

- Blockchain Technology in the Music Industry-



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“Music gives a soul to the universe, wings to the mind,
flight to the imagination and life to everything.”
– Plato.

Copenhagen, Denmark, May 2019

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Abstract

The objective of the present study is to investigate the contribution that blockchain-based digital music distribution services (BBDMDs) can make to solving the most significant problems of the music industry. Thereby, a particular focus is put on the evaluation from a consumer perspective and discover factors that determine their intention to use such services. In that respect, the study contributes as a theoretical proposition to consumer behavior literature and adds to the understanding of blockchain technology applicability in the music industry.

Within the literature review, the theoretical fundamentals regarding the music industry, blockchain technology, and consumer behavior theory are provided. Findings are derived from a multiple-case study of BBDMDs and by following a qualitative approach conducting semi-structured in-depth interviews with five music consumers.

By examining the obtained findings, the unique values of an increase in the credibility and security of service providers; cost savings on financial transactions; and the enablement of instant revenue payouts to artists could be identified. Regarding consumers' intention to use BBDMDs, our findings demonstrate that the factors of content, user interface, direct connection, price, compatibility, and technology involvement are most significant. Based on the findings, practical recommendations for an appropriate strategy to strengthen the market position of BBDMDs are suggested.

Keywords: Music industry, blockchain technology, consumer behavior, music distribution services

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List of Abbreviations

BBDMDS - blockchain-based digital music distribution service

DMDS - digital music distribution service

BCT - blockchain technology

BC-based - blockchain-based

TPB – Theory of Planned Behavior

TAM – Technology Acceptance Model

A – Attitude

SN – Subjective Norm

PBC – Perceived Behavioral Control

PEOU – Perceived Ease of Use

PU – Perceived Usefulness

1. Introduction

When Satoshi Nakamoto conceptualized Bitcoin in 2008, only a few people were able to imagine its potential to transform well-established concepts unquestioned for years, such as currency, sovereignty and intellectual property (Swan, 2015). However, Nakamoto's most significant invention was not the cryptocurrency Bitcoin, but its underlying blockchain technology (BCT). Fairfield (2015) was one of the first researchers who examined the underlying BCT and described it as a dominant system for the digital property. BCT was found to be exceptional as an open public ledger and seen as a revolutionary technology to keep track of rights, registering, confirming and transferring any contract, and operating as both database and network (Fairfield, 2015; Forte, Romano, & Schmid, 2017; Gupta, 2017).

Nowadays it is widely assumed, that BCT could disrupt any business case that involves ownership verification or transaction processing. Bitcoin and blockchain application in financial services are only the best-known examples. The general opinion exists that the application of BCT could solve problems in many industries. However, contrary arguments state that there is a low general level of understanding, which leads to an adaption of the technology in poorly fitting ways (Seppälä, 2016). This often results in a high number of startup companies with hypothetical business cases that make use of the hype for their marketing benefit (Linden & Fenn, 2003).

For the past 20 years, the music industry underwent a series of technological disruption. This becomes apparent in the development from vinyl to MP3, from listening to music on the radio to streaming music on a mobile phone. These advancements brought more convenience to a music consumer but at the same time nourished a steady decline in industry revenues. After 20 consecutive years of decline, the music industry is back on its feet with a global revenue growth of 8.1% in 2017 (IFPI, 2018). The driving factors of this increase in revenue are streaming platforms such as Spotify, that consistently grow their numbers of paid subscription users. Yet, due to the archaic structures within the music industry, many processes are still far behind the state of the art and thus yield problems for industry stakeholders. Collecting societies and labels are struggling to cope with the amount and speed of generated data and artists are seeking a fair share of revenues (Chester, 2016).

It comes as no surprise that an increasing number of entrepreneurs turn their focus on BCT applicability in the music industry. Many blockchain-based (BC-based) music startups have

emerged over the past years seeking to revolutionize the industry and offer unique value propositions to industry stakeholders (Chester, 2016). Most prominently they try to solve problems for artists that currently struggle to earn a fair share of revenues on platforms such as Spotify and from deals with record companies. Despite the growing theoretical as well as managerial interest on the topics of blockchain and its application in the music industry, there seems to be a lack of concrete case studies of companies utilizing the technology and thus a lack of evaluation of the value that BCT can bring to the industry and the ways they apply it (Bjørnstad, Harkestad, & Krogh, 2017).

Furthermore, Baym, Swartz, and Alarcon (2019) highlighted that there is a gap in research investigating consumers' willingness and interest to use BCT and applications using the technology in the music context. This can be seen as an essential factor when it comes to evaluating the success of applications and the technology itself. Bartlett (2015) argued that "the greatest unknown is not whether the technology will work – I'm confident that it will – but whether the people who listen to music actually care about any of this" (para. 34).

Based on these propositions, the purpose of this study is to investigate what value BCT can bring to the music industry through the application in BC-based digital music distribution services (hereinafter referred to as BBDMDSs). Value hereby refers to the ability to solve existing problems of the music industry and improve processes.

Furthermore, we want to find and investigate the determinants of consumers' intention to use such services and how they evaluate them. By doing this, we also aim to fill the identified research gaps, extend the knowledge within the field from both a consumer perspective and from use cases of BC-based applications, and give practical implications for BBDMDSs to exploit their potential.

Subsequently, the following research question was derived:

What value does BCT bring to the music industry through the application in digital music distribution services and what determines consumers' intention to use them?

The main question was broken down into the following sub-questions, which play the role of working questions to answer the main research question.

Q1: What value do blockchain-based use cases add to the music industry?

Q2: What determines the intention of consumers to use blockchain based digital music distribution services and how do they evaluate them?

1.1. Delimitations

In order to narrow down the scope of this study and to develop the research questions, a few delimitations were made. They are clarified in the following section.

The authors of this study focused on BBDMDs to evaluate the value that BCT can bring to the music industry. These services were chosen due to the relevance of digital music distribution services (DMDSs) in the modern music industry and their broad scale of providers. Consequently, it is outside of the scope of this study to address the value creation of BCT in the music industry on a macro-level. Furthermore, the evaluation of such services is limited to the perspective of consumers as crucial stakeholders. This results in the exclusion of other stakeholders of the music industry such as artists, labels, retailers, distributors and collecting societies from primary research.

The target group is limited to consumers who have knowledge regarding the properties and functionality of BCT to receive meaningful results from primary research. Even though digital music distribution services address consumers with all levels of knowledge, uninformed potential users are excluded due to the increased complexity of discussed topics.

This study is dealing with consumers' intentions to engage in a specific behavior. Several models are available to research on consumer behavior, yet this study is theoretically delimited to the application of the highly validated and widely used Theory of Planned Behavior (Ajzen, 1985) and the Technology Acceptance Model (Davis, 1989).

1.2. Thesis Structure

Introduction

The first chapter briefly introduces the general area of the research topic, the public opinion about BCT and the current situation in the music industry. Some of the main issues are illuminated. This conjunction clarifies the purpose of the study and presents the research question supported by its sub-questions. Lastly, the delimitations of the research project and the outline of the remaining structure are presented.

Literature Review

The purpose of this section is to reveal existing issues within the music sector and explore blockchain application capabilities. Accordingly, the evolution of the music industry and its current stakeholders are introduced, and current trends as well as challenges are highlighted. The BCT chapter provides a foundational overview of characteristics, processes and the extent to which the technology is deployed. Its use in the music domain is also briefly touched.

Conceptual Framework

The third chapter of the research outlines the theoretical framework that is used to answer the second sub-question. The chosen theories (TPB and TAM) are introduced and an overview of their application in previous studies is given. Lastly, the appended model is presented which helped to guide the empirical research.

Methodology

This chapter presents and discusses theoretical and practical perspectives taken to attain the purpose of this thesis. First, the process of the research question and sub-questions determination is outlined. Following the research onion structure, the chapter continues by introducing the chosen philosophy, research approach and design along with the deployed techniques for data collection and analysis. The chapter is finalized by a quality assessment of the methodological choices and gathered data.

Findings and Analysis of Secondary Data

The fifth chapter draws an overview of the real-life BC-enabled applications in the music industry. The selected segment of BBDMDSs is analyzed to answer the first research sub-

question. The chapter is summed up by a presentation of the created conceptual design that implements the best practices of the examined services.

Findings and Analysis of Primary Data

The findings of consumer interviews are presented in the sixth chapter, which is structured by the categories of the appended model defined in the conceptual framework. Each category is subdivided by emerging factors.

Discussion

Based on the findings gained from primary and secondary data analysis, this chapter provides a discussion of significant insights in light of explored literature and related studies. This part is divided regarding the two research sub-questions.

Practical Implications

This section provides theoretical and managerial implications for future research or similar real-life practices.

Conclusion

Based on the obtained insights, this chapter concludes the discovered areas and evaluates their significance and how they advanced previous knowledge on the phenomenon.

Limitations

In this chapter methodological and contextual limitations that could have influenced or impacted the interpretation and scope of the research findings are presented.

Future Research

A recommendation for future research areas is provided in this section.

2. Literature Review

By introducing relevant theoretical areas, the literature review builds the theoretical fundament needed to answer the stated research question. As a first step, information on the music industry is presented and current issues are illuminated. Subsequently, an overview of BTC characteristics, processes and the extent to which the technology is mostly deployed, is outlined.

2.1. The Music Industry

The music industry includes the production, publication, distribution and marketing of music in various forms. It is widely argued that the music industry is to be divided into smaller industries such as the recording, licensing, live music and publishing industry (Burnett, 1996). The processes and structures within this paper focus on the recorded music industry, yet when needed the whole music industry is regarded. Out of this reason, we will refer to the music industry, unless it is essential to distinguish.

2.1.1. Evolution of the Music Industry

The Beginning – Vinyl & Compact Discs

Over the past decade, the music industry has been subject to a constant stream of change based on digital transformation. With the introduction of the Vinyl in 1948, the first physical music product came to the market (Shayo & Guthrie, 2005). At this time artists were disconnected from their fan base and music was solely distributed by the label, sold by record stores and commercialized through the radio. In 1982 the next technological advancement impacted the industry: the compact disc (CD). This new format was a first step towards the transformation from analog to digital music and signified the most profitable time for the recorded music industry. In the year 1999, the global music revenue for physical music products (CD's, vinyl, cassette) peaked at a total of 25.2 billion US-Dollars (IFPI, 2018).

The Digital Age – MP3, File Sharing and Digital Distribution

With the increasing accessibility of the Internet and the introduction of MP3 as the newest (digital) music format, the music industry was disrupted once again in the early 2000s (Owsinski, 2014). Additionally, peer-to-peer technology was introduced, which enabled end users to share and receive files without a central server. For the first time in the history of the

industry, this enabled a distribution over which record labels had no control. These new technological introductions fostered the launch of Napster in 1999. Napster was the first P2P-file sharing network that enabled users to both share and download MP3 music files for free through the application (Shayo & Guthrie, 2005). Napster is widely credited to be the beginning of music piracy and illegal downloading, which in the following years led, among other factors, to a rapid decline in physical record sales (Figure 1). Due to their illegal operations, most P2P-file sharing networks got shut down consequently.

To monetize on digital music distribution and solve the piracy problem in the industry, Apple Inc. launched the iTunes music store in 2003, which enabled customers to legally purchase and download the music they wanted for 0,99\$ per song without subscription fees (Apple Inc., 2003). Due to the enduring popularity of illegal file sharing, revenues for legal music distribution only grew slowly yet accounted for almost 30% of total revenues in the recorded music industry in 2012 (Figure 1).

