BLOCKCHAIN IN THE MUSIC INDUSTRY: A STUDY OF TOKEN BASED MUSIC PLATFORMS

MASTER THESIS

to obtain the Erasmus Mundus Joint Master Degree

in Digital Communication Leadership (DCLead)

of

Faculty of Cultural and Social Science
Paris Londron University of Salzburg

Technical Faculty of IT and Design
Aalborg University in Copenhagen

Submitted by
MOULOUD, KESSIR
PLUS student number: s1047999
mkessi18@student.aau.dk | mouloud.kessir@stud.sbg.ac.at
Copenhagen, Denmark

Primary Supervisor: Anders Henten
Secondary Supervisor: Josef Trappel

Department of Communication Studies

SALZBURG, 30 JULY 2019

EXECUTIVE SUMMARY

The main objective of this research is to look at the use of blockchain technology in the music industry by conducting a study on token based music platforms. This type of platforms is an emerging form of leveraging blockchain technology to solve different problems in many sectors [1]. Guided by relevant theories and concepts, the researcher was able to collect necessary data to tackle the research questions and their analysis. The research produced three different outcomes by using both literature review and empirical data.

The first outcome represents the identification of issues and challenges in the music industry, particularly in royalty and copyright management. The second outcome is the creation of an integrative framework that is able to describe how token based platforms operate, create, deliver and capture value. Using conceptual framework analysis, the researcher was able to create the STT framework that is an important artefact of this study and forms the theoretical basis of this research. The STT framework is composed of 12 building blocks that are spread over three domains: Service, Token Mechanics, and Technical. The STT framework contributes to the academic and practical body of knowledge by bringing together scattered knowledge and insights around token based platforms and consolidates them into an integrative framework. Lastly, token based music platforms are studied and analyzed using the STT framework. This was carried out using a multiple case study analysis of two leading start-ups: Musicoin and IndieOn.

Considering the novelty of blockchain and the fact that crypto-economics and the concept of token based platforms are still at an early stage. It is expected that the outcomes (the STT framework in particular) produced in this research will form a foundation for the development of further research in this area.

TABLE OF CONTENTS

INTRODUCTION

Over the past few years, the music industry has witnessed a booming growth in revenue due to increasing digital sales. The International Federation of the Phonographic Industry (IFPI) has reported an industry growth of 9.7% in 2018, compared to 5.9% growth in 2016 [2]. 2018 represents the fourth consecutive year of global growth, and the fastest rate since 1997. By 2020, the music industry is expected to attain exponential growth of $26 billion in terms of market capitalization [2].

Streaming has become the most predominant style of music consumption, driving growth across most of the major markets [3]. According to RIAA, 75% of the total revenue of the music industry was fueled by streaming services (both ad supported and paid) [3]. In 2018, paid streaming was the top driver in market growth with an increase of 37% of the entire music revenues. Streaming services such as Apple Music, Spotify and others reached more than 50 million subscriptions in the United states only.

This growth in the music industry is accompanied by a significant increase of interest and appetite for independent music [4]. The number of indie music consumers grew by a staggering 141% from the start of 2015 to the end of 2016. These numbers are expected to grow as the popularity of streaming services increases [4].

The shift towards streaming instead of owning content is explained by the industry's motivation to build an interactive relationship between music creators and consumers [5]. The birth of technologies such peer-to-peer file sharing allowed initiatives like Napster to make a dent in the recording industry [6]. Online content piracy was made easy and without any legal consequences, this resulted in financial losses for musical artists. Although music streaming was able to partially mitigate problems related to piracy, musicians, are still facing unfair financial losses as they receive a trivial portion of the total revenue generated by their works, the rest is taken by intermediaries present along the value chain [7].

It's been more than a decade since Satoshi Nakamoto published his paper on Bitcoin [8] which later gave rise to the Blockchain technology, many industries began exploring or are in the middle of using this technology [1]. There is a growing number of start-ups using the Blockchain technology that aim to solve a particular problem in sectors other than the financial one—some sources estimate the existence of more than 4,000 blockchain based companies [1]. The idea of blockchain technology being a savior of the music industry has been popular in recent years. Some have suggested that this technology could bring a revolution to the music industry [9], [10], it could even help solve all the challenges that the music industry is facing [11]. Blockchains are essentially digital distributed ledgers that store data and retain transactions in a highly immutable and encrypted format [8]. Through peer-to-peer protocols and consensus mechanisms, blockchain allows to remove third parties that ensure trust in transactions [8]. A trending approach of brining decentralization into the music industry is building token based platforms that are run on a blockchain [1]. These platforms that are also being introduced to industries other than the music one possess unique attributes of tokenization and decentralization that make conventional frameworks and business model tools incapable of describing how they operate [12].

This research will focus on studying token based platforms within the music industry. Using relevant theories, conceptual framework analysis and appropriate methodologies, the researcher will carry an in-depth analysis of these platforms, within the music industry. First, the research will look at the royalty & copyright management sphere as well as the blockchain technology. Then, it will conduct a conceptual framework analysis to propose a tool that can effectively describe how token based platforms operate, create, deliver and capture value. Lastly, the research will carry a multiple case study analysis on token based music platforms using the developed framework.

RESEARCH QUESTIONS

Since this research tackles the topics of Blockchain and the music industry, it is important to understand the current issues and challenges in the music industry, particularly in royalty and copyright management. It is also important to gain solid knowledge of the blockchain technology. The first research question focuses on that.

In order to thoroughly study blockchain based music projects, it is paramount to develop an adequate framework that allows to do that. Based on this, the second research question was formulated. The third question is about discovering how token based music platforms operate, using the developed framework and a multiple case study analysis. The three research questions are:

1. **What are the issues and challenges pertaining to the music industry, particularly in copyrights and royalty management?**
2. **How can token based platforms be analyzed in terms of how they operate, create, deliver and capture value?**
3. **How is Blockchain being leveraged to overcome the issues in the music industry?**

RESEARCH OBJECTIVES

The core topics of this study are blockchain technology, and music industry (royalty and copyright management in particular). The aim of this research is to look at the use of blockchain technology in the music industry by conducting a study on token based music platforms. The objectives of this study are to:

1. Investigate the current challenges and issues pertaining to the music industry, particularly in copyrights and royalty management
2. Develop a framework that can comprehensively describe how does a token based platform operate;
3. Study, through the lens of the developed framework, how token based music platforms operate

STRUCTURE OF THE REPORT

This report begins with an introduction to the research that covers background, the problem area, research questions, and the research objectives.

Chapter 1 discusses the Blockchain technology, one of the core topics of this study.

Chapter 2 represents the findings of the first research question that concerns the royalty and copyright management in the music industry.

Chapter 3 covers the methodology; it describes the methods used throughout this research.

Chapter 4 presents the results and answers the remaining two questions. It covers both findings and analysis (conceptual framework analysis and multiple case study analysis). Discussion is also included in this chapter, this include major takeaways of the research, the limitations, as well as recommendations for future research.

CHAPTER 1: BLOCKCHAIN TECHNOLOGY

This section of the report aims at providing an understanding of what blockchain technology is, its core principles and what are its most important characteristics. This part serves as one of the foundations that allows the researcher to discuss the topic of this project from relevant angles in regards to this technology. The structure of this section follows the three main development stages or generations of Blockchain: Blockchain 1.0: Cryptocurrencies, Blockchain 2.0: Smart Contracts, Blockchain 3.0: Decentralized Applications (dApps) [13], [14]. We start with the first generation of Blockchain, how it works, the underlying mechanisms and protocols. The first generation constitutes the basis for more advanced developments in the realm of this technology which are presented at a later stage.

The literature that has been reviewed and used to build this chapter consists of academic articles, books, blogs and websites of blockchain platforms and experts, as well as reports produced by business and consultancy firms. Using the "snowball principle" [15], articles were searched and identified on the AAU Library (has access to more than a hundred databases including reputable ones such as IEEE, ProQuest) [16], Google Scholar, and Google. The following keywords were used to find relevant literature: Blockchain, distributed ledger, smart contracts, Bitcoin, Ethereum, decentralized applications, dAaps. The selection was based on its relevance for this research and its scope.

BLOCKCHAIN 1.0: CRYPTOCURRENCIES.

While the Internet filled the distance gap, Blockchain technology is filling the trust gap [17]. According to Swan, Blockchain is:

"*The decentralized transparent ledger with the transaction records—the database that is shared by all the network nodes, updated by miners, monitored by everyone, and owned and controlled by none. It is like a giant interactive spreadsheet that everyone has access to and updates and confirms that the digital transactions transferring funds are unique.*" [13]

The Blockchain technology emerged in 2008, when a group or individual under the pseudonym of Satoshi Nakamoto released the whitepaper "Bitcoin: A Peer-to-Peer Electronic Cash System" [8]. Blockchain is the underlying technology of the Bitcoin cryptocurrency. Bitcoin is "*a purely peer-to-peer version of electronic cash that would allow online payments to be sent directly from one party to another, without going through a financial institution."* [8]. This is to say that Bitcoin can be exchanged without the need for trusted third parties such as banks to prevent double spending, also known as the Byzantine Generals' Problem. This problem is essentially a failure of agreement on a collaborative course of action among members of a network that communicates conflicting information through an unreliable connection [18]. Prior to Satoshi's whitepaper, a trusted third party was always needed to prevent Byzantine Generals' Problem. Such a third party ensures trust by guarantying the validity of entries, preventing double spending, and keeping an immutable and accurate record of all transactions [19].

Blockchain is basically a chain of blocks where each block contains five types of information: main data (e.g. transaction records, contract records, etc.), a cryptographic hash of the current block, a cryptographic hash of the previous block, a timestamp and the so called nonce [20]. Because the blocks of digital data are chained together—by means of a cryptographic hash—the data is immutable, and can never be changed. It allows people to track records without the risk of an individual or entity

tampering with those records [21]. Since the ledger or the blockchain data is shared among all the nodes, the network has to reach consensus in order to add new data to the blockchain. In other words, the nodes have to agree on one single history of transactions [8]. There are numerous mechanisms for reaching consensus. The most notable one is Proof-of-Work (PoW)—proposed in the Bitcoin whitepaper and used in the same platform. In a nutshell, nodes compete to be the first to verify a group of transaction data in order to add them as a new block to the Blockchain. They do that though performing high-level calculations in a race to be the first to find the right nonce for the new block that yields an adequate hash. These high-level calculations not only require computational power but also time. The waiting time is an intended result as it will make " Blockchain slow down the creation of new blocks and make it hard to tamper with previous blocks." [22]. The nodes that are competing to add new blocks to the chain are called miners. When a miner finds a solution, they publish the new block with the network of nodes in order to be verified. Once verified, the new block is added and chained to the previous blocks. The miner that finds the solution for the new block is rewarded for the effort and the computational power with cryptocurrency (Bitcoins in the case of the Bitcoin Blockchain). Other platforms adopt different consensus models. Proof-of-Stake (PoS) for example was designed to eliminate the shortcomings of PoW in regards to the high consumption of computational power, thus electricity that is involved in the mining process. The alternative that PoS provides is the user's stake of cryptocurrency in the blockchain system. Instead of solving high-level calculations, miners use cryptocurrencies as a stake to buy proportionate block creation chances in the blockchain system [23].

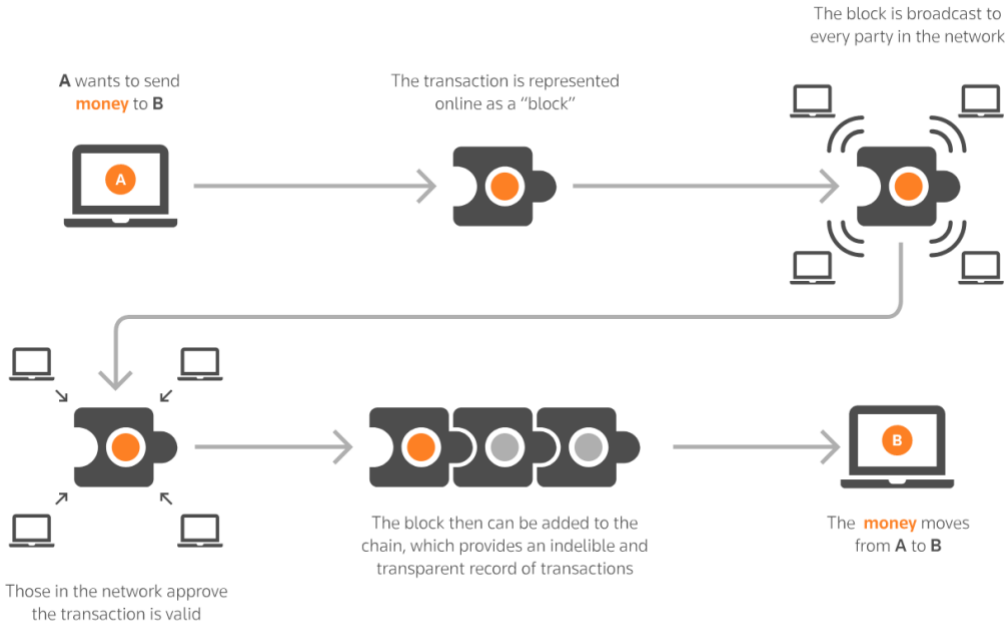

Figure 1: How Blockchain works [106]

Blockchain can be categorized into three types: public, private and hybrid. In a public blockchain (also known as permissionless) anyone is able to view the blocks or participate in the addition of new blocks (mining process). In this type, the decentralized state of the network is secured by encouraging contribution to reaching consensus by means of cryptographic consensus mechanisms. An example of a public blockchain is Bitcoin. On the other hand, a private (permissioned) blockchain can be joined only by invited nodes to view and edit data in the blockchain. For security and confidentiality reasons. A private blockchain can set up different levels of permissions for nodes. Organizations dealing with personal or sensitive information are more likely to opt for this kind of blockchain. In the hybrid blockchain, the data can be public or private, however, the nodes that have authority and voting rights are chosen in advance. This partially decentralized blockchain is also called consortium blockchain. Table # shows the different characteristics of each type of blockchain.

	Public blockchains (permissionless)	**Hybrid blockchains (consortium)**	**Private blockchains (permission)**
Read permission	Public	Public, or chosen set of nodes	Organization can choose to authorize access to: Public, restricted to chosen nodes, or restricted to one organization
Write permission	Public	Chosen set of nodes	Single organization
Consensus participants	Anyone	Chosen set of nodes	Single organization
Consensus mechanism	Proof of work Proof of stake	Voting mechanism by signing the blocks digitally	N/A
Costs of consensus	Highest	Lower	Lowest
Influence on consensus is determined by	Economic resources	Pre-determined	N/A
Security is based on	Crypto-economics	Cryptography	Cryptography
Security level	Highest	Lower	Lowest
Incentive	Reward	Stake	Stake
Centralization	Fully decentralized	Partially decentralized	Fully centralized
Regulatory compliance	Difficult	Less difficult	Least difficult
Validation speed	Lowest	Higher	Highest
Level of required trust	None	High	Very High
Reversibility	Low	High	Very High

Table 1: Different characteristics of each type of blockchain [24]

BLOCKCHAIN 2.0: SMART CONTRACTS

With the growing interest in the Blockchain technology and its potential applications in domains other than cryptocurrency exchange, an explicit demand to develop more complex solutions in Blockchain emerged. While Blockchain 1.0 was developed to decentralize money and payments, Blockchain 2.0's idea is to facilitate exchange of value in general in a peer-to-peer and decentralized way [13]. The blockchain consists of the network's peer-to-peer protocol, and the decentralized ledger that contains the protocol and the transaction data. In this second generation of Blockchain, the use is not limited to cryptocurrencies, other protocols can be built on top of the powering peer-to-peer protocol—allowing the technology to be used to for the registration, confirmation and transfer of records, property and contracts. For such application of the technology, an appropriate Turing Complete programming language is required [13]. A Turing Complete driven platform enables running any cryptocurrency, blockchain, or any other protocol. Moreover, a Turing Complete scripting language makes programming on the platform more accessible [13]. The development of such scripting language on top of the blockchain allowed the concept of smart contracts to emerge. A smart contract is essentially a program code that can run on a Blockchain.

As opposed to traditional ones, smart contracts remove the need of trust between the parties in order for the agreement to take place—none of the parties are able to change the code of the smart contract which will execute exactly as it was programmed to do. Acting on behalf of one or several parties by running pre-defined rules when certain conditions are met, smart contracts leave no room for ambiguity, the code will tell exactly what relevant nodes should do [13]. Smart contracts have the decentralization property too—there is no single point of failure as they run on all the nodes in the network.

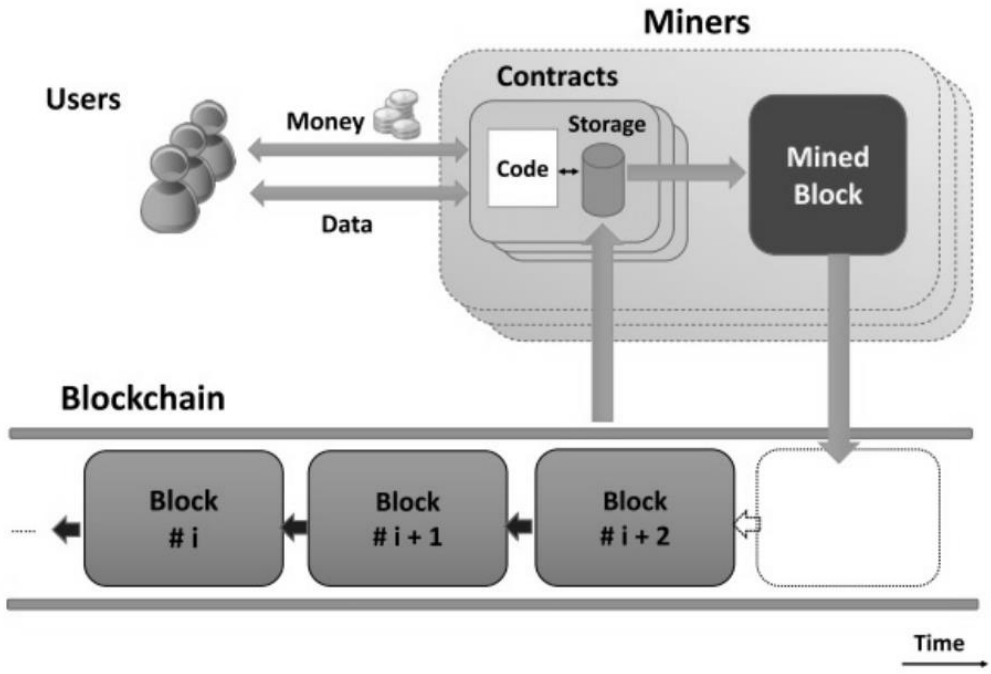

Figure 2: Smart contract on a blockchain [107]

Ethereum: EVM and Smart Contracts

A leading platform in this second generation is Ethereum—the longest blockchain (as of this writing 8,142,889 blocks), and the second most popular Blockchain after Bitcoin, if popularity was measured by market capitalization. Similar to Bitcoin, Ethereum is "*open-source, public, distributed, blockchain-based platform with a Proof Work-based consensus algorithm coupled with rewards, which absolves the need for trusted intermediaries*." [25]. One of Ethereum's most important features is Ethereum Virtual Machine (EVM), a runtime environment based on stacks that makes executing smart contracts possible. These smart contracts can be deployed on the Ethereum blockchain as bytecode by any participant of the P2P network. The immutable code and state of smart contracts are stored on the distributed ledger and can be reached through a standard Ethereum address [26]. This is to say that "*smart contracts can be perceived as autonomous entities, but their actions are triggered by users interacting with the contract.*" [25].

BLOCKCHAIN 3.0: DECENTRALIZED APPLICATIONS (DAPPS)

This generation represents the future and the possible directions that the Blockchain Technology could take. Part of the literature often described this generation at a high-level of abstraction in the academic world [13], [27]. The literature usually encompassed the element of how the technology can bring justice to different areas of life, beyond finance and business. However, modern literature describes the future more concretely. Angelis and Ribeiro da Silva believe that the focus now and in the near future will be on building decentralized applications (dApps) which are expected to revolutionize how people will interface with web applications [14], [28].

