeerd dat het veiliger zou kunnen zijn voor een voor een particuliere belegger, zoals ik  
573 bijvoorbeeld.

574 Omdat ik nog steeds denk dat ja, hoe moet ik het uitleggen? Ik denk dat de financiële instanties waar  
575 we nu van gebruik maken als mensen die hebben een bepaalde invloed en die hebben bepaalde macht.  
576 En die zouden in theorie dingen kunnen doen, wat een blockchain bijvoorbeeld niet kan, omdat het  
577 door heel veel mensen gecontroleerd wordt.

578

579 *Yes I do myself, I wonder if that would also apply to other people. But I personally think that in the end*  
580 *if it's thought through and implemented in a good way it could be safer for a retail investor like me for*  
581 *example.*

582 *Because I still think yes, how do I explain it? I think the financial institutions that we now use as*  
583 *people who have a certain influence and who have certain power. And in theory they could do things*  
584 *that a blockchain cannot, for example, because it is controlled by a lot of people.*

585 **Daan:**

586 Ja, ja, dus transparantie is zeg maar groter op, met een Tokenized Security?

587

588 *Yes, yes, so transparency is, so to speak, greater with a Tokenized Security?*

589

590 **S.v.D:**

591 Ja, Ik denk dat het zo niet per se alleen om transparantie gaan, maar kijk, ik geloof niet per se in het  
592 kwade van de mens of in het kwade van bedrijven. Alleen je hebt gewoon mensen die aan knopjes  
593 kunnen draaien daar, wat niet kan op een blockchain.

594

595 *Yes, I don't think it's just about transparency per se, but look, I don't necessarily believe in the evil of*  
596 *humans or the evil of corporations. Only you just have people who can push buttons there, which is not*  
597 *possible on a blockchain.*

598

599 **Daan:**

600 Ja precies.

601  
602 *Yes, exactly.*

603 **S.v.D:**  
604 En ik verwacht niet precies, per se dat zo'n dingen ooit gaan gebeuren, maar zeg maar als, we zitten nu  
605 vind ik nog steeds economisch gezien in een best goede periode. Alles gaat goed maar ja stel er  
606 ontstaat weer echt ooit een hele flinke crisis, dan kunnen er altijd hele gekke dingen gebeuren. En ik  
607 denk als je dan in een in een goed waterdicht systeem als daar dingen gebeuren, ja, dat als mensen daar  
608 securities verhandelen. Dat het wellicht op zo'n moment ook veiliger, als veiliger ervaren kan worden  
609 voor mij misschien.  
610  
611 *And I don't exactly expect such things to ever happen, but I think we are now still in a pretty good*  
612 *period economically. Everything is going well, but if a really big crisis arises again, then very crazy*  
613 *things can always happen. And I think if you then in a well watertight system if things happen there,*  
614 *yes, that if people trade securities there. That perhaps at such a moment it can also be experienced as*  
615 *safer, perhaps safer for me.*

616 **Daan:**  
617 Ja.  
618  
619 *Yes.*

620 **S.v.D:**  
621 En transparantie is er misschien ook wel eentje ja, ja zeker.  
622  
623 *And transparency is perhaps one of them, yes, certainly.*

624  
625 **Daan:**  
626 En zijn er ook nog bepaalde nadelen die je zo zou kunnen opnoemen of die ja waar je dingen waar je  
627 over twijfelt misschien?  
628  
629 *And are there also certain disadvantages that you could mention like that or those yes where you might*  
630 *have doubts about things?*

631 **S.v.D:**  
632 Ja, uhm, goede vraag. Uhm, ik zet de hele tijd in twee, in twee richtingen te denken als het gaat over  
633 wat ik zelf vind en wat ik denk en wat ik denk dat bijvoorbeeld Nederland zou doen.  
634  
635 *Yeah, um, good question. Uhm, I think in two directions all the time when it comes to what I think and*  
636 *what I think and what I think the Netherlands would do, for example.*

637 **Daan:**  
638 Ja in dit geval hè, het is de opinie van jou die we die hier proberen te peilen, zeg maar, dus je moet je,  
639 je mag het ook in twee splitsen, maar je mag ook gewoon vanuit je eigen perspectief die vraag  
640 beantwoorden.  
641  
642 *Yes in this case eh, it is your opinion that we are trying to collect here, say, so you have to, you can*  
643 *also split it in two, but you can also just answer that question from your own perspective.*

644 **S.v.D:**  
645 Dingen waar ik, met bijvoorbeeld het handelen in cryptocurrencies en het sturen van Bitcoin ooit naar

646 mensen of whatever tegenaan ben gelopen is dat het soms lang kan duren voordat transacties zeg maar  
647 zijn voltooid of worden. Dus niet bij iedere cryptocurrency natuurlijk het geval, maar die zijn er wel.  
648  
649 *Things that I have encountered, for example with trading cryptocurrencies and sending Bitcoin to*  
650 *people or whatever, is that it can sometimes take a long time before transactions are completed or are.*  
651 *So of course not the case with every cryptocurrency, but there are.*  
652  
653 **Daan:**  
654 Ja.  
655  
656 *Yes.*

657 **S.v.D:**  
658 Ik denk dat een van de voordelen van het verhandelen op klassieke beurzen tegenwoordig wel is dat je  
659 vrij instant je transacties kunt doen. Hoeft niet per se zo te zijn op het gebruik van, met als je gebruik  
660 maakt van Tokenized Securities op blockchain technologie maar, dat zou iets zijn waar ik wel  
661 geïnteresseerd naar ben om, ja, om eens te zien hoe dat dan precies werkt?  
662  
663 *I think one of the advantages of trading on traditional exchanges nowadays is that you can make your*  
664 *trades quite instantaneously. Doesn't necessarily have to be about using, but if you're using Tokenized*  
665 *Securities on blockchain technology, that would be something I'd be interested in, yes, to see exactly*  
666 *how that works?*

667  
668 **Daan:**  
669 Ja, ja, precies.  
670  
671 *Yes, yes, exactly.*  
672

673 **S.v.D:**  
674 Ja, ik kan zo snel geen andere nadelen bedenken.  
675  
676 *Yeah, I can't think of any other cons so quickly.*  
677

678 **Daan:**  
679 Nee, ja, het is maar net wat natuurlijk meteen in je op komt, dat is het belangrijkste.  
680 We hebben nu dus hè, een tijdje gesproken over Tokenized Securities en we hebben het ookal, ik heb  
681 ook gevraagd of dat je vertrouwen zou hebben in Distributed Ledger Technology en blockchain als  
682 toekomstig handelssysteem.  
683 In hoeverre denk jij dat deze techniek ook daadwerkelijk echt de toekomst word? Durf je daar een  
684 uitspraak over te doen of een inschatting over te maken?  
685  
686 *No, yes, it's just what comes to mind right away, that's the most important.*  
687 *So we've been talking about Tokenized Securities for a while now and we've talked about it, I also*  
688 *asked if you would have faith in Distributed Ledger Technology and blockchain as a future trading*  
689 *system.*  
690 *To what extent do you think this technology will actually become the future? Do you dare to make a*  
691 *statement or estimate about it?*

692  
693  
694 **S.v.D:**  
695 Ja, ik was, ik was 10 jaar geleden erg benieuwd om te zien hoe het zich zou gaan ontwikkelen als het  
696 gaat over adoptie en hoe, hoe snel mensen er van overtuigd zouden raken.  
697  
698 *Yes, I was, I was very curious 10 years ago to see how it would develop when it comes to adoption and*  
699 *how, how quickly people would get convinced.*  
700  
701 **Daan:**  
702 En dan, waar heb je het dan over?  
703 *And then what are you talking about?*  
704  
705 **S.v.D:**  
706 Over cryptocurrencies en ik vergelijk dat er altijd een beetje mee omdat het gebruikt, het maakt  
707 gebruik van dezelfde technologie in principe.  
708 *About cryptocurrencies and I always compare that to it a bit because it uses, it uses the same*  
709 *technology basically.*  
710 **Daan:**  
711 Nee, dat klopt. Zeker, zeker.  
712 *No that is right. Sure sure.*  
713  
714 **S.v.D:**  
715 In sommige vlakken is het natuurlijk wel anders. Ja, het ligt er een beetje aan, hoe, denk ik hoe  
716 significant t de voordelen gaan zijn dan opzichte van hoe het op dit moment gebeurt.  
717 *In some respects, of course, it is different. Yeah, it kind of depends on how, I think how significant the*  
718 *benefits are going to be compared to how it's happening right now.*  
719  
720 **Daan:**  
721 Ja, ja. Ja.  
722  
723 **S.v.D:**  
724 En ik denk dat het vooral te maken gaat hebben met hoe duidelijk zijn die voordelen voor mensen.  
725 *And I think it's mainly going to have to do with how obvious those benefits are for people.*  
726  
727 **Daan:**  
728 Ja. Het is, een soort stukje van gewoon dat er gewoon dat, dat consumenten een goede afweging  
729 kunnen maken voor en nadelen stukje educatie ook van wat gaat er dan veranderen voor de consument.  
730 Op het moment dat, dat echt bij het bredere publiek bekend is, dat er dan misschien stappen gezet  
731 kunnen worden?  
732 *Yes. It is, a kind of part of just that, that consumers can make a good assessment of the pros and cons,*  
733 *and a bit of education about what will change for the consumer. The moment that it is really known to*  
734 *the wider public, that perhaps steps can be taken?*  
735

736 **S.v.D:**  
737 Ja, ik denk dat we educatie en ik zou het misschien eerder promotie noemen heel erg belangrijk gaat  
738 zijn, want ik denk niet dat het zichzelf zo makkelijk gaat verkopen als cryptocurrencies deden.

739 *Yes, I think that education and I might call it promotion is going to be very important because I don't*  
740 *think it's going to sell itself as easily as cryptocurrencies did.*  
741

742 **Daan:**  
743 Ja.

744 **S.v.D:**  
745 Uhm, bij cryptocurrencies, was er een heel duidelijk en heel obvious voorbeeld stel, je zou even een  
746 Bitcoin bij wijze van vergelijken met een aandeel. Dan zijn daar hele duidelijke verschillen tussen. Ja,  
747 dat zijn totaal twee andere producten, maar als jij een Tokenized Security gaat vergelijken met een  
748 klassieke aandeel voor mijn gevoel zitten, zijn die verschillen echt een heel stuk kleiner.  
749 Dus denk ik ook dat het veel langer gaat duren en veel meer tijd nodig heeft om, en promotie en  
750 inderdaad educatie nodig heeft om mensen ervan te kunnen overtuigen in eerste instantie om dan te  
751 kunnen overtuigen dat het voordelen heeft en denk dat een hele grote tweede stap dan nog is om ze er  
752 ook gebruik van te laten maken. Ik denk dat het wel zou kunnen en ik, maar ik denk dat het langer tijd  
753 nodig gaat hebben omdat.. Ja om die reden eigenlijk denk ik.  
754 Denk dat je misschien gaat zien dat er altijd je hebt natuurlijk altijd early adopters en meer innovatieve  
755 ondernemingen of particuliere beleggers die het wel aandurven die wel al benieuwd naar zijn en die  
756 altijd zoeken en aan de kleinere edges die je kunt vinden.  
757 Alleen of het dan ook direct snel op schaal gaat werken, dat is wel iets wat ik wat ik betwijfel.  
758 Wat misschien wel als je het hebt over echt 20-30 jaar, wat misschien wel interessant zou kunnen zijn,  
759 maar op de korte termijn denk ik nou, dat is denk ik persoonlijk dat het wel lastig gaat worden om  
760 zoiets op grote schaal interessant te maken voor ja, voor de gewone particuliere belegger.