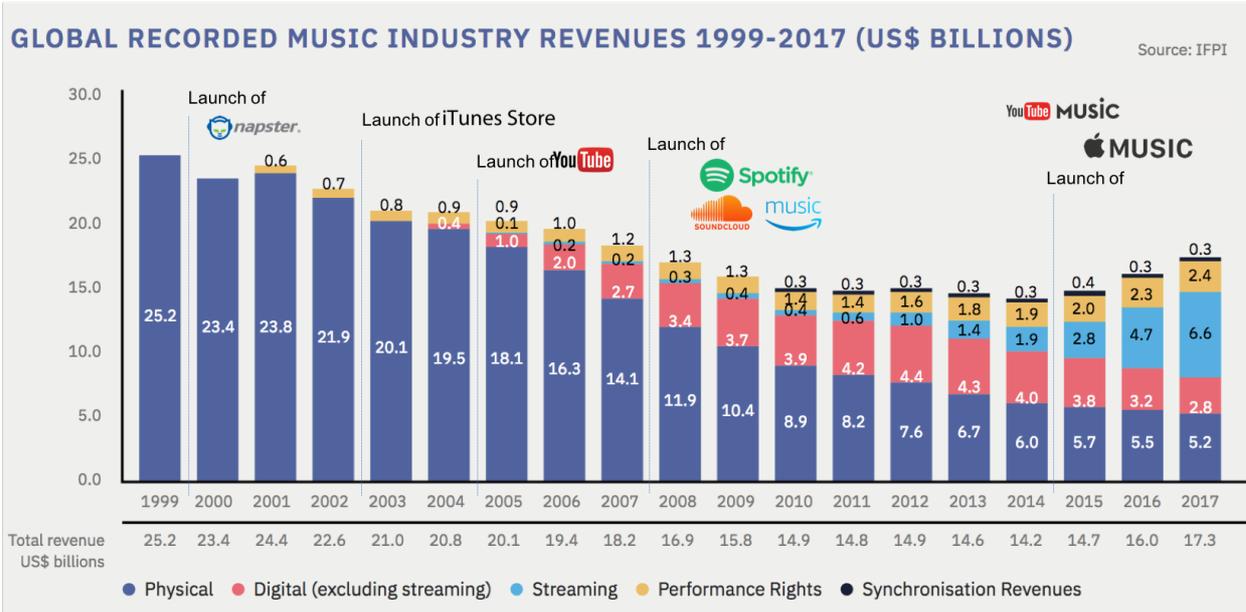


Figure 1. Market Entries and Global Recorded Music Industry Revenues 1999-2017. Adjusted from IFPI (2018)

From buying to streaming

While Apple’s iTunes music store evolved to be the biggest online music distributor in the world, the trend of streaming gained momentum, especially among younger consumers (PWC, 2018). With the launch of Spotify in 2008, the music industry was stirred up once again. By offering consumers unlimited streaming of over 35 million songs, music was now legally

consumable without the need of purchasing. On the one hand, this started a change of music consumption behavior from music owning to music “renting” and on the other hand brought back growing revenues to the industry for the first time in 2015 (IFPI, 2018). Despite the continuous decrease of physical music sales, digital music sales (incl. streaming) continued to overcompensate this loss for three consecutive years (ibid). The growing popularity of music streaming evoked the entrance of numerous additional DMDSs such as Apple Music, Amazon Music and YouTube Music which mostly offer subscription-based premium and advertising-funded free music streaming and downloading services (PWC, 2018).

2.1.2. Implications of Change

As outlined above, technological innovation brought constant change to the music industry. While revenue development is the most obvious one, changes to the supply chain, market structures, royalty payouts, transparency, and copyright are further topics of change that have been recognized by industry researchers (PWC, 2018; Tapscott & Tapscott, 2016; O’Dair & Beaven, 2017). A closer look is taken at the development within the subsections of the supply chain, distribution, and main stakeholders to understand the current challenges of the industry.

2.1.2.1. Supply Chain and Distribution

The traditional supply chain in the music industry has three levels of intermediaries between the creation of music by the artist and the consumption of music by the consumer (Graham, Burnes, Lewis & Langer, 2004) (Figure 2, left). The artists create the initial value with their music. The record company provides the know-how, services, and capital to produce and market the music on a larger scale. Distributors deliver the product to retailers, and they offer the product to the consumer (ibid.).

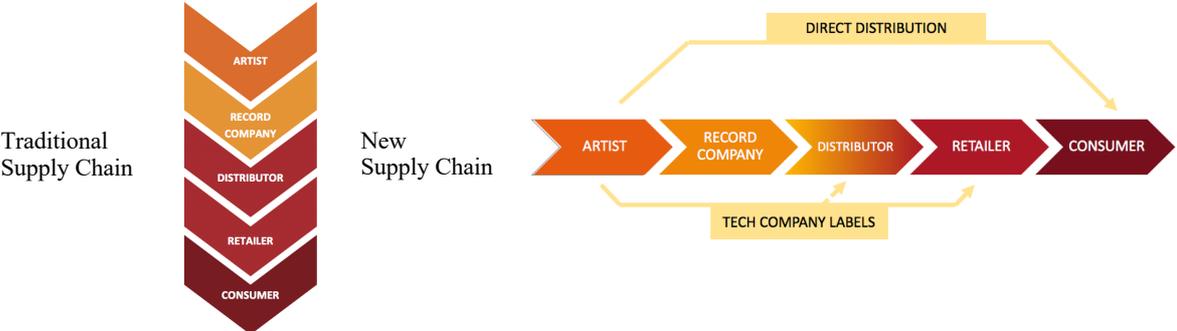


Figure 2. Schemes of Supply Chain Change in the Music Industry. Adjusted from Graham et al. (2004)

Through the introduction of the Internet, physical distribution and retailing was gradually replaced by digital distribution and the need for physical retail was minimized. This resulted in a replacement of record stores by digital retail stores like iTunes and Streaming Services. With the entrance of services like YouTube (in 2005) and Soundcloud (in 2008), a direct distribution level was added to the music industry supply chain (Figure 2, right). This enabled artists to directly distribute and promote their music to their fans without the need of a label, distributor or retail service. Yet, these services didn't offer artists to monetize their music.

Tapscott, Ticoll, and Lowy (2000) find that this development transforms the static industry supply chain into a more dynamic one where new combinations of interactions between supply chain actors emerge. Recent efforts in the music industry document actions of streaming platforms such as Spotify and Soundcloud in beta testing services, that directly close licensing deals with artists (Sisario, 2018; Soundcloud, 2019). While artists were already able to directly distribute their music through the services of Soundcloud and co., those deals also offer the possibility of direct monetization instead of only direct distribution with the benefit of increasing exposure. Such actions can further change the setup of the current supply chain in the industry and are an example of growing dynamics mentioned by Tapscott et al. (2000) (Figure 2, right).

2.1.2.2. Main Stakeholders

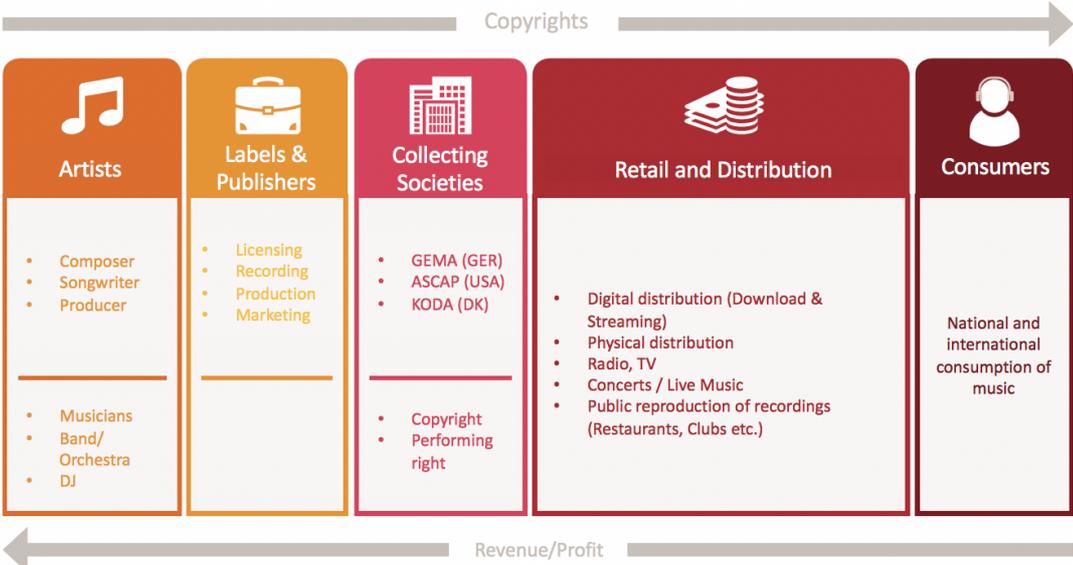


Figure 3. Actors in the Music Industry. Adjusted from PWC (2018)

To get a full picture of the music industry and the underlying processes, an overview of all the major stakeholders and their position in the market is provided in the following. This will help understand how revenue is distributed among them and shed light on the power balance and further evaluate current problems.

As outlined in the previous section, the flow of value goes from artists to consumers. The displayed, modified chart by PwC (2018, Figure 3) gives an overview of the stakeholders participating in this process, the flow of copyrights and the value creation process.

Artists

The stakeholder group of the artists includes all individuals involved in the process of creating music such as composers, producers, songwriters and musicians (vocalists, instrumentalists) (Kromer, 2007).

While artists are the root of value creation in the industry, they receive the smallest share of the money that is made with the music (Tapscott & Tapscott, 2018). "It would take songwriting royalties for roughly 47,680 plays on Spotify to earn us the profit of one LP sale" mentions Damon Krukowski, drummer of the rock band Galaxie 500 (Krukowski, 2012, para 4). As streaming increasingly develops to be the primary driver of revenue in the music recording industry (38% on 2017), artists are now more than ever dependent on live music and touring to receive an income (IFPI, 2018).

There are contradictory arguments on the bargaining power and possibilities of artists in the digital era. On one side, the technological development is said empower artists through the possibility of direct distribution for self-promotion and the possibility of full range music production without the need of a label or multiple other actors (publishers, radio stations) (Preston & Rogers, 2013; Tschmuck, 2016). On the other side, these advancements are said to vastly increase the competition by lowering the entrance barriers and eliminate physical sales, which used to be a primary income for artists (O'Dair & Beaven, 2017). Furthermore, new technologies fostered the entrance of additional intermediaries such as iTunes and Spotify, which are consequently taking their piece of the revenue (Tapscott & Tapscott, 2018).

Labels/Record Companies

Music labels unite large fields of action as they cover scouting, support and development of artists, production of music, marketing, rights management, distribution and data analysis (IFPI,

2018). They make money off of their signed artists by licensing and processing their work and in return ask for a share in revenue – which is called royalty (usually 50%). Royalties are generated from mechanical royalties (digital, physical sales, streams), performance royalties (broadcasted music, e.g. radio, clubs, restaurants) and synchronization royalties (music used in commercials, movies) (Bazinet et al., 2018).

There is a general distinction between major labels and independent labels, whereby the term “major” originates from the dominant market position of the biggest three labels (including their subsidiary companies). Therefore, labels that are not subordinated to these labels are called independent labels. The “big three” major labels today - Universal Music Group, Warner Music Group and Sony Music Entertainment, own 69.6% of the revenue market shares of the recorded music industry, whereas independent labels account for 30,4% (Informa, 2018).

Similar to the argument on the power of artists in the industry, scholars are not in unison about the development of the position of music labels, especially the majors. Some argue that technology and new structures have weakened the position of labels as creatives can get through to consumers without their help and tech companies like Google and Spotify increasingly cut in-between (Preston & Rogers, 2003; Daniel, 2019). Others are determined that development, such as decreasing entry barriers and the facilitated dissemination of music, actually strengthens the position of labels. As competition grows for everyone, artists are even more dependent on good label work to have commercial success (Arditti, 2014). Furthermore, major labels still have a remarkable impact on streaming platforms, as those platforms are dependent on the music catalogs that are in the hands of the labels (Ingham, 2016).

Collecting Societies

Concerning performance-, and synchronization royalty-payouts between artists and labels, another stakeholder comes into play. Collecting societies are associations that license music on behalf of the copyright owners (creatives/labels) (Bazinet et al., 2018). They are private organizations, usually operating on a national level. Music labels exchange information with collecting societies on behalf of the artists. This includes the registration of music titles, verification of data, revenue tracking and royalty information (PWC, 2018). These organizations collect royalties from radios, restaurants, and clubs in their national market, and with the help of their affiliate societies also internationally. For their service, they take a share of the generated revenue and pay it out the rest to labels/creatives (ibid.).

Through the digitalization of licensing and documentation processes and the high amounts of data in circulation, collecting societies increasingly struggle to maintain frequent royalty payouts and ensure transparency (PWC, 2018). This originates for example from heterogeneous data from different sources and the massive amount of data generated especially from streaming services. The formation of the ICE services as an European supplier of royalty administration services is one example of how collecting societies try to solve this problem. By joining forces and outsourcing some back-office functions, GEMA (Germany), PRS for Music (United Kingdom) and STIM (Sweden) (together ICE) try to shape their processes more efficiently (Gema, 2019). This is a second attempt after the failed creation of the Global Repertoire Database (GRD) in 2014 which intended to create a globally networked database with standardized data formats (Cooke, 2014).

Retailers and Distributors

Digital music retailers have mostly replaced traditional brick and mortar retailing in the music industry. Nowadays, platforms such as iTunes, Amazon Music or Google Play offer significant amounts of music to be downloaded in MP3 format. For offering songs on their platform, they take fees per album or single sale. The difference is paid to the labels in the form of mechanical royalties. According to McCandless (2015), iTunes takes around 30% per sold track which costs 0,99\$. The label takes a 47% share, and the artist gets the final 23%, which equals 23 cents per track.

Besides the digital retail distribution, streaming has emerged as the most critical revenue source of the recorded music industry. Companies such as Spotify, Amazon Music, and Apple Music offer both advertising funded free and paid subscription-based streaming services to consumers. Licensed music is forwarded to the platform by the label or distributor, and the platform offers the music to its customers (PWC, 2018). The distribution services usually negotiate catalog licensing deals with the labels, which allow them to distribute the music through their service for a specific amount of time and territory. Based on paid subscriptions, Spotify is the biggest platform with 207 million active monthly users and 97 million paying subscribers (for comparison: Apple Music has 50 million). This number is expected to grow to around 117-127 million paying subscribers (Spotify, 2019). The biggest streaming platform (music & video) by users is YouTube with 1.9 billion users monthly (Youtube, 2019). These companies are referred to as digital music distribution services (DMDSs).