A dApp is an application that runs its backend code on a decentralized, peer-to-peer network as opposed to centralized servers in the case of conventional web applications. The shared property between dApps and traditional web applications is that they render pages, they both use common scripting languages such as HTML, JavaScript. They key differentiator is the use of smart contracts. While traditional apps connect to a database through API, decentralized applications use smart contracts to connect and interact with a blockchain. The decentralization could be increased by hosting the front-end code as well on decentralized storage solution such as IPFS [29]. According to Jason Wu—founder of DeFinerOrg: "*decentralized applications will play a crucial*

role in helping build a decentralized society by serving as the bridge between mainstream users and blockchain technology." [30]

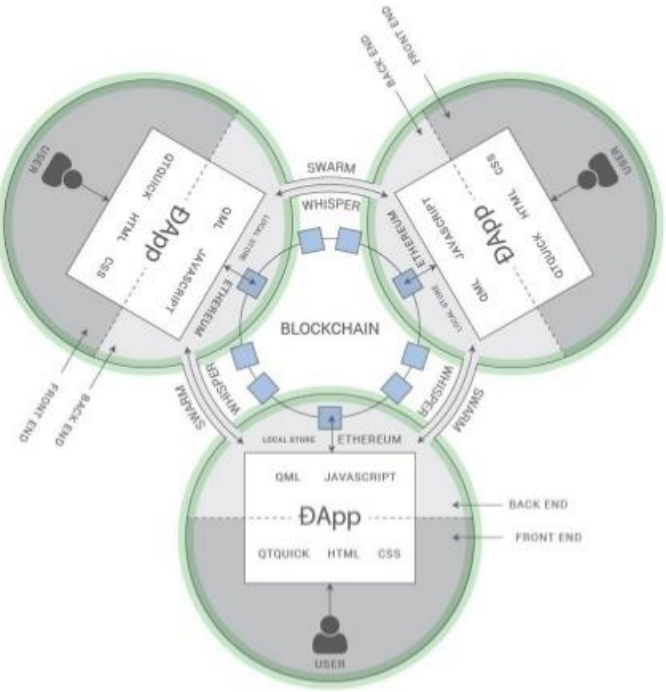

Figure 3: Decentralized Applications

While Bitcoin is the platform that gave birth to the Blockchain technology and introduced to the world its basic mechanisms through Satoshi Nakamoto's whitepaper [8]. Ethereum is the pioneer of the second generation of Blockchain. It is playing a major role in enabling the introduction of the Blockchain technology to domains other than the financial ones, thanks to its support of advanced smart contracts and its powerful scripting based on incorporating Turing-completeness and value awareness [30]. Cardano is an emerging platform that could take the role of the pioneer in the third generation of blockchain. It is considered to be the first ever blockchain that is built from a scientific philosophy [31]. It is more than a platform that is able to send and receive digital funds through its native cryptocurrency Ada. Cardano claims that it will be capable of running financial applications that are used day to day by individuals, organizations and governments all around the world. Because the platform is being constructed in layers, the system will be more flexible and easier to maintain. It will also allow upgrades by means of soft forks. There will be separate layers that

will be built to handle smart contracts and dApps. Also, Cardano claims that one of its major innovations is the balance that it will bring between the needs of users and those of regulators. This would result in combining privacy with regulation, and regulated computing that will bring greater financial inclusion [32].

EMERGING BUSINESS MODELS ENABLED BY BLOCKCHAIN

It's been more than a decade since Satoshi Nakamoto published his paper on bitcoin which later gave rise to the Blockchain technology, a hot topic and a point of debate between those enthusiastic about the technology and the skeptics. Nonetheless, many incumbent organizations began exploring how to benefit from the technology. Furthermore, there is a growing number of start-ups using the Blockchain technology that aims to solve a particular problem in industries other than the financial one, some sources estimate the existence of more than 4 000 blockchain based companies [1].

Offering blockchain as a service is one of the most prominent business models, Microsoft, Amazon and IBM offer blockchain as a service or BaaS. Essentially, it is about providing an ecosystem for other organizations to explore blockchain solutions. In this ecosystem, organizations can experiment, test, research and develop. Microsoft Azure's solution allows to offer the service by providing organizations a platform to develop, test and create blockchain apps [33]. Some of its customers include XBOX and Nasdaq [33]. In the same way, Amazon's AWS (Amazon Web Services) offer ways to build scalable blockchain networks and ledger applications for other organizations [34]. IBM offers a managed service that enables building, running and governing blockchain business applications easy [35].

Another emerging pattern is "Development Platforms. The novelty, the potential and the attention gained of Blockchain has encouraged individuals and organizations to invest time and money on the development and research of the technology [36]. Companies that are following this pattern work on providing tools, frameworks,

guidelines and other materials to support blockchain development [37]. An example would be Hyperledger, a project hosted by the Linux Foundation. It is an open-source collaborative effort that was created to further enhance cross-industry blockchain technologies [38]. "*Only an Open Source, collaborative software development approach can ensure the transparency, longevity, interoperability and support required to bring blockchain technologies forward to mainstream commercial adoption. That is what Hyperledger is about – communities of software developers building blockchain frameworks and platforms.*" [38]. According to Changpeng Zhao, the CEO of Binance, "*For our industry to grow we need more entrepreneurs to build real projects.*" [39]

Network fee charge model is about charging a small amount of cryptocurrency or fiat money for users of different activities in the blockchain network. Ethereum is an excellent example as it employs this model for one of its services [40]. Developers are charged for making their decentralized applications live on the Ethereum blockchain, the network fee is called GAS [40]. Similarly, in NEO you need to pay for your dApp with GAS tokens [41]. In the case of dApps, an example is Golem, you need to have GNT (Golem tokens) in order to gain access to the benefits of the Golem supercomputer [42].

The token based platform is a model adopted by many startups aiming to solve problems in a decentralized way [43]. These platforms are based on token economics, which is a trend in cryptocurrencies. Crypto-economics differs from traditional economics in three different ways. First, it can program an economic system to reflect the volatility and complexity based on a decentralized technology such as blockchain, thus crypto-economy is also called a programmable economy [44]. Second, transnationality is a property of crypto-economic systems [45]. For instance, Bitcoin can be liquidated in various countries using just a wallet address. Third, in crypto-economics, it is possible to program the property of currency. As to human behavior, it can be controlled within a certain predictable range by introducing incentives. Therefore, it is possible to establish a user participation incentive system [8]. For

example, incentives can be programmed and introduced to motivate users to take part of activities that can increase currency value and system efficiency.

Systems with incentives designed with conventional currencies or points are prone to manipulation, hacking or abuse. Contrarily, a cryptocurrency-based incentive system not only provides transparency and accuracy in handling data, but also allows businesses to raise funds to develop and grow the project by selling different kinds of tokens to potential future users instead of initial investment costs [46]. The effect of a network in proportional to the square number of connected users [47]. Therefore, in a crypto-economics, the value of the network is linked to the value of the token in that network. As the network grows, the value of token and its incentives increases. This would allow providing ample benefits to the participants of the network. For instance, Steemit is a token based platform. It is a decentralized social media platform where all participants are part of a token based network. Steemit has a sophisticated reward system for its participants (users, content creators, curators) that is not based on advertising, unlike existing social media giants such as Facebook and YouTube, which ranks their profits for shareholders only [48].

CHAPTER 2: ROYALTY AND COPYRIGHT MANAGEMENT

Private companies and creative content creators are looking for more ways to succeed, by incorporating innovations into their products, or striving to increase creativity in the case of digital works authors such as music artists. Intellectual Property Rights (IPR) plays a significant role in growing economies, spurring innovation and giving companies and content creators the right tools and framework to drive their success.

Essentially, IPR refers to the legal rights given to creators and inventors to protect their works over a certain period of time. These legal rights also provide a framework for the creators to transfer ownership or license the use of their works [49]. The EU classifies IPRs into 9 different types: *Patents, Industrial Designs, Databases, Trademarks, Utility Models, Trade Secrets, Domain Names, Geographical Locations, and Copyright.*

A patent is an exclusive right granted for the protection of inventions (products or processes) offering a new technical solution or facilitating a new way of doing something. The patent holder enjoys the exclusive right to prevent third parties from commercially exploiting their invention for a limited period of time. As for trademark, its main use is to identify a good or service commercial origin. Trademark carries information about the quality of the product, hence it plays a role in facilitating consumer's choice. Legally, a trademark is an exclusive right over a sign in relation to the goods and services for which it is registered [49].

An industrial design is the outward appearance of the whole or part of a product resulting from the features of the lines, contours, colours, shapes, textures and/or materials of the product itself and/or its ornamentation. A Utility model or also known as petty patent is an exclusive right granted for an invention, which allows its owner to prevent others from commercially using the protected invention, without their authorisation, for a limited period of time [49].

The EU also lists trade secret, databases, domain names and geographical indications as IPRs. However, one of the most important and discussed IPR is copyright[50].

Copyright is the intellectual property right that grants creators protection over their works of literary, scientific, or artistic nature. In the EU and in most countries of the world, registration is not needed to obtain copyright protection. Authors, artists, and other creators obtain protection over their works automatically from the moment the work is created [49].

Nonetheless, it is a common practice to include a copyright notice in the form of a statement "*all rights reserved*" or the symbol © alongside the year in which the work was created. The copyright notice informs others of the existence of copyright, which would reduce the likelihood of potential infringement. There is no exhaustive list that contains all the types of works that qualify to be protected by copyrights [50]. However, the following list of works are generally covered by copyright protection at the international level:

- literary works such as novels, poems, plays, newspaper articles;
- computer programs/software, databases;
- films, musical compositions, and choreographies;
- artistic works such as paintings, drawings, photographs, and sculptures;
- architecture, maps, plans, technical drawings;
- sketches and three-dimensional works relative to geography, topography, architecture or science;
- advertisements, sometimes applied art;
- flyers, commercial material, slogans, brochures and user manuals.

According to EU law and in many other countries, an idea cannot be protected by copyright. It is the expression of an idea (such as the types of works above) that can be protected.

Copyright laws grants creators two types of rights: economic and moral.

- **Economic rights:** this enables right holders to control the use of their works and derive financial reward and remuneration over the use of their works by

others. Economic rights normally take the form of exclusive rights to either allow or prohibit the making and distribution of copies or their communication to the public.

Some examples of economic rights are:

- right of reproduction, e.g. to make copies of the work such as printed publications or sound recordings
- right of distribution, e.g. to distribute copies of the work
- right of fixation, e.g. to record the work in, for example, a CD or DVD
- right of communication to the public, e.g. broadcasting via radio, TV or Internet
- right to perform the work publicly, e.g. to authorise live performances of the work such as in a play
- right to make "derivative works", e.g. to authorise modifications, translations, adaptations such as turning a novel into a screenplay, or other new uses of a work.

- **Moral rights:** these are generally non-transferable rights. They enable the author to claim authorship over their works and prevent distortion or mutilation of their work which may impact the author's honour or reputation. The second type of rights are not harmonised at the EU level. E.g. in Germany and Austria, a sale/transfer of copyright ownership from a copyright owner to a third party is allowed.

Unlike moral rights, economic rights are limited in time, the Bern Convention stipulates that this type of rights must last at least 50 years after the right holder's death. However, national laws may ensure longer protection. An example is the EU, it is set at 70 years from the right holder's death.

Copyrights management laws has always been a point of contention between legislators, copyright holder, licensors, and other actors in the value chain. This has created various challenges. The recent developments in technology related to copyrighted content has given rise to even more challenges.

Although there have been efforts to harmonize copyrights management laws across borders either internationally e.g. the Bern Convention[51]. Or regionally e.g. EU Copyright Directive [52], there's still a long way to go. This status quo forces the existence of many players in the form of policy making institutions, collecting societies, etc. More players means more different databases that track digital works and their ownership details, hence creating a lack of transparency about copyrighted works. Also, what is noticeable is the lack of legislation behind technology. As technology continues to develop rapidly, it is constantly changing the scope of copyright laws in many countries [53].

The lack of transparency and the inherent complication of copyrights management law inevitably creates an unfair balance in terms of remuneration across the value chain. A chain that is being monopolized by intermediaries, leaving little to no control for authors over their digital works. In fact, authors lose control over their digital works once they are shared on the internet; in the age of the information economy where Copyrighted digital works can be replicated and transmitted at a near zero cost. This gives rise to serious issues in regards to piracy and unauthorized access to copyrighted content [54].

Lack of information and transparency

The lack of geographical harmonization of copyrights management laws and the lack of cost-friendly widely accepted technologies results in a lack of a comprehensive database that organizes all information about music, films, photos, and other works subject to copyright protection. Determining the right owner or groups of owner of a song can be a hassle when information is spread over several databases of publishers, collecting societies and other organizations that have no economic or political incentive to share it [55].

This status quo impacts both consumers and creators of music. From consumer perspective, transaction costs increase as finding information about songs comes at a financial and time cost. Sometimes consumers refrain from using certain pieces of music just because of its unclear copyright status. On the other side of the value chain,

musical artists more than often do not receive fair compensation for their due to this lack of transparency and have to share the royalties with a series of intermediaries such as publishers and collecting societies [55].

Unfair remuneration for authors

The internet has made the world a small village with a substantial amount of content where musical artists can be located in various jurisdictions with different copyright law, payment processes and different databases of copyrighted works. This situation prevents musical artists from receiving the appropriate royalties for the user of their creations. Moreover, the rise of giant intermediaries in the example of Spotify, Apple Music, and YouTube enlarged the so called value gap that music creators suffer from [53].

A common complaint made by music creators concerns these intermediaries. They increasingly put themselves into the value chain between musical artists and their content consumers. Consequently, creator have little to decide on how their works is priced and end up receiving smaller parts of the overall revenue which shared across the value chain. In the music industry, the disparity of royalty rates between artists and record labels is significant. Streaming services like Spotify typically pay record labels a large some of fees for a license of their songs. Additionally, they negotiate a royalty in which the rates are kept undisclosed. However, there have been researches that estimated the sound recording royalty per stream. Apple Music is estimated to pay royalties of about 6/10 of a cent, Spotify 4/10 of a cent, Pandora 1/10 of a cent, and YouTube 6/100 of a cent per stream [7].

These fractions of cents per stream are paid to record labels, which in turn pay an even smaller cut to the recording artists. The royalties are typically determined in the artists' record deals and artists do not necessarily know what the negotiated royalties are between their labels and the streaming services. To completely understand the dynamics of such payments, there are other factors that must be taken into consideration. For instance, free, ad-supported platforms offer far lower royalties [53].

Unauthorized access to copyrighted works.

The rapid development of technology in the last two decades impacted the world and people's lives. In the age of information economy, sharing digital works like musical artefacts on the internet can mean losing control over it [54]. It takes near zero cost for a user to make perfect digital replicas and transmit them anywhere in the planet. If an infringement happens on a song, it is very unlikely that the original creator or group of creators are aware about it. Moreover, even they do, it is very burdensome to take effective legal action about it especially if it happens on the other side of the world.

Various technological tools have been introduced in an effort to mitigate piracy issues. Digital Right Management tools (DRM) is an example. Although DRM can to some extent reduce the occurrences of unauthorized access to copyrighted works, it is not a perfect solution. DRM adds complexity to the distribution of digital works, also substantial increases to transaction costs for copyright holders. Moreover, DRM is not a perfect solution from a technological point of view. Sony's rootkit case which was installed on music CDs as a DRM solution resulted in slowing down user's computers and opening security holes [56]. Back in 1999, a teenager was able to break Content Scramble System (CSS) which was still used together with regional coding to protect DVDs [57].

Stagnant copyright laws

Technology continues to develop and industries like the music industry have evolved in recent years with the entrance of new intermediaries such as Spotify, however, the laws governing these industries have remained stagnant. An example would be the current copyright law in the United States which does not contain any sort of definition for interactive streaming services like Spotify nor does it specify which exclusive rights interactive streaming infringes upon [55]. Contrary to technology in its rapid development aspect, the legislative process is long and dependent on various stakeholders. The delay of policy making is also a result of the rapid, dynamic and predictable nature of technology. As a consequence, copyright laws adopted by legislators in the US and the EU are often left as open-ended standards to avoid the

constant need for revisions. This ambiguity paves the way for the exploitation of copyrighted materials [53].

A staggering example of this phenomena is the Digital Millennium Copyright Act (DCMA) signed into law in 1998 in the United States [58]. The DCMA was devised with the intention to promote access to information and the growth of the internet. However, since 1998 the internet has evolved significantly while the legislation has not. Title II of the DMCA, the Online Copyright Infringement Liability Limitation Act (OCILLA), granted online service providers safe harbour absolving them of monetary liability in certain cases of copyright infringement. If a provider is unaware of material transmitted, cached, stored or linked by its users that infringes upon a copyright, it cannot be held monetarily liable. The only two requirements for a provider to be eligible for liability limitation are that they "(1) adopt and reasonably implement a policy of terminating in appropriate circumstances the accounts of subscribers who are repeat infringers; and (2) must accommodate and not interfere with "standard technical measures." The OCILLA effectively allows online service providers like YouTube to profit off of illegal materials. With automatic ad placement on user uploaded videos that infringe upon songwriters' and artists' copyrights, YouTube can claim ignorance and remove the material only once the copyright holder has submitted a notification of copyright infringement [53].

CHAPTER 3: METHODOLOGY

This chapter presents the methodological choices and tools used to answer the research questions. This chapter starts off with the research idea formulation, which explains how did the author settled on the topic of the research and its questions. The research approach is also discussed afterwards, followed by the methods employed for data collection, validation and synthesis for every objective of this research.

RESEARCH IDEA FORMULATION

The idea of this research stemmed from the interest of the author in both the Blockchain technology and the various issues present in the online media industry. Therefore, the author started the research as an exploratory study. As Robson points out, an exploratory study is a valuable means of finding out "*what is happening; to seek new insights; to ask questions and to assess phenomena in a new light*." [59]. Saunders builds on this and states that exploratory research is "*particularly useful if you wish to clarify your understanding of a problem, such as if you are unsure of the precise nature of the problem. It may well be that time is well spent on exploratory research, as it may show that the research is not worth pursuing.*" [60]. In the case of this research, the interest was to explore how decentralized systems such as the Blockchain technology can overcome the issues present in the online media industry, especially in terms of royalty and copyright management.

Copyright is the intellectual property right that grants creators protection over their works of literary, scientific, or artistic nature [49]. Copyrights management laws have always been a point of contention between legislators, copyright holder, licensors, and other actors in the value chain. The recent developments in technology related to copyrighted content has given rise to even more challenges. The lack of transparency and the inherent complication of copyright law inevitably creates an unfair balance in terms of remuneration across the value chain. A chain that is being monopolized by intermediaries, living little to no control for authors over their digital works. In fact, authors lose control over their digital works once they are shared on the internet; in

the age of the information economy where copyrighted digital works can be replicated and transmitted at a near zero cost. This gives rise to serious issues in regards to piracy and unauthorized access to copyrighted content [54].

After reviewing different literature from the business and academic world the researcher narrowed down the focus on the music industry as it is the immediate sector being revolutionized by the Blockchain technology. There has been more than a dozen of projects attempting to build music platforms in a decentralized way in order to solve a set of issues in the music industry [12]. Furthermore, the literature review not only helped to narrow down the focus of the research but also yielded the realization that the literature—both in the academic and business worlds—lacks a comprehensive framework that can describe and evaluate how blockchain platforms (that are based on tokenization) operate, create, deliver and capture value.

Therefore, the research idea focuses on the impact of Blockchain on the music industry as well as exploring Blockchain-powered music platforms using a framework that is also developed during this research, and forms the theoretical basis.

DATA COLLECTION METHODS

Literature review and semi-structured interviews are the two main data collection methods used in this research project. Essentially, literature review is the use of previous scientific, business and practical data to gather information about the different domains covered by this research—Blockchain, business models, music industry, royalty and copyright management etc. The literature review method was also used to build the conceptual framework that forms the theoretical foundation of this research. In a nutshell, this first technique was used to explore the direction and focus of this research and more importantly to address the objectives of this research.

Literature review was conducted using the snowball principle [15]. Several databases were used to search for data sources, these included: AAU Library (has access to more than a hundred databases including reputable ones such as IEEE, ProQuest) [16],

Google Scholar, and Google search engine. Relevant keywords were used during the search process, as explained in each section.

The second method used for data collection in this research is a qualitative one, semi-structured interviews. A qualitative method is a method that uses or generates non-numerical data [60]. Interview is a technique that involves two or more people who have a discussion with a purpose [61]. Saunders et al explains that in semi-structured interviews, a list of themes and questions to be covered should be defined. This list may vary from interview to another. This means that the researcher may ignore some questions in particular interviews or add new ones, given a specific organizational context that is encountered in relation to the research topic. The order of questions may also vary depending on the flow of the conversation [60]. The data from the interviews helped the author enhance the focus and scope of the research, and gain deeper insights on the domains covered in this research project. Interviews with representatives of case study companies generated the needed empirical data. Additionally, this method allowed the researcher to validate some of the findings.

INTERVIEWS

Most of the interviews were conducted online via Skype and Google hangouts as the interviewees are located in USA, Paris, Switzerland, and Canada. In some cases, interviewees were contacted again via email and on LinkedIn to clarify additional points. The following table presents an overview of the people interviewed during this research.

Interviewee	Organization	Details
Lorenzo Pistolesi	Musicoin	Lorenzo is a musician based in Italy. He a is user of the Musicoin platform and one of its volunteer ambassadors. Lorenzo was the point of contact with Musicoin.
Isaac Mao	Musicoin	Isaac Mao is the CEO of Musicoin. He is a software architect, entrepreneur (and learning technology, social technology researcher. Isaac is now in advisor

		board for Global Voices Online project initiated by Berkman Center of Harvard University. Isaac also leads the Creative Commons China team.
Dr. Micah Hale Do	IndieOn	Dr. Micah Hale, is one of the founders of IndieOn and an early adopter of cryptocurrencies and the Blockchain technology.
Nassim Belouar	Blockchain Algeria	A Paris based consultant an expert in technology and blockchain
Allan Hammershøj	Mediathand	Technology expert and COO at Mediathand.