761 *Uhm, with cryptocurrencies, there was a very clear and very obvious example, you could compare a*  
762 *Bitcoin with a stock. Then there are very clear differences between them. Yes, those are two completely*  
763 *different products, but if you compare a Tokenized Security with a classic stock, in my opinion, the*  
764 *differences are really a lot smaller. So I also think it's going to take a lot longer and a lot more time to,*  
765 *and promotion and indeed education to be able to convince people in the first instance and then to be*  
766 *able to convince that it has benefits and think a really big second The next step is to let them use it. I*  
767 *think it could be and I do, but I think it will take longer because.. Yes for that reason actually I think*  
768 *you might see that there is always of course always early adopters and more innovative companies or*  
769 *retail investors who dare who are already curious and who are always looking and on the smaller*  
770 *edges that you can find .Only whether it will also work quickly on scale is something I doubt. Which*  
771 *maybe if you're talking about really 20-30 years, which might be interesting, but in the short term I*  
772 *think well, that's personally I think it's going to be difficult to make something like this interesting on a*  
773 *large scale for yes, for the ordinary retail investor.*  
774

775  
776 **Daan:**  
777 En stel, je krijgt een bericht van DeGiro, een mailtje, een update over 5 jaar gaan wij onze back-end  
778 laten draaien op deze techniek.

779 *And suppose you receive a message from DeGiro, an email, an update in 5 years' time, we will have*  
780 *our back-end run on this technology.*  
781

782 **S.v.D:**  
783 Ja dat is interessant.

784 *Yes that is interesting.*  
785  
786 **Daan:**  
787 Qua interface verandert er niks, je kunt gewoon dezelfde, ga je dan op zoek naar een nieuwe broker?  
788 Of zou je dan denken van nou weet je, ik vertrouw DeGiro in dit geval erop dat dit allemaal smooth  
789 blijft lopen en dat me posities niet in gevaar zijn als het ware.  
790 Hoe zou je daar mee omgaan, zou je, ja?

791 *Nothing changes in terms of interface, you can just use the same one, do you look for a new broker?*  
792 *Or would you think well you know, in this case I trust DeGiro that this will all continue to run*  
793 *smoothly and that my positions are not in danger as it were. How would you deal with that, would you,*  
794 *yeah?*

795 **S.v.D:**  
796 Ja, vind ik wel een hele interessante, want dan maak je het voor mensen. Dan hoeven ze in principe  
797 zelf niet de stap te zetten, dus dat zou een hele mooie manier zijn van het in gebruik nemen daarvan  
798 denk ik. Zo had ik er zelf nog niet over nagedacht.  
799 Ja ik, ik zou er zelf dan wel voor open staan om inderdaad even goed te onderzoeken van, is het voor  
800 mij, vooral verandert er voor mij veel. Ik vertrouw, ik zou het best vertrouwen zeg maar.  
801 Maar ik zou ook wel willen zien dat het, dat het me in ieder geval geen nadelen brengt ten opzichte  
802 van, weet ik veel, voor kiezen voor een andere traditionele broker.

803 *Yes, I find a very interesting one, because then you make it for people. Then in principle they don't*  
804 *have to take the step themselves, so I think that would be a very nice way of using it. I hadn't thought*  
805 *about it that way before.*  
806 *Yes I would, I would be open to investigate it indeed, is it for me, especially a lot changes for me. I*  
807 *trust, I should trust it so to speak.*  
808 *But I would also like to see that it does not bring me any disadvantages compared, I know, for*  
809 *choosing another traditional broker.*  
810

811 **Daan:**  
812 Nee, nee, ja.  
813  
814 *No, no, yes.*  
815

816  
817 **S.v.D:**  
818 Dus ik vind het nog een beetje lastig beoordelen, alleen omdat ik niet precies de voor en nadelen op  
819 een rijtje zou hebben van het één of het ander.

820 *So I still find it a bit difficult to judge, just because I wouldn't know exactly the list of pros and cons of*  
821 *one or the other.*  
822

823 **Daan:**  
824 Ja, Ja, Nee, Ja het is zeer begrijpelijk.  
825 Even kijken.  
826 Zijn er nog overige dingen die je zou willen toevoegen aan je opinie zeg maar, over het investeren in

827 Tokenized Securities. Dit is eigenlijk mijn laatste vraag, dus als er nog iets is wat je te binnen schiet of  
828 over kwijt wil, dan is dit het moment om te benoemen.

829 *Yes, yes, no, yes it is very understandable.*  
830 *Let's see.*  
831 *Are there any other things you would like to add to your opinion about investing in Tokenized*  
832 *Securities? This is actually my last question, so if there's anything else that comes to mind or wants to*  
833 *say about it, now's the time to mention it.*

834 **S.v.D:**  
835 Ja, ja, ik denk dat het gewoon heel erg belangrijk gaat zijn uiteindelijk als je, ja, als je wil dat bedrijven  
836 of ja bedrijven, instellingen, mensen of particuliere beleggers zelf er goed gebruik van willen gaan  
837 maken, of op schaal gebruik van willen gaan maken dat het vooral ook belangrijk gaat zijn om goed na  
838 te denken over: Hoe brengen we het bij de mensen of hoe laten we ze daar kennis mee maken.

839 *Yes, yes, I think it's just going to be really, really important eventually if you, yes, if you want*  
840 *companies or yes companies, institutions, people or retail investors themselves to want to make good*  
841 *use of it, or use it at scale will make it especially important to think carefully about: How do we bring*  
842 *it to the people or how do we introduce it to them.*  
843

844 **Daan:**  
845 Ja ja, precies ja.  
846  
847 *Yes yes, exactly yes.*

848 **S.v.D:**  
849 Ja, dat gaat gewoon, denk ik iets zijn van de lange adem, ja, mijn gevoel, dat zegt mijn gevoel op dit  
850 moment.

851 *Yes, that's just going to, I think, be something of the long haul, yes, my feeling, that's my feeling at the*  
852 *moment.*

853 **Daan:**  
854 Nouja, het is zeer inter....  
855 *Well, it's very inter....*  
856

857 **S.v.D:**  
858 En misschien is er ook wel een belangrijk ding is, misschien ook wel, nu hebben mensen nog steeds  
859 gewoon heel erg een associatie met als het gaat over blockchain, blockchain, kennen mensen denk ik  
860 voornamelijk van cryptocurrencies.  
861 Ja, en cryptocurrencies hebben natuurlijk ook een bepaald imago.

862 *And maybe there is also an important thing, maybe also, now people still just have a lot of association*  
863 *with when it comes to blockchain, blockchain, I think people mainly know about cryptocurrencies.*  
864 *Yes, and of course cryptocurrencies also have a certain image.*  
865

866 **Daan:**  
867 Ja, zeker omtrent volatiliteit etcetera en....  
868 *Yes, especially with regard to volatility etcetera and....*  
869

870 **S.v.D:**



871 Ik denk dat ook een beetje een dun lijntje gaat zijn, of, een belangrijk punt in ieder geval om over na te  
872 denken van hoe...

873 *I think that's also going to be a bit of a thin line, or, at least an important point to think about of how...*

874 **Daan:**  
875 En stel ze laten de term blockchain weg en ze beschrijven het als Distributed Ledger Technology, wat  
876 eigenlijk een soort van verzamelnaam is voor verschillende varianten van blockchain. Maar het puur  
877 gaat om zeg maar het verdelen van de verantwoordelijkheid, dus de decentralisatie om het zo te  
878 noemen.

879 *And suppose they omit the term blockchain and describe it as Distributed Ledger Technology, which is*  
880 *actually a kind of collective name for different variants of blockchain. But it is purely about dividing*  
881 *the responsibility, so to call it decentralization.*

882 **S.v.D:**  
883 Ja nou, dat zijn inderdaad zo'n dingen. Dat zijn denk ik dingen om, die heel erg belangrijk gaan zijn als  
884 het gaat over hoe algemeen geaccepteerd zoiets gaat worden, ja, ja.

885 *Yes, well, those are indeed such things. Those are things I think are going to be really important when*  
886 *it comes to how widely accepted something like this is going to be, yeah, yeah.*

887 **Daan:**  
888 Nee, duidelijk.  
889 Dan wil ik bij deze graag het gesprek gaan afronden en je te bedanken voor je antwoorden en voor je  
890 tijd natuurlijk en om je mening te delen over dit nieuwe fenomeen.

891 *No, clear.*

892 *Then I would like to finish the conversation and thank you for your answers and for your time of*  
893 *course and for sharing your opinion about this new phenomenon.*  
894

895 **S.v.D:**  
896 Ik hoop vooral dat je er iets aan hebt

897 *I hope it's of some use to you*

898 **Daan:**  
899 Ja, nee, zeker, dat gaan we zien, Maar dat komt goed. Dan ga ik bij deze opname beëindigen.

900 *Yeah, no, sure, we'll see, But it'll be okay. Then I'm going to end on this recording.*

## 3.2 Investor interview 2

W.H.

19 September 2022

[15:58 – 16:28]

In this transcript, Daan is the researcher and W.H. is the interviewee. The first paragraph is the original one in Dutch the second paragraph in italics is the English translation.

1 **Daan:**

2 Welkom bij mijn interview over de opinie omtrent Tokenized Securities zoals je te horen had  
3 gekregen.

4 Ja even heel kort, ik ben een masterstudent business Administration en ik schrijf mijn scriptie over, ja,  
5 dit nieuwe financiële instrument waar mensen dus in kunnen beleggen als het ware en ik ben eigenlijk  
6 benieuwd naar de opinie van investeerders met een dus danig vermogen boven de € 100.000 om te  
7 kijken wat zij ja of wat ze hiervan vinden eigenlijk. Dus ik ben heel benieuwd naar jouw mening, dus  
8 ik zal je een paar vragen stellen om toch wat sturing te geven zeg maar aan het interview en mijn eerste  
9 vraag is eigenlijk of dat je wat kort kunt vertellen over jezelf en wat je huidige ervaring is met  
10 betrekking tot investeren.

11

12 *Welcome to my interview about the opinion of Tokenized Securities as you have been told.*

13 *Yes, briefly, I am a master's student in Business Administration and I am writing my thesis about, yes,*  
14 *this new financial instrument that people can invest in, as it were and I am actually curious about the*  
15 *opinion of investors with an investable capital above the € 100,000 to see what they yes or what they*  
16 *think about this. So I'm very curious about your opinion, so I'll ask you a few questions to give you*  
17 *some guidance to the interview and my first question is actually if you can tell us a little bit about*  
18 *yourself and your current experiences related to investing.*

19

20 **W.H:**

21 Nou, Ik ben dus W.H. en 27 jaar en tenminste ja, ik heb ook op de Universiteit Twente gezeten. Ik heb  
22 mijn master net niet afgemaakt. Ik ben een beetje blijven haken bij de scriptie dus. En toen ging het  
23 ook heel goed met pokeren, dus toen heb ik eigenlijk heel veel geld gewonnen. Met pokeren waardoor  
24 ik ook ja, dus eigenlijk meteen maar moest gaan beleggen. Ik geloof twee jaar geleden dat ik mijn  
25 eerste echt grote prijs won toen en toen was het ook meteen tijd om, nou ja, om het ergens te gaan  
26 beleggen.

27

28 *Well, so I'm W.H. and 27 years old and at least yes, I also went to the University of Twente. I just*  
29 *didn't finish my master's degree. So I got stuck at the thesis part.*

30 *And then poker went really well, so I actually won a lot of money back then. With poker which made*  
31 *me yes, so I had to start investing right away. I believe I won my first really big prize two years ago*  
32 *and then it was also time to, well, invest it somewhere.*

33

34 **Daan:**

35 Ja ja precies.

36 *Yes yes exactly.*

37

38

39 **W.H:**

40 Dus daar startten het beleggen mee. Ik heb eigenlijk sinds die tijd best wel veel het nieuws erom heen  
41 gevolgd, dus ik heb een beetje crypto nieuws en beurs nieuws gevolgd. En ook via ING krijg ik nu  
42 uitnodigingen.

43

44 *So that's where I started investing. I've actually followed quite a lot of the news around it since then, so*  
45 *I've followed a bit of crypto news and stock market news. And I now also receive invitations via ING.*

46

47 **Daan:**

48 Ja.

49

50 *Yes.*

51

52 **W.H:**

53 En voor van die evenementen of gewoon van die nou ja van die online meetings dat ze dan wat  
54 presenteren. Ja, dus dat is een beetje, maar ik heb eigenlijk nog helemaal niks zelf gedaan, dus ik heb  
55 alles laten beleggen door de ING tot nu toe.