The technology companies, as entirely new types of intermediaries, inserted themselves into the supply chain and took part of the revenue pie for themselves. This made it even more difficult for artists to earn money from mechanical royalties (Tapscott & Tapscott, 2017). For music streaming the revenue distribution is estimated as follows: 25% to the streaming platform, 55% to the label and 20% to the artist. This signifies about 0.0011\$ per stream on Spotify for an artist (McCandless, 2015).

Consumers

As the final stakeholder and ultimate participant of the value chain, consumers have adopted their habits in music consumption in line with technological developments over the years. In 2018, 86% of consumers worldwide were listening to music through on-demand streaming services. Furthermore, 75% of consumers used their smartphone to enjoy music (IFPI, 2018). Despite the vast increase in streaming with paid subscriptions growing by 41.1%, substantial numbers of listeners still engaged in music piracy. In 2018, more than one-third of consumers obtained music through copyright-infringement. Another popular reason for consumers not to pay for music consumption was the fact that they could find most of the music they were looking for on YouTube (ibid). This leads to the widely discussed “value gap” in the music industry. 55% of on-demand streaming comes from video streaming (like YouTube), yet this only generates 15% of the revenues of total streaming. This is because platforms like YouTube claim that they are not liable for the music they make available to the public (ibid.). While other services like iTunes and Spotify need to license their music catalogs before offering it to their customers, user upload services rely on safe harbor liability privileges to bypass this matter. The recent efforts to change the current copyright directive with the addition of “article 13” is aiming at terminating this problem (Council of the European Union, 2018).

2.1.3. Chapter Summary

This chapter introduced the music industry and the major stakeholders, the development of the industry over the past years and the challenges and trends that have emerged.

The music consumption and distribution underwent a digital shift, whereby music streaming emerged to the most popular way of music consumption as well as to the driving factor of revenue of the recorded music industry with a contribution around 38% of total created revenue

in 2017 (Figure 1). While this brought back revenue growth to the recorded music industry after more than a decade of straight revenue decrease, challenges like growing amounts of data, transparency, payment and copyright issues arose. Based on the presented findings, a couple of the main problems are summarized in the following.

The digital era helped creatives to reach their audiences and market their music without the need of multiple intermediaries such as labels and publishers. Though, after the decrease of physical sales and the rise of streaming, it became harder for creatives to make a living off of their art. Additional intermediaries (e.g., Spotify, Youtube) take part of the revenue pie and **fair and transparent payment distribution** remains an unsolved problem.

Alongside growing numbers of data through online distribution, the **increase of copyrighted music** products states a challenge for collecting societies and labels. It becomes increasingly difficult for them to properly document rightful ownership and distribute royalties in a frequent and comprehensible manner.

Besides the growth in paid subscriptions for streaming services, **music piracy** is still a severe problem of the industry. In 2018, 38% of music consumers still engaged in music piracy.

The **power in the industry is shifting** more and more towards a decreasing number of big players. This is noticeable in the reduction of major labels from six to three in a period of 20 years. Additionally, giant technology companies like Google (YouTube), Amazon and Spotify with a strong financial backbone increasingly built up their influence in the industry.

2.2. Blockchain Technology

This chapter aims to reflect on the current BCT capabilities and briefly touches its applicability scope. The chapter begins by introducing the foundation of the technology and its operation. After a literature review, blockchain characteristics are presented, and the most prominent ones are elaborated further. The features are reflected based on their relevance for the music industry. Also, an overview of different blockchain generations shows the scope of adoption possibilities. Lastly, the controversial side of the technology is presented in the sub-section of challenges. The chapter ends with a brief overview of previous studies that evaluated the blockchain application possibilities in the music industry.

2.2.1. How Does it Work?

Blockchain is a ledger of records that are distributed to every participant of a blockchain network. A ledger corresponds to a block that has its unique cryptographic hash. Each block also holds the hash of the previous block. In this way, blocks are linked, and a chain of blocks is created – this explains the name *blockchain* (Christidis & Devetsikiotis, 2016). Every transaction on the blockchain is registered, time-stamped, and one after another spread and locked in a block with a unique hash (Nowiński & Kozma, 2017).

The BCT enables the exchange of any digital asset between network participants in a secure way via the Internet (Wile, 2014). The participants, also called *nodes*, can freely and securely transact between each other without knowing or trusting anyone. In addition, “the ledger itself can also be programmed to trigger transactions automatically” (Lansiti & Lakhani, 2017, p. 2). Such network without any trusted central entity brings faster interaction between transacting parties (Christidis & Devetsikiotis, 2016). Furthermore, each node with access to a network can read the recorded data, but nobody has full control over it. In the end, this constitutes a peer-to-peer network of non-trusting participants sharing a collection of records with no trusted intermediary (Greenspan, 2015a). In order to avoid chaos and reach a comprehensive view (consensus), every blockchain has established rules that each transaction in the network has to comply with (Christidis & Devetsikiotis, 2016).

It is easier to understand how blockchain works by explaining the operation process of a blockchain network. Figure 4 presents a simplified scheme of a blockchain transaction. First, 1) due to private and public keys (see section 2.2.2.3. for more information) users can interact with others on the blockchain network and start the transaction. Then 2) a user’s node sends the transaction to the neighboring network nodes, which 3) assure the validity of the incoming transaction before passing it on. If fraud is detected, the transaction is discarded. Otherwise, 4) the confirmed transaction is recorded on a time-stamped block along with other transactions. Such a process is called mining. 5) The block is sent back to the network by the mining node. If the nodes verify the prerequisites (e.g., the new block holds valid transactions, and the hash references the correct previous block of the chain), then this block is added to the chain. In the case of rejection, the proposed block is discarded. Lastly, 6) the completed transaction ends a round (Nowiński & Kozma, 2017; Christidis & Devetsikiotis, 2016).

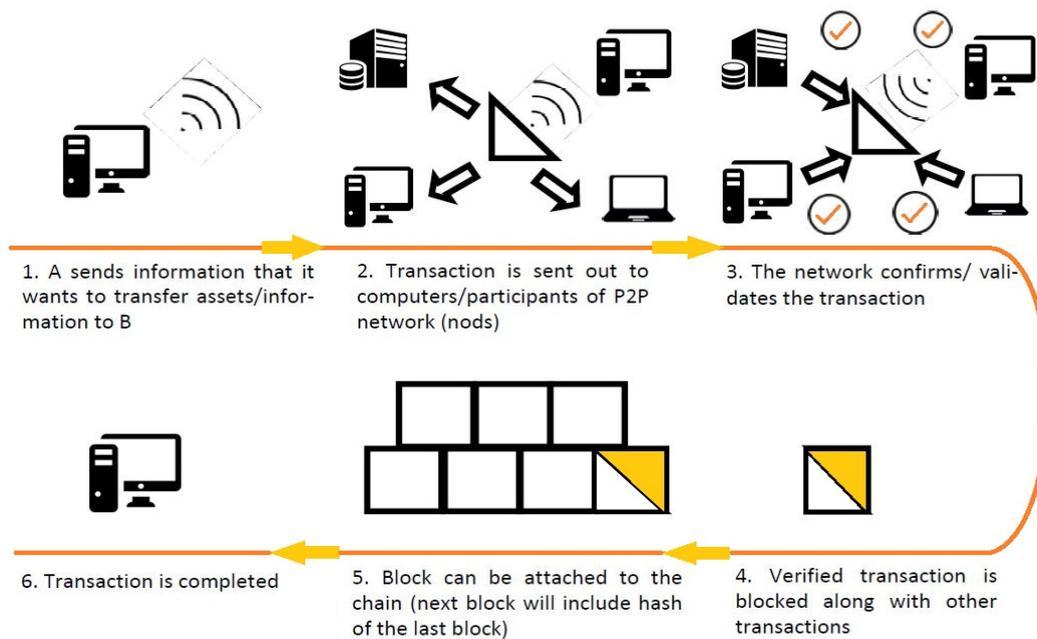


Figure 4. Simplified Scheme of a Blockchain Transaction. Adjusted from Nowiński & Kozma (2017) and Christidis & Devetsikiotis (2016)

Blockchain is an innovative technology that already has successful operating use cases. At the same time, there is still a big gap of knowledge in both the society and the business world due to its fully digital and nascent concept. For this reason, the following sections are dedicated to defining the technology by breaking it down and discussing the most prominent use cases.

2.2.2. Blockchain Characteristics

In order to understand how blockchain could improve particular processes, it is essential to identify the features of the technology.

Different use cases of blockchain applications highlight different features of the technology. However, the lack of literature within blockchain applicability in the music domain raises the difficulty to relate blockchain characteristics to the music industry. For this reason, a broader perspective was taken which covers different industries: the financial sector (Dhillon, Metcalf, & Hooper, 2017), equity crowdfunding market (Zhu & Zhou, 2016), and social businesses (Mukkamala, Vatrappu, Ray, Sengupta, & Halder, 2018). Table 1 provides a consolidated overview where outcomes of the presented studies are merged. Such perspective is created considering their application possibilities within processes in the music industry.

Table 1. Blockchain Characteristics

Characteristics	Description
Decentralized and distributed database (Dhillon et al., 2017)	Full history of data transactions is distributed in the network. Every party can verify records of transactions directly; there is no central body controlling the data.
Peer-to-peer transmission (Dhillon et al., 2017)	Communication occurs directly between peers instead of via a central node. Information is stored in every node as well as forwarded with every other transaction.
Transparency (Mukkamala et al., 2018)	Transparency is an underlying factor that is built into blockchains to achieve verifiability. Thus everyone ¹ is capable to connect to the network, see contents and verify them.
Anonymity (Mukkamala et al., 2018; Dhillon et al., 2017)	Usually stakeholders interact in the network utilizing their public or private keys instead of using their personal information. Every user has a unique 30-plus-alphanumeric address that identifies it. Users can choose to remain anonymous or provide proof of their identity to others.
Data security (Zhu & Zhou, 2017; Dhillon et al., 2017)	Blockchain architecture makes its data immutable and tamper-proof: once a transaction is entered in the database, the accounts are updated and the records cannot be altered, because they are linked to every transaction record that came before them. Also, decentralization removes the risk of losing data in case of central unit's problems.
Computational logic (Dhillon et al., 2017; Zhu & Zhou, 2017)	Blockchain can be programmed by setting up rules ("smart contracts") which automatically trigger transactions between nodes. Such feature increases flexibility and reliability in various application scenarios.

Note: Created according to characteristics described by Mukkamala et al. (2018), Dhillon et al. (2017), Zhu & Zhou (2017)

Blockchain, as a complex and nascent technology, maintains some specificities that are new and profound. This includes smart contracts, tokens, the concept of private/public keys, consensus protocols, and the type of blockchain (public/permissioned/private). Hence, a further elaboration on these aspects together with legal perspectives is given in the following sections.

2.2.2.1. Smart contracts

A crucial underlying factor of BCT is the concept of smart contracts, which was first introduced in 1994 by Szabo (as cited in O'Dair & Beaven, 2017). The emergence of BCT granted the concept with wide attention. Smart contracts are programmable protocols that can activate themselves when predefined conditions occur (Capgemini Consulting, 2016). In other words, "smart contracts operate as autonomous actors, whose behavior is completely predictable" (Christidis & Devetsikiotis, 2016, p. 297). Moreover, a contractual event is automatically executed without any monitoring or administration costs (Kiviat, 2015). Researchers suggested that smart contracts are "one of the first truly disruptive technological advancements to the practice of law since the invention of the printing press" (Wright & De Filippi, 2015, p. 10).

¹ Generally speaking, blockchain technology enables everyone to join the network and have equal responsibilities in it. However, there are exceptions depending on different types of blockchain. They are introduced in section 2.2.2.5.

The potential of these contracts is particularly high in fault financial activities like speed of settlement, risk of fraud, back-office costs or operational risks (Nowiński & Kozma, 2017). For example, a program can be written that a payment is released when a specific value of a particular good is reached. In a music streaming context, an artist could receive the agreed payment instantly whenever 1 million streams are reached. Another use case could be crowdfunding platforms like Kickstarter, where a creator would get funds only when a predefined target sum is accomplished.

2.2.2.2. Tokens and ICO

The shift from applying BCT to financial services to other applications beyond digital currencies occurred in 2015 with the rise of a blockchain called Ethereum and its related cryptocurrency called Ether. Vitalik Buterin together with his team developed the project in order to expand the capabilities of blockchain and create a general-purpose platform suitable for building new decentralized applications and digital tokens (Buterin, 2014a). This type of blockchain is an important milestone for developers and entrepreneurs which connected to the power of tokenization.