Table 2: List of interviewees

DATA COLLECTION, VALIDATION AND ANALYSIS

The objectives of this research are: (1) Investigate the current challenges and issues pertaining to the music industry, particularly in copyrights and royalty management; (2) Develop a conceptual framework that allows to study how does a token based platform create and deliver value; (3) Study, through the lens of the developed framework, how token based music platforms operate. In terms of approach, data collection, validation and analysis, the aforementioned objectives are tackled in different ways.

1. Investigate the current challenges and issues pertaining to the music industry, particularly in copyrights and royalty management.

This objective is linked with the first research question:
What are the issues and challenges pertaining to the music industry, particularly in copyrights and royalty management?

This research began with an exploratory approach. The first step was to conduct a critical review of literature pertaining to the core subjects of this research. The sources

of literature varied from scientific articles, government publications, whitepapers, conference proceedings to blog articles. This preliminary literature review gave insights to the researcher that the royalty and copyright management in the modern music industry is a worthy subject to focus on, given the various issues that the industry is experiencing. Furthermore, the modern music is one of the industries being challenged by the Blockchain technology, there are more than a dozen blockchain start-ups in this field [12].

In addition to literature review, semi-structured interviews allowed the researcher to understand the industry better and gain deeper insights about the technology. The interviewees included Blockchain experts and individuals working on blockchain projects within the music industry.

2. Develop a conceptual framework that allows to study how does a token based platform create, capture and deliver value

This objective is linked with the following research question:
Research question: *How can token based platforms be analyzed in terms of how they operate, create, deliver and capture value?*

It's been more than a decade since Satoshi Nakamoto published his paper on Bitcoin which later gave rise to the Blockchain technology, a hot topic and a point of debate between those enthusiastic about the technology and the skeptics [8]. Nonetheless, many incumbent organizations began exploring how to benefit from the technology. Furthermore, there is a growing number of start-ups using the Blockchain technology that aims to solve a particular problem in industries other than the financial one, some sources estimate the existence of more than 4 000 blockchain based companies [1].

As part of the Blockchain world started experimenting with crypto-economics and took the direction of building token based platforms to address different problems, the literature review results suggest that the various existing and traditional tools used to design and evaluate digital ventures do not work well in this new space [62]. Tools

like the business model canvas, the lean canvas or the STOF model fail to capture core components of tokenization and decentralization such as governance and token economics. In light of this, scientific research should provide the necessary tools and conceptual assistance to study and further develop these models [63].

One of the objectives of this research is to contribute to the academic and practical body of knowledge by proposing a conceptual framework that brings together scattered knowledge and insights around token based platforms and consolidates them into an integrative concept that combines the necessary and key elements and dimensions of a token based platform. The framework should be able to describe how these platforms operate, create, capture and deliver value.

Although there exists various definitions and philosophies in regards to what is a conceptual framework. This research will follow the definition provided by Yousef Jabareen [64]. The author defines a conceptual framework as:

"*a network, or 'a plan,' of interlinked concepts that together provide a comprehensive understanding of a phenomenon or phenomena. The concepts that constitute a conceptual framework support one another, articulate their respective phenomena, and establish a framework-specific philosophy.*" [64]

Inspired by the procedure proposed in "Building a Conceptual Framework: Philosophy, Definitions, and Procedure" [64], the development of this conceptual framework has been designed into four different phases:

Phase 1: Data preparation and selection:

A systematic literature review (SLR) was conducted with the goal of mapping the spectrum of multidisciplinary literature regarding token based platforms. Various topics were covered to guarantee that data collection is comprehensive and complete, in order to have a holistic mapping that ensures validity [65]. A selection of primary texts was carried.

Phase 2: Concept identification, deconstruction, and integration

This phase started with extensive reading of the selected data. The objective here was attempting to categorize data and ideas into different possible classifications, in order to facilitate concept discovery. This step increases the effectiveness of the inquiry and ensures effective representation of different ideas and disciplines [64]. This was done in an iterative process with a steady movement between concepts and data.

Phase 3: Synthesis

The process of synthetization has been conducted in an iterative way, by synthesis and re-synthesis of concepts and groups of concepts until the achievement of a comprehensive framework that makes sense.

Phase 4: Validation

The aim of this phase was to validate the proposed conceptual framework. What needs to be checked is whether the framework makes sense not only to the author but also to other people—experts in the field. The process of validation enabled the researcher to obtain valuable feedback and integrate it to further enhance the conceptual framework.

3. Study, through the lens of the developed framework, how token based music platforms operate

This objective is linked with the following research question:

Research question: *How is Blockchain being leveraged to overcome the issues in the music industry?*

The third objective of this research is to take a closer look at how the blockchain technology is being implemented within the music industry. As of this writing, there are more than 10 initiatives that are tackling the issues pertaining the music industry using decentralized systems to build token based platforms [12]. In this part, the research will employ multiple case study strategy to gain deeper insights regarding the design and implementation of token based platforms that are working on solving one

or multiple issues in the music industry. According to Saunders: "*A case study strategy can also incorporate multiple cases, that is, more than one case. The rationale for using multiple cases focuses upon the need to establish whether the findings of the first case occur in other cases and, as a consequence, the need to generalise from these findings.*" [60]

Using the conceptual framework developed in this research, the selected case study start-ups will be reviewed. The criteria set for selecting the case study companies was that the initiative should be addressing directly or indirectly the topic of music through blockchain, more specifically, through building a token based platform. The researcher has reached out to 11 start-ups matching the criteria. All of those organizations are building token based platforms. These are: *Soundchains, Choon, Musicoin, Imusify, Ujo Music, My Music Tokens, Audius, Voise, IndieOn, Audiocoin,* and *Musiconom*. Contact was established with six start-ups but only two agreed to participate in the interviews. These are *Musicoin* and *IndieOn*. Empirical data required to conduct a multiple case study were obtained from the information available online about the companies through their website and whitepapers, as well as interviews with different people working at the start-ups. The researcher has selected Musicoin, and IndieOn.

CHAPTER 4: RESULTS

This section of the report discusses the results (findings and analysis) pertaining to the second and third research questions. It covers the findings and analysis related to conceptual framework (which forms the theoretical basis of this research), as well as the presentation of case study findings and analysis. Discussion is also covered in this section.

CONCEPTUAL FRAMEWORK

Phase 1: Data preparation and selection

The systematic literature review was conducted around the area of token based platforms. The main objective of this phase was to identify the data sources and extract a relevant but comprehensive body of literature. To make the search comprehensive, texts were identified and searched using the AAU Library (has access to more than 100 databases including reputable ones such as IEEE, ProQuest) [16], Google Scholar, and Google search engine. The search was conducted using the snowball principle [15]. The following keywords and their combinations were used: Blockchain, business models, token economies, ICO, crypto-economics, blockchain business models, blockchain framework, token platforms.

The search process yielded a total of 165 texts. These consisted of academic articles, books, blogs and websites of blockchain platforms and experts, as well as reports by business and consultancy firms. All these texts were saved in Mendeley, the referencing tool used to write this report.

Selecting Primary Texts:

The next step was to select the most relevant texts from the pool of all of the identified literature. The selection was carried out according to the following set of criteria:

- Language of text: English or French (the languages the researcher speaks)
- Content type: Any text that revolves around at least one of the below topics:
    - Business models
    - Business models in Blockchain
    - Token economies or ecosystems in general
    - Token economy design
    - Crypto-economics
    - Token distribution models
    - Blockchain technical implementation
    - Blockchain technology evolution

Beside the scholarly articles, blog texts from Blockchain experts and institutions working in this area were included. This is due to the novelty of the concept of token based platforms, and the lack of literature on this topic in the academic sphere. Moreover, the decision of including practical knowledge was driven by the intention of making the review comprehensive to ensure validity and reliability. The type of content was set to include all the topics relating to Blockchain and business models in general, as well as token based platforms and their properties. Mendeley was used in order to read, review and sort the extracted texts following the criterion set above. A set of main 16 texts were chosen. Minor data was included from other texts in order to support some of the ideas expressed in the main texts. Table 3 shows the main 16 texts chosen.

#	Title	Main Topics	Author(s)
1	Sustainable Growth and Token Economy Design: The Case of Steemit [66]	Token economy; Crypto-economics	Moon Soo Kim and Jee Yong Chung
2	Tokenomics — A Business Guide to Token Usage, Utility and Value [67]	Token economy; token properties	William Mougayar
3	Decoding Token Economics: Insights from our Token Engineering & Token Economy Design Workshop at Berlin Blockchain Week [68]	Token economics	Mohit Anand

4	Initial Coin Offering (ICO) Evaluation Model [69]	Token distribution; Initial coin offering	Sebastian Lahajnar Alenka Rožanec
5	Liquidity and market efficiency in cryptocurrencies [70]	Crypto-economics	Wang ChunWei
6	TokenWork: Introducing the Token Utility Canvas (TUC) [71]	Token economics	Marc Ziade
7	Evaluating Blockchain Projects With Token Economy Canvas [72]	Token economics; lean canvas	Philip Stehlik
8	The Token Classification Framework: A multi-dimensional tool for understanding and classifying crypto tokens. [73]	Token economics; Token economics	Thomas Euler
9	Token Ecosystem Creation: A strategic process to architect and engineer viable token economies [62]	Token economics; Token economics	Outlier Ventures Aron van Ammers Lawrence Lundy Rumi Morales Matt Law
10	Business Models for Blockchain-based Ventures: An Exploratory Study [74]	Blockchain business models	Enrico Ferro
11	Some Simple Economics of the Blockchain [75]	Crypto-economics	Christian Catalini Joshua S. Gans
12	Token based Business Models [76]	Blockchain business models; Token economics; Token economics	Paolo Tasca
13	Business Model Generation [77]	Business models	Alexander Osterwalder and Yves Pigneur ISBN:
14	Measuring Ethereum-based ERC20 Token Networks [25]	Smart contracts	Friedhelm Victor and Bianca Katharina L¨uders Technische
15	Conceptualizing the STOF Model [78]	Business models	H. BouwmanE. FaberT. HaakerB. KijlM. De Reuve
16	The Business Model: Recent Developments and Future Research [79]	Business models	Zott, Christoph Amit, Raphael Massa, Lorenzo

Table 3: Selected texts

Phase 2: Concept identification, deconstruction, and integration

In this phase, the selected data was read and thoroughly reviewed. Additionally, data that was deemed useful was categorized in different possible classifications in order to facilitate discovering concepts. This step increases the effectiveness of the inquiry and ensures effective representation of different ideas and disciplines [64]. After that concepts were identified and labeled. At the same time these concepts were deconstructed in order to identify key information about each concept such as attributes, role, assumptions and characteristics. Certain concepts—especially overlapping ones—are integrated into a group of one or more concepts. As illustrated in figure X, this was done in an iterative process with a steady movement between concepts and data, and using whiteboards and sticky notes. This has enabled better visualization of concepts, the relationship and dynamics between them, and the overall meaning of the conceptual framework.

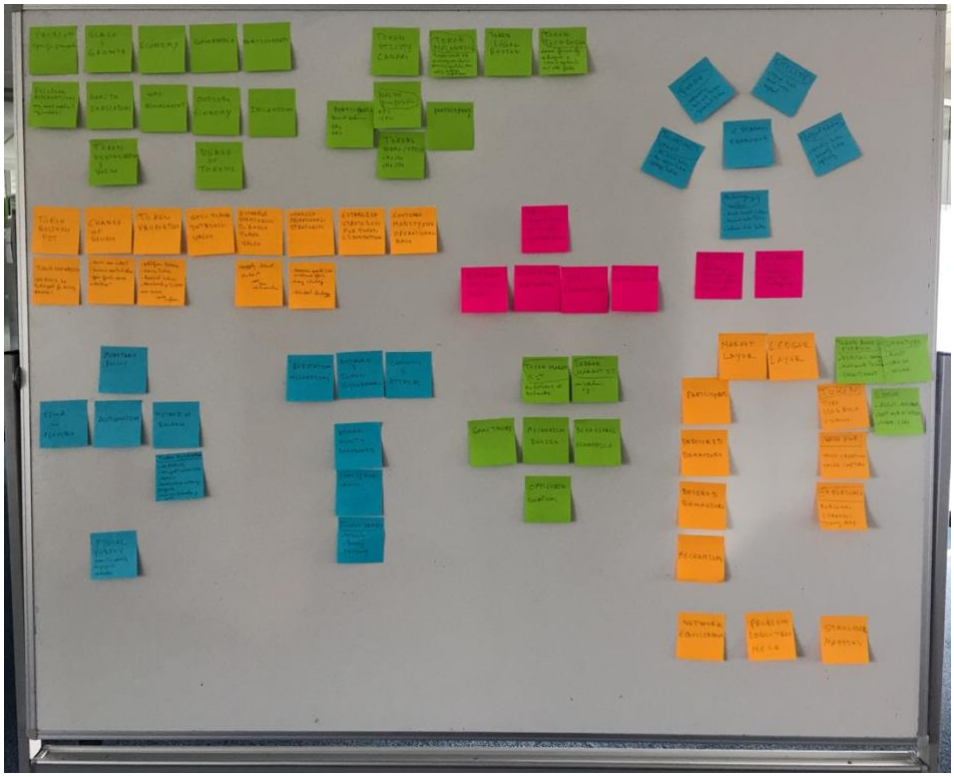

Figure 4: Sticky notes

The concepts that have been discovered were categorized as follows:

Concept 1: Token Economics:

One of the dominating topics covered in the selected literature is Token Economics, or as often referred to "Tokenomics". Some of the literature regarding this concept focuses on its origins [66], and its application within blockchain powered platforms. In phycology, Token Economy "*a system of operant conditioning used for behavior therapy that involves rewarding desirable behaviors with tokens which can be exchanged for items or privileges (as food or free time) and punishing undesirable behaviors (as destruction or violence) by taking away tokens*" [80].

In the field of blockchain, Token Economy refers to "*the system of incentives based on cryptocurrencies that reinforce and build desirable behaviors the blockchain ecosystem*" [81]. These kind of systems have come to be known as token based platforms. Token economics is a trend in cryptocurrencies. In crypto-economics human behavior can be controlled within a certain predictable range by introducing incentives. Therefore, it is possible to establish a user participation incentive system [8]. For example, incentives can be programmed and introduced to motivate users to take part in activities that can increase currency value and system efficiency.

A cryptocurrency-based incentive system not only provides transparency and accuracy in handling data, but also allows businesses to raise funds to develop and grow the project by selling different kinds of tokens to potential future users instead of initial investment costs [46]. The effect of a network in proportional to the square number of connected users [47]. Therefore, in a crypto-economics, the value of the network is linked to the value of the token in that network which depends on the user base and quality of the platform [82]. As the network grows, the value of token and its incentives increases. This would allow providing ample benefits to the participants of the network. In these networks, created value (which used to be monopolized by a few giant firms) can now be distributed to individual community users, thus combining their social incentives and financial value [68]. Tokens facilitate transactions among users and contribute to the growth of communities. A great example of a token based platform is

Steemit. It is a decentralized social media platform where all participants are part of a token based network. It has a sophisticated reward system for its participants (users, content creators, curators) that is not based on advertising, unlike existing social media giants such as Facebook and YouTube, which ranks their profits for shareholders only [48].

Concept 2: Business models

Similar to traditional and centralized ventures, token based platforms are entities working to solve a specific problem or set of problems in an industry or a sector. Therefore, the topic of value creation, delivery and capture is paramount if the intention is to build a comprehensive framework.

Business modeling has been a popular topic in recent years, in both academic and business worlds. Zott and his fellow co-authors argue that there are different schools of thought in this area because researchers adopt different definitions that are particular to the objectives of their own studies. However, there are more similarities than differences between these schools of thought [79].

In the paper "Business Models: Origin, Development and Future Research Perspectives", the authors define a business model as "*a simplified and aggregated representation of the relevant activities of a company*" [83]. The authors propose the idea that a business model is a set of components that belong to three main categories: (1) strategic components; (2) customer and market components; and (3) value creation components. They further explain that these main categories are split into sub categories as follows (Although they are presented as separate elements, the authors suggest that they should be viewed as an integrated model): Strategic components are divided into models of: strategy, recourse and network. In the same way, the customer and market components contain: customer, market offer, and revenue models. Lastly, value creation components are: manufacturing, procurement and financial models.

Dasilva and Trkman build on the work done by Casadesus- Masanell and Ricart [84] who stated that "*business models are reflections of the realized strategy.*" [85] The authors argue that instead of providing strategic insight, a business model "*paints a*

picture of the company and reveals how the various elements of the business work together at a certain moment in time." [85]

Bouwman et al introduced the STOF model in 2008. This model is composed of four core domains. These are: (1) Service; (2) Technology; (3) Organization; and (4) Finance (STOF) [78]. This method was developed primarily for mobile service design [78]. In this model, the design variables as well as Critical Design Issues (CDIs)—in every domain and between the domains—are described in details. The CDIs are considered to be crucial for the viability of a business model. The STOF model encompasses also Critical Success Factors (CSFs) which are crucial for the creation of value for the customer and for the network. Table 4 lists the design variables and their CDIs.

Domain	Design Variables	Critical Design Issues
Service This domain describes the delivery of value propositions to targeted customers.	- Intended Value - Delivered Value - Expected Value - Perceived Value - Customer or End-user - Context - Tariff and Effort - Bundling	- Targeting - Creating Value Elements - Branding - Customer Retention
Technology It describes the required technical architecture for the offering of the service	- Technical Architecture - Backbone Infrastructure - Access Networks - Service Platforms - Devices - Applications - Data - Technical Functionality	- Security - Quality of Service - System Integration - Accessibility for Customers - Management of User Profiles
Organization This domain addresses issues related to capabilities, resources, and collaboration.	- Actors - Value Network - Interactions and Relations - Strategies and Goals - Organizational Arrangements - Value Activities	- Partner Selection - Network Openness - Network Governance - Network Complexity

	- Resources and Capabilities	
Finance It describes value is captured.	- Investment Sources - Cost Sources - Performance Indicators - Revenue Sources - Risk Sources - Pricing - Financial Arrangements	- Pricing - Division of investments - Valuation of contributions and benefits - Division of costs and revenues

Table 4: STOF variables [78]

One of the prominent authors in this area is Alexander Osterwalder. In his paper "The business model ontology", he defines a business model as: "*A conceptual tool that contains a set of elements and their relationships and allows expressing a company's logic of earning money. It is a description of the value a company offers to one or several segments of customers and the architecture of the firm and its network of partners for creating, marketing and delivering this value and relationship capital, in order to generate profitable and sustainable revenue streams.*" [86]. His concept of a business model contains four dimensions: (1) product; (2) customer interface; (3) infrastructure management; and (4) financial aspects. This concept forms the basis of his later renowned publication of "The business Model Generation" where the

aforementioned four dimensions are divided into nine sub-categories, or nine building blocks, forming what came to be known as the Business Model Canvas [77].

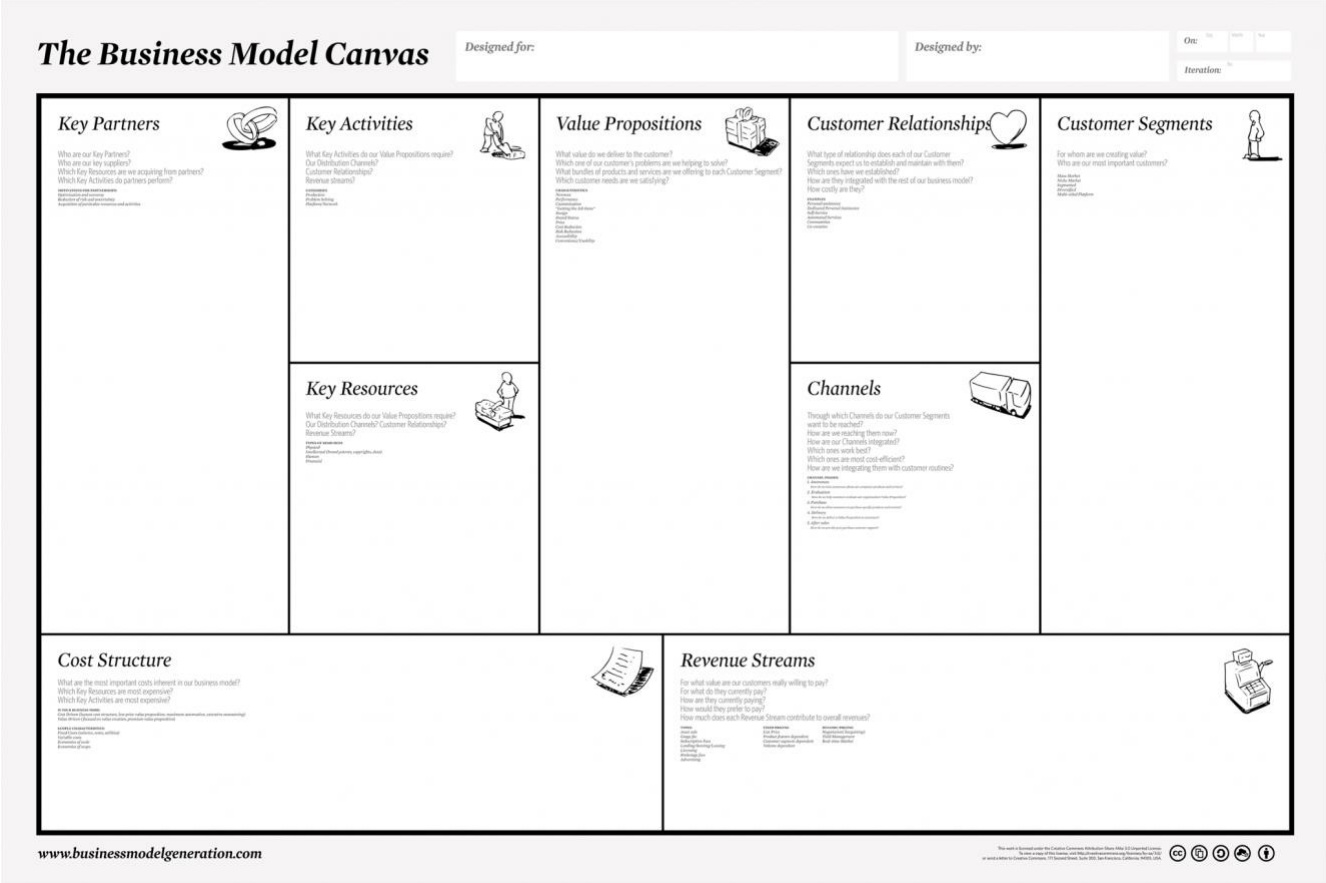

Figure 5: Business Model Canvas [77]

Based on the Business Model Canvas, Ash Maurya proposed a modified version in 2012, it's called the lean canvas. This model focuses "*on providing systematic tools to mitigate risk in the new product, service and business development*" [87]. Because it is designed for lean startups [88], the lean canvas puts attention on and expands a subset of elements that are most relevant to new startups. The design of this canvas "*appears to be more intuitive and better suited to address the multiple uncertainties and risks that are typical of the context of new technology startups.*"[87]. The main goal of the lean canvas is to make it as actionable as possible while keeping it as close as possible to any specific entrepreneurial context.