56

57 *And for those events or just those, well, those online meetings that they present something. Yes, so*  
58 *that's a bit, but I haven't actually done anything myself yet, so I've had everything invested by ING so*  
59 *far.*

60

61 **Daan:**

62 Ja, ja, dus je bent eigenlijk gewoon naar ING toegestapt van, ik heb een bepaald vermogen, beleg dat  
63 maar voor mij en dus is dat dan een fonds of een ETF of foe ziet dat eruit?

64 *Yes, yes, so you actually just went to ING and said, I have a certain amount of capital, invest it for me*  
65 *and so is that a fund or an ETF or What does that look like?*

66

67 **W.H:**

68 Ja, het is een indexfonds ja. Noemen ze het ook, ik heb een zeer offensief indexfonds volgens mij en  
69 nu hebben ze het net omgezet naar een offensief duurzaam fonds geloof ik.

70 *Yes it is an index fund yes. They call it that, I have a very offensive index fund I think and now they just*  
71 *converted it to an offensive sustainable fund I believe.*

72

73 **Daan:**

74 Oké ja ja ja.

75

76 *Ok yes yes yes.*

77

78

79 **W.H:**

80 En dan ja bij boven, dat is volgens mij ook gewoon vanaf elk bedrag te doen, alleen als je dan boven  
81 een bepaald bedrag zit, gaan volgens mij je kosten iets omlaag en dan krijg je een mannetje van de  
82 bank als het ware die je altijd kan appen.

83  
84 *And then yes at the top, I think that can also be done from any amount, only if you are above a certain*  
85 *amount, I think your costs will go down slightly and then you get a man from the bank, that you can*  
86 *always sent messages.*

87  
88 **Daan:**  
89 Ja, ja, precies soort van private banker als contactpersoon.  
90  
91 *Yes, yes, just kind of private banker as a contactperson.*

92  
93 **W.H:**  
94 Dat klopt ja.  
95  
96 *That's right yes.*

97  
98 **Daan:**  
99 Oké mooi en zijn er nog andere dingen naast gewoon bijvoorbeeld dit fonds waar je nog investeert, zeg  
100 maar voor je vermogensopbouw of iets anders?

101 *Okay great and are there other things besides just this fund where you still invest, say for your wealth*  
102 *accumulation or something else?*

103  
104 **W.H:**  
105 Nou, ik heb net een huis gekocht hier, dus eigenlijk, ja, zou je kunnen zeggen dat dat wel redelijk, daar  
106 stort je ook wel wat geld in. Wel ook nog een hypotheek erbij genomen samen met mijn vriendin.

107 *Well, I just bought a house here, so actually, yeah, you could say that's reasonable, you're going to put*  
108 *some money in there too. But, I also took out a mortgage together with my girlfriend.*

109  
110 **Daan:**  
111 Ja.  
112  
113 *Yes.*

114  
115 **W.H:**  
116 En verder niet ja, ik speel poker toernooien, dat kun je als investering zien. Ik weet niet.  
117  
118 *And no, I play poker tournaments, you can see that as an investment. I do not know.*

119  
120 **Daan:**  
121 Ja.  
122  
123 *Yes.*

124  
125 **W.H:**  
126 Hoe zie jij dat?

127

128 *How do you see that?*

129

130 **Daan:**

131 Ja, goed je buy-in, daar heb je natuurlijk een verwachte return op, dus ja, dat klopt.

132

133 *Yes, well your buy-in, of course you have an expected return on that, so yes, that's right.*

134

135 **W.H:**

136 Ja, maar wel met heel veel variantie en ook wel met zo veel variantie dat ik nu mezelf ook daar niet  
137 meer een verwachte return op speel. Maar ik laat ik het zo zeggen, speel als hobby nu ook echt en ja, ik  
138 ben nu gewoon aan het werk, dus je speelt zo weinig toernooien dat je eigenlijk niet meer de variantie  
139 eruit gehaald uit die toernooien.

140

141 *Yes, but with a lot of variance and also with so much variance that I no longer play an expected return  
142 on that either. But let me put it this way, I really play as a hobby now and yes, I'm just working now, so  
143 you play so few tournaments that you can't really get the variance out of those tournaments anymore.*

144

145 **Daan:**

146 Nee, nee, oké. Helder en wat betreft de meer crypto gerelateerde investeringen dus crypto currencies of  
147 andere digital assets ben je daar actief in?

148

149 *No, no, okay. Clear and with regard to the more crypto-related investments, so crypto currencies or  
150 other digital assets, are you active in that?*

151

152 **W.H:**

153 Nou, Ik vind het wel super interessant en ik volg het dus ook wel. Alleen mijn Binance account die  
154 accepteerde mijn paspoort maar niet dus ik heb iets van 5 keer mijn paspoort opgestuurd.

155

156 *Well, I think it's super interesting and I follow it. But, only my Binance account continuously didn't  
157 accept my passport so I sent my passport in for like 5 times.*

158

159

160 **Daan:**

161 Oké.

162

163 *Okay.*

164

165 **W.H:**

166 Ik kwam er niet doorheen, toen was ik er wel een beetje klaar mee en het is, ik heb, staat nu iets van €  
167 250 aan Bitcoin heb ik maar dus niet serieus. En nou ja, ik volg het nieuws dus wel, maar ik ben nog  
168 niet echt een investeerder erin.

169

170 *I couldn't get through it, then I was a bit done with it and it is, I have, now say something like € 250 in  
171 Bitcoin, but it's nothing serious. And well, I do follow the news, but I'm not really an investor in it yet.*

172  
173 **Daan:**  
174 Oké nou helder en wat was voor jou een belangrijke overweging om te kiezen voor bijvoorbeeld zo'n  
175 index fonds, zeg maar. Waarom heb je specifiek dit fonds gekozen of hoe is dat, hoe is die keuze tot  
176 stand gekomen?  
177  
178 *Okay, now clear and what was an important consideration for you to choose, say, such an index fund.*  
179 *Why did you specifically choose this fund or how did that choice come about?*

180  
181 **W.H:**  
182 Dat de kosten laag waren, ik heb gekozen of ik heb een beetje, ik had het geld nu niet nodig, dus ik kan  
183 ook heel lang, een hele lange tijd beleggen.  
184  
185 *That the costs were low, I chose or I have a little, I did not need the money now, so I can also invest for*  
186 *a very long time, for a very long time.*

187 **Daan:**  
188 Ja.  
189  
190 *Yes.*

191  
192 **W.H:**  
193 En ja mijn vader die nu voor de ING koos, mijn vader heeft ook private banking bij de ING. Daar was  
194 hij wel tevreden over, dus dat kwam zo een beetje uit.  
195  
196 *And yes, my father, who now opted for ING, my father also has private banking with ING. He was*  
197 *quite happy with that, so that worked out a bit.*

198  
199 **Daan:**  
200 Ja, ja, precies dus een soort van kosten analyse gemaakt van nou, daar valt het mee.  
201  
202 *Yes, yes, exactly so a kind of cost analysis made of well, that's it.*

203  
204 **W.H:**  
205 Ik heb het nog wel even gekeken, ja maar ik was vooral bang om te veel kosten te maken.  
206  
207 *I looked it up, yes, but I was mainly afraid of making too many costs.*

208  
209 **Daan:**  
210 Ja, ja, precies nee, dat is begrijpelijk.  
211  
212 *Yes, yes, exactly no, that's understandable.*

213  
214 **W.H:**  
215 Ja.

216  
217 *Yes.*

218  
219 **Daan:**  
220 En zijn er op dit moment bepaalde moeilijkheden of drempels waar je tegenaan loopt in je  
221 investeringsactiviteiten. Nou, je noemde net al met Binance bijvoorbeeld met je paspoort, maar of er  
222 nog andere drempels zijn?

223 *And are there currently certain difficulties or barriers that you encounter in your investment activities.*  
224 *Well, you just mentioned with Binance for example with your passport, but are there any other*  
225 *barriers?*

226  
227 **W.H:**  
228 Even denken, hoor nou, ik heb wel eens overwogen om dus zeg maar in plaats van dat je door de ING  
229 laat doen dat je het zelf doet, zeg maar.

230  
231 *Let me think for a moment, come on, I've considered doing it yourself, so instead of having ING let you*  
232 *do it yourself, so to speak.*

233  
234 **Daan:**  
235 Ja.  
236  
237 *Yes.*

238  
239 **W.H:**  
240 Maar ben ik toch wel een beetje huiverig voor omdat je dan toch eigenlijk niet zo goed weet waar je  
241 mee bezig bent. En, Ik denk ook dat het me dan ook meer persoonlijk zou raken. Ik kan het nu gewoon  
242 wegzetten, dus eigenlijk, de drempel is dan dat ik er niet de tijd in wil investeren om het onderzoek te  
243 doen.

244  
245 *But I'm a bit hesitant because then you don't really know what you're doing. And, I also think it would*  
246 *touch me more personally. I can just put it away now, so actually, the barrier is that I don't want to*  
247 *invest the time in doing the research.*

248  
249 **Daan:**  
250 Ja precies.

251 *Yes, exactly.*

252  
253 **W.H.**  
254 En dat het voor nu eigenlijk wel fijn is dat je gewoon er juist niet mee bezig hoeft te zijn.  
255  
256 *And that for now it's actually nice that you just don't have to worry about it.*

257  
258

259 **Daan:**  
260 Nee precies, het is hun verantwoordelijkheid in die zin dat ze verwacht rendement moeten behalen  
261 voor in je wat ze beloven, waarschijnlijk in het begin.  
262  
263 *No, exactly, it's their responsibility in the sense that they have to deliver expected returns for you what*  
264 *they promise, probably in the beginning.*

265  
266 **W.H:**  
267 Ja.  
268  
269 *Yes.*

270  
271 **Daan:**  
272 En dan kun je dat ook, ja, inderdaad makkelijker loslaten , helder.  
273 *And then you can let go of that too, yes, indeed easier, clear.*  
274

275 **W.H:**  
276 Ja.  
277  
278 *Yes.*

279  
280 **Daan:**  
281 Ja, Dat was eigenlijk een beetje het gedeelte over de traditionele manier van investeren, hoe heel veel  
282 mensen het waarschijnlijk aanpakken of in ieder geval bekende producten.  
283  
284 *Yeah, that was kind of the part about the traditional way of investing, how a lot of people probably go*  
285 *about it or at least known products.*

286  
287 **W.H:**  
288 Ja.  
289 *Yes.*

290  
291 **Daan:**  
292 En ik heb je dus uitgenodigd voor een interview over Tokenized Securities wat je eigenlijk zou kunnen  
293 vertalen in het Nederlands als getokeniseerde effecten dus effecten kunnen zijn, een fonds inderdaad of  
294 een aandeel, een obligatie. Alleen deze zijn dan uitgegeven op blockchain techniek of ook wel  
295 genoemd Distributed Ledger Technology, dus eigenlijk decentraliseren van het systeem. Waar crypto  
296 dus eigenlijk ook opgebouwd is, had je daar ooit eerder van gehoord van deze term?