The process of tokenization enhances innovation and entrepreneurship as well as democratizes related processes (Chen, 2018). Briefly, a crypto token is a subset category of cryptocurrency which stands for an asset or utility reposed on its own blockchain (Frankfield, 2018). Tokens can both circulate in their own system by trading them into particular goods or services and be exchanged to specific cryptocurrencies. Also, token systems enable a modern way of raising funds and engaging stakeholders early in a project with a possibility to shape it (Chen, 2018). That is possible due to Initial Coin Offering (ICO), which is a digital substitute of the Initial Public Offering (IPO) in traditional business. ICO operates as a token sale when interested parties purchase tokens of a particular application and in that way sponsor further development of the project (ibid.). Moreover, tokens could be used as incentives to reward users for a specific action akin to a gamification concept. For example, Steemit is a BC-based social media platform where content users are awarded with tokens when they publish content (Sandre, 2018). Hence, looking at the range of token-related possibilities, creating a BC-based applications resembles building a community or an ecosystem.

2.2.2.3. Private and Public Keys

Network participants can interact with the blockchain and exchange data with their private/public keys which are mathematically linked together but not derived from each other (Microsoft, 2014). A private/public key is a long string of arbitrary letters and numbers (O'Dair, Beaven, Neilson, Osborne, & Pacifico, 2016). A private key is used as a signature to sign individual transactions or spend coins, and a public key resembles an individual address on the network (Christidis & Devetsikiotis, 2016). That is why private keys must be kept in secret, whereas public keys can be easily shared between other network nodes (O'Dair et al., 2016).

The process where the private/public keys are utilized is called asymmetric encryption due to its specificity of data encryption and decryption. First, the sender initiates a transaction and uses his own private key to sign the transaction. Then the transaction is spread to the blockchain network where the nodes can use the sender's public key to confirm the origin of the transaction. When the transaction is verified on the network, the receiver gets it and can unlock with his/her private key (Dhillon, Metcalf, & Hooper, 2017). Such asymmetric cryptography brings authentication, integrity, and non-repudiation into the network (Christidis & Devetsikiotis, 2016).

2.2.2.4. Consensus Protocols: Proof-of-X

The process of adding new blocks to the blockchain and the validation of transactions is called *mining*. Blocks are added only when a complicated mathematical equation is found, and the nodes reach a general agreement over the found solution (Jain, Arora, Shukla, Patil, & Sawant-Patil, 2018). Thus mining secures the ledger and generates new coins (Tschorsch & Scheuermann, 2016). However, the network nodes might be faulty or misbehave on purpose. This can disturb a continuous service of the blockchain. To prevent that, every node on the blockchain network runs a fault-tolerant consensus protocol (Cachin & Vukolić, 2017). This mathematical algorithm has two functions: 1) to guarantee that the block is updated by the same record in the same order over the whole system; 2) to keep attackers away from unbalancing the network and forking the chain (Jain et al., 2018). The updated block guarantees that all nodes reached a consensus on how new transactions are added to the blockchain and in which order. Such a mechanism establishes trust among the involved parties and provides security and integrity of a blockchain (Tschorsch & Scheuermann, 2016).

Consensus protocols can differ depending on the system. The most popular ones are *proof-of-work* and *proof-of-stake*, and both can operate only on a blockchain with deployed cryptocurrency (Christidis & Devetsikiotis, 2016). It is important to mention that despite which consensus mechanism is used, the blockchain network miners cannot fake the transactions, so they have considerably less control comparing to the owner of a traditional centralized database (Greenspan, 2015a).

The *proof-of-work* (PoW) is defined by “the probability of solving the complex equation which is directly proportional to the hardware computational power with the node” (Jain et al., 2018, p. 292). In other words, the higher the computational power, the more chances to solve the equation faster. In the PoW concept, cryptocurrency is used as a reward for miners for a block creation where costly hash calculations are needed (Christidis & Devetsikiotis, 2016). The majority of cryptocurrencies utilize this mechanism for mining and for prevention of Sybil attacks. Sybil attack is a security threat when an entity creates multiple identities in order to generate multiple votes, which can affect the network to act according to the entity’s favor (Christidis & Devetsikiotis, 2016; Tschorsch & Scheuermann, 2016). According to Ethereum founder Buterin (2014), the PoW protocol has many weaknesses, and high energy inefficiency is one of them. For example, it was estimated that the general use of global power consumption of Bitcoin is 22 TWh per year which is almost equals the power consumption of Ireland per year (de Vries, 2018).

The *proof-of-stake* (PoS) protocol is an alternative to PoW which employs much less computational energy. The mechanism defines that a node for mining the next block is chosen by the node’s balance (Christidis & Devetsikiotis, 2016). In other words, the possibility to be chosen is equally proportional to the participant’s stake in the given cryptocurrency system (Jain et al., 2018). The mining (also called *minting*) nodes are awarded according to the transaction value and also could lose their stake for malicious actions (ibid.). Hence, this protocol refers to a much greener and more secure consensus protocol. This reasoning is prominent for Ethereum blockchain developers who aim to switch from PoW to PoS in the nearest future (Huillet, 2019).

Another type of consensus protocol is *proof-of-authority* (PoA) which is similar to PoS and in some cases even more appealing. According to Banks (as cited in Naumoff, 2017), the concern around PoS is that a validator with the highest stake will not necessarily act in the best interest

of the blockchain due to different reasons. PoA is akin to PoS, only instead of the node's balance, the validator's reputation is used (POA Network, 2017). PoA works on a voluntary disclosed identity which is awarded by the right to validate blocks. However, in order to guarantee that the provided identity is true, additional robust verification processes are needed (ibid.). As an example, this type of protocol is utilized in Microsoft Azure, which offers solutions for private networks (Binance Academy, 2018).

2.2.2.5. Public, Permissioned and Private Blockchain

Blockchains can be categorized by *public*, *permissioned* and *private* blockchains, which differ by their level of decentralization and access possibilities (Walport, 2016). The majority of blockchains are kept publicly available (thus *public* or *permissionless* blockchain), meaning that anyone can join the network and run a node, invoke and validate transactions (Cachin & Vukolić, 2017). The open source nature of the blockchain fosters both the technology and integrity within other systems (Ivring-Berger, 2016). On the other hand, only some nodes with particular permission can access and update a *permissioned* blockchain which is operated by public entities (Cachin & Vukolić, 2017; Deloitte, 2016). Although the decentralized power of permissioned blockchains is minimized, they offer faster transactions, and data on the blockchain is more secure (Walport, 2016); whereas public blockchains require a higher security level. Simply said, the fewer people are aware of a blockchain, the safer it is (Parker, 2016). Systems of permissioned blockchains have their ways on how to identify their users (nodes) and manage who can release the transaction (Cachin & Vukolić, 2017). A *private blockchain* is also a permissioned blockchain, but its operation is managed by a single entity (ibid.). Moreover, since the participants in permissioned networks are whitelisted, the risk of a Sybil attack barely exists. The probability of a Sybil attack leads to a more costly consensus in public networks regarding both the needed computational power and incentives for miners (ibid.)

The most famous and largest application of public blockchains is Bitcoin whose network everyone can join and update (Poelstra, 2014). Permissioned blockchains are the ones developed for business, e.g., Hyperledger (Meng, Tischhauser, Wang, Wang, & Han, 2018). Private blockchains are capable of co-existing within the legal framework and escalate it rather than compete with it (Savelyev, 2018). For this reason, private blockchains have the most use cases in the financial and governmental sector.

2.2.1.6. Legal Perspectives: GDPR

In May 2018 a new approach to personal data protection came into force – the EU General Data Protection Regulation (GDPR). According to the European Commission, GDPR aims to strengthen EU citizens' rights and build trust in the Digital Single Market (European Commission, 2015). Every company falls under the GDPR if it offers free or paid goods or services as well as monitors or processes personal data of EU residents. This does not depend on whether a business is located in the EU or not (Art. 3 GDPR). One of the introduced rules within GDPR is the right to be forgotten. This means that individuals have the right to ask for their data erasure from a database by the service provider (Art. 17 GDPR). Due to the immutable nature of a blockchain, it would be impossible to execute such an inquiry. This means that user data cannot be recorded on a blockchain in order to comply with GDPR. However, it is possible to overcome this obstacle by storing users' private data in an off-chain repository. Then a location of such data would be linked to a unique hash data pointer which can be recorded on the blockchain. Later, if a user opts out from services or uses the GDPR right to be forgotten, data from the off-chain repository is deleted, and the hash on a blockchain becomes null (Zheng, Mukkamala, Vatrupu, & Ordieres-Mere, 2018). Hence, every BC-based business must also grasp how blockchain specificities cooperate with existing legal frameworks and in the case of impediments, employ other supplementing technologies.

2.2.3. The Scope of Applications

Although the history of blockchain is not that long, it is already possible to discern different generations of technology. Swan (2015) divided blockchain development stages into three categories that provide an overview of the most applicable cases (Table 2).

According to Swan (2015), Blockchain 1.0 started with its initial application in digital currency with Bitcoin whose value escalated by 1300% over 2017 (CoinDesk, 2018). However, 2018 is called the Crypto Crash year as Bitcoin plunged from \$19,000 per bitcoin in December 2017 to \$8,000 in February 2018 with smaller cryptocurrencies going down as well (Popken, 2018).

Table 2. Blockchain Development Stages

Type	Description	Examples
Blockchain 1.0	Currency	Bitcoin and similar cryptocurrencies
Blockchain 2.0	Contracts	Financial services, crowdfunding, smart property, smart contracts
Blockchain 3.0	Justice applications beyond currency, economics, and markets	Digital Identity, Intellectual Property Protection, Governance Services, government, Domain name systems

Note. Three Blockchain development stages and their use cases. Adapted from Swan’s (2015)

Later generations of blockchain started from 2015. Blockchain 2.0 refers to digital finance. An example is Nasdaq’s initiative of the BC-based application Linq, which provides private firms with the service to represent share ownership digitally or their improvements in a proxy voting, and company and public pension registrations (Nasdaq, 2016).

Nowadays BC-based applications tend to expand to other sectors beyond financial services. Zhao, Fan, and Yan (2016) related Blockchain 3.0 to a digital society, whose solutions are already starting to take form. The scope of applicable activities is enormous, starting with notary services and continuing with applications in the entertainment industry. First, using blockchain for notarization enhances security and privacy for both documents and certification seekers. In fact, notary files enabled by cryptographic hashes within BCT allow publishing proof of publication as well as eliminate the necessity for costly notarization procedures and ineffective mechanisms for transferring documents (Crosby, Nachiappan, Pattanayak, Verma, & Kalyanaraman, 2016). The entertainment industry is not an exception in the blockchain adaptation scope. Employing blockchain means evading content aggregators and platform providers that are a result of direct and efficient provision of products (Deloitte, 2017). According to Nowiński and Kozma (2017), subscribers of a particular blockchain community would be more willing to pay for content when they know that their fees are transferred to the rightful owners. Also, every user would pay for individual items they consume (e.g., songs) instead of the whole bundle covering the content they do not want (Nowiński & Kozma, 2017). Such new processes would enable a new commercialization business model that provides more transparent opportunities.

2.2.4. Challenges

Previous sections provided general information to shape a comprehension about BCT and related real-life use cases. However, only useful features were covered that could enhance existing processes. In reality, the technology has its hurdles which make it redundant or inapplicable in some digital interactions.

Energy Consumption

Various research and developments, trial and error, have assisted in identifying the current limitations of blockchain. First, the energy consumption of particular blockchain work is unsustainable. The proof-of-work protocol consumes a lot of computing power and thus energy. For example, it takes \$100 million worth of energy each year to complete \$3 billion worth of bitcoin transactions (Tapscott & Tapscott, 2016). Aware of the problem, developers are already working on energy-saving verification procedures. For instance, Ethereum version 2.0 aims to replace the proof-of-work algorithm with the proof-of-stake model, which then eliminates the need for miners causing an enormous amount of energy consumption (Huillet, 2019).

Unknown Governmental Position

Taking an outlook into the future, it stays unknown whether governmental intervention may hinder or prevent the dissemination of BCT. Formal organizations that could guide the development needs are still in a nascent stage and therefore valuable support is missing for the communities engaged in the blockchain sector (Tapscott & Tapscott, 2016). Moreover, there are some cases where BC-related services are illegal. For example, cryptocurrency trading and exchange operations are banned in China (Akolkar, 2018). When talking about China, it is also worrying that 74 percent of Bitcoin computing power is located in the country (Aki, 2018). If more than 50 percent of the hashing power is obtained by a single or a group of miners, then they can effectively control the blockchain (“51% attack”) which then eliminates the essence of blockchain – the decentralization factor (Tapscott & Tapscott, 2016). This and similar chances of abuse raise uncertainty that the BCT itself could also be considered a threat, especially if more criminal actions appear.

Blockchain as Job Killer

Blockchain can become a job killer once current authorization activities are employed within a blockchain (Tapscott & Tapscott, 2016). For example, in the music industry this could affect

music publishers, record companies and collecting societies. It is needless to say that resistance of the respective organizations is inevitable.