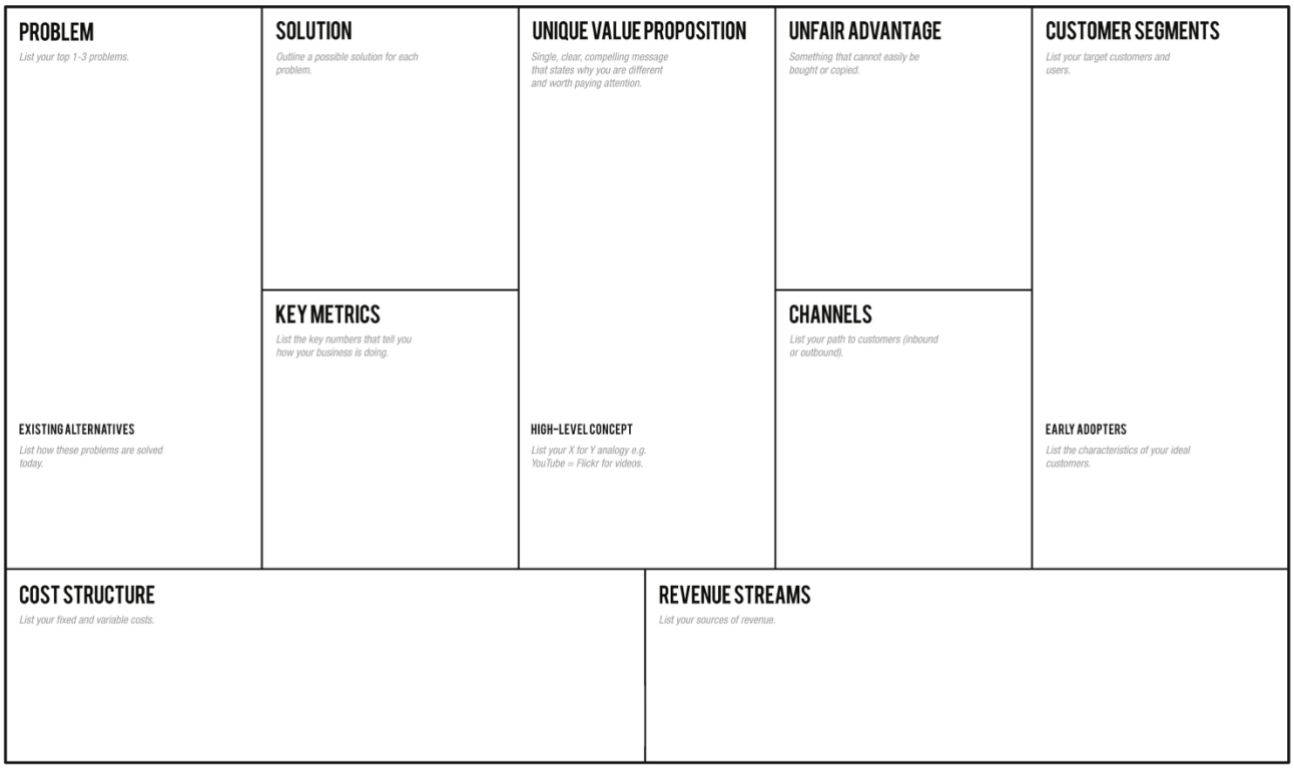

Figure 6: Lean Canvas [87]

The simple and visual nature of the business model canvas and the lean canvas makes it easier to model how an organization creates, delivers and captures value. However, this is the case only for traditional organizations working in a centralized ecosystem. In a token based platform—a decentralized ecosystem, built on a blockchain—tools, such as the lean canvas, the business model canvas or the STOF model fail to describe how the organization operates, creates, delivers and captures value. This is due to the nature of blockchain based platforms and ecosystems, where different dynamics and forces are present. Existing tools simply cannot capture core components of tokenization and decentralization such as governance. The literature suggests that although there is a great interest in this issue in business, the academic world seems to be lagging behind.

One example of the literature that originates from the business world is the "Token Ecosystem Creation: A strategic process to architect and engineer viable token economies". In their publication Aron van Ammers et al, suggest that a token based

platform can have two main layers [62], business and technical. The business layer includes the value proposition field. This should describe how value is created and captured. "*This is one of the ecosystem's distinguishing factors. Focusing on the ecosystem's value proposition helps the token design meet key value drivers, while also aiding in the clear external communication of its value to potential network participants.*" [62].

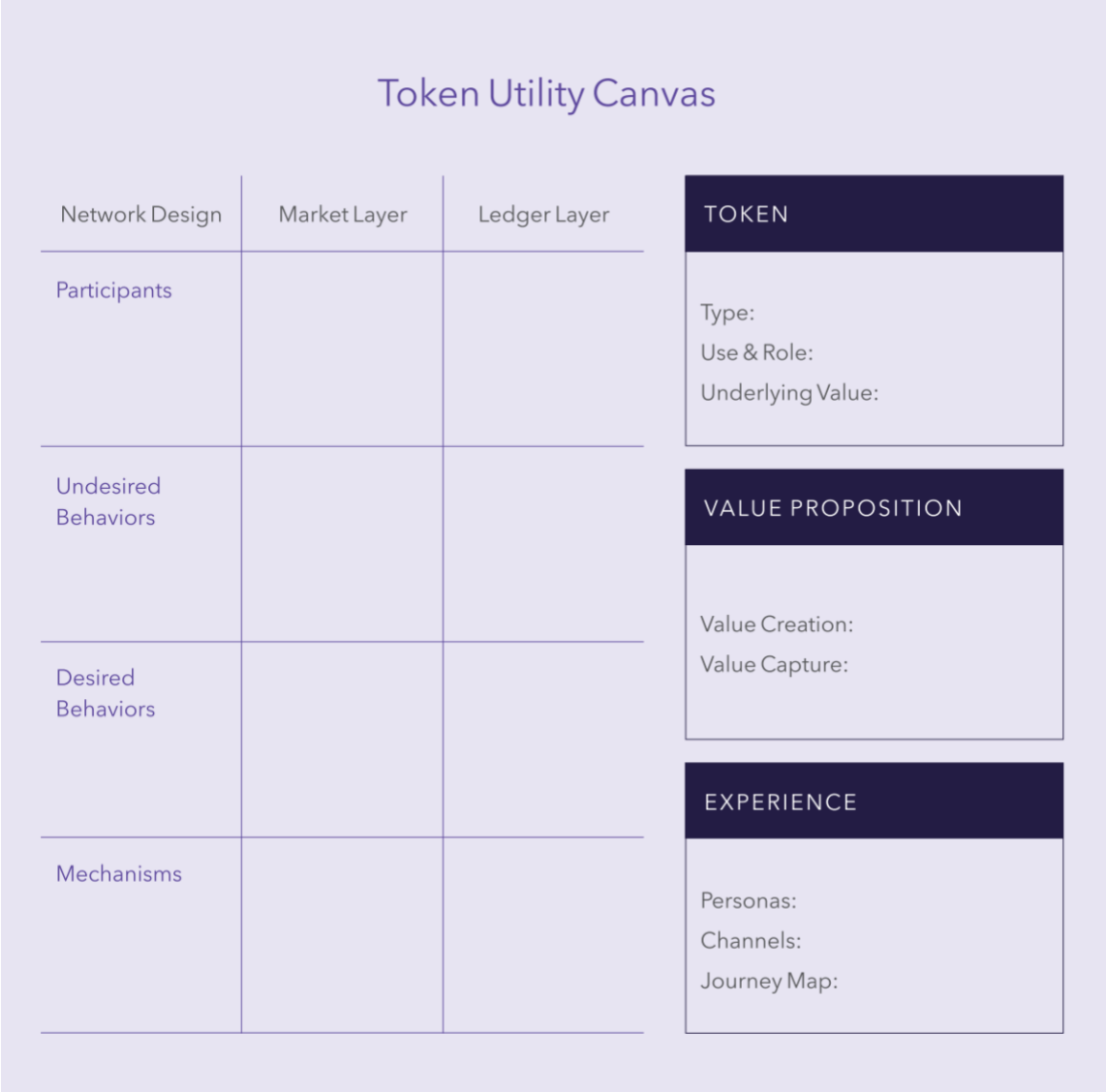

Figure 7: Token Utility Canvas [62]

Another example is based on the structure of the Lean Canvas which was inspired by the Business Model Canvas, Philip Stehlik proposes another model that consists of nine building blocks [89]. The nine building blocks are essentially questions or statements that Philip and his team developed to help them to evaluate blockchain projects. The economy building should be a short description of what the platform does and how it works, this is basically a description of the value proposition.

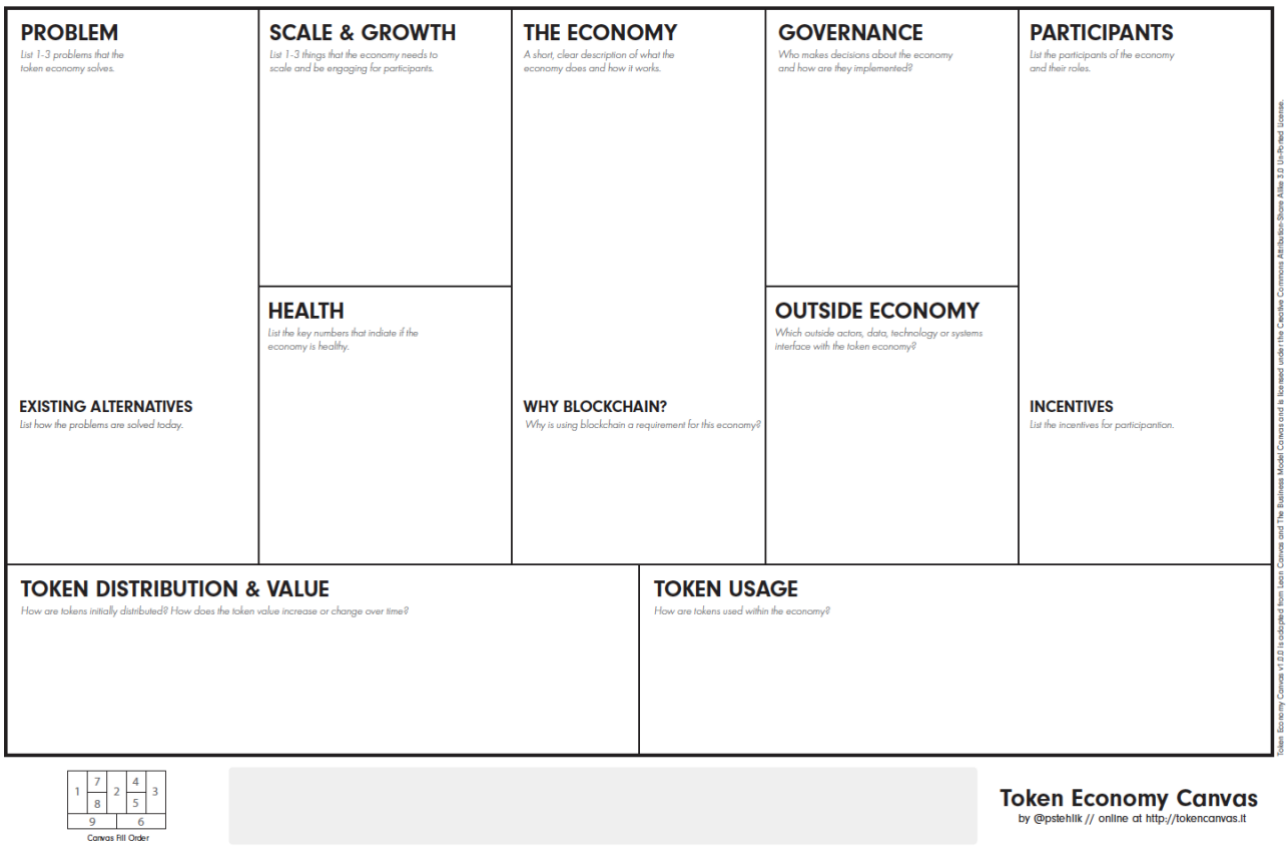

Figure 8: Token Economy Canvas [89]

Concept 3: Segments of participants and their incentives

The decentralized and tokenized nature of Blockchain-based projects gives importance to those who are the segments of participants taking part of the network. The term participant encompasses all the individuals and entities who have a role in the platform. Participants are not only mapped but their incentives are studied as well [62]. Incentives are essentially the motivations of participants for joining and continuously

participating in the network. This is an important factor because again of the nature of token economy, "*a system of operant conditioning used for behavior therapy that involves rewarding desirable behaviors with tokens which can be exchanged for items or privileges (as food or free time) and punishing undesirable behaviors (as destruction or violence) by taking away tokens*" [80].

In the previously mentioned canvas developed by Philip Stehlik and his team, there exists a building block labeled "Participants". This block should contain a list of all participants segments—the individuals or entities participating in the platform as well as their roles. The block is complemented by the incentives, which lists the motivation of participants for joining and continuously participating in the token based platform [72].

Concept 4: Token Definition

A common quality in emerging domains and technologies is the lack of clear and generally agreed upon definitions and terminology [90]. In blockchain literature, the terms: token, coin, cryptocurrency are often used interchangeably, which is not exactly precise nor correct.

Cryptocurrencies are "*digital or virtual currencies that are encrypted (secured) using cryptography.*" [91] Cryptography here refers to the use of encryption techniques to both secure and verify the transfer of transactions. Bitcoin is the first decentralized cryptocurrency, which is built using the Blockchain technology [8]. Tokens and coins have one common quality—both of them are cryptocurrencies.

A broad description of the difference between a coin and a token would be: while a coin represents a means of payment, a token possess wider functionality [92]. A coin is essentially a form of digital money created by using encryption techniques and hosted on a decentralized system. Just like fiat money, coins are characterized by fungibility, divisibility, portability, durability and limited supply [93]. As of this writing, Bitcoin is the most popular coin.

Tokens, on the other hand, represent digital assets, issued by a blockchain based project (e.g. Steemit) which can perform a function similar to that of coins—as a means of payment inside the ecosystem of the project. The key difference is that tokens have wider functionality, they give their holder the right to participate in the network of the project for example [93]. According to functionality and other properties, tokens can be categorized in different classifications. Ethereum is one of the leading platforms that allows to create tokens.

Concept 5: Token types and properties

In the body of literature regarding blockchain and tokens, the topic of token types and properties is often discussed. Considering the novelty of blockchain and token based networks, there are slightly different but often overlapping viewpoints in regards to token classification. In his article "Token based Business Models" Paolo Tasca presents a taxonomy that is adopted by several institutions such as the Swiss Financial Market Supervisory Authority (FINMA) [94]. The taxonomy states that there are four classes of tokens: (1) Payment; (2) Utility; (3) Asset/debt; and (4) Hybrid [76]. The first class, that is payment tokens, are used "*as means of payment for acquiring goods or services or as a means of money or value transfer.*" [76]. The second class of tokens are called utility tokens, these types of tokens provide digital access to services or applications that are generally built on top of a blockchain infrastructure. Asset or debt tokens is another class of tokens according to Tasca. These have the same role as a share, for the person or entity holding them, they represent assets such as debt or equity. The fourth class represents hybrid tokens, these are tokens that have a mixture of two or more features of the previously mentioned classes [76].

Another framework of token types and properties is the one proposed by William Mougayar, author of the book "The Business Blockchain: Promise, Practice, and Application of the Next Internet Technology" [95]. In his frequently cited article "Tokenomics — A Business Guide to Token Usage, Utility and Value", the author argues that there are three key properties for tokens: (1) Role; (2) Purpose; and (3) Features. For each role, there is a key purpose and a set of features. For example, the

function role has the purpose of enriching user experience, its features include: joining a network, connecting with users, and incentives for usage [95].

The most extensive framework is the one proposed by Thomas Euler. The author argues that subject of cryptographic tokens can be approached from five different angles, meaning that there are five dimensions in which tokens can be classified: (1) Purpose; (2) Utility; (3) Legal; (4) Technical layer; and (5) Underlying value [96].

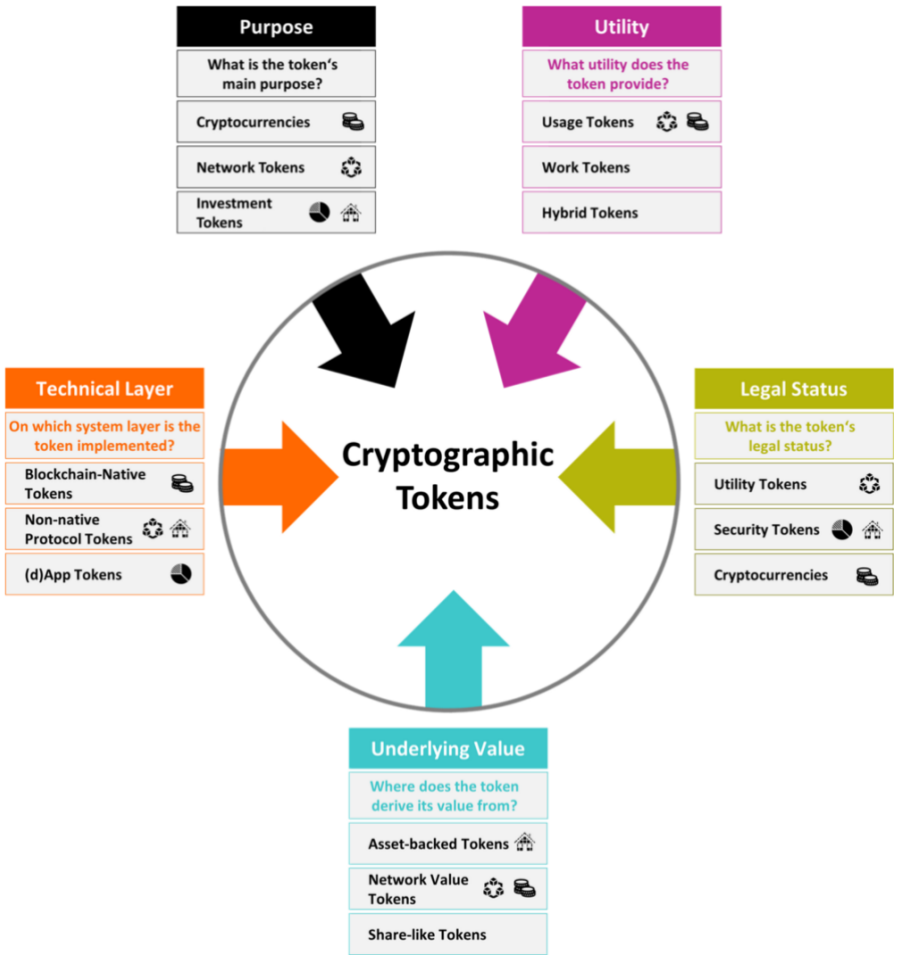

Figure 9: Token Classification Framework [96]

Concept 6: Token design, distribution and circulation

With the rise of crypto-economics and token based platforms, the academic and business literature focused on the design, release and circulation strategies for tokens. After deciding on the token types and properties, a strategy of release and circulation

should be devised. This is to say, how participants acquire tokens, and how these tokens are exchanged both inside and outside of the network. The authors of "Sustainable Growth and Token Economy Design: The Case of Steemit" propose a token design process based on one of the most successful Blockchain projects, Steemit [66]. The proposed design process by authors is composed of 8 steps: (1) Determine token-business fit; (2) determine the chance of success; (3) determine the properties of token; (4) give tokens intrinsic value; (5) establish strategies to raise token value; (6) establish operational strategies of token economy system; (7) establish strategies for token liquidation; (8) continue modifying the operational base. The authors discuss the importance of raising token value, "*If token value rises steadily, it is possible to retain existing users while attracting new ones and the community will be able to grow sustainably.*" [66]. Management strategies of tokens are also discussed. According to the paper, *"token management strategies can be classified into business growth-linked, burning, and dividend types, depending on the business purpose. A growth-linked strategy uses network effects, meaning the bigger the network, the higher the incentives for participation* [47]. *The burning strategy involves increasing token value by burning the cryptocurrency and the dividend strategy is about distributing newly issued tokens to existing token holders.*" [66]

In their publication "Token Ecosystem Creation: A strategic process to architect and engineer viable token economies", Aron van Ammers et al discuss monetary policy. In the context of token based platforms, monetary policy refers to the overall management of the token supply, that is the amount that will be released and the level of automation involved in the process, as well as frequency and methods of release [62]. Three common methods of token distribution are: (1) Token sales; (2) Airdrops; and (3) Initial Coin Offering (ICO). Token sales is a simple form of providing tokens to participants in exchange for digital currencies or fiat money. Airdrops focuses on delivering tokens to targeted users. E.g. In 2018 the company Numerai conducted an airdrop targeting Kraggle users that have rating above novice [97]. ICO is a team that leans on IPO (Initial Public Offering). It is defined as a poorly regulated process (method) of obtaining start-up funding for companies engaged in blockchain technology [98]. Blockchain projects conduct ICO to "*circumvent a rigorous and*

precisely regulated process of raising capital demanded by institutional investors in the classical procedures of the public offering of shares." [99]. Practically, in an ICO process, a defined percentage of tokens are distributed to early investors—usually discounted—in return for cryptocurrencies or fiat money [99].