297  
298 *And so I invited you for an interview about Tokenized Securities which you could actually translate*  
299 *into Dutch as tokenized securities, securities can be; a fund indeed or a share, a bond. Only these are*  
300 *then issued on blockchain technology or also called Distributed Ledger Technology, so actually*  
301 *decentralizing the system. So where crypto is actually built on, had you ever heard of this term before?*



302  
303 **W.H:**  
304 Nee, maar kon er wel wat bij voorstellen.  
305  
306 *No, but I could imagine it myself.*

307  
308 **Daan:**  
309 Oké. En, en,  
310  
311 *Okay. and, and,*

312  
313 **W.H:**  
314 Ze hangen alles, zeg maar, ze hangen alles aan die crypto. Hé, je kan in principe alles natuurlijk als  
315 waarde aan een crypto hangen. Je kan het leveragen tegenover hè, je kan ook put en call opties erbij  
316 kopen, dus het leek me ook logisch dat je dan ook dit soort dingen er wel aan kon hangen nu, ja, ja.  
317  
318 *They attach everything, say, they attach everything on crypto. Hey, in principle you can attach*  
319 *anything to crypto as value. You can leverage it, you can also buy put and call options, so it seemed*  
320 *logical to me that you could also attach these kinds of things to it now, yes, yes.*

321 **Daan:**  
322 Ja, ja, nee klopt ja, Tokenized Securities betekent wel dat het is gebouwd eigenlijk op de techniek,  
323 waar ook bijvoorbeeld een Ethereum of een Bitcoin op draait. Alleen het kunnen wel gewoon  
324 traditionele ASML aandelen zijn die je dan koopt, maar dan koop je ze bij een andere exchange  
325 eigenlijk dan bijvoorbeeld de klassieke DeGiro of bij je bank.  
326  
327 *Yes, yes, no, yes, Tokenized Securities does mean that it is actually built on the technology, which also*  
328 *runs an Ethereum or Bitcoin, for example. Only it can be traditional ASML shares that you then buy,*  
329 *but then you actually buy them at a different exchange than, for example, the classic DeGiro or at your*  
330 *bank.*

331  
332 **W.H:**  
333 Ja, dus.  
334  
335 *So yes.*

336  
337 **Daan:**  
338 En als je zeg maar concreet het verschil zou moeten benoemen. Wat is in jouw ogen dan het verschil  
339 tussen een Tokenized Security en de traditionele gang van zaken? Wat komt dan in je omhoog?  
340 *And if you have to say concretely the difference. In your opinion, what is the difference between a*  
341 *Tokenized Security and the traditional way of doing things? What comes to mind?*

342 **W.H:**  
343 Het lijkt me dat de transactiekosten heel duidelijk vooraf in zichtbaar zijn hè, dus dat is heel  
344 inzichtelijk. Lijkt me ook dat de transacties zelf een stuk inzichtelijker worden, dus dat je manipulatie  
345 zou je sneller kunnen aan zien komen, misschien?  
346

347 *It seems to me that the transaction costs are very clearly visible in advance, so that is very insightful. It*  
348 *also seems to me that the trades themselves become a lot more transparent, so that your manipulation*  
349 *could be seen coming sooner, perhaps?*

350

351 **Daan:**

352 Ja.

353

354 *Yes.*

355

356 **W.H:**

357 En, het lijkt me wel lastig om juist dat er hè? Ik denk dat het ook makkelijker wordt om te  
358 manipuleren, omdat er dus niet zo'n exchange als een soort politie achter zit, zeg maar.

359

360 *And, I think it's hard to get that right, doesn't it? I think it also becomes easier to manipulate, because*  
361 *there is not such an exchange as a kind of police behind it, so to speak.*

362

363 **Daan:**

364 Ja, dus dat omdat die centrale partij wegvalt, zeg maar dus een soort van vertrouwde naam als de bank  
365 of DeGiro of net wat. Dat je dat dan zou missen als Single Trust Party, die zeg maar...

366 *Yes, so that's because that central party is disappearing, so say a kind of trusted name like the bank or*  
367 *DeGiro or something. That you would miss that as a Single Trust Party, that's to say...*

368

369 **W.H:**

370 Ja, nou ja, dat ook, omdat je...

371 *Yes, well, that too, because you...*

372

373 **Daan:**

374 Ja.

375

376 *Yes.*

377

378 **W.H:**

379 Ja tenminste ik, ik zag ook nu, hè, dat als de crypto een beetje omlaag gaat dan, dan vallen er ook wat  
380 van die partij om, waarvan nou ook ons mensen dat niet hadden zien aankomen of zo. Ik verwacht dat  
381 dat hier ook het moeilijk te controleren dat voor elke token aandeel die er is om dan te checken of daar  
382 ook een echte aandeel tegenover staat, denk ik.

383 *Yes, at least I, I saw now, huh, that if the crypto goes down a bit, then some of those parties will also*  
384 *fall, of which us people also did not see it coming or something. I expect that it is also difficult to check*  
385 *that for every token share that is out there to check whether there is also a real share against it, I think.*

386

387 **Daan:**

388 Oké, nee duidelijk en het systeem van blockchain en Distributed Ledger aan zich. Dus denk jij dat dat  
389 te vertrouwen is als toekomstig handels ecosysteem dus stel, we zouden, de grote partijen zouden  
390 besluiten. We gaan alleen nog maar op deze techniek handel drijven en de ouderwetse systemen Laten  
391 we achterwege.

392  
393 *Okay, no clear and the blockchain and Distributed Ledger system to itself. So do you think that can be*  
394 *trusted as a future trading ecosystem so suppose we were, the major parties would decide. We are only*  
395 *going to trade on this technique and leave the old-fashioned systems behind.*

396  
397 **W.H:**

398 Ja in zekere zin wel ja, en daar weet ik er ook te weinig, denk ik, vanaf om iets te kunnen zeggen over  
399 de veiligheid, maar wat wel altijd door mijn hoofd heen gaat als misschien een beetje leek is dat ik  
400 denk van nou ja, straks misschien als kwantumcomputers echt makkelijker toegankelijk worden ben ik  
401 nog wel een beetje huiverig voor de blockchain techniek aan zich om te kijken of die misschien  
402 gekraakt kan worden of zo, of dat daar een soort exploits die die mensen nu nog niet kunnen voorzien  
403 omdat computers daar niet snel genoeg voor zijn.

404 *Yes, in a sense yes, and I don't know enough about that, I think, to be able to say something about*  
405 *safety, but what always crosses my mind if it seemed a little bit is that I think well , maybe later when*  
406 *quantum computers really become easier to access, I'm still a bit hesitant about the blockchain*  
407 *technology to see if it can be cracked or something, or whether there are some kind of exploits that*  
408 *people can't foresee yet because computers not be fast enough for that.*

409  
410 **Daan:**

411 Ja.

412  
413 *Yes.*

414  
415 **W.H:**

416 Ja, daar ben ik wel, daar ben ik nog heel benieuwd naar en daar heb ik nog niets van gezien dat het mij  
417 geruststelt, maar ook niet dat het me heel erg bang maakt ofzo hoor maar.

418 *Yes, I am, I am still very curious about that and I have not seen anything that reassures me, but also*  
419 *not that it scares me very much or anything.*

420  
421 **Daan:**

422 Nee precies, dus kan ik aannemen dat je er een soort van neutrale houding in hebt op dit moment?

423 *No exactly, so can I assume you're kind of neutral about it at the moment?*

424  
425 **W.H:**

426 Ja ja, dat denk ik wel.

427  
428 *Yes yes, I think so.*

429  
430 **Daan:**

431 Top, dankjewel.

432 En daarop aansluitend eigenlijk, ja, zou je ooit overwegen om te investeren als er, stel er komt een  
433 Tokenized fund of zo hè. Dus nog steeds een fonds waar je nu in belegt, maar dan een tokenized versie  
434 ervan. Dat zou ING bijvoorbeeld aanbieden, zou je daar dan in willen investeren of wat zou dan je  
435 afweging zijn?

436

437 *Great, thank you.*  
438 *And then actually, yes, would you ever consider investing if there is, say, a Tokenized fund or*  
439 *something like that. So still a fund that you now invest in, but a tokenized version of it. ING would offer*  
440 *that, for example, would you like to invest in it or what would you consider?*

441  
442 **W.H:**

443 *Ja Ik denk, hangt ervan af, kun je me iets vertellen over wat volgens jou of als jij er nu iets dieper inzit,*  
444 *wat zou een voordeel daarvan zijn. Zijn transactiekosten dan het enige waar je aan moet denken of wat*  
445 *zou nog meer voordeel?*

446  
447 *Yes I think, depends, can you tell me about what you think or if you are a little deeper into it now, what*  
448 *would be an advantage of that. Are transaction costs the only thing you have to think about or what*  
449 *else would benefit?*

450  
451 **Daan:**

452 *Nee, er zijn verschillende voordelen te benoemen. Een voordeel wat vaak genoemd wordt, is eigenlijk*  
453 *inderdaad dat de middle man wegvalt, waardoor je dus automatisch kostenreductie als gevolg krijgt.*  
454 *Dus dat ja vertaalt zich ook in de transactiekosten. Daarnaast is de verwachting dat kijk zo'n*  
455 *blockchain dat runt 24/7 nou ben jij misschien niet zo'n actieve handelaar, maar er zijn mensen die*  
456 *ervan balen als vijf uur de beurs dicht gaat en dan is het gewoon 24/7 open.*  
457 *Daarnaast met deze techniek kun je heel veel verschillende soorten assets, eigenlijk tokenizen en*  
458 *daarmee verhandelbaar maken, dus ook vastgoed, maar ook bijvoorbeeld kunst artikelen. Hè, dan zit je*  
459 *meer richting van NFT's, dus de toegankelijkheid wordt groter. Er zijn ook mensen die, dat, veiligheid*  
460 *toch wel degelijk een verbetering is omdat blockchain gedecentraliseerd is vaak, dus dat er niet een*  
461 *centrale partij is die daar invloed op uit kan oefenen. Of stel die partij heeft problemen dat daar het*  
462 *hele...*

463  
464 *No, there are several advantages to mention. An advantage that is often mentioned is actually that the*  
465 *middle man disappears, so you automatically get a cost reduction as a result. So that yes also*  
466 *translates into transaction costs. In addition, it is expected that a blockchain that runs 24/7, well you*  
467 *may not be such an active trader, but there are people who hate it when the stock market closes for five*  
468 *hours and then it is just open 24/7.*

469 *In addition, with this technique you can actually tokenize many different types of assets and make them*  
470 *tradable, including real estate, but also, for example, art items. Hey, then you are more in the direction*  
471 *of NFTs, so the accessibility is greater. There are also people who believe that security is indeed an*  
472 *improvement because blockchain is often decentralized, so that there is no central party that can*  
473 *influence it. Or suppose that party has problems that the whole...*

474  
475 **W.H:**

476 *Ja.*

477 *Yes.*

478  
479 **Daan:**

480 *Ecosysteem aan vast hangt en zo zijn er nog wel een aantal voordelen te benoemen, denk ik die de*  
481 *literatuur hè. Dus ik zeg niet dat dat mijn mening is, maar die literatuur naar boven haalt als voordeel*  
482 *zijnde.*

483  
484 *Ecosystem is attached to it and there are still a number of advantages to be named, I think that the*  
485 *literature does. So I'm not saying that's my opinion, but that literature brings up as an advantage.*

486  
487 **W.H:**  
488 Ik denk dat ik het zou overwegen op het moment dat het wel op een, ook op een chain staat dat het dan  
489 nog hè, op bijvoorbeeld een Ethereum zou ik het eerder overwegen dan op een andere. Er zijn een  
490 aantal andere blockchains natuurlijk die ik...  
491

492 *I think I would consider it the moment it is on one, even on a chain that it is still there, on an Ethereum*  
493 *for example I would rather consider it than on another. There are some other blockchains of course*  
494 *that I...*

495  
496 **Daan:**  
497 Ja, ja, ja.  
498  
499 *Yes Yes Yes.*

500  
501 **W.H:**  
502 Als je die minder goed kent dat je dan ook wel hoort dat er allemaal opeens een, een gat komt in die  
503 toch een gat in, een exploit in die code of ergens dan loop je natuurlijk nog zoveel meer risico en dan  
504 denk ik ja, dan weet je dat risico is moeilijk. Nou stel dat de kans is 1%, dat zoiets in 10 jaar tijd  
505 gebeurd, dat je alles kwijt bent.  
506

507 *If you know it less well that you then also hear that there is all of a sudden a hole, a hole in it, an*  
508 *exploit in that code or somewhere, then of course you run so much more risk and then I think yes, then*  
509 *you know risk is difficult. Now suppose there is a 1% chance that something like this will happen in 10*  
510 *years, that you have lost everything.*

511  
512 **Daan:**  
513 Ja, ja, ja.  
514  
515 *Yes Yes Yes.*

516  
517

518 **W.H:**  
519 Dan moet daar dan wel een hele grote kostenreductie wil dat waard zijn, zeg maar als je een kosten  
520 batenanalyse zou doen.  
521

522 *Then there must be a very large cost reduction for it to be worth it, say if you were to do a cost-benefit*  
523 *analysis.*

524  
525 **Daan:**  
526 Ja, nee, zeker, zeker.