Increase of Privacy Problem

Lastly, blockchain could further intensify the already existing privacy problem by the transparency of transactions. Blockchain now opens up more data collection options (i.e., via smart home connected appliances) which corporations and intelligence agencies could take advantage of (ibid.). Within the music industry, it is crucial to carefully examine how private data is recorded in order to comply with GDPR rules. Most likely, additional off-chain databases could be needed to enable changing or deleting the data when needed.

In general, presented challenges could affect any business case where BCT is implemented. Yet, existing challenges within the blockchain operating mechanism, as well as application difficulties, have not limited the industry from further growth up to now. The active blockchain community consists of developers and tech-savvy entrepreneurs who accelerate the emergence of new solutions aiming to demolish current problems.

2.2.5. Related Studies: Blockchain Use in the Music Industry

Although there is a definite scarcity in the field of studies on blockchain in the music industry, generally expressed opinions are quite optimistic and attention to the subject is increasing. According to some opinions, BCT is expected to revolutionize the music industry (Perez, 2015; Wallach, 2014). One of the BC-based cases attracting the most attention is Mycelia, represented by the British singer, songwriter, and producer Imogen Heap. Gansky (2016) stated that her concept is going to transform music distribution as well as the way artists get paid. Gottfried (2015) went even further by presuming that BCT is capable of solving all the digital issues appearing in the music industry nowadays.

Researchers have identified several use cases of potential blockchain application in the music industry. They are presented in the following. First to mention is a **networked database** for music copyright data. O'Dair et al. (2016) argued that each item of recorded music could contain specific metadata, consisting of terms of use and contact details of the copyright holder. This would make it a lot easier to obtain a license to use such an item, e.g., a music track. Consequently, a progressing BC-based database of copyright data could ultimately become a

unifying comprehensive copyright database for music. On the other hand, such a concept raises questions inviting further considerations: who will enter such data? Who would verify the entered data? (ibid.)

Blockchain employs **fast and frictionless royalty payments**. In addition to low transaction costs of cryptocurrencies, smart contracts could activate prompt, automatic payments distributed to all rights holders (ibid.). Regarding this, Tapscott and Tapscott (2016) mentioned the possibility to *micrometer* streamed content – thousandths of a penny for milliseconds of video. However, it is unclear if consumers would be willing to start paying per stream instead of paying for a subscription plan.

Blockchain offers **transparency via the value chain** (O’Dair et al., 2016). Currently, specific details of streaming service contracts are concealed with non-disclosure agreements; thus it is almost impossible to evaluate if labels, publishers or collective management organizations are dealing with payments fairly (Cooke, 2015). It is said that Bitcoin provided a solution to the so-called Byzantine Generals Problem² (Lampert et al., 1982 as cited in O’Dair et al., 2016) – the problem of exchanging data over an unreliable network. PoW algorithm, embedded in Bitcoin, allows achieving consensus without any central authority or intermediary involved for verification of transactions (Back, 2002). Consequently, non-disclosure agreements would be brought to light in connection with transparency throughout the value chain. However, not all of the data has to be unveiled due to commercially sensitive information for publishers or different other reasons for fans and artists. Thus, the Dot Blockchain Music Start-up, for example, provides an option to hide or reveal anything beyond the Minimum Viable Data from/to the public. On the other hand, artists and managers still can overview the full value chain (O’Dair et al., 2016).

BCT enables **alternative sources of capital**. O’Dair et al. (2016) mentioned three potential sources. First, the offered transparency in music distribution via the blockchain can shed more light on different activities. This can enable creating higher levels of investor trust and a foundation possibility of influencing the estimated capital. Second, the authors introduced

² The Byzantine Generals Problem is a situation where involved parties must agree on a sole strategy in order to prevent a breakdown, but where some of the parties are immoral and spread false information or are unreliable in other ways. (Moskov, 2018)

“artist accelerators” as a viable business model, where artists are fully monitored during their careers in order to attract new sources of capital. Artists would be offered access to resources, facilities and networking in exchange for a small share of their future recording income. Lastly, crowdfunding can also level up by artists establishing their own tokens and smart contracts which can ensure that contributions are returned in case of not meeting a preset target (ibid.).

Debates on the BCT use in the music industry are argued to **omit the perspective of consumers**. It is reasoned, that in most discussions and applications, the opinion of consumers about the applicability and meaningfulness of such applications is left out (Baym et al., 2019). This is seen as problematic due to the fact, that consumers would need to adapt BCT as a medium to access music. In fact, by investigating discussions on the latter, a missing observation of the consumer’s standpoint becomes evident.

All in all, it appears that blockchain adaptation could support the development of a GRD, whose creation attempts have failed previously. Also, increased transparency in the value chain in combination with an improved payment system and new funding solutions could improve the poorly operating processes of the music industry. However, the found literature seems to provide a one-sided view of the potential of BCT application in the music industry. Scientific literature itself is not enough, and a lack of analysis of case studies was found. This gap within literature is intended to be filled in this thesis by performing a case study of current BC-based applications in the music industry.

2.2.6. Chapter Summary

Various successful BC-based use cases are continually extending the scope of blockchain possibilities. Innovative features like decentralization, transparency, immutability and smart contracts are expected to solve many issues throughout different industries. However, a detailed analysis is needed before jumping to a quick adaptation of the technology. Despite having knowledge of current legal rules, it is also essential to recognize the limitations and challenges of the technology.

While this paper focuses on the Blockchain 3.0 generation, having knowledge of the evolution of blockchain can provide assumptions about the current societal mindset towards cryptocurrencies and blockchain in general. For example, the infamous Crypto Crash in 2018

might have shaped a negative opinion in society preventing people from utilizing blockchain-based applications in their daily lives.

The previously introduced issues of DMDSs prove the demand for a sustainable business model. BC-based music applications are already emerging and their value proposition seems promising. However, a thorough analysis of current practices could help evaluate whether the technology is appropriate and can enhance current processes rather than making them more complex.

3. Conceptual Framework

One of the goals of this thesis is to understand consumers' behavioral intention towards the use of BBDMDs and the factors that determine the intention. This chapter will outline the theoretical framework that is used to research on consumers' intention. It will start by reasoning why theories were chosen and used in the present setting, followingly introducing the TPB and TAM and how they were applied in previous studies. Lastly, the appended model combining the used theories is presented.

One of the most renowned and validated theories in predicting human behavior is the Theory of Planned Behavior (TPB) by Ajzen (1985) (Cesareo & Pastore, 2014). The TPB has been widely applied in settings such as predicting the use of technology-based self-service outlets (Bobbitt & Dabholkar, 2001), the adoption of household technologies (Brown & Venkatesh, 2005), web-based e-commerce amongst small businesses (Riemenschneider & McKinney, 2001), Internet purchasing (George, 2004) and banking (Shih & Fang, 2004). Furthermore, the theory has proven itself valuable in constructing conceptual models to analyze digital music service adaption as well as predicting consumer behavior in such settings (Cesareo & Pastore, 2014; Kwong & Park, 2008; Martins, 2013). This is found to be a solid groundwork for applying the TPB to the present setting.

Additionally, after executing extensive research in the field of predicting human behavior in relation to IT usage and IT adoption, the Technology Acceptance Model (TAM) by Davis (1989) became evident as one of the best-known and highly empirically validated models (Taylor & Todd, 1995). As this study deals with predicting behavior that includes the use of new IT, the inclusion of the TAM seems suitable. Ajzen (1991), the creator of the TPB, further argues that additional predictors can be included in the model, as long as there is a strong theoretical justification for it. For justification, we rely on several studies that have been including variables of the TAM to the TPB in order to predict human behavior including IS acceptance (Taylor & Todd, 1995; Bounagui, Raubenheimer & Nel, 2009; Lee, 2009; Kwong & Park, 2008). Furthermore, TAM has been used in related studies dealing with blockchain adoption and cryptocurrency use (Queiroz & Fosso Wamba, 2019; Arias-Oliva, Pelegrín-Borondo, & Matías-Clavero, 2019).

Therefore, we added variables of the TAM to the TPB model to receive an appended model for our research. It will be presented later in this chapter. The creation of an appended model is motivated by previous studies, which have been including further variables to the traditional TPB model that were fitting in the IT adoption context and helped to further explain behavioral intention (Kwong & Park, 2008; Taylor & Todd, 1995). Furthermore, it is important to mention that a guiding premise of this study is that the decision to use a BBDMDS is a rational and thoughtful decision rather than an irrational one guided by unconscious motives.

3.1. Theory of Planned Behavior

The TPB is an extension of the Theory of Reasoned Action (TRA) developed by Ajzen and Fishbein (1980). Both models assume that an individual’s action is rational and accessible information is systematically used to make a decision. This means that an individual carefully assesses possible consequences given by certain actions. Furthermore, they take into account that the behavior of a particular individual is determined by his/her intention to perform a specific behavior. Intention in the context of the TBP is understood as the desire to perform a particular behavior. The TPB extends the TRA as it adds perceived behavioral control as variable beside subjective norm and attitude to the factors influencing the intention to perform a specific behavior (Ajzen, 1985). The model is depicted in Figure 5.

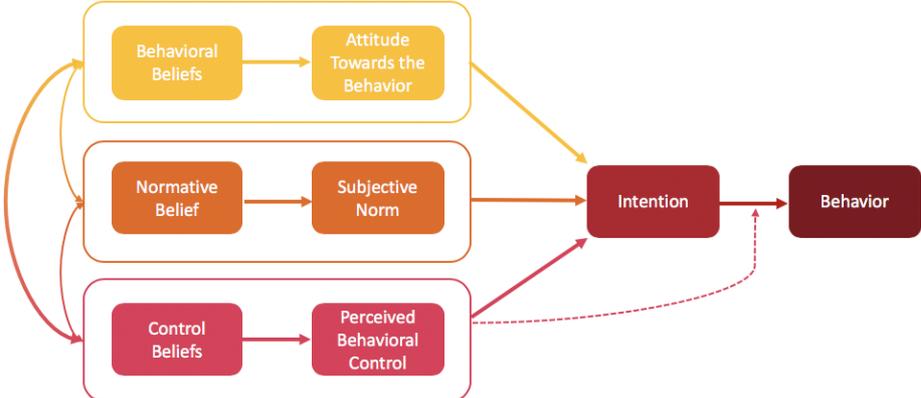


Figure 5. Scheme of the Theory of Planned Behavior. Adapted from Ajzen (1991)

The variables of the model reflect psychological constructs which will be briefly explained in the following sections.

3.1.1. Attitude Towards The Behavior

The first determinant of intention is *attitude (A)*, which is defined as the “individuals positive or negative evaluation of performing the behavior” (Ajzen, 1985, p. 12). In turn, attitudes are determined by beliefs, which link the behavior to a certain valued outcome. Those beliefs are called *behavioral beliefs*. For the given context an example could be a person’s belief, that *streaming music through a blockchain application (behavior), leads to a more transparent system, gets an artist paid directly, leads to a democratization of the industry (outcome)*. Whether the attitude towards a specific behavior is positive or negative, depends on the evaluation of the outcomes associated with a certain behavior and the strength of this association. This implicates that a person will hold a favorable attitude towards a certain behavior if he/she believes that the behavior will mostly have advantages and vice versa (ibid.).

3.1.2. Subjective Norm

The second determinant is the *subjective norm (SN)*, which Ajzen (1985) described as “a person’s perception of the social pressures put on him to perform or not perform the behavior in question“ (p. 12). Just as with attitude, the SN is based on beliefs. In this case, Ajzen (1985) talked about *normative beliefs*, which are beliefs about the opinion of other individuals or groups on whether the individual should or should not perform a certain behavior (ibid.). This means that if an individual believes that most of the people around him, with whom he wishes to consent, think he/she should/should not perform a certain behavior, he/she is likely to feel pressure to perform/not perform this behavior (social pressure). Whether the opinion of a person or group influences the decision to perform a certain behavior also depends on the individual’s motivation to comply with referent others (ibid.). An example for a normative belief in the given context could be an individual’s belief that *others think using a BBDMDS helps artists getting paid or blockchain related services are useless as blockchain concepts are destined to collapse*.

3.1.3. Perceived Behavioral Control

The last antecedent of behavioral intention is *perceived behavioral control (PBC)*, which is understood as an individual’s perception of how easy or difficult it is to perform a specific behavior (Ajzen, 1991). This factor is based on the premise that the performance of most behaviors depends to some degree on non-motivational and non-social variables such as

availability of requisite opportunities and resources (e.g., money, skills, accessibility) (ibid.). Just as with the previous factors, PBC is determined by beliefs. In this case, beliefs are termed *control beliefs*. They refer to the beliefs about the availability of skills, resources, and opportunities that may facilitate or impede the performance of the behavior. Control beliefs can be both personal (e.g., being able to use a blockchain based service) and situational (e.g., having access to a specific functionality in an application) (Ajzen, 2005). These beliefs are evaluated, based on the importance of those resources to achieve a certain behavior (perceived facilitation). Furthermore, the TPB claims that in some cases, PBC can predict behavior directly and not only indirectly through intention (Ajzen, 1991).