Concept 7: Technical Implementation

Token based projects aiming to solve a particular problem or set of problems using Blockchain need to make decisions about the technical implementation of their solution. Fundamentally there are two different directions that could be taken, either building the system from scratch, this means that the project will have its own protocol and the network will build and operate its own distributed ledger [62]. This obviously incurs costs in terms of money and time. As seen in the first chapter of this report, the development of blockchain ecosystem allowed the emergence of different solutions for entities aspiring to create projects in a decentralized way. These developments facilitate building projects using existing blockchains and protocols. Ethereum solutions are commonly used by token based platforms. Ethereum Virtual Machine (EVM) is a runtime environment based on stacks that makes executing smart contracts possible. These smart contracts can be deployed on the Ethereum blockchain as bytecode by any participant of the P2P network. Technically, Tokens are smart contracts running on the blockchain. In fact, a number of smart contracts in the financial category follow the token design pattern. This pattern is used to represent and assist the distribution of fungible goods [25]. "*In contrast to the native coins that typically represent a (digital) currency, tokens may represent a variety of transferable and countable goods such as digital and physical assets, shares, votes, memberships, loyalty points and other utility.*" [25]

In order to establish a common interface for fungible tokens. Ethereum launched the ERC-20 standard in 2015 [25]. ERC stands for Ethereum Request for Comments and 20 is a unique ID number to differentiate it from other standards. The idea is to make smart contracts compatible by implementing a set of functions, of which only the signatures are specified, and the implementations are not [25]. The signatures can be identified in a smart contract's bytecode by their entry points. These are marked by the

first 4-bytes of the Keecak hashes of the high level function signature. ERC-20 compatible smart contracts can be pinpointed through a search for the corresponding hashes in the bytecodes of the deployed smart contract.

Classification		*Signature*		*First 4-byte Keccak hash*
ERC-20	Required	Method	totalSupply()	18160ddd
			balanceOf(address)	70a08231
			transfer(address,uint256)	a9059cbb
			transferFrom(address,address,uint256)	23b872dd
			approve(address,uint256)	095ea7b3
			allowance(address,address)	dd62ed3e
		Event	Transfer(address,address,uint256)	ddf252ad
			Approval(address,address,uint256)	8c5be1e5
	Optional	Method	name()	06fdde03
			symbol()	95d89b41
			decimals()	313ce567

Table 5: ERC-20 Standard

Other token standards were proposed later such as the ERC-621 which introduced the Mint and Burn events that can increase or decrease balances without performing any transfer.

Concept 8: Agility and Network Heath

Given the novelty of the Blockchain technology, token based platforms are essentially start-ups, According to Eic Ries, a start-up is "*a human institution designed to create a new product or service under conditions of extreme uncertainty*" [88]. Such a lean definition of a startup requires lean thinking. Furthermore, a tokenized venture encompasses a set of complex systems of governance, crypto-economics, and cryptography [62]. The development of a token based platforms should be lean and

agile—experimentation, learning, and iteration are key in monitoring the health of the network.

These feedback loops are key in monitoring the health of the network, they enable token models to be agile and make real-time adjustments. "*Token models are more sustainable if they are able to react and optimize based on little shocks in the network, If these little network shocks go undetected or the model simply does not adjust accordingly, then inefficiencies will build up and the risk of a much larger, destabilizing shock increase, which risks the viability of the network.*" [62]

The previously mentioned Token Economy Canvas proposed by Philip Stehlik dedicates one building block for the network health. It suggests to list all the relevant metrics that indicate if the economy is healthy. In this context Aron van Ammers et al go beyond stressing on the importance of this point and propose token gravity as a measure of the network health. Token gravity consists of three key metrics. The first one is token velocity (both internal and external). Just like capital movements, imports, and exports affects a nation's GDP in different ways, internal and external velocity have different effects on the health of a given network. Internal velocity indicates the number of times a token exchanges ownership over a set period of time within the ecosystem, higher values indicates good network health. On the other hand, external velocity represents how many times tokens are being exchanged outside of the ecosystem, e.g. through liquidation. Generally speaking, higher values imply poor state of the network health and value leakage. Severity is the second key metric, it simply shows the quantity of transactions being exchanged on the ecosystem. The third metric is frequency, which is quite similar to velocity but slightly different. Frequency here focuses on the number of transactions within the ecosystem but not on the number of times a token changes the owner.

Phase 4 &5: Synthesis and validation

Following an iterative way of concepts synthesis and inclusions of feedback of the validating blockchain expert, the STT framework emerged.

STT FRAMEWORK

The systematic literature review showed that the knowledge revolving around the token based networks—both coming from the academic and business worlds—is scattered. The first phase of the process chosen to build this framework has yielded the most relevant texts that address elements of token based platforms. None of the texts address all the important elements and ideas that constitutes a blockchain-based project using a tokenized network. Furthermore, existing tools designed for digital ventures such as the STOF model, the lean canvas and the business model canvas fail to capture core components of tokenization and decentralization. In light of this, there is a strong need for an integrative framework that showcases how a token based platform operates, creates, delivers and captures value.

The concepts identified in **"phase 2: Concept identification, deconstruction, and integration"** have been synthesized and categorized into three different domains: Service, Token Mechanics, and Technical. This process has been done in an iterative way that involves steady movement between data, concepts, domains, and expert feedback. The proposed framework emerged from the findings of the synthesis phase in the conceptual framework building process [64]. The abbreviation STT is based on the three main domains that constitutes it: Service, Token Mechanics, and Technical. These domains provide a holistic view of how a token based platform operates.

Similar to traditional digital ventures, token based platforms operating on a blockchain are also ventures working on solving a problem or a set of problems in a particular industry. These ventures propose value(s) to target audience(s). The service domain in the STT framework represents this aspect. The Token Mechanics domain focuses on the token economics part, and allows to describe the token strategy of the platform.

The technical choices to be made in terms of front-end, back-end and network governance aspects are visualized in the last domain, which is the technical one.

The rationale behind the design choice of representing the three domains with connected cogwheels is to communicate how interlinked the domains are; building blocks from different domains influence each other (some more than others). Moreover, the cogwheel design signifies the importance of the domains as a whole also. Poor design thus poor performance of the platform in one domain would heavily influence the whole system and could cause the other wheels (i.e. domains) to cease to work.

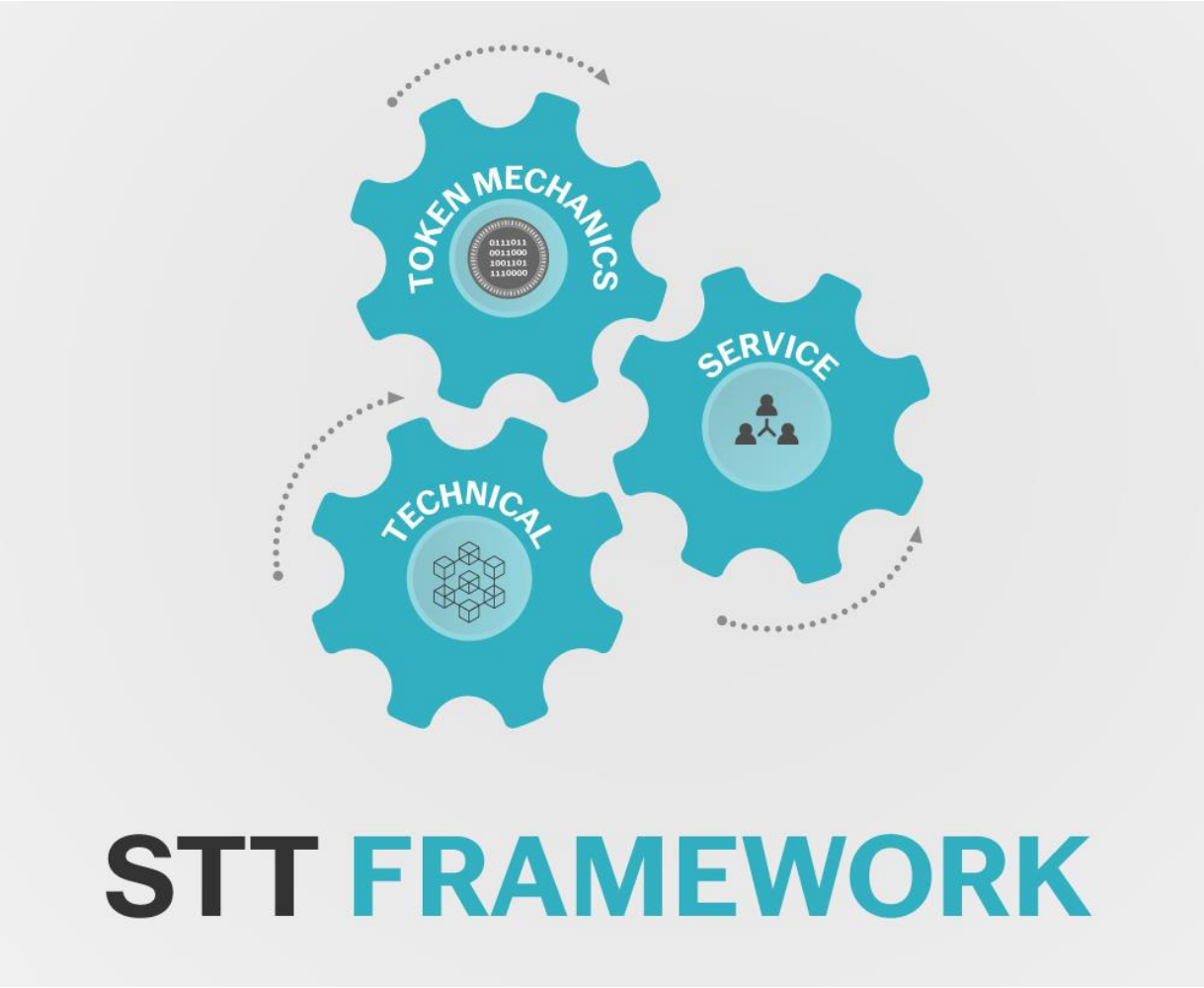

Figure 10: STT Framework - Minimalistic version

SERVICE DOMAIN

The service domain allows to describe the purpose of the blockchain venture from a business point of view. This domain is composed of five building blocks: (1) value proposition; (2) Participants; (3) Channels; (4) Cost Structure; and (5) Revenue Streams.

1. Value Proposition

The first building block of this domain defines how the venture is addressing the problems that their key targeted audiences are experiencing, or how it is meeting their needs. "*The value proposition is the reason why customers turn to one company over another*" [77]. A blockchain project may have more than one value proposition, each one is composed of a service or a set of bundle of services that addresses the problems or needs of key target audiences. Given that the STT framework is designed for ventures based on Blockchains, common properties of value propositions include decentralization and removal or reduction of number of intermediaries in a given industry or market.

2. Participants

This building block should provide information regarding all the segments of individuals or entities taking part of the platform and would benefit from the value proposition both directly and indirectly. It should include those who have both active and passive roles. In the same building block, information about these participants in regards to their motivation to join the network should be thought-out and stated. The term employed here is "Incentive"; for each participant segment, there should be at least one incentive that motivates to join the platform and continuously contribute to it. A well mapped list of participants and their incentives is paramount in devising the token strategy.

3. **Channels**

These building blocks describe how the Blockchain venture plans on reaching and attracting the segments of participants, and how they will interface with the network.

4. **Cost Structure**

This building block describes all the fixed and variable costs needed to launch and maintain the token based platform. These could be: platform development and maintenance (which will depend on the strategic choices in the technical implementation of the projects). Marketing is another example, which can depend on token distribution strategy.

5. **Revenue Streams**

This block describes sources of revenue for the platform. A simple example of this would be advertising, or transaction fees.

TOKEN MECHANICS DOMAIN

The second domain is composed of three building blocks that explain the token strategy of the platform.

1. **Token properties**

Based on the information in the previous service domain, namely, in the participants building block, a list of token types that will circulate in the economy should be created. Properties of each token should be defined. At least one token should be allocated to each participant segment. There two properties to be defined for each token: Utility and Underlying value.

The first property, utility, describes what kind of use the token will provide. Token utility can be classified into three categories: (1) Usage; (2) Work; and (3) Hybrid.

- **Usage**: The tokens that fall into category in terms of utility provide access to the digital platform or network. Whether holders of this token type can access all the functionalities or specific ones only could depend on various factors such as the amount of tokens they hold. The utility of this token type is derived from the utility of the decentralized platform.

- **Work:** These types of tokens provide their holders the right to contribute to the network. The utility of this token type is derived from the utility of the decentralized coordination of holders of this type of tokens.

- **Hybrid:** This type is characterized by a mixture of both previous ones.

The second property to define for each token type is the underlying value. This describes what kind of value is the token tied to. Token underlying value can be classified into three different categories:

- **Coin (digital currency):** a token with this purpose is intended to be a pure means of payment. It functions as a frictionless medium of exchange and/or store of value.

- **Network:** This type of token is tied to the development and value of the issuing network. It is not intended to be a general cryptocurrency and has functionality within the platform or system where it is issues. Network tokens have an important role in the incentive mechanism for participants.

- **Asset:** Tokens of this purpose function as a claim on an underlying asset. They cryptographically represent digital assets, digital commodities or physical assets.

- **Shares:** These tokens have the same properties of traditional shares in a company. The owners of these tokens are promised shares in the success of the

issuing platform or the underlying asset. Tokens of this kind may or may not come with voting rights.

- **Hybrid:** This type is characterized by a mixture of both previous ones.

2. Token Distribution and circulation

The second building block is about the strategies of issuing the tokens to build interest in the platform in order to both attract new relevant participants and maintain old ones. The usage of strategies describes how the tokens will circulate within the network and how the growth and sustainability of the token economy will be achieved.

For token distribution, there three common methods: (1) Token sale; (2) Initial Coin Offering (ICO); and (3) Airdrops.

- **Token sale**: It is a simple form of providing tokens to participants in exchange for digital currencies or fiat money. This is to say that in order to create an account in the platform or start using its functions, a participant must hold a certain amount of tokens that can be purchased upon registration.

- **Initial Coin Offering**: Referred to as ICOs— a terms that leans on IPO (Initial Public Offering). It is a staged form of a token sale. The idea is to start the token sale prior to the development of the Blockchain project or sometimes after in order to build interest before officially launching the platform. It is an instrument to raise funds that help to develop the platform. It is usually conducted in phases, with varying discounts at each phase.

- **Airdrops**: This method focuses on delivering tokens to targeted participant segments that are vital to the network. E.g. In 2018 the company Numerai conducted an airdrop targeting Kraggle users that have rating above novice [97].

3. **Token Exchange**

This block is about the strategies related to increasing the value of tokens by making it easier to be exchanged with other digital currencies, fiat money, or other mediums of exchange and value storage. This includes making the decision on which tokens can be exchanged, and on which centralized (CEX) or decentralized exchanges (DEX), the tokens should be listed.

TECHNICAL DOMAIN

The domain is about the strategies and choices regarding the technical implementation of the project. It is composed of three building blocks:

1. **Back-end**

This building block is about the blockchain that enables token economy in the network. It should entail the strategic choices of the technical implementation of protocols and smart contracts that will power the creation, distribution and usage of tokens. This will include the decision of whether to build the decentralized system from scratch, or building the project on an existing solution such as Ethereum. To build a native blockchain system for the platform, the project team will need to make other choices such as the choice of protocol, a consensus mechanism, reputation mechanism, etc. The development of smart contracts to act as tokens will also be needed.

On the other hand, if the project team decides to build the platform on an existing solution, they will need to make choices in regards to which existing blockchain platform and type of smart contract standard that would allow issuing tokens that are suitable to their token mechanics strategy.

2. Governance

The decentralization property of token based platforms provides the choice of including the community of participants in the governance of the platform. This would pose questions to the founding team regarding the governance structure: will the community of participants be involved in making decisions about the project at all?; If yes, who should be involved and how should it be done?; How will this be implemented?; Will there be a consortium that will make joint decision?; Perhaps this will be done through a voting mechanism that will permit holders of certain tokens to make decisions jointly. This building is more relevant if the platform owns and operates its own blockchain, as it would be highly customizable.

3. Front-end

As the naming suggests, this block is about choices regarding how the participants will interface with the platform. Will it be a web application, mobile application, or both? Will the front-end of the platform be designed on traditional centralized storage solutions. i.e. server, or will the team take decentralization one level more and build the front-end on decentralized solution such as IPFS [29].

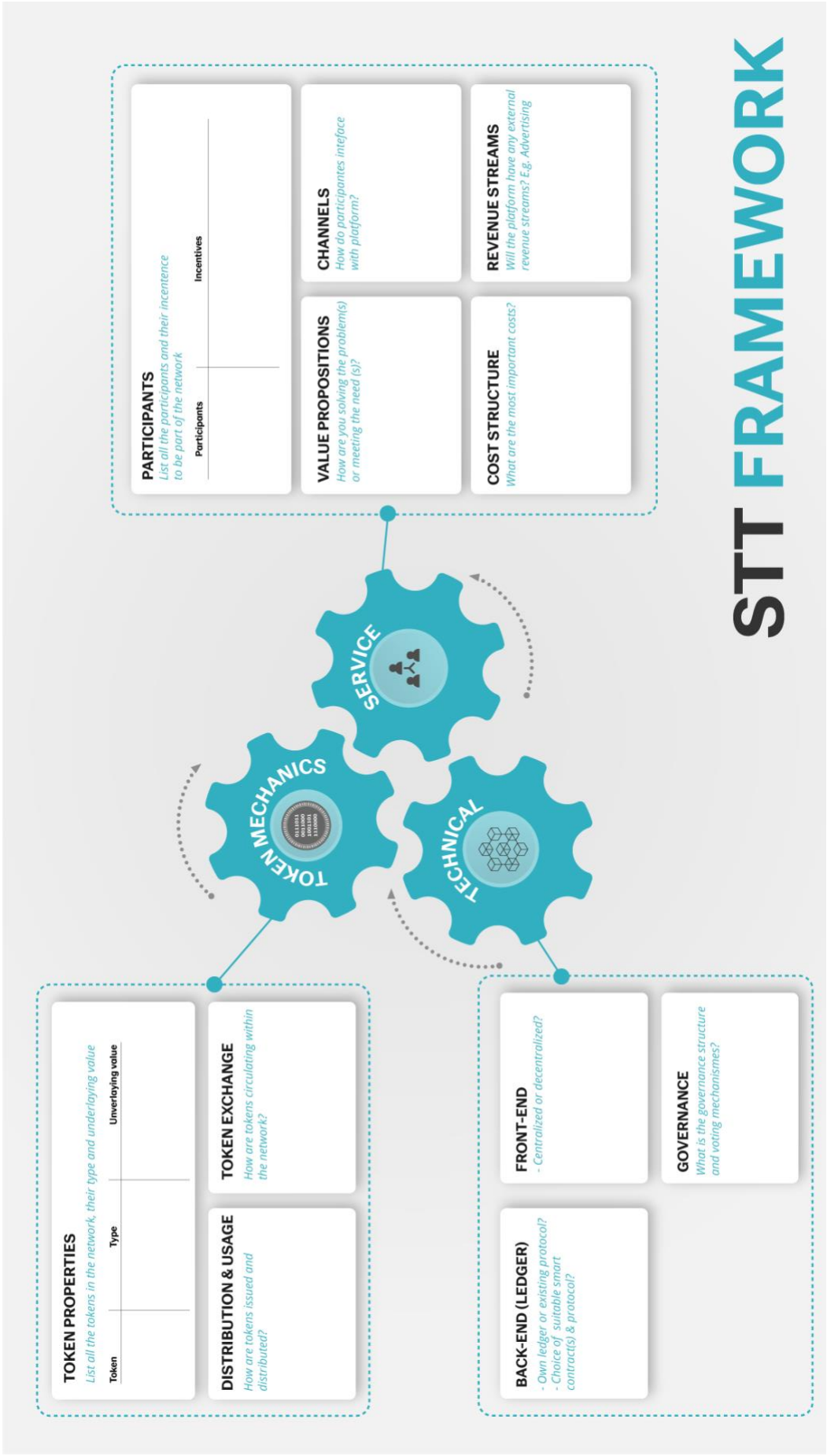

Figure 11: STT Framework

CASE STUDY ANALYSIS

This part of the report presents the results from the multiple case study. The Two selected platforms: IndieOn, and Musicoin were analyzed using the STT framework. Empirical data required to conduct a multiple case study were obtained from the information available online about the companies through their website and whitepapers, as well as interviews with different people working at the start-ups.