527

528 *Yes, no, sure, sure.*

529

530 **W.H:**

531 Dus en nou ja, achteraf is dat denk ik makkelijker te bepalen om te kijken van ja, dat is inderdaad was  
532 een goeie hè. het is hartstikke veilig. Alleen Ik denk toch dat ik het niet zou doen, gewoon puur omdat  
533 je denkt van dat ik dan toch, misschien, liever wat dat betreft wat conservatiever ben, dat ik dan een  
534 centrale partij die daarvoor garant staat voor die veiligheid dus heb zitten.

535

536 *So and well, in retrospect I think that is easier to determine to look like yes, that is indeed a good one,*  
537 *isn't it. it's very safe. Only I don't think I would do it, simply because you think that I then, perhaps,*  
538 *would rather be a bit more conservative in that regard, that I then have a central party that guarantees*  
539 *that security.*

540

541 **Daan:**

542 Ja, ja, precies en je noemde net al hè, stel er 1% kans is op dat er een bepaalde exploit zit in de code.  
543 Inderdaad, dat is een terechte opmerking. Verwacht je ook dat die Tokenized Securities een  
544 zogenaamde risk premium met zich meebrengen? Dat er dus een hogere return verwacht kan worden  
545 omdat het bijvoorbeeld iets nieuws is?

546

547 *Yes, yes, exactly and you just mentioned hey, suppose there is a 1% chance that there is a certain*  
548 *exploit in the code. Indeed, that is a fair comment. Do you also expect those Tokenized Securities to*  
549 *entail a so-called risk premium? So that a higher return can be expected because it is something new,*  
550 *for example?*

551

552 **W.H:**

553 Ik vraag me af, wat de toegevoegde waarde of de toegevoegde waarde van bijvoorbeeld een aandeel  
554 ASML op de blockchain in plaats van een product, hè dus dat je altijd kan verhandelen in plaats van  
555 een projectje op de ASML.

556 Zelfde effect dat je dan op de beurs van had of die toegevoegde waarde groot genoeg is om het risico  
557 af te dekken.

558 *I wonder what the added value or added value of, for example, an ASML share on the blockchain*  
559 *instead of a product, so that you can always trade instead of a project on the ASML.*

560 *The same effect that you then had on the stock exchange of whether the added value is large enough to*  
561 *cover the risk.*

562

563 **Daan:**

564 Oké, dat is mooi gezegd.

565

566 *Okay, that's nicely said.*

567

568 **W.H:**

569 Ja.

570

571 *Yes.*

572  
573 **Daan:**  
574 En ja, ik weet niet of dat fonds, dat zal natuurlijk een verwacht rendement wat je nu hebt, zeg maar. Ja,  
575 dat is, dat stellen ze een beetje vast hè, gebaseerd op het verleden. Denk jij dat het rendement van zo'n  
576 Tokenized fund in lijn is, zeg maar of verwacht jij zijn er ja, wat zijn je rendementsverwachtingen van  
577 zoiets?  
578  
579 *And yes, I don't know if that fund, that will of course have an expected return what you have now, say.*  
580 *Yes, that is, they establish that a bit, eh, based on the past. Do you think the return of such a Tokenized*  
581 *fund is in line, say or do you expect there will be, what are your return expectations of such a thing?*

582  
583 **W.H.:**  
584 Nou, Ik denk dat dat de rendementen stel je zou na aftrek van kosten een keer jaarlijks bij de ING 5%  
585 over houden, verwacht ik wel dat je tenminste nog 1,5% aan kosten...  
586  
587 *Well, I think that the returns suppose you would have 5% left over at ING once a year after deducting*  
588 *costs, I do expect that you still have at least 1.5% in costs...*

589  
590 **Daan:**  
591 Ja, ja, ja, ja.  
592  
593 *Yes, yes, yes, yes.*

594  
595 **W.H.:**  
596 Van de securities bespaart, maar ook nog eens de bespaar denk ik ook nog. Je hebt ook nog weer  
597 indexfonds vanuit de, die ING dan weer koopt als het ware, daar zit ook nog weer een premium op  
598 natuurlijk.  
599  
600 *Saves from the securities, but also the savings I think. You also have an index fund from the, which*  
601 *ING buys again, as it were, there is also a premium on it, of course.*

602  
603 **Daan:**  
604 Ja.  
605  
606 *Yes.*

607  
608 **W.H.:**  
609 Dus je zou misschien die kosten wel eens met 2,5% kunnen verlagen en dan de kosten, naar 1-2% of  
610 1% hebben als je het op de blockchain doet.  
611  
612 *So maybe you could cut that cost by 2.5% and then have the cost, to 1-2% or 1% if you do it on the*  
613 *blockchain.*

614 **Daan:**  
615 Ja.

616  
617 *Yes.*

618  
619 **W.H:**  
620 Dus dat zal ongetwijfeld iets hoger zijn, dus misschien kun je dan van 5% naar 7% of zo...  
621  
622 *So no doubt that will be a little higher, so maybe you can go from 5% to 7% or so...*

623  
624 **Daan:**  
625 Ja, ja.  
626  
627 *Yes Yes.*

628  
629 **W.H:**  
630 Voor het rendement wat volgens mij is, ik denk ja, ik zit nu in zeer offensieve index dat dat rendement  
631 is verwacht op volgens mij 10%.

632  
633 *For the return which I think is, I think yes, I am now in very offensive index that that return is expected*  
634 *at I think 10%.*

635  
636 **Daan:**  
637 Ja.  
638  
639 *Yes.*

640  
641 **W.H:**  
642 Weet ik ook niet zeker.  
643  
644 *I'm not sure either.*

645  
646 **Daan:**  
647 Nee duidelijk en stel dat de ING over 1-2 jaar een mail stuurt naar jou en zegt van: We gaan de back-  
648 end systemen veranderen van onze fondsen en aandelen handelen. We gaan dus voortaan op het  
649 Ethereum blockchain draaien in plaats van op de traditionele manier. Zou dat voor jou een reden zijn  
650 om dan naar een andere bank te stappen of zou je daar ja, hoe zou je daar mee omgaan als ze het zo  
651 zouden maken?

652  
653 *No clear, and suppose that ING sends you an email in 1-2 years and says: We are going to change the*  
654 *back-end systems of our funds and trade shares. So from now on we will run on the Ethereum*  
655 *blockchain instead of the traditional way. Would that be a reason for you to switch to another bank or*  
656 *would you, yes, how would you deal with it if they made it that way?*

657  
658 **W.H:**  
659 Zou ik niet, nee, ik denk dat zou ik niet. Ik denk als ING dat al zou doen dan dat er al veel meer  
660 concepten al hebben laten zien dat dat werkt, zeg maar, dus dan zou ik denk ik niet overstappen naar



661 een andere bank dan.

662

663 *I wouldn't, no, I guess I wouldn't. I think if ING were to do that, then many more concepts have already*  
664 *shown that it works, so I don't think I would switch to another bank.*

665

666 **Daan:**

667 Ja, ja, dus; het is wanneer het door de grote institutionele partijen geadopteerd wordt, dan is dat voor  
668 jou reden genoeg om daar vertrouwen in te hebben?

669

670 *Yes, yes, so; it is when it is adopted by the big institutional parties, is that reason enough for you to*  
671 *have confidence in it?*

672

673 **W.H:**

674 Ja, ja, precies.

675

676 *Yes, yes, exactly.*

677

678 **Daan:**

679 Oké, en verwacht jij ook dat het handelen dus eigenlijk dat het hele financiële systeem overgebracht  
680 kan worden op Distributed Ledger Technology en blockchain?

681

682 *Okay, and do you also expect that trading or so that the entire financial system can be transferred to*  
683 *Distributed Ledger Technology and blockchain?*

684

685 **W.H:**

686 Dat lijkt me heel lastig, misschien wel op de lange termijn. Dat is natuurlijk wel wat denk ik mensen  
687 die heel erg geloven in de blockchain, dat zij dat voorzien op zijn, maar die denken van nou, dit wordt  
688 het nieuwe financiële systeem en dat zou kunnen. Dat weet ik niet, zeg maar ik ben er niet zo sceptisch  
689 over dat ik denk van, dat gaat nooit gebeuren. Maar ik denk ook van dat er wel heel veel weerstand is  
690 van heel veel partijen.

691 *That seems very difficult to me, perhaps in the long run. That is of course what I think people who*  
692 *believe very much in the blockchain, that they are ready for it, but they think well, this will be the new*  
693 *financial system and that could be. I don't know, but I'm not so skeptical about it that I think that's*  
694 *never going to happen. But I also think that there is a lot of resistance from many parties.*

695

696 **Daan:**

697 Ja.

698

699 Yes.

700

701 **W.H:**

702 In die de regels maken die hè, die nu aan de touwtjes trekken, wat dat betreft die dat gewoon een ja niet  
703 zo zien zitten en dat, ik denk ook dat er genoeg argumenten nu of ze tegen zijn, laat ik het zo zeggen.

704 Ik denk dat het nog niet veilig en makkelijk genoeg is voor de algemene gebruiker om zo maar het hele

705 financiële systeem erop over te zetten en ik denk dat we daar ook nog te ver vanaf zitten, maar  
706 misschien over een jaar of tien ofzo dan zou ik ja, ik ben er wel fan van, laat ik het zo zeggen.

707 *In that they make the rules, who are now pulling the strings, for that matter they just don't like that yes*  
708 *and that, I also think there are enough arguments now whether they are against, let me put it this way.*  
709 *I don't think it's safe and easy enough for the general user to just transfer the entire financial system to*  
710 *it and I think we're too far from that, but maybe in ten years or so I'd yes, I do like it, let me put it this*  
711 *way.*

712 **Daan:**

713 Ja, ja, ja, oké.

714

715 *Yes, yes, yes, okay.*

716 **W.H:**

717 Maar ik ben nog wel een beetje sceptisch over of dat ook echt gaat gebeuren.

718

719 *But I'm still a bit skeptical about whether that will actually happen.*

720

721 **Daan:**

722 Nee oke, duidelijk. En ja, wat zou, als je zo zegt, maar wat meteen in je op zou komen als ik zou  
723 vragen van, wat zouden de voor en nadelen zijn van het gebruik van Tokenized Securities ten opzichte  
724 van traditionele effecten? Wat zijn dan zo de eerste dingen die bij omhoog komen?

725

726 *No okay, clear. And yes, what would, if you say so, but what would immediately come to mind if I were*  
727 *to ask, what would be the pros and cons of using Tokenized Securities over traditional securities? So*  
728 *what are the first things that come up?*

729

730 **W.H:**

731 Ja, nou ja, ik denk inderdaad de kosten en stel, we zetten alle effecten op de blockchain, dan wordt het  
732 natuurlijk ook heel erg goed, inzichtelijk of er manipulatie plaatsvindt.

733

734 *Yes, well, I do indeed think the costs and suppose, we put all the securities on the blockchain, then it*  
735 *will of course also be very good, insight into whether manipulation is taking place.*

736

737 **Daan:**

738 Ja, ja, ja, ja.

739

740 *Yes, yes, yes, yes.*

741

742 **W.H:**

743 Dan kun je dus heel goed zien, wat, of mensen die iets roepen of ze daar dan ook een belang in hebben,  
744 hè? En dat lijkt me een stuk eerlijker in het grotere geheel ook voor de consumenten die beleggen.