3.1.4. Intention and Behavior

Although there is no perfect relationship between behavioral intention and actual behavior, intention can be used as a predictor of behavior (Ajzen, 1991). The intention is influenced by the three previously mentioned determinants. Generally, it can be stated that the more favorable the attitude towards a specific behavior and the subjective norm is, and the greater the perceived behavioral control, the stronger should be the intention of an individual to perform a behavior. The relative influence of each determinant on the intention varies across different behaviors and situations (ibid.). This implicates that for some applications only attitude has an impact on the intention to behave or in others, only attitude and perceived behavioral control.

3.1.5. Related Studies

The TPB has been largely used in previous studies as the basis of their primary research. The majority of studies fall back on quantitative methods to measure the influence of attitude, subjective norm and perceived behavioral control on the intention to engage in a particular behavior (related to IT usage) (Kwong & Park, 2008; Cesareo & Pastore, 2014). This most likely originates from TPB founder's Ajzen (1985) original use and creation of the theory within an empirical context. Further, Ajzen (2002) provided conceptual questionnaire guidelines which he suggested for quantitative research. Yet, few studies like Tan et al.'s (2016) qualitative assessment of value-added service adaption demonstrated the successful use of TPB in a qualitative research environment. Assuming that the use of BCT in digital music services also aims at adding value to the applications, this approach seems valuable for our case. Hence,

we will apply a similar qualitative method to our study, adapting research methods and conceptual questionnaire guidelines proposed by the Ajzen (2002) to gain an in-depth understanding of consumers' intention towards the usage of BBDMS. This will allow us to gain knowledge about factors determining the relatively nascent use of BBDMSs and to some extent help us assess the importance of each variable to predict such behavior.

Most of the previous (empirical) studies researching on the intention of IT usage adoption find a correlation between attitude, subjective norm, perceived behavioral control and behavioral intention (Taylor & Todd, 1995; Tan et al., 2016; Kwong & Park, 2008). Kwong and Park (2008) however noticed that in their case, regarding the use of digital music services, the PBC variable is insignificant as most people nowadays have a solid understanding of using digital services and handle their way around digital applications. This could also be assumed for our case. Yet, due to the inclusion of BCT and novel features and processes resulting from it, the way of using digital applications and its complexity change (such as creating a wallet before using a service). Therefore, we will analyze both the comprehension of BCT in this new context and the perception towards the use of BBDMS to get a holistic view on the factors affecting the PBC variable.

In their research on consumer attitude and behavior towards online piracy and subscription-based music services, Cesareo and Pastore (2014) further discuss the factors of importance and exposure to music (how passionate listeners are) and willingness to try (a service). Due to a similar context and the use of the TRA (a predecessor model of TPB), these factors will be discussed as potential influencers of consumers' intention to use BBDMSs.

3.2. Technology Acceptance Model

Like the TPB, the TAM was adapted from the TRA. The theory was developed to explain the determinants and followingly the intention and behavior of an individual to use or not to use a specific information technology (Davis, 1989). The attitude towards the use of specific IT is determined by the variables *perceived usefulness* (PU) and *perceived ease of use* (PEOU). PU is determined by PEOU and is additionally seen to have a direct effect on intention. Just like in the TPB, attitude is the determinant of intention which in turn is directly related to actual usage behavior (Taylor & Todd, 1995). The model is presented below (Figure 6).

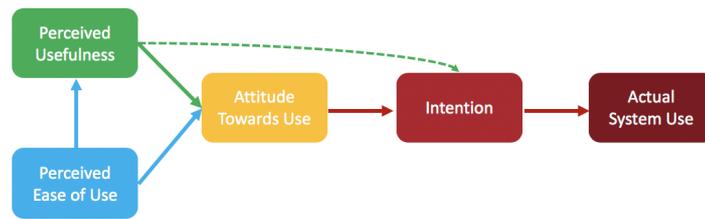


Figure 6. Scheme of the Technology Acceptance Model. Adapted from Davis (1998)

There are multiple extensions of the TAM such as the TAM2 (Venkatesh & Davis, 2000), the Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh, Morris, Davis & Davis, 2003) and the UTAUT2 (Venkatesh, Thong & Xu, 2012), which add further determinants of behavioral intention such as social influence, facilitating conditions, price value, habit etc. (ibid). Besides the fact, that the model extensions have been found to explain a high proportion of variance of intention across many contexts, they are also widely criticized for their overly complex nature and unlikelihood to measure each variable (van Raaij & Schepers, 2008). Bagozzi (2007) called the model “a patchwork of many largely unintegrated and uncoordinated abridgements” (p. 252). This is a reason why we choose to apply the simpler TAM model with the two variables of PU and PEOU, which were found to be highly correlated to the influence on attitude towards the IT usage and adoption (Teo, 2011; Kwong & Park, 2008). These two variables will extend the solid foundation of the TPB. Just as in the TPB, the variables represent psychological constructs which will be briefly explained in the following sections.

3.2.1. Perceived Ease of Use

The first antecedent of attitude towards the intention to use a technology is the PEOU. It refers to an individual’s beliefs of the effortlessness of using a technology. The concept of PEOU involves the logic, that even though a person believes that a technology would be useful for them, they might not adopt it if they perceive too much effort needed to use the technology (Davis, 1989). Therefore the TAM also mentions a direct effect of PEOU on PU. This is further justified by reasoning that the simpler a system is to use, the more usefulness can be derived from it (Venkatesh & Davis, 2000). In this study, PEOU is defined as the consumer's belief that using BC-related processes in BBDMDs will involve minimal effort.

3.2.2. Perceived Usefulness

The second determinant of attitude towards the intention to use a technology is termed PU. PU refers to the extent that an individual believes that using a particular technology will help him/her to perform a task better compared to his/her performance without the technology (Davis, 1989). This indicates that users usually develop a positive attitude towards IT use when they perceive technology as useful (ibid.). Therefore, PU has an additional potential direct effect on the intention to use IT. In this study, PU is defined as the consumer's belief about the usefulness of using BC-related processes in the context of BBDMDs.

3.2.1. Related Studies

Previous studies in the IT context have found positive effects of PU and PEOU on attitude and PEOU having a positive effect on PU (Taylor & Todd, 1995; Bounagui et al., 2009; Kwong & Park, 2008). Kwong and Park (2008) found out that the easier one can navigate through an application, the better is the PEOU and thereby the PU of the service. The navigation process refers to finding and listening to music.

Researchers further investigated the influence of additional factors on the intention to use particular IT. Taylor and Todd (1995) for example additionally found a positive influence of prior experience on the intention to use IT (use of a computer lab that provides high-end computing and printing services). Bounagui et al. (2009) included the influence of gender on the intention to use IT (music downloading services) while applying the TAM. They find that trust and self-efficacy are important predictors of usage intention for women while men focus on enjoyment. This is supported by Elliott and Hall (2005) who found that female consumers are less confident in using technology. Another study disclosed that a well-designed, user-friendly interface enhances user experience (Pauws, Bouwhuis & Eggen, 2000). Vlachos and Vrechopoulos (2003) listed content availability as the most important factor for mobile music services to be successful. In the course of this study, we aim at finding more underlying factors affecting the PEOU and PU of digital music services and will discuss our findings in relation to the results of the presented studies.

3.3. Appended model

We combine the two theories of TAM and TPB into an appended model. The model is presented below (Figure 7). It is built in a side-by-side structure, whereby the two models are assembled by their two common variables of attitude and intention. All other variables and their respective relationships are incorporated into the model separately and as in their original models. With the help of this theoretical framework, we aim to find out underlying factors determining consumers' intention to use BC-based digital music distribution services. The five factors PEOU, PU, A, SN, and PBC will serve as categories to conceptualize the questionnaire as well as assign and analyze answers of respondents and evaluate the importance of each category. As one of the studies also applying an appended model consisting of both TAM and TPB, Kwong & Park (2008) find a connection between PEOU and PBC. They reason that a service that is easier to use results in a user's increased belief that he/she will achieve what he/she wants to do. Due to the similarity of the research topics and theories used, we include this connection in our model and test the assumption in the course of our research.

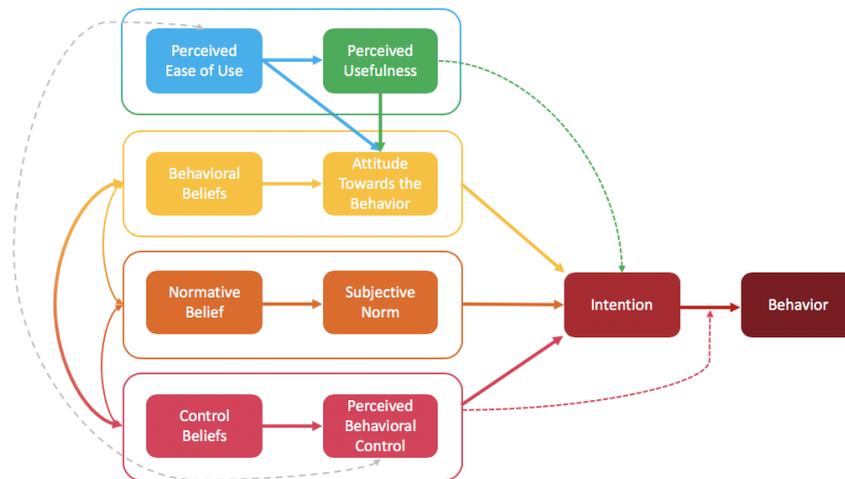


Figure 7. Scheme of the Appended model of TAM and TPB. Adjusted from Davis (1989) and Ajzen (1991)

3.4. Chapter Summary

This chapter introduced the theories used in this paper to investigate consumer behavior: the TPB and the TAM. We relied on these theories, as they offer a possibility to determine how consumers' intention to engage in a specific behavior is formed. The two presented theories have been combined to shape an appended model consisting of their respective variables. These are A, SN, PBC, PU, and PEOU. The appended model is used to shape the framework of our

primary research and leads the creation of the questionnaire. Together with the theory on the music industry and BCT, the appended model ultimately enables us to answer the proposed second research sub-question: *What determines the intention of consumers to use blockchain based digital music distribution services and how do they evaluate them?*

4. Methodology

This chapter presents and discusses the theoretical and practical approach taken for this research project in order to answer the research question. The following structure is based on the layers of the research onion established by Saunders, Lewis and Thornhill (2016) and visualized in Figure 8. The chapter begins by introducing how the research question was determined. Concerning the research onion strategy, a research philosophy is presented as the foundation of the study along with the research approach of the theory development. In the research design section, different elements are discussed which shaped the plan of undertaking the study at hand and corresponds to the orange section in the research onion. The center of the scheme presents techniques and procedures for data collection and analysis. The chapter is finalized by assessing the quality of this research project.

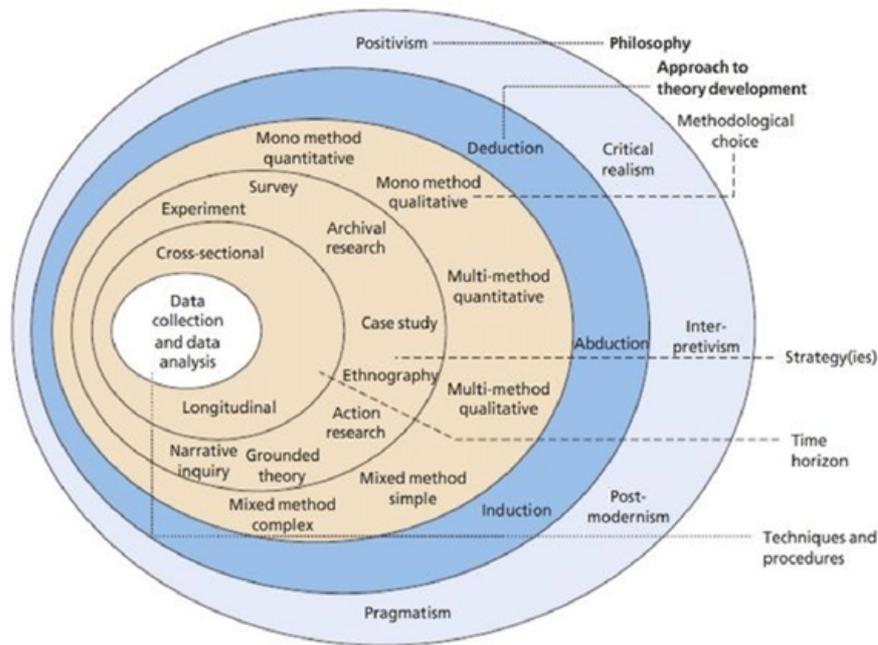


Figure 8. Scheme of the Research Onion. Adapted from Saunders et al. (2016)

4.1. Determining the Research Question

Referring to Alvesson and Sandberg (2011), the origin of a scientific research question is anchored in existing academic literature. Accordingly, they suggested two approaches to develop feasible research questions. The first perspective recommends to identify and challenge

foundational assumptions of the found literature; whereas the second one points to existing gaps in the literature and aims to fill them without questioning underlying assumptions (Alvesson & Sandberg, 2011).