IndieOn

IndieOn self-identifies as a digital media application with a distributed platform to enable frictionless trade. It is based in Delaware, USA. It is a token based platform that was launched in 2018. It connects creative media content creators and consumers without the need for intermediaries that are present in the traditional creative media industries [100]. The platform focuses on music content but supports film content as well. The team behind the platform is composed of four members who have a mix of experience in start-ups, and creative media industries. The technical implementation though was handed to BlueRose Technologies, a tech firm based in India. IndieOn is home for the NDI token used to incentivize the ecosystem, it is currently being sold under an ICO. To gain more insights about the platform, an interview was conducted with Micah Hale, one of the founders.

SERVICE DOMAIN

Value Proposition

IndieOn's value propositions include providing indie music and film content creators with a frictionless digital platform to market, monetize, manage and distribute creative content and merchandize [100]. For content consumers, IndieOn aims to provide them with cheaper access (compared to streaming incumbents) to music and film content. Also, listeners can also gain money (token rewards) through content curation [100].

Channels

The platform is available as both a web and mobile (IOS & Android) application. IndieOn's plans of reaching potential participants include the ongoing ICO that started in May 2019, but also on marketing efforts. Additionally, IndieOn is relying on renowned artists to drive traction to their platform, as Micah pointed out: "*You need big artists, you need big film people involved and with their notoriety the interaction will come […] one of our greatest contacts is Steven Spielberg's daughter. She is the head of the New Mexico film division*".

Revenue Streams

IndieOn captures value through traditional transaction processes. It charges 2.25% for all the transactions. This includes NDI purchases and transfers to external platforms. The platform also charges 8.75% for purchases from merchandize stores. These stores intend to offer paraphernalia from artists, such as t-shirts. IndieOn has two subscription plans for listeners. $5.99/month for individuals, and $13.99 for families (of four members) [100].

Cost Structure.

For now, in this ICO phase before launch. Platform development is the most important cost for IndieOn. "*We spent over three hundred thousand dollars on tech and building the platform."* reports Micah Hale. After the closing of the ICO and the launch of the platform. Future planned costs for the platform include Marketing, platform maintenance and human resources. Micah Hale says that "*the marketers that I talked to on the higher end said your burn rate's going to be about twenty five thousand dollars a week*."

Platform Participants

Two participants segments are targeted: (1) Indie music and film artists, and small production houses; and (2) Music and film fans [100]. The first segment, content creator, are paid $0.2 per royalty generating event (playing the song or piece of content 80% of the way through). "*They have to listen to 80 percent. They can't just go click*

on and listen listening to it for five seconds and click off of it trying to scam the system." Says Micah Hale. The content creators are incentivized by providing them with an NDI token for each song or film. However, for music, artists are required to upload 10 songs in the beginning. Micah Hale clarifies this point: "*It doesn't have to be an album but the minimum requirement in the beginning is 10 songs so that we have legitimate artists and not people recording their children singing the ABC because that's not our intent here, our intent is not to be a YouTube.*"

The second segment, music and film fans, are provided with 5 tokens upon registration. Listeners have two subscription plans to choose from: $5.99/month for individuals, or $13.99 for families (of four members). Fans are incentivized by NDI tokens if they share media with another fan or someone else who becomes a fan (member in the platform). Half of the royalty will go to the fan who shared it, and the other half will go to the artist pool [100].

Regarding whether IndieOn is planning to involve other participant segments in the future such as major production houses, Micah Hale responded: "*What we found was that the major production houses aren't ready for a cryptocurrency based system at all. They do not know how to operate in it yet. That's what we learn through those conversations.*"

TOKEN MECHANICS

Token properties

IndieOn adopts one token, NDI. It provides access to the digital platform and allows interaction inside. It is not a minable token as it is an ERC-20 token based on the Ethereum technology. Therefore, it is a usage token in terms of type. In regards to its underlying value, it is both a coin and network token. This is because it can act as a means of a payment within the network. At the same time, it is used in the incentivization mechanism [100].

Token Distribution

IndieOn has limited NDI supply capped at 10 billion single tokens. One billion of those are being distributed initially through an ICO that started in May 2019 and will finish in November or until sold out [100]. An NDI token is sold at $0.02. The ICO has four phases with different discounts in the first three. For the first 30 days, the discount is 30%. The second 30 days, it's at 15% discount. The third 30 days is at 5% discount. Tokens can be purchased by Bitcoin, Ether or fiat currency through credit cards. As of this writing 1,429,735 NDI tokens have been sold [101]. Regarding this, Micah Hale says that "*Without massive amounts of marketing and huge amount of finance, the marketing aspect of it tends to go very slow. So in terms of meeting goals we are close to what our desired goals are, although we're not quite hitting the desired mark that we had but with us with all speculation and hope it is what the market will allow.***"**

Beside the one billion of tokens released in the ICO. Another billion is reserved to IndieOn founders, and seven billions will be held in the vault to be sold during future offerings if needed, as the platform grows and scales up with more artists [100].

Token Exchange

IndieOn adopts a growth-linked strategy to manage the ecosystem and raise its value. This uses the network effects—the bigger the network, the more content in the platform, the higher the participation incentives. Furthermore, IndieOn believe that the way they conducted ICO process will impact the NDI token value— they launched ICO after developing the platform and not before. Micah Hale comments "*We started this project based on all what we've learned. About 90 percent of all ICOs were going to be flash in the pan. What we had legitimized is that if we created the product then took it to market as an ICO that we would have a better chance at success*." In terms of liquidation strategies, The NDI token is in the process of being listed in the exchange system: Orderbook [100]. This would allow NDI token holders to exchange it with other cryptocurrencies or fiat money.

TECHNICAL DOMAIN

Back-end

IndieOn built its blockchain solution on Ethereum smart contracts. The NDI token follows the ERC-20 standard. It automates the allocation of tokens during an ICO. "*It does this by transferring digital currency in exchange for fiat and/or cryptocurrency and subsequently updating accounts and recording key permanent evidence or transactions on the blockchain.*" [100]. The smart contract is also used for the artists' registration on the IndieOn UPDB (Distributed Intellectual Property Rights Database). ***

Front-end

The IndieOn is available as both web and mobile application (IOS and Android). When artists or small production houses upload content on the platform, it goes through a conversion process. The source content will be processed using the AWS Elemental MediaConvert [102]. Content will be converted into multiple output formats and will be stored in the Amazon S3 storage.

Governance

The governance and management of the platform rest on the founding team behind IndieOn. Micah Hale explains that the community is not directly involved in the governance but their feedback and inputs are welcome, "*Because this is not a token that is mineable all it thus would not require a consensus for. We're not a mineable open source token in that sense. we want the involvement of the community and we would love the input of the community but in terms of truly giving the community the platform. It is not the case.*"

Musicoin

Musicoin is a music platform built on a peer-to-peer protocol and programmable smart contracts. It's another platform that is aiming to cut through intermediaries in the traditional music business and connect music creators with fans. Musicoin was launched back in 2017 [5]. To gain more insights about the platform, interviews were conducted with Isaac Mao (founder and CEO), and Lorenzo Pistolesi, a user of the platform, he is a musician and an ambassador of Musicoin.

SERVICE DOMAIN

Value propositions

Musicoin's value proposition to music creators is transparency and full ownership over their content and its monetization. For listeners, it provides them with a free alternative of Spotify and other major music streaming platform. Streaming on Musicoin is actually free, listeners have the option to tip their favorite musicians [5]. This is enabled through Universal Basic Income (UBI), which explained in the revenue streams building block.

Channels

The Musicoin is available both as a web application and also on mobile (iOS and Android). Musicoin's marketing efforts are focused on social media, and their ambassadorship program. A selected pool of musical artists on Musicoin work as ambassadors for the platform in exchange for tokens. "*we have the ambassadors from musicians group and they also receive partial fund.*" Explains Isaac Mao.

Revenue streams

Musicoin's vision is to be a true decentralized platform that is self-sustainable through its internal economy powered by its token, $Music. Musicoin has set up a shared fund

called UBI (Universal Basic Income). It is named after the economic model that ensures fairness in terms of rewards for each contributor in proportion to their contribution. UBI is partially funded by a percentage of the tokens resulting from the mining process. It was designed to ensure basic income for artists (in proportion to the number of streams for their music) as the streaming is provided for free to the listeners—the latter have the option whether to tip their favorite musicians.

Cost structure

The most important cost for Musicoin is the platform development and maintenance. Part of the UBI fund goes towards the development of the platform. The rewards from the mining process are divided into two parts. 314 $Music tokens are generated per block every 15-30 second depending on the mining difficulty. Of those 314 tokens, 250 tokens (~80%) will go to miners and the rest of 64 tokens (~20%) will go into a common UBI pool. Of those 64 tokens in the UBI pool, 50 tokens will be reserved for content streaming on the platform and the remaining 14 tokens will go towards platform research and development. Funds are also used to pay the developers who used to work pro-bono before the implementation of UBI.

Participants

Musicoin gathers 4 participant segments. (1) Musicians; (2) Listeners; (3) Miners and (4) Traders. Because the platform uses a mineable token and operates its own ledger, miners are needed in the ecosystem. In exchange for using computational power to conduct Proof-of Work to verify transactions and add new blocks, miners are rewarded with 250 tokens for each block. "*Miners are our first layer of stakeholders in the whole system. We managed to get up to 7000 miners who are from different places. They download the same software we developed to conduct (PoW) in order to reach a consensus and generate new blocks.*" Explains Isaac Mao. The second segment of participants are listeners. This segment is incentivized by providing them with free streaming, and the option to tip musicians using the native token $Music (Which can be purchased using cryptocurrencies or fiat money). Traders represent another segment of the participants, their sole role is help to raise the token value. "*Traders exchange*

(buy and sell the music coin) all the time. Their role is to generate dynamics exchange rate and value for the token." Says Isaac Mao.

The last segment is evidently musicians, the content creators. The musicians who are a part of the Musicoin network are incentivized by a minimum of income coming from the Universal Basic Income. Moreover, Musicians can receive tips from their fans.

Regarding whether Musicoin is planning on involving other segments in the future such as major production houses, or signed artists, Issac Mao commented: "*The traditional industry has a huge problem […] they don't want to change. But at the same time when you talk to them, they display some form of arrogance, they tend to impose that you pay big upfront down payment.*"

TOKEN MECHANICS DOMAIN

Token Properties

Musicoin offers one token labeled $Music. It drives the internal token economy [5]. $Music is a hybrid token in terms of type—it is both work and usage token. $Music is used in the mining process. Additionally, it provides other participants (Musicians, listeners and traders) access to interact inside the platform. The token is also hybrid in terms of underlying value. It acts as a coin (a means of a payment or storage of value), it is also a network token.

Token Distribution and Usage

Musicoin is one of the few blockchain startups that launched without conducting an Initial Coin Offering. "*In the true spirit of decentralization and fair distribution, the project started without an Initial Coin Offering (ICO) or pre-mine or pre-allocation of funds for development.*" [5]. Fairness is not the sole reason for not conducting an ICO, previous experiences and results of other blockchain projects had an impact on this decision. According to Isaac Mao: "*Many ICOs failed. […] People don't trust ICOs any more simply because they 'print money' once and then do nothing. […] For*

Musicoin, we try to 'print money' based on the economics […] Tokens are being issued steadily as the economy grows steadily."

Token Exchange

Musicoin adopts a growth-linked strategy to manage the ecosystem and raise it the token value. This uses the network effects—the bigger the network, the more content in the platform, the higher the participation incentives. Musicoin relies on traders to increase token value but also on the UBI pool. "*Empirical data from our blockchain shows that revenue to musicians from tips is five-fold higher than their revenue from streaming (prior to UBI implementation) consumption of music on the platform will encourage users to tip musicians even more which will in-turn encourage musicians to consistently deliver quality content and grow its fan-base. This will create a positive feedback loop that will increase the value and utility of $MUSIC.*" [5]

In terms of liquidation strategies, Musicoin is moving for external exchange systems to developing their own exchange system, Isaac Mao explains this, "*We don't like the exchange platforms. They don't care about inherit value of tokens. That's why we are building out embedded exchange platform in our system so people can use Bitcoin to exchange with our token $Music, without going into exchanges.*"

TECHNICAL DOMAIN

Back end

Musicoin operates its own ledger which is a fork from the Ethereum blockchain. The genesis (first block) block of this forked blockchain was created on 11 February 2017 [5]. The mining process follows a Proof-of-Work model using ETHash developed by Etheureum. Because it's a form of the Ethereum blockchain, "*the network nodes and protocols configured as an Ethereum Virtual Machine (EVM), capable of executing smart contracts in a Turing-complete language.*" [5]. This to say that Musicoin doesn't work within the Ethereum ecosystem, unlike platforms using ERC-20 token.

The decentralized ledger that Musicoin uses is an iteration from Ethereum code-base. Musicoin employs a native smart contract called Pay Per Pay. For each stream, the PPP smart contract enforces and executes licensing terms attached to that song in order to reward a certain fixed amount of $Music tokens to the musician or band. Additionally, the PPP smart contract can be programmed to enforce an immediate split of the reward to several beneficiaries, if the creator is a band. "*For example, a PPP contract of a license for a four-person band can enforce a split payout of 45% to the main musician, 20% to the songwriters and producers, 10% to the guitarist and 25% to the drummer. The use of this contract allows us to avoid unnecessary costs in content acquisition by removing all middle-men involved and thereby distribute 100% of the earnings to the musicians.*" [5]

Musicoin takes decentralization to another level by storing the content on the Peer-to-peer file distribution, IPFS.

Front-end

The Musicoin platform is available as both web and mobile application (IOS and Android).

Governance

The founders and the development team are involved in the decision making process about the governance of the Musicoin platform. The ambassadors are included in some aspects of the decision process. The overall community can also join "town hall" meetings where they can join the discussion about the roadmap, and provide feedback.

IMPORTANT ASPECTS

Importance of initial toke distribution:

The findings from the case study analysis confirms some part of the literature in regards to Initial Coin offerings. ICOs have not worked well for blockchain projects. In fact 46% of ICOs in 2018 have failed [103]. Of all 902 crowd sales that occurred last year, 142 failed in the funding stage; the projects didn't sell the needed number of tokens to gather ample funds. Additional 276 ICOs failed after the funding stage. One reason for that was due to the nature of ICOs; It is a poorly regulated process of obtaining start-up funding for companies engaged in blockchain technology [98]. Because of that, some project just took the money and didn't deliver. Other projects faded in stagnation and obscurity. All of those ICOs were launched before the development of the project in order to raise necessary funds. Furthermore, there was a significant number of blockchain projects (123) that succeeded in raising funds during ICOs but are currently deemed future failures [103]. Either because the community they created was so small or because they stopped communicating on social media. This would mean 59% of 2018 ICOs have either failed or are on the way to [103]. ICOs are gaining bad reputation because of their poor results. There have a few studies around this topic. An example would be the paper "Initial Coin Offering (ICO) evaluation model" where the authors propose a tool to help people make a decision whether to participate in an ICO or not [99].

IndieOn and Musicoin took these facts into consideration. Both of them approached token distribution different than other blockchain projects. Musicoin decided to not conduct any crowd sale. As the founder Isaac Mao pointed out: "*Many ICOs failed. People don't trust ICOs any more simply because they 'print money' once and then do nothing. For Musicoin, we try to 'print money' based on the economics […] Tokens are being issued steadily as the economy grows steadily.*" On the other hand, IndieOn is currently conducting an ICO but they started it only after they completed developing the platform. On this, Micah Hale said: "*We started this project based on all what we've learned. About 90 percent of all ICOs were going to be flash in the pan. What*

we had legitimized is that if we created the product then took it to market as an ICO that we would have a better chance at success."

Incentives

A key aspect in token based platforms is how the participants are incentivized. This is due to the nature of these platforms that are based on token economics. It is defined as "*the system of incentives based on cryptocurrencies that reinforce and build desirable behaviors the in blockchain ecosystem.*" [62]. Devising suitable incentive mechanisms heavily influence the performance of token based platforms. IndieOn is capitalizing on this, especially for the content consumer side as they have the ability to make money. Fans are incentivized by NDI tokens if they share media with another fan or someone else who becomes a fan (member in the platform). Half of the royalty will go to the fan who shared it, and the other half will go to the artist pool [87]. Musicoin, on the other hand, introduced a new concept in the sphere of blockchain projects, that is UBI (Universal Basic Income). It was inspired by the economic model of the same name that ensures fairness in terms of rewards for each contributor in proportion to their contribution. UBI is partially funded by a percentage of the tokens resulting from the mining process. It was designed to ensure basic income for artists (in proportion to the number of streams for their music) as the streaming is provided for free to the listeners—the latter have the option whether to tip their favorite musicians [5].

Level of decentralization

A common belief and an initial assumption prior to this research was that blockchain projects—tokenized networks in particular—are completely decentralized. In reality it is more nuanced [104]. Decentralization is not a state, it is a spectrum. Blockchain projects can be at different level of decentralization [62]. The factors that include the level of decentralization include: (1) Consensus mechanisms; (2) Decentralization level of value capture; (3) Governance—Who controls the product map?; and (4) Platform development [62]. From the findings of the case study analysis, we see that IndieOn and Musicoin sit on different spots along the spectrum of the decentralization

level. IndieOn is less decentralized. This is due to the choices made by the founders in regards to the technical implementation, network governance, value capture, and platform development. On other hand, Musicoin is more decentralized, and aspires to increase its level of decentralization.

Policy and regulation

Despite the continuous development of the blockchain technology and crypto-economics, policymaking institutions around the world are often characterized by stagnation, hesitation and lack of harmonization in regards to cryptocurrencies [105]. This pose numerous challenges for blockchain projects. The most important being the condition of extreme uncertainty in regards to future regulations of cryptocurrencies and how they can influence their value. Micah Hale talks about some of the challenges that IndieOn experience, "*challenges have been the overwhelming actions of the establishments attempts to crush crypto tech and funding for it. From banking regulation, SEC (US security and exchange commission) decisions, numerous government actions*". We've seen how many blockchain projects fail at conduction ICOs, mainly because they are poorly regulated. The introduction of adequate policies and regulation to cryptocurrencies and ICOs could help reduce the failure percentage.

DISCUSSION

The main theme of this research revolves around two main topics: the blockchain technology, and the music industry. It explores how the blockchain technology is being used to overcome the issues in the music industry by building token based platforms. This research has been designed around three main objectives: (1) Investigate the current challenges and issues pertaining to the music industry, particularly in copyrights and royalty management; (2) Develop a framework that can comprehensively describe how does a token based platform operate; (3) Study, through the lens of the developed framework, how token based music platforms operate. To reach the aforementioned objectives, the following research questions have been formulated:

1. What are the issues and challenges pertaining to the music industry, particularly in copyrights and royalty management?
2. How can token based platforms be analyzed in terms of how they operate, create, deliver and capture value?
3. How is Blockchain being leveraged to overcome the issues in the music industry?

Because blockchain is a core topic of this research, the author investigated this technology thoroughly and built on their existing understanding about this topic. Doing so has allowed the researcher to gain the needed knowledge to address the objectives of this research. The process of studying the technology was conducted through a literature review and supported by insights gained from interviews. This process has resulted in the blockchain technology chapter. The technology was presented following its development generations: (1) Blockchain 1.0: Cryptocurrencies; (2) Blockchain 2.0: Smart Contracts; (3) Blockchain 3.0: Decentralized Applications (dApps).

The first objective of this research was to address the other core topic of this study: the music industry and its issues in regards to royalty and copyright management. Using the method of literature review and information from expert interviews, the author was

able to build the royalty and copyright management chapter. This part of the report introduces the broader topic of Intellectual Property Rights (IPR). After that, the chapter moves to discuss copyrights and royalties, and the issues pertaining its management, specifically for music content. The results confirmed the assumptions held by the author prior to this research in terms of the types of issues and their impact on the music value chain. Moreover, the findings explain the significant interest and enthusiasm of certain players in the music industry (especially creators) about the blockchain technology. An interest and enthusiasm that were translated in various startups aiming to leverage the blockchain technology and to overcome the issues in the industry [12].