745

746 *Then you can see very well, what, or people shouting something whether they have an interest in it,*  
747 *huh? And that seems a lot fairer to me in the bigger picture, also for the consumers who invest.*

748

749

750 **Daan:**  
751 Ja nee zeker. Ik denk dat transparantie is ook één van de grote voordelen wat daarin genoemd wordt,  
752 dat het transparante aspect van blockchain en zeker in de financiële markten een hele grote factor heeft.  
753 Dat is natuurlijk terecht wat je zegt dat bij gewoon de wat kleinere beleggers, de consumenten daar  
754 vaak de dupe van zijn. Omdat ze die informatie of voorkennis missen en dat dat dan goed inzichtelijk  
755 wordt.  
756 En zijn er ook nog bepaalde nadelen die je zou kunnen noemen?  
757  
758 *Yes no for sure. I think that transparency is also one of the great advantages that is mentioned there,*  
759 *that the transparent aspect of blockchain and certainly in the financial markets has a very large factor.*  
760 *That is of course correct what you say that with just the smaller investors, the consumers are often the*  
761 *victims. Because they lack that information or prior knowledge and that it then becomes clear.*  
762 *And are there any other drawbacks you could mention?*  
763  
764 **W.H:**  
765 Ik denk veiligheid en dat dat gevaarlijk is, ik denk.  
766  
767 *I think safety and that's dangerous, I think.*  
768 **Daan:**  
769 En met veiligheid refereren we naar die kwantumcomputers, zeg maar?  
770  
771 *And by security we refer to those quantum computers, say?*  
772  
773 **W.H:**  
774 O, maar ook wel, dat denk ik ook wel, juist ook. Stel we laten opa van 80, laten we ook toetreden tot de  
775 blockchain is het weer heel makkelijk. Als daar geen partij tussen zit of ING, die heeft toevallig die die  
776 blockchain code, die staat ergens in je informatie.  
777  
778 *Oh, but also, I think so, right. Let's say grandfather of 80, let's also join the blockchain it is very easy*  
779 *again. If there is no party in between or ING, they happen to have that blockchain code, which is*  
780 *somewhere in your information.*  
781 **Daan:**  
782 Ja, ja, ja, ja.  
783  
784 *Yes, yes, yes, yes.*  
785  
786 **W.H:**  
787 Ik denk dat je net zoals als dat nu allen een gevaar is, dat het misschien nog wel makkelijker wordt om  
788 opa op te lichten van zijn pensioen. Want zie je nu ook al heel veel hoe, groot kennis al is op de...  
789  
790 *I think that just like all that is now a danger, it might become even easier to scam Grandpa out of his*  
791 *pension. Because you already see a lot of how great knowledge is already on that...*  
792  
793 **Daan:**  
794 Nee klopt ja zeker. Oké.

795  
796 *No, yes, sure. Okay.*

797  
798 **W.H:**  
799 Ik denk niet dat dat minder daardoor zou gaan worden, dus dat zie ik als een groot nadeel, ook dat dat  
800 daar eigenlijk een betere oplossing voor zou moeten zijn.  
801  
802 *I don't think that would reduce that, so I see that as a big disadvantage, also that it should actually be*  
803 *a better solution for that.*

804  
805 **Daan:**  
806 Ja, dat is een mooie aanvulling inderdaad.  
807 Ja, dan kom ik eigenlijk al bij mijn laatste vraag aan of er nog, ja kijk, het gaat hem om je opinie te  
808 peilen. Ik heb je wat vragen erover gesteld om wat dingen naar boven te halen. Zijn er nog andere  
809 dingen die ik niet genoemd heb die je nog zou willen toevoegen aan je e mening over Tokenized  
810 Securities?  
811  
812 *Yes, that's a nice addition indeed.*  
813 *Yes, then I actually come to my last question whether there is still, yes look, it is all about gauging your*  
814 *opinion. I asked you some questions about it to bring out some things. Are there other things I haven't*  
815 *mentioned that you would like to add to your opinion about Tokenized Securities?*

816  
817 **W.H:**  
818 Ik denk dat het, het gebruik, ik denk dat het een mooie het zijn super mooie technieken, Maar ik denk  
819 dat het, dat de techniek ook gebruikt kunnen worden op een meer gecentraliseerde manier en dat er een  
820 soort hè, dat over 10 jaar dat je er meer misschien op een soort hybride vorm over kan gaan en dat dat  
821 dan meer de gouden middenweg is die mensen moeten vinden en ik ben benieuwd of dat ook echt gaat  
822 gebeuren.  
823  
824 *I think it, the use, I think it's a nice one they're super nice techniques, But I think it, that the technique*  
825 *can also be used in a more centralized way and that there's kind of eh, that in 10 years that maybe you*  
826 *can go more into a kind of hybrid form and that that's more of the golden mean that people have to find*  
827 *and I'm curious if that will actually happen.*

828 **Daan:**  
829 Echt top, dat is een mooie aanvulling inderdaad. Zijn er nog vragen die je aan mij hebt, bijvoorbeeld op  
830 dit moment of dingen die je wilt toevoegen?  
831  
832 *Really great, that's a nice addition indeed. Are there any questions you have for me, for example right*  
833 *now or things you want to add?*

834  
835 **W.H:**  
836 Nee, ik geloof niet. Ik ben wel, ja, ik ben wel benieuwd naar jouw mening erover tot nu toe.  
837 *No, I don't believe. I am, yes, I am curious about your opinion on it so far.*  
838  
839 **Daan:**

840 Ja, nee snap ik, snap ik ja, Aas je het goed vindt, ga ik eerst even de opname stoppen dan wordt dat in  
841 ieder geval niet meegenomen in de transcriptie.

842

843 *Yes, no I get it, I get it yes, If it's okay with you, if I'm going to stop the recording first, then that will in*  
844 *any case not be included in the transcription.*

### 3.1 Company interview 1

GroeneWarmte  
20 September 2022  
[15:30 – 15:56]

In this interview summary Daan is the researcher and G.W. is the interviewee. The first paragraph is the original one in Dutch the second paragraph in italics is the English translation.

1 **Daan:**

2 Kunt u mij in het kort vertellen over de financiering behoefte van uw bedrijf?

3

4 *Can you briefly tell me about your company's financing needs?*

5

6 **GW:**

7 GroeneWarmte heeft financiering lopen via de NPEX beurs in Nederland. MBK beurs voor startups  
8 waarin GroeneWarmte gekozen heeft voor het uitgeven van certificaten die aandelen  
9 vertegenwoordigen. Deze aandelen geven recht op dividend mits de gestelde eisen door  
10 GroeneWarmte behaald worden. Er is geen stemrecht gekoppeld aan deze certificaten.

11 Om hier aan mee te mogen doen wordt er eerst een Sanity Check gedaan om te kijken of je bedrijf  
12 financieel gezond is. Daarnaast dient er een Prospectus geschreven te worden die de investeerder dient  
13 te informeren over de mogelijke risico's van de investering. De certificaten zijn op naam vastgelegd bij  
14 de Notaris. De minimale ticketsize (afname) was 1000 euro voor een investeerder, dit is vanuit NPEX  
15 vastgesteld.

16 NPEX staat onder toezicht van de AFM en daar dienen de bedrijven zich ook aan te houden wanneer  
17 zij bepaalde informatie willen uitgeven.

18 Wanneer je dus met exotischere instrumenten aan de slag wil gaan dient dit wel onder goedkeuring te  
19 vallen van de toezichthouder. De NPEX gaat elke dag om 10 uur open en sluit om 16 uur. Vanaf 10uur  
20 's ochtends is er een orderboek te zien wat de bied en laat prijzen weergeeft.

21 De reden waarom voor financiering is gekozen via NPEX is omdat het een wat professionelere aanpak  
22 is ten opzichte van crowdfunding, wat meer past bij de doelstellingen van GroenteWarmte. Daarnaast  
23 is een certificaat van NPEX verhandelbaar wat liquiditeit creëert voor de investeerder.

24 Vanuit het oogpunt van het bedrijf wordt er gekeken naar de cost of capital om te kijken wat  
25 aantrekkelijk is qua financiering. Waarin ook CAPEX based decision-making wordt genoemd wat  
26 belangrijk is voor de financiën.

27

28 *GroeneWarmte has financing through the NPEX stock exchange in the Netherlands. It is an SME  
29 exchange for startups in which GroeneWarmte has opted to issue depositary receipts representing  
30 shares. These shares give the right to a dividend, provided that predefined requirements are met by  
31 GroeneWarmte. No voting rights are attached to these certificates.*

32 *To be allowed to participate on the NPEX, a Sanity Check is first performed to see whether your  
33 company is financially healthy. In addition, a Prospectus must be written that informs the investor  
34 about the possible risks of the investment. The certificates are registered by name at the Notary. The  
35 minimum ticket size (purchase) was 1000 euros for an investor, this is determined by NPEX.*

36 *NPEX is supervised by the AFM and companies must also adhere to this if they wish to publish certain  
37 information.*

38 *So if you want to work with more exotic instruments, this must be subject to the approval of the  
39 regulator. The NPEX opens every day at 10am and closes at 4pm. From 10 o'clock in the morning  
40 there is an orderbook that shows the bid and ask prices.*

41

42 *The reason why we opted for financing via NPEX is because it is a somewhat more professional  
43 approach compared to crowdfunding, which is more in line with the objectives of GroeneWarmte. In  
44 addition, a certificate from NPEX is tradeable, which creates liquidity for the investor.*

45 *From the company's point of view, the cost of capital is looked at to see what is attractive in terms of*  
46 *financing. In which CAPEX based decision-making is also mentioned, which is important for their way*  
47 *of financing.*

48  
49 **Daan:**

50 Welke financiële instrumenten zijn er op dit moment in gebruik voor de financiering?

51

52 *Which financial instruments are currently in use for financing?*

53

54 **GW:**

55 Veel van de antwoorden komen al naar boven bij vraag één.

56

57 *Many of the answers already come up in question one.*

58

59 **Daan:**

60 Heeft u ooit gehoord van financiering via *Tokenized Securities* (getokeniseerde effecten)?

61

62 *Have you ever heard of financing through Tokenized Securities?*

63

64 **GW:**

65 *Tokenized Securities zijn een nieuw begrip voor ons. Wel eerder van Blockchain gehoord om daar*  
66 *destijds iets mee te doen om energie te kunnen verhandelen. Als het energie net niet in balans is door*  
67 *teveel aanbod en te weinig vraag is moet er iets gebeuren. Door regels op te stellen via blockchain zou*  
68 *er efficiënt overdracht kunnen zijn om zo hier een markt voor te creëren.*

69

70 *Tokenized Securities are a new concept for them. Heard of Blockchain before to do something with it*  
71 *at the time to be able to trade energy. If the energy network is not in balance due to too much supply*  
72 *and too little demand, something has to be done. By setting up rules via blockchain, there could be*  
73 *efficient transfers to create a market for this.*

74

75 **Daan:**

76 Zou u het overwegen om voor uw bedrijf *Tokenized Securities* uit te geven als financiering methode,  
77 waarom wel of waarom niet?

78

79 *Would you consider issuing Tokenized Securities as a financing method for your company, why or why*  
80 *not?*

81

82 **GW:**

83 Om voor deze methode te kiezen wordt ook wel het belang van de investeerder in acht genomen die  
84 met name; betaalbaarheid, leveringszekerheid en duurzaamheid belangrijk vinden. Als deze principes  
85 gegarandeerd kunnen worden vinden zij het interessant om het via deze manier te doen.  
86 Daarnaast is het ook positief als er een grote markt is omdat dat dan meer geld op kan leveren omdat  
87 meer mensen certificaten willen.