Based on the previously discussed literature review it can be assumed that there is a gap in current related literature. In general, the existing literature stems from a predictive nature, which mainly covers the implicit opportunities of BCT in the music industry (e.g. O’Dair et al., 2016; Tapscott & Tapscott, 2016). The area lacks investigation of real-life case studies of companies that have implemented BCT within their services. For this reason, we aim to examine how and to what extent BCT can create value for the music industry through the application in BBDMDSs. Consequently, we will be able to assess what value this can bring to different stakeholders and derive practical implications. Thus, the first research sub-question is:

Q1: What value do blockchain-based use cases add to the music industry?

In addition, the carried out literature review revealed that existing research and discussions in the field tend to omit consumers’ perspective. Hence, through examining possibilities, especially novel factors of BCT applications in the music industry, we seek to find out about consumers intention to use BBDMDSs and their evaluation of the latter. Therefore, the second sub-question is defined as:

Q2: What determines the intention of consumers to use blockchain based digital music distribution services and how do they evaluate them?

The analysis and combination of the findings of the preceding questions along with the literature review on the music industry as well as the status quo within the BCT research field aim to answer the general research question of this study:

What value does BCT bring to the music industry through the application in digital music distribution services and what determines consumers’ intention to use them?

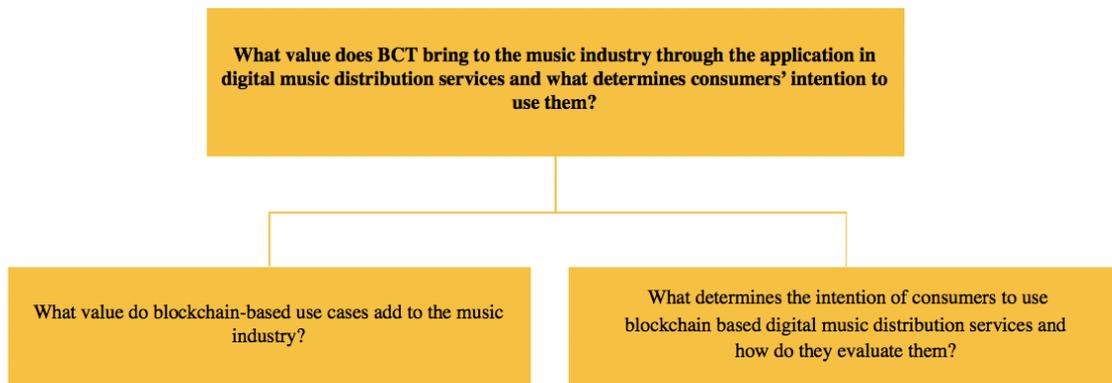


Figure 9. Diagram of the Research Question and its Sub-Questions

4.2. Research Philosophy

Business and management related studies can be generally presented by research philosophy theories. The adopted theory helps to identify a suitable research design (Saunders et al., 2016). Regarding the study in hand, pragmatist philosophy seemed to be the most applicable for several reasons. Firstly, “pragmatism is concerned with action and change and the interplay between knowledge and action” (Goldkuhl, 2012, p. 136). It is applicable when a research intervenes into the world instead of merely observing it (ibid.). Pragmatist philosophy also highlights the importance of practical solutions that can inform future practice (Saunders et al., 2016). Following that, this research started by defining the problem whose investigation aims to establish constructive knowledge supplemented with practical outcomes. Moreover, the pragmatic approach allows examining what is perceived valuable for a researcher in a way he or she finds it relevant (Tashakkori & Teddlie, 1998). For this reason, the authors of this study chose to examine consumers’ position over other stakeholders’ of BBDMDs, utilizing techniques and strategies relevant to their perception at that time.

In addition, every research consists of assumptions that can help to define the relevant research philosophy. They include beliefs about human knowledge (epistemology), nature of reality or being (ontology) as well as the range and ways researcher’s values have an impact on the research process (axiology) (Saunders et al., 2016). These elements shape a researcher’s understanding of the research question, the way for choosing methods and interpreting findings (Crotty, 1998 as cited in Saunders et al., 2016). Assumptions applicable together with the chosen pragmatist philosophy are discussed further.

4.2.1. Ontology

Ontology defines the assumptions about the nature of reality (Saunders et al., 2016), which in this study is generalized to examine what it is like being a consumer of DMDs. Ontological assumptions can be divided into two different positions: *subjectivism* and *objectivism*.

The *subjective* perspective refers to the social truth created by observations and the corresponding behavior of people. As opposed to subjectivism, the *objective* approach claims that social reality is external to us and other social actors that are concerned with it (ibid.). Accordingly, both perspectives of ontological assumptions are reflected in this study. First, the *objective* reality is examined when investigating related real-life cases and pursuing to answer the first sub-question. Although there were no data-generated scientific facts, the collected information produced generalizable outcomes. Then, assuming that the usage of BBDMDs is influenced by individual perceptions, a *subjective* approach is taken to answer the second research sub-question. Such a combined approach is expected to reveal unbiased organizational factors which were later tested through consumers' perspective and ultimately led to a multifaceted discussion.

4.2.2. Epistemology

Epistemological assumptions aim to answer the question of what constitutes adequate knowledge and how to communicate it to others (Burrell & Morgan, 1979, as cited in Saunders et al., 2016). Consequently, different positions can be used for knowledge development, such as positivism, interpretive or realism.

As we found out from the ontological position already, this study embodies both objectivism and subjectivism continua in regards to the proposed sub-questions. Epistemologically, the focus on organizational data reflected objective positivism which shapes knowledge based on facts. Even though data was collected via the Internet sources, this helped to answer the first research sub-question. On the contrary, the interpretive perspective was employed by collecting knowledge from consumers towards their perception of BBDMDs and providing practical implications. In turn, this helped to gain findings to answer the second research sub-question. In both cases, theoretical implications will be supplemented with practical knowledge which

can offer hands-on solutions for future practices containing similar problems as defined in this study.

4.2.3. Axiology

Axiological assumptions define the extent to which researchers' values and ethics have an impact on the research process. Besides, researchers often have to deal with research participants' values as well. A study is usually initiated by researchers' uncertainties and assumptions that are developed throughout the whole project process (Sanders et al., 2016). From an axiological point of view, the chosen pragmatist philosophy reflects value-driven research since the significance of the phenomenon was inspected from an industry perspective as well as consumers' position. Despite that, during the analysis of the first research sub-question with an objective approach, a value-free position was kept in order to provide unbiased results and a general image of the situation.

4.3. Research Approach

Saunders et al. (2016) presented three research approaches: deductive, inductive and abductive. First, the *deductive* approach is a top-down method that starts with a theory that is tested throughout the work by utilizing empirical data. On the opposite, *inductive* reasoning generates novel theories grounded by empirical data and discovered themes and patterns. Lastly, the *abductive* approach is taken when neither of the previously described ones can be adopted fully. *Abduction* combines deduction and induction, thus moves back and forth between theory and data (Suddaby, 2006, as cited in Saunders et al., 2016).

The ongoing study deploys an *abductive* research approach. Initially, the argumentation of the problem statement was delivered from the literature review; thus a deductive approach was used. Consequently, the inductive reasoning was followed as the collected secondary data enabled to explore the phenomenon as well as determine and discuss patterns regarding BBDMDSs. These findings were utilized later as a basis for primary data collection in the context of the conceptual framework, thereby aiming to answer the second sub-question.

4.4. Research Design

This part presents and discusses the steps that were taken in order to answer the initially determined research question and sub-questions.

As explored throughout the literature review, there is a lack of studies examining real-life use cases of blockchain application within the music industry, and none reflect on consumers' perception towards them. Accordingly, an *exploratory* approach was taken as the purpose of the research design to explore new insights and to evaluate the phenomenon in a new light (Robson, 2002). Such an approach is expected to help us fill the determined research gap and establish knowledge in the field by employing a *qualitative research design*.

According to Saunders et al. (2016), *qualitative research* is used for an in-depth analysis of particular situations in a given context. Qualitative methods are claimed to provide an understanding of complex practices while gathering and examining meanings and their links expressed by the participants (Saunders et al., 2016). Concerning the study in hand and its pragmatist philosophy, the contribution will be supplemented with practical outcomes. The study represents a *cross-sectional time horizon* as it studies the particular phenomenon at the specific time of writing the project.

4.4.1. Research Strategy

The research strategy chosen for this study is *an Action Research strategy*. Generally, Action Research (AR) is an iterative strategy that is used to create answers for genuine organizational issues and involves the community in the process (Coghlan, 2011; Coghlan & Brannick, 2014). Simply put, the goal of this strategy is to provide organizational learning with practical outcomes. According to Saunders et al. (2016), the procedure successively includes cycles consisting of problem identification, action planning, taking action, and evaluating the result. Although the strategy begins from a particular context with a specific research question, it is common that the attention of the question changes as the research evolves. This is inherited due to the cyclic action plan that the strategy deploys (ibid.).

Regarding the study in hand, the initially chosen pragmatist philosophy aligns with the AR strategy. As implied earlier, pragmatism is about action and alteration as well as information exchange supporting particular actions (Goldkuhl, 2012). Thus AR also reaches for practical outcome acting on knowledge. Moreover, in the AR strategy, participants of the ongoing

research acquire the role of co-researchers (Saunders et al., 2016). Applied to the present case, knowledge was passed on to interviewees by introducing underlying concepts and the functionality of BBDMDSs. This enabled a better understanding for participants because the established concept was assumed to be unfamiliar to the general public.

The Strategy Process

The specific steps of the AR strategy applied particularly to this study can be visualized in a spiral graph (see Figure 10).

The first cycle of the AR spiral represents the section of this study, where we looked into what value BBDMDSs bring to the music industry (Q1). As the outcome of this, we proposed an improved concept of BBDMDSs. The second cycle of the AR spiral was performed by collecting factors that form the intentions of consumers to use the proposed conceptual model and assessing them afterward (Q2). Once we evaluated these aspects, the third cycle of the AR spiral occurred - evaluated findings allowed us to derive practical knowledge for any BBDMDS, which can assist them to drive further action.

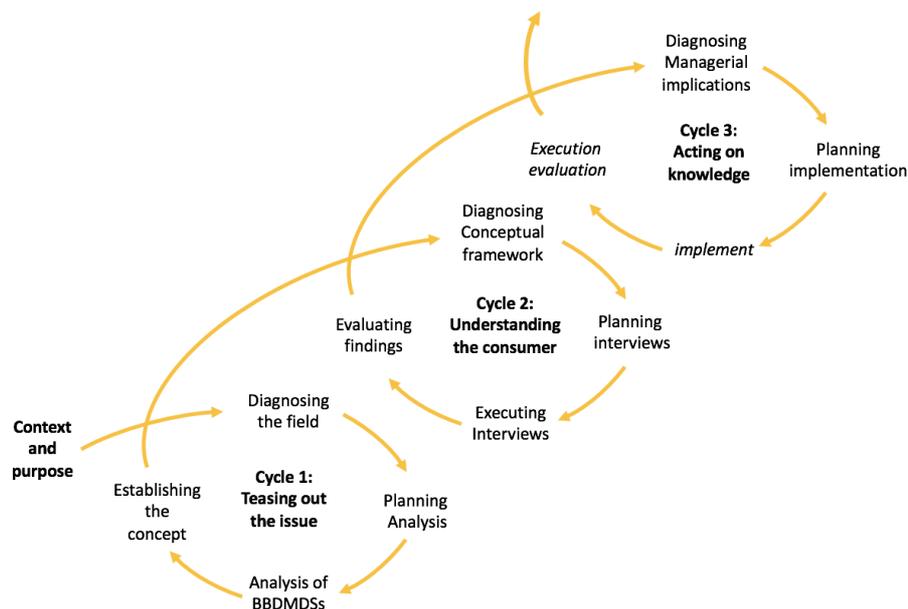


Figure 10. The Spiral of the Action Research strategy adopted in this study. Adjusted from Saunders et al. (2016)

4.4.2. Ethics

Ethics in research consider “the standards of behavior that guide your conduct in relation to the rights of those who become the subject of your work, or are affected by it” (Saunders et al.,

2016, p. 239). Simply put, it signifies the respectability of researchers' behavior towards the individuals involved in or affected by the study. It tackles respect to others, avoidance of harm to participants, informed consent and privacy of those taking part (Bryman & Bell, 2015; Saunders et al., 2016). In the context of this thesis, each interview began with introducing the objectives of the research and what part the participant is taking in the context of the study. Secondly, all interviewees were kindly asked if they provide their consent to be voice-recorder, to use their name and the data within the scope of the research. Their given consent to use their actual name also complied with privacy rules. Besides, the participants were not forced to answer questions they felt uncomfortable with.