One of these issues is the lack of information and transparency in terms of copyrights management and royalties. The lack of geographical harmonization of copyright management laws and the lack of cost-friendly widely accepted technologies results in a lack of a comprehensive database that organizes all information about music content. The lack of transparency inevitably creates an unfair balance in terms of remuneration across the value chain. A chain that is being monopolized by intermediaries. In the music industry, the disparity of royalty rates between artists and record labels is significant. Another issue is the unauthorized access to copyrighted works, it takes near zero cost for a user to make perfect digital replicas and transmit them anywhere in the planet. If an infringement happens on a song, it is very unlikely that the original creator or group of creators are aware about it.

An emerging way to address the aforementioned issues using blockchain is building token based platforms [1]. As of this writing, there are more than 10 initiatives of this kind [12]. Conventional tools such the business model canvas are limited when it comes to describing how token based platforms operate. Moreover, the academic and practical body of knowledge regarding this type of platforms is scattered. The second objective of this research proposes an integrative framework that can describe how token based platforms operate. Through a four phase conceptual analysis and using systematic literature review as well as expert validation and feedback, the author built the STT framework. Composed of three domains (Service, Token Mechanics,

Technical), the framework helps to visualize how does a token based platform create, deliver and captures value. Five building blocks constitute the service domain, these are: (1) Value proposition; (2) Channels; (3) Participants; (4) Cost structure; and (5) Revenue streams. The Token Mechanics domain that explain the inside crypto-economics is composed of three building blocks: (1) Token properties; (2) Token distribution and usage; and (3) Token exchange. The Technical domain—which describes how the platform is implemented—is composed of three building blocks: (1) Back-end; (2) Front-end; and (3) Governance.

This part of the research contributes to the academic literature by proposing the STT framework, a model that brings together scattered knowledge and insights and consolidates them into an integrative concept that combines the necessary and key elements and dimensions in order to enable describing how a token based platform operates. The motivation behind developing this framework is the conviction that the scientific community should provide the necessary tools and conceptual assistance to study and further develop this kind of platforms.

The third objective of this research was to study how token based music platforms operate. This was carried out through a multiple case study of two platforms: IndieOn and Musicoin. The STT framework developed in the previous part helped in both the analysis process and in understanding how these two platforms operate. Empirical data required to conduct a multiple case study were obtained from the information available online about the companies through their website and whitepapers, as well as interviews with different individuals working at the start-ups. Some important aspects emerged from the study of the two case study platform. These are: token distribution strategy, incentives, level of decentralization, and policy & regulation.

Limitations

This research has some potential limitations. In regards to the first objective of analyzing the music industry and its issues, input information from intermediaries, such as collecting societies and major production houses is missing. Although the researcher has reached out multiple times to six organizations which are based in Denmark and in other countries within the European union, contact was not established. The intention was to conduct interviews and obtain information regarding the state of the music industry from the angle of these intermediary organizations, as well as, their opinion and stance regarding the blockchain technology. In this context of involving relevant parties in the study, the researcher was able to involve only two token based platforms in the multiple case study analysis—11 projects were contacted. The STT framework was shared with one blockchain expert for validation and feedback. The researcher had the intention to include more than one expert with different background, and in fact they were contacted. However, due to availability and time constraints, discussing the STT framework was not possible.

CONCLUSION

The main objective of this research was to look at the use of blockchain technology in the music industry by conducting a study on token based music platforms. This type of platforms is an emerging form of leveraging blockchain technology to solve different problems in many sectors. Guided by relevant theories and concepts, the researcher was able to collect necessary data to tackle the formulated research questions: (1) What are the issues and challenges pertaining to the music industry, particularly in copyrights and royalty management?; (2) How can token based platforms be analyzed in terms of how they operate, create, deliver and capture value?; and (3) How is blockchain being leveraged to overcome the issues in the music industry?

The results obtained for the first research question confirmed the assumptions held by the author prior to this research in terms of the types of issues and their impact on the music value chain. Moreover, the findings explain the significant interest and enthusiasm of certain players in the music industry (especially creators) about the blockchain technology. To address the second research question, the author built the STT framework. Composed of three domains (Service, Token Mechanics, Technical), the framework helps to visualize how does a token based platform create, deliver and capture value. This part of the research contributes to the academic literature by proposing the framework, a model that brings together scattered knowledge and insights and consolidates them into an integrative concept that combines the necessary and key elements and dimensions in order to enable describing how a token based platform operates.

Lastly, the research studied how token based music platforms operate. This was carried out through a multiple case study of two platforms: IndieOn and Musicoin, using the STT framework. Some important aspects emerged from the study of the two case study platform. These are: token distribution strategy, incentives, level of decentralization, and policy and regulation.

Considering the novelty of blockchain and the fact that crypto-economics and the concept of token based platforms are still at an early stage, it is expected that the outcomes (the STT framework in particular) produced in this research will form a foundation for the development of further research in this area.

REFERENCES

[1] "List of top Blockchain Companies | Crunchbase." [Online]. Available: https://www.crunchbase.com/hub/blockchain-companies#section-overview. [Accessed: 28-Jul-2019].

[2] S. Of and T. H. E. Industry, "Global Music Report 2019," 2019.

[3] "RIAA 2018 YEAR-END MUSIC INDUSTRY REVENUE REPORT."

[4] "Gimme Indie Rock. And Indie Folk. And Indie Dance. - Glenn Peoples - Medium." [Online]. Available: https://medium.com/@glennpeoples/gimme-indie-rock-at-pandora-b46e0a5943e4. [Accessed: 31-Jul-2019].

[5] Musicoin, "Musicoin Whitepaper." 2017.

[6] "16 Years Ago Today, Napster Changed Music as We Knew It." [Online]. Available: https://www.mic.com/articles/119734/16-years-ago-today-napster-changed-music-as-we-knew-it. [Accessed: 31-Jul-2019].

[7] "What Streaming Music Services Pay — Information is Beautiful." [Online]. Available: https://informationisbeautiful.net/visualizations/spotify-apple-music-tidal-music-streaming-services-royalty-rates-compared/. [Accessed: 03-May-2019].

[8] S. Nakamoto, "Bitcoin: A Peer-to-Peer Electronic Cash System."

[9] D.A. Wallach, "Bitcoin for Rockstars: How Cryptocurrency Can Revolutionize The Music Industry." [Online]. Available: https://www.coindesk.com/bitcoin-rockstars-cryptocurrency-music-industry. [Accessed: 31-Jul-2019].

[10] Yessi Bello Perez, "Grammy Winner Imogen Heap: Blockchain Tech Can Empower Artists - CoinDesk." [Online]. Available: https://www.coindesk.com/grammy-award-nominee-touts-benefits-of-blockchain-tech. [Accessed: 31-Jul-2019].

[11] "Why blockchain will save the music business in 2016." [Online]. Available: https://revelator.news/why-blockchain-will-save-the-music-business-in-2016-f332f2b94a8a. [Accessed: 31-Jul-2019].

[12] "17 Blockchain Music Companies You Should Know | Built In." [Online]. Available: https://builtin.com/blockchain/blockchain-music-Innovation-examples. [Accessed: 28-Jul-2019].

[13] M. Swan, *Blockchain : blueprint for a new economy*. .

[14] J. Angelis and E. Ribeiro da Silva, "Blockchain adoption: A value driver perspective," *Bus. Horiz.*, vol. 62, no. 3, pp. 307–314, May 2019.

[15] P. Verschuren, H. (Hans) Doorewaard, and M. J. Mellion, *Designing a research project*. .

[16] "Databases and suppliers - Aalborg University Library (AUB) - Aalborg University (AAU)." [Online]. Available: https://www.en.aub.aau.dk/find-material/databases. [Accessed: 28-Jul-2019].

[17] D. C. Coita, M. M. Abrudan, and M. C. Matei, "Effects of the Blockchain Technology on Human Resources and Marketing: An Exploratory Study," Springer, Cham, 2019, pp. 683–691.

[18] L. Lamport, R. Shostak, and M. Pease, "The Byzantine Generals Problem,"

1982.
[19] M. R. Mainelli, M. Smith, M. Mainelli, and M. Smith, “Sharing ledgers for sharing economies: an exploration of mutual distributed ledgers (aka blockchain technology),” *J. Financ. Perspect.*, vol. 3, no. 3, pp. 38–58, 2015.
[20] I.-C. Lin and T.-C. Liao, “A Survey of Blockchain Security Issues and Challenges,” *Int. J. Netw. Secur.*, vol. 19, no. 5, pp. 653–659, 2017.
[21] “How does blockchain work in 7 steps — A clear and simple explanation.” [Online]. Available: https://blog.goodaudience.com/blockchain-for-beginners-what-is-blockchain-519db8c6677a? [Accessed: 28-Jul-2019].
[22] M. Maroufi, R. Abdolee, and B. Mozaffari, “On the Convergence of Blockchain and Internet of Things (IoT) Technologies.”
[23] A. Baliga, “Understanding Blockchain Consensus Models,” 2017.
[24] V. Buterin, “On Public and Private Blockchains.” [Online]. Available: https://blog.ethereum.org/2015/08/07/on-public-and-private-blockchains/. [Accessed: 28-Jul-2019].
[25] F. Victor and B. K. Lüders, “Measuring Ethereum-based ERC20 Token Networks.”
[26] “ETHEREUM: A SECURE DECENTRALISED GENERALISED TRANSACTION LEDGER.”
[27] D. Tapscott and A. Tapscott, *Blockchain revolution : how the technology behind bitcoin is changing money, business, and the world*. .
[28] “What is a Decentralized Application (dApp)? dApp Examples 2019.” [Online]. Available: https://medium.com/@muhammadnoor/what-is-a-decentralized-application-dapp-dapp-examples-40b155370477. [Accessed: 17-Jul-2019].
[29] “IPFS is the Distributed Web.” [Online]. Available: https://ipfs.io/. [Accessed: 28-Jul-2019].
[30] “Basics of Second Generation Blockchain and its Applications in Capital Market.” [Online]. Available: https://medium.com/datadriveninvestor/basics-of-second-generation-blockchain-and-its-applications-in-capital-market-244f75ce72ff. [Accessed: 17-Jul-2019].
[31] “Academic Papers - Cardano.” [Online]. Available: https://www.cardano.org/en/academic-papers/. [Accessed: 28-Jul-2019].
[32] “Cardano - Home of the Ada cryptocurrency and technological platform.” [Online]. Available: https://www.cardano.org/zh/home-3/. [Accessed: 28-Jul-2019].
[33] “Blockchain Technology and Applications | Microsoft Azure.” [Online]. Available: https://azure.microsoft.com/en-us/solutions/blockchain/. [Accessed: 28-Jul-2019].
[34] “Blockchain on AWS.” [Online]. Available: https://aws.amazon.com/blockchain/. [Accessed: 28-Jul-2019].
[35] “Blockchain on Bluemix: IBM Blockchain Blog.” [Online]. Available: https://www.ibm.com/blogs/blockchain/category/blockchain-on-cloud/. [Accessed: 28-Jul-2019].
[36] “Deloitte’s 2019 Global Blockchain Survey.”
[37] “Top 7 Blockchain Business Models That You Should Know About.” [Online]. Available: https://101blockchains.com/blockchain-business-models/. [Accessed: 22-Jun-2019].

[38] “About – Hyperledger.” [Online]. Available: https://www.hyperledger.org/about. [Accessed: 28-Jul-2019].
[39] “Binance CEO CZ: Crypto Growth Needs Entrepreneurs and Projects, Not ETFs.” [Online]. Available: https://news.yahoo.com/binance-ceo-cz-crypto-growth-131800583.html. [Accessed: 25-Jun-2019].
[40] “Home | Ethereum.” [Online]. Available: https://www.ethereum.org/. [Accessed: 28-Jul-2019].
[41] “NEO Smart Economy.” [Online]. Available: https://neo.org/. [Accessed: 28-Jul-2019].
[42] “home - Golem.” [Online]. Available: https://golem.network/. [Accessed: 28-Jul-2019].
[43] “Stats and Facts | ICObench.” [Online]. Available: https://icobench.com/stats. [Accessed: 31-Jul-2019].
[44] “Maverick* Research: The Programmable Economy Is the Ultimate Destination for Digital Business.” [Online]. Available: https://www.gartner.com/en/documents/3152917/maverick-research-the-programmable-economy-is-the-ultima. [Accessed: 28-Jul-2019].
[45] D. Babbitt and J. Dietz, “Crypto---economic Design: A Proposed Agent---Based Modelling Effort.”
[46] J. P. Conley, “Blockchain and the Economics of Crypto-tokens and Initial Coin Offerings Blockchain and the Economics of Crypto-tokens and Initial Coin Offerings 1,” 2017.
[47] B. Metcalfe, “Metcalfe’s Law after 40 Years of Ethernet,” *Computer (Long. Beach. Calif).*, vol. 46, no. 12, pp. 26–31, Dec. 2013.
[48] “Trending posts — Steemit.” [Online]. Available: https://steemit.com/. [Accessed: 28-Jul-2019].
[49] T. European IPR Helpdesk, “The European IPR Helpdesk Your Guide to IP in Europe The essentials of IP protection in Europe The European IPR Helpdesk Your Guide to IP in Europe CONTENTS.”
[50] E. IPR Helpdesk, “Fact Sheet - Copyright essentials,” 2017.
[51] “Summary of the Berne Convention for the Protection of Literary and Artistic Works (1886).” [Online]. Available: https://www.wipo.int/treaties/en/ip/berne/summary_berne.html. [Accessed: 03-May-2019].
[52] “European Parliament TEXTS ADOPTED P8_TA-PROV(2019)0231 Copyright in the Digital Single Market ***I European Parliament legislative resolution of 26 March 2019 on the proposal for a directive of the European Parliament and of the Council on copyright in the Digital Single Market (COM(2016)0593-C8-0383/2016-2016/0280(COD)) (Ordinary legislative procedure: first reading),” 2014.
[53] “Outdated and Ineffective: The Problems with Copyright Law | The Claremont Journal of Law and Public Policy.” [Online]. Available: https://5clpp.com/2018/04/11/outdated-and-ineffective-the-problems-with-copyright-law/. [Accessed: 01-May-2019].
[54] N. R. Council, *The Digital Dilemma*. Washington, D.C.: National Academies Press, 2000.
[55] A. Savelyev, “Copyright in the blockchain era: Promises and challenges,” *Comput. Law Secur. Rev.*, vol. 34, no. 3, pp. 550–561, Jun. 2018.

[56] “Revisiting the Sony Rootkit fiasco.” [Online]. Available: https://fsfe.org/activities/drm/sony-rootkit-fiasco.en.html. [Accessed: 03-May-2019].
[57] “An Example Of Broken Security | Content Scramble System (CSS), a digital rights management scheme, was implemented within the DVD format for protecting DVD media content from piracy | Electronic Design.” [Online]. Available: https://www.electronicdesign.com/embedded/example-broken-security. [Accessed: 03-May-2019].
[58] Us, “THE DIGITAL MILLENNIUM COPYRIGHT ACT OF 1998,” 2860.
[59] C. Robson and K. McCartan, *Real world research : a resource for users of social research methods in applied settings*. .
[60] M. Saunders, P. Lewis, and A. Thornhill, *kitap 2: for Business Students Fi Fth Edition*. 2009.
[61] O. N. Larsen, “THE DYNAMICS OF INTERVIEWING: Theory, Technique, and Cases. By Robert L. Kahn and Charles F. Cannell. New York: John Wiley and Sons, 1957. 368 pp. $7.75,” *Soc. Forces*, vol. 37, no. 1, pp. 83–84, Oct. 1958.
[62] “Token Ecosystem Creation A strategic process to architect and engineer viable token economies.”
[63] B. W. Wirtz, *Business Model Management Design - Instruments - Success Factors of Business Models*. .
[64] Y. Jabareen, “Building a Conceptual Framework: Philosophy, Definitions, and Procedure,” 2009.
[65] J. M. Morse and C. Mitcham, “Exploring Qualitatively-Derived Concepts: Inductive—Deductive Pitfalls,” *Int. J. Qual. Methods*, vol. 1, no. 4, pp. 28–35, Dec. 2002.
[66] M. S. Kim and J. Y. Chung, “Sustainable growth and token economy design: The case of Steemit,” *Sustain.*, vol. 11, no. 1, pp. 1–12, 2018.
[67] “Tokenomics — A Business Guide to Token Usage, Utility and Value - Medium.” [Online]. Available: https://medium.com/@wmougayar/tokenomics-a-business-guide-to-token-usage-utility-and-value-b19242053416. [Accessed: 25-Jun-2019].
[68] “Decoding Token Economics: Insights from our Token Engineering & Token Economy Design Workshop at… - Medium.” [Online]. Available: https://medium.com/ostdotcom/decoding-token-economics-insights-from-our-token-engineering-token-economy-design-workshop-at-cfd1a0e39421. [Accessed: 25-Jun-2019].
[69] S. Lahajnar and A. Rožanec, “Initial coin offering (ICO) evaluation model,” *Invest. Manag. Financ. Innov.*, vol. 15, no. 4, pp. 169–182, 2018.
[70] W. C. Wei, “Liquidity and market efficiency in cryptocurrencies,” *Econ. Lett.*, vol. 168, pp. 21–24, Jul. 2018.
[71] “TokenWork: Introducing the Token Utility Canvas (TUC).” [Online]. Available: https://medium.com/@marcziade/tokenwork-introducing-the-token-utility-canvas-tuc-5b4d348d2022. [Accessed: 23-Jun-2019].
[72] “Evaluating Blockchain Projects With Token Economy Canvas - Medium.” [Online]. Available: https://medium.com/@pstehlik/evaluating-blockchain-projects-with-token-economy-canvas-908bc1bab6. [Accessed: 25-Jun-2019].
[73] “The Token Classification Framework: A multi-dimensional tool for

understanding and classifying crypto tokens. – untitled-inc." [Online]. Available: http://www.untitled-inc.com/the-token-classification-framework-a-multi-dimensional-tool-for-understanding-and-classifying-crypto-tokens/. [Accessed: 28-Jul-2019].
[74] "Enrico Ferro: Business Models for Blockchain-based Ventures: An Exploratory Study." [Online]. Available: http://enricoferro.blogspot.com/2018/07/bm4btc.html#.XQ8sQtMzZbU. [Accessed: 23-Jun-2019].
[75] C. Catalini *et al.*, "SOME SIMPLE ECONOMICS OF THE BLOCKCHAIN," 2016.
[76] P. Tasca, "Token-Based Business Models," in *Disrupting Finance*, Cham: Springer International Publishing, 2019, pp. 135–148.
[77] A. Osterwalder and Y. Pigneur, "Business Model Generation." 2010.
[78] H. Bouwman, E. Faber, T. Haaker, B. Kijl, and M. De Reuver, "Conceptualizing the STOF Model," in *Mobile Service Innovation and Business Models*, Berlin, Heidelberg: Springer Berlin Heidelberg, 2008, pp. 31–70.
[79] C. Zott, R. Amit, and L. Massa, "The Business Model: Recent Developments and Future Research," *J. Manage.*, vol. 37, no. 4, pp. 1019–1042, Jul. 2011.
[80] "Token Economy Medical Definition | Merriam-Webster Medical Dictionary." [Online]. Available: https://www.merriam-webster.com/medical/token economy. [Accessed: 25-Jun-2019].
[81] "Token Economics #2: Comparison Review of Token Economy - By Token Economy Institute." [Online]. Available: https://hackernoon.com/token-economics-2-comparison-review-of-token-economy-8759dd70783. [Accessed: 31-Jul-2019].
[82] L. William Cong *et al.*, "Tokenomics: Dynamic Adoption and Valuation Tokenomics: Dynamic Adoption and Valuation *," 2018.
[83] B. W. Wirtz, A. Pistoia, S. Ullrich, and V. Göttel, "Business Models: Origin, Development and Future Research Perspectives," *Long Range Plann.*, vol. 49, no. 1, pp. 36–54, Feb. 2016.
[84] R. Casadesus-Masanell and J. E. Ricart, "From Strategy to Business Models and onto Tactics," *Long Range Plann.*, vol. 43, no. 2–3, pp. 195–215, Apr. 2010.
[85] C. M. DaSilva and P. Trkman, "Business Model: What It Is and What It Is Not," *Long Range Plann.*, vol. 47, no. 6, pp. 379–389, Dec. 2014.
[86] A. Osterwalder, "The Business Model Ontology," *C ...*, p. 169, 2004.
[87] M. Borseman, S. Tanev, M. Weiss, and E. S. Rasmussen, "Lost in the canvases: Managing uncertainty in lean global startups."
[88] E. Ries, *The lean startup : how today's entrepreneurs use continuous innovation to create radically successful businesses*. .
[89] "Token Economy Canvas - Evaluate Blockchain Projects and ICOs based on the proposed mechanics of their tokens and coins." [Online]. Available: http://tokencanvas.it/. [Accessed: 23-Jun-2019].
[90] "The Token Classification Framework: A multi-dimensional tool for understanding and classifying crypto tokens — Steemit." [Online]. Available: https://steemit.com/cryptocurrency/@marcosoliveira/the-token-classification-framework-a-multi-dimensional-tool-for-understanding-and-classifying-

crypto-tokens. [Accessed: 28-Jul-2019].
[91] “Differences Between Cryptocurrency Coins and Tokens.” [Online]. Available: https://masterthecrypto.com/differences-between-cryptocurrency-coins-and-tokens/. [Accessed: 28-Jul-2019].
[92] “Token vs Coin — what’s the difference? - ChronoBank.io blog.” [Online]. Available: https://blog.chronobank.io/token-vs-coin-whats-the-difference-5ef7580d1199. [Accessed: 28-Jul-2019].
[93] “What’s the Difference Between Tokens & Coins? - CoinBundle - Medium.” [Online]. Available: https://medium.com/coinbundle/whats-the-difference-between-tokens-coins-9942fe42f275. [Accessed: 28-Jul-2019].
[94] “FINMA - FINMA publishes ICO guidelines.” [Online]. Available: https://www.finma.ch/en/news/2018/02/20180216-mm-ico-wegleitung. [Accessed: 28-Jul-2019].
[95] W. Mougayar, *The business blockchain : promise, practice, and application of the next Internet technology*. .
[96] “The Token Classification Framework: A multi-dimensional tool for understanding and classifying crypto tokens. – untitled-inc.” [Online]. Available: http://www.untitled-inc.com/the-token-classification-framework-a-multi-dimensional-tool-for-understanding-and-classifying-crypto-tokens/. [Accessed: 07-Jul-2019].
[97] “Numerai Crypocurrency Airdrop | Kaggle.” [Online]. Available: https://www.kaggle.com/general/52852. [Accessed: 28-Jul-2019].
[98] “Initial Coin Offering (ICO).” [Online]. Available: https://www.investopedia.com/terms/i/initial-coin-offering-ico.asp. [Accessed: 28-Jul-2019].
[99] “"Initial Coin Offering (ICO) evaluation model"”
[100] IndieOn, “IndieOn whitepaper.” .
[101] “indieOn Website - The Media Currency.” [Online]. Available: https://www.indieon.com/. [Accessed: 31-Jul-2019].
[102] “AWS Elemental MediaConvert.” [Online]. Available: https://aws.amazon.com/mediaconvert/. [Accessed: 29-Jul-2019].
[103] “46% of Last Year’s ICOs Have Failed Already - Bitcoin News.” [Online]. Available: https://news.bitcoin.com/46-last-years-icos-failed-already/. [Accessed: 31-Jul-2019].
[104] “Comparison Between Different Blockchains - InnCreTech - Medium.” [Online]. Available: https://medium.com/@inncretech/comparison-between-different-blockchains-e92f7b6aaeb3. [Accessed: 31-Jul-2019].
[105] “US Moves Closer to Accepting Blockchain, Still Uncertain Over Crypto.” [Online]. Available: https://cointelegraph.com/news/us-moves-closer-to-accepting-blockchain-still-uncertain-over-crypto. [Accessed: 31-Jul-2019].
[106] “Are you ready for blockchain? | Thomson Reuters.” [Online]. Available: https://www.thomsonreuters.com/en/reports/blockchain.html. [Accessed: 26-Jul-2019].
[107] M. Alharby and A. van Moorsel, “Blockchain-based Smart Contracts: A Systematic Mapping Study,” Oct. 2017.