88

89 *In order to choose this method, the interests of the investor need also to be taken into account, in*  
90 *particular; affordability, security of supply and sustainability are important. If these principles can be*  
91 *guaranteed, they find it interesting to do it this way.*

92 *In addition, it is also positive if there is a large market because it can generate more money because*  
93 *more people want certificates.*

94

95 **Daan:**

96 Heeft u vertrouwen in Distributed Ledger Technology/Blockchain als toekomstig handels ecosysteem?

97  
98 *Do you trust Distributed Ledger Technology/Blockchain as a future trading ecosystem?*  
99  
100 **GW:**  
101 Te weinig echte projecten veel pilots nog geen grote beweging waardoor het nog niet echt vertrouwd  
102 en breed gebruikt is.  
103  
104 *Too few real projects, many pilots, not yet a big movement, so that it is not yet really trusted and*  
105 *widely used.*  
106  
107  
108 **Daan:**  
109 Denkt u dat er investeringsbehoefte is voor *Tokenized Securities*?  
110  
111 *Do you think there is investment appetite for Tokenized Securities?*  
112  
113 **GW:**  
114 Mensen die vooruit willen, early adopters zouden en jonge mensen die hier geïnteresseerd in zijn  
115 kunnen hier behoefte naar hebben.  
116  
117 *People who want to move forward, early adopters and young people who are interested in this may*  
118 *have investment appetite.*  
119  
120 **Daan:** (Indien u er meer van weet) Zou u overwegen om uw huidige uitgegeven effecten over te  
121 hevelen naar Distributed Ledger Technology/Blockchain?  
122  
123 *(If you know more about it) Would you consider transferring your currently issued securities to*  
124 *Distributed Ledger Technology/Blockchain?*  
125  
126 **GW:**  
127 Wanneer NPEX zou besluiten om op blockchain te gaan draaien zouden ze hier geen problemen mee  
128 hebben en financiering voortzetten op deze manier. Alleen maar mooi als er meer voordelen uit te  
129 halen zijn voor de klant.  
130  
131 *If NPEX decided to run on blockchain, they would have no problem with this and continue funding in*  
132 *this way. Only nice if there are more benefits to be gained for the customer.*  
133  
134 **Daan:**  
135 Denkt u dat het handelen van effecten op Distributed Ledger Technology/Blockchain de toekomst  
136 wordt?  
137  
138 *Do you think trading securities on Distributed Ledger Technology/Blockchain will be the future?*  
139  
140 **GW:**  
141 Moeilijk om hier een duidelijke uitspraak over te doen, geïnterviewde verwacht wel dat digitaal geld  
142 meer vlucht gaat nemen zoals een digitale euro. Of daadwerkelijke de financiële markten hierop gaan  
143 draaien is geen uitspraak over.  
144  
145 *Difficult to make a clear statement about this, the interviewee does expect that digital money will take*  
146 *off like a digital euro. Whether the actual financial markets will run on this is no statement made for.*  
147



148 **Daan:**  
149 Welke voor/nadelen denkt u dat *Tokenized Securities* hebben ten opzichte van ‘traditionele effecten’?  
150  
151 *What advantages/disadvantages do you think Tokenized Securities have over 'traditional securities'?*  
152  
153 **GW:**  
154 Nadeel is: Het is nog wel een verhaal om uit te leggen voordat mensen hier mee in zee willen gaan. Als  
155 de digitale wereld en geld van de grond komt en het het kan gaan schalen zitten er zeker voordelen aan  
156 zoals: Grote markt, at ook betekend een liquide markt omdat er meer geld in omloop is, de  
157 verhandelbaarheid gaat omhoog van je investering, grotere vraag en natuurlijk ook aanbod. Grotere  
158 markt is een voordeel zodat je je positie kan verkopen.  
159  
160 *The disadvantage is: It is still a concept to explain before people want to go into business with this. If*  
161 *the digital world and money takes off and it can start to scale there are certainly advantages such as:*  
162 *Large market, which also means a liquid market because there is more money in circulation, the*  
163 *tradability of your investment goes up, greater demand and of course greater offer. Larger market is*  
164 *an advantage so that you can sell your position as an investor.*  
165  
166 **Daan:**  
167 Behoort kosten reductie tot een van de mogelijkheden?  
168  
169 *Is cost reduction one of the options?*  
170  
171 **GW:**  
172 -Verdienmodel NPEX is bijvoorbeeld moeilijk in te schatten de huidige fees kunnen wellicht omlaag.  
173 Maar iets van rond de 1% zal waarschijnlijk wel blijven wellicht dat het voor de helft van het geld kan.  
174  
175 Voordelen om er leuke dingen mee te kunnen doen zoals:  
176  
177 CertiQi: een bedrijf Garanties geeft van Oorsprong en Certificaten van Oorsprong uit voor elektriciteit  
178 en hernieuwbare warmte. Dit zou vastgelegd kunnen worden in de blockchain en/of securities.  
179 Fit voor 55  
180 Inkoop warmte CO2 verplichtingen zouden ook toegevoegd kunnen worden hieraan.  
181  
182 *The earning model NPEX is difficult to estimate, for example, the current fees may be lower. But*  
183 *something around 1% will probably remain, perhaps for half the money.*  
184  
185 *Other advantages mentioned of blockchain/distributed ledger technology are; being able to do fun*  
186 *things with it such as:*  
187  
188 *CertiQi: a company issues Guarantees of Origin and Certificates of Origin for electricity and*  
189 *renewable heat. This could be recorded in the blockchain and/or securities.*  
190 *Guarantee the EU Fit for 55 goals.*  
191 *Purchasing heat CO2 obligations could also be added to this.*

#### 4. Codebook of interviews of investors

Dimensions	Description of dimensions
Current investment experience	This dimension captures any relevant information about the interviewees' investment plan and the investment barriers that they currently experience.
Stance on tokenized securities	This dimension captures any relevant information about the interviewees knowledge on tokenized securities, perceived (dis)advantages and how they see tokenized securities versus traditional securities.
Obstacles for technology embracement	This dimension captures any relevant information on the uncertainty for changing towards tokenized securities, the wider adoption of it, perceived challenges for the adoption and the associations with blockchain technology.

Overarching dimensions	Second order themes	First order categories	Empirical indicator
Current investment experience	Investment plan	Long-term investment approach	<i>“that plan took shape in a slightly more conservative long-term plan that I really intend to stick to for decades. And that is actually that I put a fixed amount every month, partly in ETFs at the moment (S.v.D., lines 80-82)”</i>
Current investment experience	Investment plan	Portfolio distribution	<i>“Yes, at the moment, apart from cryptocurrencies, which is a much smaller part than my investments in ETFs, it is all ETFs, so no individual shares (S.v.D., lines 100-101)”</i>
Current investment experience	Investment barriers	Lack of knowledge	<i>“Since I don't consider myself someone who knows enough about it, I just don't want to get into that just yet (S.v.D. line 123)”</i>
Current investment experience	Investment barriers	Rebalancing portfolio	<i>“Yes, then I have to think for a moment, because, well, one is for example about balancing, rebalancing your portfolio (S.v.D., lines 173-174)”</i>
Current investment experience	Investment barriers	Liquidity problems	<i>“There can be no demand for an ETF at a certain point in time, say, while the price will remain indexed at a certain point how do you get rid of it? Let's say, if you ever want to sell a large part of your portfolio if you have built up a really good portfolio over the long term, what about liquidity of the share ? (S.v.D., lines 185-189)”</i>
Current investment experience	Investment plan	Risk-averse ETF's	<i>“My idea was actually to start with somewhat conservative risk-averse ETFs, if you could call it that, because of course it remains investing (S.v.D., lines 208-209)”</i> .
Current investment experience	Investment plan	Potential growth ETF's 5-10 years	<i>“Yes and then on, say the other part of the ETFs also mainly selected on ok, where do I think that something more in the medium term like about 5, maybe 5 to 10 years most where I see more potential, say than the world market (S.v.D., lines 232-234)”</i> .

Stance on tokenized securities	Tokenized security knowledge	Familiar with Tokenized Securities in terms of crypto	<i>“I had heard of tokens in the landscape of cryptocurrencies, where they also often tokenize cryptocurrencies I think you have some kind of token of that currency, but beyond that actually quite unknown (S.v.D., lines 257-259)”</i> .
Stance on tokenized securities	Tokenized security knowledge	Hard to tell the difference	<i>“I have to say that I don't necessarily understand or understand the difference with what is the difference with a traditional stock (S.v.D., lines 279-280)”</i> .
Stance on tokenized securities	Tokenized versus traditional securities	Possible advantage of tokenized securities	<i>“the token is tradable on blockchain technology. Ultimately or useful at least, useful compared to traditional and traditional a share of ASML that you can only trade on the stock exchanges of those we know (S.v.D., lines 307-309)”</i> .
Obstacles for technology embracement	Wider adoption	Trust in Blockchain/DLT	<i>“I think it has already proven itself in some sense when it comes to cryptocurrencies themselves. And I think that would be a pretty good indicator before it could work for the Tokenized Securities as well (S.v.D., lines 330-331)”</i> .
Obstacles for technology embracement	Wider adoption	Adoption by authorities	<i>“As you look purely at the technology of blockchain, I think I would trust it and certainly, certainly I think if the authorities known to people start to implement something like this (S.v.D., lines 350-351)”</i> .
Obstacles for technology embracement	Uncertainty for change	No clear reason to change	<i>“Uhh yeah, for me there must be some major reason why I would want to change, change or buy it through, that way, versus the way I do it now and the way I do it now me very easily. And I trust, say, the party where I am indeed doing the Giro in this case, where I am doing it at the moment. So, say, suppose the option exists now and it could. Then I wouldn't see any reason at the moment to really start using it right away and leave the other thing for what it is (S.v.D., lines 394-398)”</i> .
Obstacles for technology embracement	Uncertainty for change	Lack of knowledge why to change	<i>“So, there should be a good reason for me to switch to it, and that's a reason I wouldn't see at this point. Could be if I knew a little more that, that choice was made quite easily for me (S.v.D., lines 410-411)”</i> .
Stance on tokenized securities	Tokenized versus traditional securities	No risk premium	<i>“But I don't necessarily see a reason why you would have that more with a Tokenized Security than with a classic security (S.v.D., lines 432-434)”</i> .
Obstacles for technology embracement	Uncertainty for change	Hard to tell where value comes from	<i>“And, I think it will be very different with a Tokenized Security. Because, say, the value of such a token or an asset is in a different place (S.v.D., lines 471-472)”</i> .
Stance on tokenized securities	Advantages of tokenized securities	Cutting out middleman leads to fee reduction	<i>“I can imagine that an environment arises where you ultimately pay less fees. And yes, if you have an investment strategy for the 30 years and you want to buy something every month, that is a big factor (S.v.D., lines 512-514)”</i> .

Stance on tokenized securities	Tokenized versus traditional securities	Blockchain no added intrinsic value	<i>“But not necessarily because I think that the share will be worth more faster because the blockchain would be changed than compared to the traditional stock exchange (S.v.D., lines 537-538)”</i> .
Stance on tokenized securities	Advantages of tokenized securities	Safety as an advantage	<i>“But, I personally think that in the end if it's thought through and implemented in a good way it could be safer for a retail investor like me for example (S.v.D., lines 563-564)”</i> .
Stance on tokenized securities	Advantages of tokenized securities	Decentralization as an advantage	<i>“I think the financial institutions that we now use as people who have a certain influence and who have certain power. And in theory they could do things that a blockchain cannot, for example, because it is controlled by a lot of people (S.v.D., lines 565-567)”</i> .
Stance on tokenized securities	Advantages of tokenized securities	Transparency as an advantage	<i>“And transparency is perhaps one of them, yes, certainly (S.v.D., lines 605)”</i> .
Stance on tokenized securities	Disadvantages of tokenized securities	Disadvantage long transfer times with blockchain	<i>“Things that I have encountered, for example with trading cryptocurrencies and sending Bitcoin to people or whatever, is that it can sometimes take a long time before transactions are completed or are. So of course not the case with every cryptocurrency, but there are...(S.v.D., lines 630-632)”</i> .
Stance on tokenized securities	Disadvantages of tokenized securities	Doubts about transaction finality	<i>“I think one of the advantages of trading on traditional exchanges nowadays is that you can make your trades quite instantaneously. Doesn't necessarily have to be about using, but if you're using Tokenized Securities on blockchain technology, that would be something I'd be interested in, yes, to see exactly how that works (S.v.D., lines 644-646)”</i> .
Obstacles for technology embracement	Challenges for adoption	Tokenized securities as future potential	<i>“Yes, I think that education and I might call it promotion is going to be very important because I don't think it's going to sell itself as easily as cryptocurrencies did (S.v.D., lines 717-718)”</i> .
Obstacles for technology embracement	Challenges for adoption	Lack of interest from the general public	<i>“Yes, those are two completely different products, but if you compare a Tokenized Security with a classic stock, in my opinion, the differences are really a lot smaller. So I also think it's going to take a lot longer and a lot more time to, and promotion and indeed education to be able to convince people in the first instance and then to be able to convince that it has benefits and think a really big second The next step is to let them use it. I think it could be and I do, but I think it will take longer because (S.v.D., lines 740-745)”</i> .
Obstacles for technology embracement	Challenges for adoption	People who could be interested	<i>“Yes for that reason actually I think you might see that there is always of course always early adopters and more innovative companies or retail investors who dare who are already curious and who are always looking and on the smaller edges that you can find .Only whether it will also work quickly on scale is</i>