APPENDIXES

INTERVIEW TRANSCRIPTS:

Micah Hale: We do this process globally to where we could create a platform for indie artists to put on their music and out of that was born indie on and we subsequently added the ability for film to also be loaded up through our partnerships in the state of New Mexico and Wagon Wheels studios up in Santa Fe New Mexico. So it's just kind of been this combination of a two year odyssey and to this creation and the tokenization of the music.

Interviewer: Yes. Especially in light of the all the problems that the music the modern music industry is witnessing especially for the artists who gets only the crumbs out of the pie.

Micah Hale: Well yeah and I would say almost like the downfall of the musician is technology because you're back in the day, to enjoy your music you would go buy a C.D. or you would buy an album. You'd have the physical tangible source with the music on it that doesn't exist anymore. What we've learned what we've learned is legally. Every time a song gets played an artist should get a royalty. But we found that doesn't happen with our artist attorney specialist Moses. We've learned that there are massive companies that just stopped paying royalties because it's cheaper to get sued and pay out on the lawsuit than it is to pay on the royalties. Pelaton is a great example of that. They initially did licensing deals and then they just signed it on and it's easier to fight it in court for the next five six 10 years. While they're making up millions and millions. Our idea was to support the little person, the artist.

Interviewer: And actually I was also curious what types of participants are you intending to include in the platform is it the just content consumers and content producers or are you planning on including some other players with giving them incentives them incentives. Is that the case? perhaps some intermediaries from the traditional industry that you would like to include them

Micah Hale: We we're in discussion with smaller houses like C.D. baby. We we have talked with Atlantic Records one of our partners Andrea Velasco. She has family actually, I think her uncle who is a talent representative for Atlantic Records and we've talked with them and what we found was that the major production houses aren't ready for a cryptocurrency based system at all. They do not know how to operate in it yet. That's what we learn through those conversations. And in terms of content attainment, for a business model you want to get as much content as possible.

Interviewer: These are actually valuable insights. and I see that the ICO is going on now. I would was wondering how is that going. Are you reaching your targets? How many artists consumers do you have signed up in the platform?

Micah Hale: What we've run into is the age old issue of the variability of cryptocurrency. When we started this project based on all that I've learned and while that I follow we saw very quickly that We started this project based on all what we've learned. About 90 percent of all ICOs were going to be flash in the pan. What we had legitimized is that if we created the product then took it to market as an ICO that we would have a better chance at success. And what we found is that without massive amounts of marketing and huge amount of finance, the marketing aspect of it tends to go very slow. So in terms of meeting goals we are close to what our desired goals are, although we're not quite hitting the desired mark that we had but with us with all speculation and hope it is what the market will allow.

Interviewer: I know that the is it's going it's the second phase of discount. So people tend to also buy things towards the end before deadline.

Micah Hale: We've we've seen that also we actually have a stronger private market that does not want to be involved in the ICO. We've found we've had many communications with people who want to invest in the company directly but that are not interested in partaking in the ICO. And we found that to be very interesting in that

manner not exactly sure why. I think a time will tell as to whether those are truth or shenanigans.

Interviewer: I have a couple of other questions. I know you want to incentivize the content creators with the NDI token. I mean they would earn the crypto currency for their works. How can and if can consumers earn NDI token.

Micah Hale: A couple of ways. Number one you get a certain amount of tokens for signing up so you get five tokens. five or ten tokens I can't remember right off the top of my head for signing up and starting the process of you know joining. So you're doing the streaming service for five ninety nine for an individual a month or eleven ninety nine for a family of up to five people. So you begin with tokenization. So the other way that the artists that the fan makes token is in the sharing of a song. Whether you're on the platform or you're not. If you share a song with another fan or somebody who becomes a fan, a fan would be somebody who has the streaming service. When that fan plays the song half of the royalty will go to the fan that shared it and half goes to the artist pool so whatever the artist breakdown is. Now every time the artist's song gets played they get two cents worth of NDI. Right now the greatest payer is Spotify is paying a half a cent per royalty generating event and we calculate that events as playing the song 80 percent of the way through. So they have to listen to 80 percent. They can't just go click on and listen listening to it for five seconds and click off of it trying to scam the system. That's the ways that the fan makes NDI token. And then the way the artist makes the revenue is per song upload. They get a token a song and the requirement is 10 songs. So they need to put on 10 songs which will create kind of like an album. It doesn't have to be an album but the minimum requirement in the beginning is 10 songs so that we have legitimate artists and not people recording their children singing the ABC because that's not our intent here, our intent is not to be a YouTube. To be a legitimate streaming service for video content and song content.

Interviewer: is there any other ways before I move on to the next question?

Micah Hale: Right now we haven't created any additional ways. There will be gamification processes that occur to where voting for songs and albums and artists and that voting process would generate NDI tokens. But that that's a later phase process as the the marketing campaigns go forward and we have success in bringing on content and fans.

Interviewer: That's very interesting.

Micah Hale: Well gamification is actually one of the most important parts because the it's almost like, you vote, you get access to a possible concert tickets you know. And then you'd bring in the Advertiser media medium and you can get people stuff whether it be T-shirts you know electronic C.D. if you will. Stuff of that nature. And you know basically artist and paraphernalia that they've created to the market and monetize their creative content.

Interviewer: I had the question of how IndieOn makes money.

Micah Hale: IndieOn makes some money based on traditional transaction processes. So every transaction would make Indieon back to 2.25 percent. So all transactions across whether it be the purchasing of the streaming whether it be the transition of tokens back and forth. it's almost like a bank you know for every process that occurs there will be a small fee attached. Then when the store occurs and you you're selling whatever it is you're selling related to the art you've created or the content you have created. T-shirts bumper stickers. There's a percentage off of that. And then of course the revenue that comes from the streaming service which tends not to be as much your ad revenue is your greatest income for how a system would make its money. Because the premise is that if we are making NDI the token as a small percentage off of each transaction then the ecosystem has to be funded by the ICO and then the investment on the outside of the token.

Interviewer: Perhaps something about the governance. Are you planning or are you thinking of including the community decision making process how IndieOn be in the future?

Micah Hale: I watched this occur on many different aspects with all of that it becomes a tremendous amount of infighting and that's where you have the splits occur. Because this is not a token that is mineable all it thus would not require a consensus for. We're not a mineable open source token in that sense. we want the involvement of the community and we would love the input of the community but in terms of truly giving the community the platform. It is not the case. So in a utilitarian way, absolutely. In their traditional Democratic ideology of open source cryptocurrency. No because that's not our system. Because humans worked very well together in small groups. Once you get past about 40 people it starts to break down and democracy falls into chaos and infighting.

Interviewer: Another question will be, do you have a strategy in mind to raise the token value?

Micah Hale: Yes, to launch it on exchanges. It's a limited 10 billion tokens that would be first you limit its overall size then there will never be more than 10 billion made. To our decimal points. Very long it's to the 18th power so it allows extensive growth. And then it's marketing you need. You need big artists, you need big film people involved and with their notoriety the interaction will come. So believe it or not […] one of our greatest contacts is Steven Spielberg's daughter. She is the head of the New Mexico film division We have quite a few. And it's. Just about being present and being honest you know. Yeah we are very ready to do this in a grassroots manner because we've spent all our money on tech. I mean we spent over three hundred thousand dollars on tech and building the platform and what we did not plan for is that you need about another three hundred thousand dollars just for marketing. At least the people the marketers that I talked to on the higher end said your burn rate's going to be about twenty five thousand dollars a week. And I've heard that from a lot of them and that's

not just because they want to make that it's just that's the system that they have to reach all the various and sundry people. And that takes a lot of money and a lot of capital.

Interviewer: And with no guarantee that it's going to work.

Micah Hale: None whatsoever. We kind of created this altruistic system that if it works everybody can get paid. But we've taken the risk that if it doesn't work it's been a wonderful idea. But it can still grow grass roots. You know we're still working with IOS. We're still working in the Android system that will exist here. People can put their product on. They may have a token that's not worth a whole lot in the beginning but the eco system exists for this to take hold because nothing like this exists to where it's a self-fulfilling process. And by the interaction of the fan and the artists and or the fans and the content creator. And it's totally you know it's it's totally open as to what it is. It's a giant enormous ledger because just think of who we disrupt. We just stripped the power centers of modern music film is a little different. You see the guys now they're monetizing movies to where you can advertise in there. That actor who is a big crypto guy the short guy wears the hat.I can remember his name but he has created a system where you can go in and buy a token that's related to the production of a major studio production. Now I'll remember his name later went right to film because I follow him on Instagram and listen to his stuff. But. From the standpoint of music and what the tokenization aspect is for the artist is you have a legal document that's does you own this piece of art that you own this content. The minute you put it on ours. And that right there gets rid of all the copyright lawyers but what we found is that the legal processes that exist in each country have to agree that that is a legal document and they haven't done that yet. They haven't tackled that issue but they're starting to but they haven't gotten there yet. So we've created the hope and the prayer and spent a lot of money personal money doing it because we're small you know we don't have that we have many wonderful connected people related to related to the music and just trade in the film industry but we don't have massive venture capital backing yet. Maybe eventually.

Interviewer: Yeah I mean I think that's quite. Powerful and would serve you in the long term as he said if it doesn't work in the market, it can always develop.

Micah Hale: Well yeah if it has to do the grassroots that's what we're here for. We all have other gigs. If you had a right team and the right people come together then it'll work. Yeah. And we had many fortuitous events to get us to here. And you know with some potential future funding that's in the pipeline. It's just about marketing and getting people involved. We are at the end of beta testing and we will actually have a life product to integrate the royalty generating event and the algorithmic pay out of it.

Isaac: This set the foundation and pushed us to think about how we can well use new technologies like social technologies like blockchain technologies to connect you know the sharing like behaviors like musicians many indie musicians on the ground and also those established musicians you know but they cannot you know if they share that very hard to say they are very worried that it becomes kind of like a freebie things being able to generate income stream. That's why we designed you know a concept. You know it's back to 2016 we tried to create a very atomic model which can enable if user access content pieces you know. And this access behavior triggers a small little contract which can give musicians and creators because there is not only musicians but also like lyricists you know composers. There's only one ecosystem you know and it's very difficult. The traditional business industry to try to clear those structures and eventually pay back to musicians and creators. It takes a long life cycle to really give people this kind of compensation or remuneration. That's where. We want to shorten this path and want to cut through the whole system to see it through you know how this relationship being built in the traditional industry and how we can shorten the path and make it transparent. That's the atomic you know motto was trying to solve and we thought is not really rocket science. We can't just try to tinker together some existing technologies and try to make sure we can force this relationship. This contract being executed you know all the time. So we design this PPP contract called the pay per play. It's like that streaming services today you know the industry trying to count how many streams you know a song being served. Not listeners and they eventually go through a lot of processes and send you a report that maybe not sending you directly and send to

your middlemen you know a lot of organizations in the middle and eventually maybe some of them receive the money and redistribute., and then send you a two dollar maybe. check for your like You are like thousands of plays and this delivering could take a nine month two up to 18 months. You may expand with a very traditional payment method. It is very complicated because it's not only one system. There are many different systems costing a lot of you know friction cost you know and eventually dramatically reduced the income of the creators and from their report you know that several reports actually only roughly 12 percent of the industry income goes to eventually end up like a musician's hands and pockets. 12 Percent. So that's why we designed the PPP first and this is one of the social contracts you know we put down to our system but we don't want to people misunderstand this social contract how they can be executed and they're assured. So we opened up a system based on the blockchain that's the Musicoin blockchain started back in 2017. And after several weeks we have the first batch of musicians indie musicians you know get on board and starting to create their content and they feel easy because it's easy to see through. What's going on there. How it works and how their income could only.

Mouloud: I have a specific question around that. Who are the participants in this token ecosystem that you created beside of course creators and listeners? And then what kind of tokens do they have.

Isaac: OK, so the whole system is based on a mineable bow block chain. Miners are our first layer of stakeholders in the whole system. We managed to get up to 7000 miners who are from different places. They download the same software we developed to conduct PoW in order to reach a consensus and generate new blocks. They generate coins and they try to sell the coins to the market trying to make some profit cover their power, and energy cost. At the same time the generated currency goes to the market you know being purchased by listeners and also being reserved partially we call the Universal Basic Income Pool. You know this is a very interesting pool which is called UBI.

Mouloud: I actually wanted to get more information about UBI

Isaac: Yeah. So we have we have miners started to supporting the system to make sure it is ongoing and progressing all the time. And then the printed currency goes to different places some to UBI pool and some to listeners hands and listeners can use the currency to tip musicians. The musicians don't need to worry about that even they are users. Those listeners don't tip a song. If they played the song I'm afraid that UBI pool will give them money you know as a basic income as we understood. Yeah. So. So that's the that's the very delicate design you know from miners to UBI pool to listeners because their listeners buy from the market. And also there is some money in the market you know a very interesting and commonly known now is called traders. Traders exchange buy and sell the Music coin all the time. Their role is to generate dynamics exchange rate and value for the token.. So musicians fully 100 percent receive their income if they want a middleman, it's their own kind of allocation but we don't charge anything. Every play generates you know music coin you know income to musicians wallet and also the tips from listeners you find I love a song I like the song I can give tips based on the play playback. So there is such kind of stakeholders you know graph in the whole system you can see through miners traders listeners creators they're all there and also are marketers you know and also some middlemen from traditional institutions. They also want to take this opportunity. So they join and they help musicians to provide some kind of facilitating or maybe kind of services in how musician manage their accounts. But that's not our major target. You know they have formed their relationships right from there.

Mouloud: My next question, why not include traditional big intermediaries?

Isaac: I think the traditional industry has a huge problem, of course they have their own you know kind of interest in this whole system. And of course they know how to manage that their own structure and also their location in the whole system. And they grab this kind of benefits. And they see the that they benefit from the whole global adoption for mobile devices for example. And they did benefit from the bouncing back of the streaming music you know. So they earn lots of money from the current streaming. I don't think they can easily you know try to move. they tend to now to

move too much you know and have a radical change with their existing benefits. and that's the problem. You know they don't want change. But at the same time you talk to them. They still hold a very big arrogance you know and like I said you know as a startup I talked to those big players and they have a simple answer to ours. OK. Either you pay big upfront down payment.

Mouloud: Like they do with the streaming services.

Isaac: Exactly. So, that's all the things you know that that's why even those streaming services like big players Spotify Apple and Google is. They still need to negotiate you know every year with those industry incumbents. You know we know that. So we are now in that position to bargain. So we try to find an alternative way. Because we know there are a lot contracted musicians on the ground. As we talk to them. We had so many communications with them literally. They don't think the industry is helping. And they were alienated for a long time. And that's why we are not only seeking a new model. We are also seeking the new connection. new relationship with those musicians on the ground.

Mouloud: A also I noticed that one thing that differentiates you from other token based platforms especially also in the music is you did not release any ICO. An initial coin offering and I was really interested why you didn't do that.

Isaac: I think many ICO fail as we've already seen you know It's not a mania anymore. No. You know almost no. You know in recent days you know because people don't trust those ICO projects simply they print money once and they like do nothing next. Many of them. I cannot say everyone but many of them you know really draw a picture, raise a lot of fun. But nothing delivered. So our philosophy at the beginning first day we are not trying to lose money from those example community. You lose money from them and eventually you don't commit. You lost your credibility. So our goal is trying to print the money from the blockchain based on the economic progress. As long as the economy is scaling because we believe the economy is growing steadily then the money being issued steadily as well. You know it's like the GDP vs the country

monetary policy. Same thing. So we can convince and build this community. Step by step and then we we're now trying to like accumulate a lot of funds but eventually lose your credibility. So, we are very patient. You got to deliver and tried to make this economy eventually become a very trustable system.

Mouloud: Good. I have two or three more questions. One is about the exchange systems.

Isaac: We don't like the exchange platforms. They don't care about inherit value of tokens. That's why we are building out embedded exchange platform in our system so people can use Bitcoin to exchange with our token, without going into exchanges. We are still holding the same system. It just never changed. The chain is still progressing. The musicians recruitment is still ongoing. The thing is we don't like the current ecosystem like exchange. Basically it manipulates a lot of things about you know Lots of coins. They serve nothing. We are OK with bitcoin it's not really a currency as well but people trusted from the first day that the digital revolution is there and people use it to store value. That's why we are doing embedded little mini exchange in our system so people can use bitcoin to exchange music coin. Without going into exchanges. That's our next move. Yeah. So people like musicians like in Italy they can earn musician they can earn music coin first but they want to cash out they may not just be able to spend music coin in their local grocery shop but they may accept bitcoin but they can't sell music coin to bitcoin if they need it and they can spend it somewhere else. So we are trying to move away from exchange economy. And we don't like those kinds of manipulation by exchanges and some exchanges literally they are they are not supporting any innovations at all. They're just trying to build some kind of value lace you know kind of menu.

Mouloud: One last question is about the governance. Who makes the decisions? I mean it's a blockchain Based so there are many nodes, many participants

Isaac: Firstly we are open source software and we share all the things to the community and because the developers send their miners as they can see the source

code they know whether they can trust so they also contribute to a lot of ideas to our software development. This is one level of governance. So it's a kind of consensus. We call it. And the second layer is that the for the team that development team we have seven core members. We have a structure to hold the shares of the business. working on this project but also the same time we receive a little portion from the mining process as a development fund. So we need to make sure we can maintain the project you know, and also we have the ambassadors from musicians group and they also receive partial fund and they can also join our decision processes. And the last way is the broader community. We don't even know who they are. Sometimes they can join some town hall meeting. They can join some of those like community discussions based on our seasonal plan and a road map sharing statues. This kind of activity is always ongoing. Though it's not it's not something designed from a secrete chamber

Mouloud: That's very good. I won't take much of your time I know you have a meeting right after this. I just wanted to thank you. And see if it's possible please share with me the white paper the PDF, the long one. And would it be possible to if necessary, have another interview in two weeks' time perhaps with you or maybe with one from the development team because Lorenzo expressed that it might be possible and perhaps if I have just a question or two that I could share with you by email. Would that be possible?

Isaac: Absolutely do feel free. And don't worry about that. Let's try to talk later

Mouloud: Okay. All right. Thank you very much.

Isaac: Thank you. . Have a good day.

Mouloud: You too.