			<i>something I doubt. Which maybe if you're talking about really 20-30 years, which might be interesting, but in the short term I think well, that's personally I think it's going to be difficult to make something like this interesting on a large scale for yes, for the ordinary retail investor (S.v.D., lines 745-750)".</i>
Stance on tokenized securities	Tokenized versus traditional securities	Lack of knowledge of pros and cons	<i>"So I still find it a bit difficult to judge, just because I wouldn't know exactly the list of pros and cons of one or the other (S.v.D., 796-797)".</i>
Obstacles for technology embracement	Challenges for adoption	How to introduce tokenized securities	<i>"Yes, yes, I think it's just going to be really, really important eventually if you, yes, if you want companies or yes companies, institutions, people or retail investors themselves to want to make good use of it, or use it at scale will make it especially important to think carefully about: How do we bring it to the people or how do we introduce it to them (S.v.D., lines 815-818)".</i>
Obstacles for technology embracement	Associations with blockchain	Possible negative association with cryptocurrencies	<i>"And maybe there is also an important thing, maybe also, now people still just have a lot of association with when it comes to blockchain, blockchain, I think people mainly know about cryptocurrencies. Yes, and of course cryptocurrencies also have a certain image (S.v.D., lines 838-840)".</i>
Current investment experience	Investment plan	Current investment approach	<i>"Yes, so that's a bit, but I haven't actually done anything myself yet, so I've had everything invested by ING so far (W.H., lines 54-55)".</i>
Current investment experience	Investment plan	Index fund description	<i>"Yes it is an index fund yes. They call it that, I have a very offensive index fund I think and now they just converted it to an offensive sustainable fund I believe (W.H., lines 66-67)".</i>
Current investment experience	Investment plan	Current crypto investments	<i>"I have, now say something like € 250 in Bitcoin, but it's nothing serious. And well, I do follow the news, but I'm not really an investor in it yet (W.H., lines 166-167)".</i>
Current investment experience	Investment barriers	Avoiding high investment costs	<i>"I looked it up, yes, but I was mainly afraid of making too many costs (W.H., line 203)".</i>
Current investment experience	Investment barriers	No time for doing research	<i>"I can just put it away now, so actually, the barrier is that I don't want to invest the time in doing the research (W.H., lines 240-241)".</i>
Stance on tokenized securities	Tokenized security knowledge	Not so familiar with tokenized securities	<i>"No, but I could imagine it myself (W.H., line 300)".</i>
Obstacles for technology embracement	Associations with blockchain	Connection of tokenized	<i>"They attach everything, say, they attach everything on crypto. Hey, in principle you can attach anything to crypto as value. You can leverage it, you can also buy</i>

		securities with crypto.	<i>put and call options, so it seemed logical to me that you could also attach these kinds of things to it now, yes, yes (W.H., lines 312-314)”</i>
Stance on tokenized securities	Advantages of tokenized securities	Differences and advantages of tokenized securities	<i>“It seems to me that the transaction costs are very clearly visible in advance, so that is very insightful. It also seems to me that the trades themselves become a lot more transparent, so that your manipulation could be seen coming sooner, perhaps (W.H., lines 340-342)”</i> .
Stance on tokenized securities	Disadvantages of tokenized securities	Lack of central party	<i>“And, I think it's hard to get that right, doesn't it? I think it also becomes easier to manipulate, because there is not such an exchange as a kind of police behind it, so to speak (W.H., lines 353-354)”</i> .
Stance on tokenized securities	Disadvantages of tokenized securities	Difficult to distinguish valid companies	<i>“I expect that it is also difficult to check that for every token share that is out there to check whether there is also a real share against it, I think (W.H., lines 377-378)”</i> .
Obstacles for technology embracement	Uncertainty for change	Threat of quantum computing to blockchain	<i>“I'm still a bit hesitant about the blockchain technology to see if it can be cracked or something, or whether there are some kind of exploits that people can't foresee yet because computers are not fast enough for that (W.H., lines 398-400)”</i> .
Stance on tokenized securities	Advantages of tokenized securities	Uncertainty of the advantages	<i>“Are transaction costs the only thing you have to think about or what else would benefit (W.H., lines 440-441)”</i> .
Obstacles for technology embracement	Uncertainty for change	Blockchains needs to be trustable	<i>“I think I would consider it the moment it is on one, even on a chain that it is still there, on an Ethereum for example I would rather consider it than on another. There are some other blockchains of course that I... (W.H., lines 482-483)”</i> .
Obstacles for technology embracement	Associations with blockchain	Code bugs and risk of losing everything	<i>“If you know it less well that you then also hear that there is all of a sudden a hole, a hole in it, an exploit in that code or somewhere, then of course you run so much more risk and then I think yes, then you know risk is difficult. Now suppose there is a 1% chance that something like this will happen in 10 years, that you have lost everything (W.H., lines 496-499)”</i> .
Stance on tokenized securities	Tokenized versus traditional securities	Importance of clear advantages	<i>“Then there must be a very large cost reduction for it to be worth it, say if you were to do a cost-benefit analysis (W.H., lines 511-512)”</i> .
Obstacles for technology embracement	Challenges for adoption	Willingness to transfer and trust in central party	<i>“So and well, in retrospect I think that is easier to determine to look like yes, that is indeed a good one, isn't it. it's very safe. Only I don't think I would do it, simply because you think that I then, perhaps, would rather be a bit more conservative in that regard, that I then have a central party that guarantees that security (W.H., lines 525-527)”</i> .

Stance on tokenized securities	Tokenized versus traditional securities	Uncertain of added value	<i>"I wonder what the added value or added value of, for example, an ASML share on the blockchain instead of a product, so that you can always trade instead of a project on the ASML. The same effect that you then had on the stock exchange of whether the added value is large enough to cover the risk (W.H., lines 545-548)".</i>
Stance on tokenized securities	Advantages of tokenized securities	Cost reduction as advantage	<i>"So maybe you could cut that cost by 2.5% and then have the cost, to 1-2% or 1% if you do it on the blockchain (W.H., lines 597-598)".</i>
Stance on tokenized securities	Advantages of tokenized securities	Expected higher returns	<i>"So no doubt that will be a little higher, so maybe you can go from 5% to 7% or so... (W.H., line 608)".</i>
Obstacles for technology embracement	Wider adoption	Institutional adoption	<i>"I think if ING were to do that, then many more concepts have already shown that it works, so I don't think I would switch to another bank (W.H., lines 648-649)".</i>
Obstacles for technology embracement	Uncertainty for change	Transferring financial system to blockchain	<i>"I don't think it's safe and easy enough for the general user to just transfer the entire financial system to it and I think we're too far from that, but maybe in ten years or so I'd yes, I do like it, let me put it this way (W.H., lines 692-694)".</i>
Stance on tokenized securities	Advantages of tokenized securities	Transparency as an advantage	<i>"I do indeed think the costs and suppose, we put all the securities on the blockchain, then it will of course also be very good, insight into whether manipulation is taking place (W.H., lines 718-719)".</i>
Stance on tokenized securities	Advantages of tokenized securities	Transparency as an advantage	<i>"Then you can see very well, what, or people shouting something whether they have an interest in it, huh? And that seems a lot fairer to me in the bigger picture, also for the consumers who invest (W.H., lines 730-731)".</i>
Stance on tokenized securities	Disadvantages of tokenized securities	Lack of safety as a disadvantage	<i>"I think safety and that's dangerous, I think (W.H., line 749)".</i>
Stance on tokenized securities	Disadvantages of tokenized securities	Decentralization as a disadvantage	<i>"Oh, but also, I think so, right. Let's say grandfather of 80, let's also join the blockchain it is very easy again. If there is no party in between or ING, they happen to have that blockchain code, which is somewhere in your information [...] I think that just like all that is now a danger, it might become even easier to scam Grandpa out of his pension. Because you already see a lot of how great knowledge is already on that [...] I don't think that would reduce that, so I see that as a big disadvantage, also that it should actually be a better solution for that (W.H., lines 760-762; 772-773; 784-785)".</i>
Obstacles for technology embracement	Challenges for adoption	Golden mean between decentralization	<i>"I think it, the use, I think it's a nice one they're super nice techniques, But I think it, that the technique can also be used in a more centralized way and that there's kind of eh, that in 10 years that maybe you can go</i>

		and centralization	<i>more into a kind of hybrid form and that that's more of the golden mean that people have to find and I'm curious if that will actually happen (W.H., lines 804-807)".</i>
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## 5. Codebook of interviews of issuer

<b>Dimensions</b>	<b>Description of dimensions</b>
Financing approach	This dimensions captures the reason for their current chosen financing method.
Stance on tokenized securities	This dimension captures any relevant information about the interviewee's knowledge on tokenized securities and perceived (dis)advantages.
Obstacles for technology embracement	This dimension captures any relevant information on the requirements for changing towards tokenized securities and the perceived outlook on DLT/Blockchain.

<b>Aggregated dimensions</b>	<b>Second order themes</b>	<b>First order concepts</b>	<b>Empirical indicator</b>
Financing approach	Current financing method	Reasons for current way of financing	<i>"The reason why we opted for financing via NPEX is because it is a somewhat more professional approach compared to crowdfunding, which is more in line with the objectives of GW. In addition, a certificate from NPEX is tradeable, which creates liquidity for the investor. From the company's point of view, the cost of capital is looked at to see what is attractive in terms of financing. In which CAPEX based decision-making is also mentioned, which is important for their way of financing (G.W., lines 41-46)".</i>
Stance on tokenized securities	Knowledge on tokenized securities	Unfamiliar with tokenized securities	<i>"Tokenized Securities are a new concept for them. Heard of Blockchain before to do something with it at the time to be able to trade energy. If the energy network is t not in balance due to too much supply and too little demand, something has to be done. By setting up rules via blockchain, there could be efficient transfers to create a market for this (G.W., lines 69-72)".</i>
Obstacles for technology embracement	Requirements for change	Considerations for changing to tokenized securities	<i>"In order to choose this method, the interests of the investor need also to be taken into account, in particular; affordability, security of supply and sustainability are important. If these principles can be guaranteed, they find it interesting to do it this way.</i>



			<i>In addition, it is also positive if there is a large market because it can generate more money because more people want certificates (G.W., lines 87-91) ”.</i>
Obstacles for technology embracement	Outlook on DLT/Blockchain	Lack of trust in DLT/Blockchain as potential trading system	<i>“Too few real projects, many pilots, not yet a big movement, so that it is not yet really trusted and widely used (G.W., lines 102-103) ”.</i>
Obstacles for technology embracement	Requirements for change	Investment appetite among people	<i>“People who want to move forward, early adopters and young people who are interested in this may have investment appetite (G.W., lines 115-116) ”.</i>
Stance on tokenized securities	Tokenized securities advantages	Open for change	<i>“If NPEX decided to run on blockchain, they would have no problem with this and continue funding in this way. Only nice if there are more benefits to be gained for the customer (G.W., lines 129-130) ”.</i>
Obstacles for technology embracement	Outlook on DLT/Blockchain	Predictions about DLT/Blockchain is the future	<i>“Difficult to make a clear statement about this, the interviewee does expect that digital money will take off like a digital euro. Whether the actual financial markets will run on this is no statement made for (G.W., lines 142-143) ”.</i>
Obstacles for technology embracement	Outlook on DLT/Blockchain	Lack of knowledge in general public	<i>“It is still a concept to explain before people want to go into business with this (G.W., line 157) ”.</i>
Stance on tokenized securities	Tokenized securities advantages	Liquidity and trade ability as advantages for investors	<i>“If the digital world and money takes off and it can start to scale there are certainly advantages such as: Large market, which also means a liquid market because there is more money in circulation, the tradability of your investment goes up, greater demand and of course greater offer. Larger market is an advantage so that you can sell your position as an investor (G.W., lines 157-161) ”</i>
Stance on tokenized securities	Tokenized securities advantages	Cost reduction for both parties as an advantage	<i>“The earning model NPEX is difficult to estimate, for example, the current fees may be lower. But something around 1% will probably remain, perhaps for half the money (G.W., lines 179-180) ”.</i>