4.5. Research Techniques and Procedures

In order to gain a full image of the current context covering both business cases and technical understanding of BBDMDSs, a *multi-method qualitative approach* was adopted with a corresponding qualitative analytical procedure. This approach was chosen because of the novelty of the phenomenon and the mass audience's lack of familiarity with blockchain applications in the music industry. In this way it fits the purpose of the study, aiming to collect in-depth insights about consumers' intention. In addition, different research methods can provide distinct data types in the form of primary and secondary data. Consequently, data collection and analysis techniques, that are discussed in the following sections helped to establish practical implications.

4.5.1. Data Collection

The following section turns the attention specifically to the outline carried out for secondary and primary data collection along with the deployed methods.

4.5.1.1. Secondary Data

Scientific literature alone was not enough to answer the research question. For this reason, *multi-source secondary data collection* was applied which enables to gain valuable data covering a broad range of sources. Several additional reasons led to the choice of this data collection method. Firstly, it allowed shaping a general image of BC-enabled music applications. Secondly, it substituted lacking insights about organizational processes from internal stakeholders of the analyzed applications, as they were not available. Also, it is less

time consuming than primary data collection and often yields higher-quality data (Smith, 2006, as cited in Saunders et al., 2016). Followingly, it enables us to get unbiased information applicable to all BBDMDSs.

The secondary data collection is used in the first cycle of the previously presented Action Research strategy. The information about real-life cases of BC-based services was collected from various sources. First, the article “List of blockchain music streaming platforms to watch in 2019” (Bartmann, 2019) was analyzed and active applications were selected. Second, the category *Entertainment* on the website *CoinCheckup.com* (CoinCheckup, n.d.) was inspected in order to find new music platforms that were not involved in the Bartmann’s (2019) article. The collected data was put into a table of comparison in order to construct themes and patterns. This provided a general view of the density of applications in specific fields. Consequently, the densest segment of BBDMDSs was chosen for a more detailed analysis applying a *multi-case study research method*.

Case studies “explore and investigate contemporary real-life phenomenon through detailed contextual analysis” within a specific number of events together with their interconnections (Zainal, 2007, p. 2). Briefly said, such technique enabled to examine real-life events in-depth within the research context. Particularly the multi-case design is used within a real-life phenomenon which provides replication of evidence through various sources (ibid.). In our case, the replication was obtained when the selected segment of multi-BBDMDSs was analyzed. The revealed patterns assisted in explaining the complexity of the situation and understanding the extent to which BCT is applied in DMDSs.

Many prominent details about BBDMDSs were found via Internet sources. Organizational websites, company whitepapers, reports, forum posts and blogs were taken into consideration. It is important to note that such data is usually not created for academic purposes, nevertheless it assists in getting a broader perspective and preliminary information on the subject.

4.5.1.2. Primary Data

After analyzing and consolidating the gained secondary information, primary data was collected in order to provide an answer to the second sub-question in connection to the main research question. For data generation, we used *semi-structured interviews* involving music

consumers. The purpose of the primary data collection was to obtain insights into consumers' intentions to use BBDMDSs. Subsequently, the elements and process of the interviews are presented.

Sample Group

The ideal population for primary data collection is people who actively use digital music distribution services and have some knowledge of BCT. In this way we aimed to find a sample group who is familiar with main BC capabilities and some use cases, thus have a general perception towards the nascent technology so that our interview questions would make sense for the participants. Also, participants' knowledge assisted in investigating what aspects of BCT should be highlighted in the marketing communication of BBDMDSs.

Interviewees participated voluntarily, and all of them expressed their consent to use their name and data in the research project. The chosen sample size consists of five participants, which is sufficient as the minimal number for a qualitative analysis according to Creswell (1998). We went with the minimum required sample group size due to time and resource scarcity. Furthermore, due to the novelty of BBDMDSs, emerging factors in the interviews were quite limited, and saturation of new factors was noticed after the fifth interview.

In general, the sample group consists of 23 to 31-year-old male working students with different nationalities. Demographics of the participants are not taken into account for the analysis, but if needed for transferability reasons, they can be found in Appendix A.

Structure of the Questionnaire

Semi-structured interviews were conducted for primary data collection. The interview consisted of different parts covering questions to get participant's consent (1), demographics (2), individual music consumption (3), music industry (4), BCT (5), and usage of BBDMDSs (6). The last topic is the most important to our study, where the questions reflected the variables from the previously defined appended model of TPB and TAM (see section 3.3.). All of the other topics assisted as an introduction to the last part (6), so that participants would consecutively shape their general impression of the industry and BCT which later would assist in providing answers within the more difficult topic on BBDMDSs.

Consequently, 46 open key-questions were included. TPB related questions were set according to Ajzen's (2002) conceptual questionnaire guidelines. The interview was opened with a remark where the main topic was introduced and an explanation was given on how participants would contribute to the research. Also, before the last topic (6), the concept of a BBDMDS platform was introduced in order to collect service-specific insights. The full interview structure can be found in Appendix B.

Interview Process

After the structure of the questionnaire was set, we proceeded with a control interview. Then we discussed the general impression of the questions, their difficulty, and the perceived relevance with the interviewee. According to that, some modifications were made to the original questionnaire. The obtained insights from the control interview were evaluated as valid; therefore they were used in the overall research analysis context. All interviews were carried out within the period of weeks April 10-24th, 2019.

4.5.2. Thematic Data Analysis

Thematic Analysis is seen "as a generic approach to analysing qualitative data" (Saunders et al., 2016, p. 579). This type of analysis offers guidance in searching for themes that can be found across a data set. It involves the coding of data for further analysis, related to the research question (*ibid.*). Themes in this research are also referred to as factors.

This research applied the Thematic Analysis approach according to the procedure provided by Saunders et al. (2016). First of all, we familiarized ourselves with the data set by reading the transcripts. As a second step, the data set was coded in chunks of text, and those chunks were assigned to factors with the help of the coding software NVivo. The factors that emerged throughout this coding process were merged as well as discarded in the further analysis process. In turn, the factors were assigned to categories where they seemed most applicable. Categories were obtained from the applied TPB and TAM theoretical model. Hereby, categories referred to the variables of the appended model, namely A, SN, PBC, PEOU, and PU. Relevant text passages were documented as citations, interpreted in their meaning and used to lead the analysis and the following discussion. Hereby, the number of applicable quotes per factor was counted numerically to facilitate the analysis. The obtained data is expected to expand the theory and provide practical implications.

4.6. Quality Evaluation

Central elements for data quality assessment are *validity* and *reliability* factors. They ensure the credibility of the research design by minimizing the chances of misinterpretation and wrongful influence on the study outcome (Saunders et al., 2016). However, these factors are better in use for quantitative evaluations and are often considered as inappropriate in a qualitative study. Consequently, Saunders et al. (2016) suggested alternative concepts which are more suitable for qualitative research. They are *credibility*, *transferability*, and *dependability* (Lincoln & Guba, 1985). The quality of this thesis is proven according to these criteria in the following sections.

4.6.1. Credibility

Credibility refers to the internal validity and the level to which findings are compatible with reality (Lincoln & Guba, 1985; Shenton, 2004). In this study, credibility is assured by following the proven research strategy of AR which is well-suited for conducting qualitative research with a focus on practical outcomes (Saunders et al., 2016). Moreover, the strategy is strengthened by pragmatism philosophy, as philosophy also underlines the focus on practical implications.

Regarding secondary data, it is common that the primary purpose of such collected data may not match with the objectives of the ongoing research. Also, there is a risk that such data could be outdated (*ibid.*). For this reason, we focused on secondary data related only to applications that are currently in use and have published news within the ongoing year 2019.

To obtain credible primary data, which in our case represents the data gained from consumer interviews, it is crucial to enroll a well-prepared procedure (Saunders et al., 2016). First, in order to assure authentic answers, we involved participants who have expressed their free will to take part in this study. This is a beneficial factor to get a credible outcome (Shenton, 2004). Next, the framework of the interviews was prepared according to the well-established theories of TPB and TAM. They are commonly used for consumer behavior research, also within the IT and music sector. In addition, by the time of the interviews, the authors already had extensive knowledge about the status quo in the music industry and BCT application in this context. It allowed to assess the accuracy of responses and provide additional information to the participants when needed. Moreover, interviews were carried out by both researchers together.

After every interview, findings were discussed and reflected. This also affirms the credibility factor (Saunders et al., 2016).

4.6.2. Transferability

Transferability corresponds to the external validity factor, or also termed generalizability (Lincoln & Guba, 1985). Transferability is given if a researcher provided a well-defined subject under investigation, results and findings that could be transferred to another setting (Saunders et al., 2016). Accordingly, we spent much of our attention on informing ourselves about the status quo in the music industry and BCT capabilities in this context by analyzing real-life use cases. Concerning that, a reader should be capable of assessing if the established conceptual design fits a different setting that he/she is interested in. If a parallel is found, then the reader can act upon further defined practical implications which were obtained from the data collection. However, it is important to note that the involved sample group is relatively small, therefore we acknowledge that the findings from primary data collection only to some extent represent a general audience.

4.6.3. Dependability

This criterion is similar to reliability, which refers to recording all of the progressions in order to create a reliable research paper easily understood and assessed by others (Saunders et al., 2016). Simply put, an established study should be appropriate to use for later investigators and generate similar outcomes. In fact, dependability and credibility are akin to one another (Shenton, 2004); thus some factors were already addressed when ensuring the credibility.

Nevertheless, in the studies where secondary sources are used, the original purpose might be different from the present study. Therefore, it is recommended to be cautious about the nature of the selected studies as well as the way to analyze and generalize them (Hakim, 2000). Accordingly, to avoid misrepresentation of the analyzed BBDMDs during secondary data collection, we looked into various available sources and reflected on the latest and the most trustworthy ones. In addition, throughout the whole work, we focused on delivering cogent findings as well as follow a structured approach to obtain them. By doing this, we assume that other researchers are capable of replicating our study if needed. Nevertheless, it is important to note, that due to the cross-sectional time horizon of the project, the phenomenon is likely to

change in essence. Consequently, before replicating the study, we recommend evaluating its relevance and the status quo again.

4.7. Chapter Summary

The study at hand deployed pragmatism and followed the AR strategy which allowed dividing different stages into cycles with the overall goal to produce a study whose design can be transferred to another setting. The qualitative research design was applied with respective techniques to generate in-depth insights. The research can be seen as a threefold. First, in order to examine the value that BCT brings to the music industry through BBDMDSs, a multiple-case study method was employed. Second, semi-structured interviews assisted in understanding what factors seem decisive for consumers to start using BBDMDSs and how they evaluate such services. Finally, the explorative as well as pragmatic approach assisted in deriving research implications that can be utilized practically.

5. Findings and Analysis of BC-Based Applications & Conceptual Design

Although the attention to BCT is growing, there exists a clear gap of research within the scope of blockchain applications and application capabilities in the music industry. Hence, this chapter is devoted to an overview of the real-life use cases. Starting from this, the landscape of applications is presented and discussed. Subsequently, a case study of the selected segment of BBDMDSs is performed. The chapter is summed up by a presentation of the conceptual design that implements the best practices of the analyzed BBDMDSs.

5.1. Application Landscape

In order to overview the current landscape of BC-based music applications, the discovered cases were documented in a table for comparison (Table 3). The table helped to identify particular segments of applications that currently offer BC-based services within the music sector. This list is not exhaustive, yet contains the applications that were perceived as most credible.

Most of the use cases apply BCT to enable the use of smart contracts and decentralized peer-to-peer transactions. The majority offers digital music distribution services that focus on a fairer payment system for artists (e.g., Ujo, Peertracks, Choon, Musicoin). A minor amount of applications focus on topics such as creating a new ecosystem for the live music industry (e.g., Viberate) or changing the way artist information and copyright data is stored (e.g., Dotblockchain, Mycelia).

According to the type of service and target audience of the applications, three segments were identified (can be withdrawn from colors below the applications in Table 3):

1. Digital music distribution (incl. streaming) (BBDMDSs)
2. Live music
3. Information storing

Overall it can be said, that BCT deployment aims to create a fairer music ecosystem, where intermediaries, which do not contribute directly to the value creation process, are removed from the value chain.

Table 3. Overview of blockchain applications in the music industry

Name	How does it work?	Service	Blockchain/ Token	Resource
Ujo*	Digitizing music rights and metadata and sharing this info in open environment for direct music licensing and artist payout Install MetaMask (digital wallet service) Free membership, Ether (digital currency) needed to purchase music for download Members can tip artists	Licensing and distribution for artists & music streaming and downloading for consumers	Ethereum Blockchain / Ether	(UjoMusic, 2018)
Viberate	Free membership Currently directory of artists, venues, agencies and organizers – rankings, stats, joint live music marketplace to connect all of them Reward system based on tokens for growing the platform	Crowdsourced live music ecosystem - connect musicians with event organizers, booking agencies, advertisement	Ethereum Blockchain / Ether	(Viberate, 2018)
Peertracks	free membership add free streaming of songs by registered artists, artist earn RYLT tokens for plays artists need to register account and songs on the platform and get certified	Licensing and distribution for artists & music streaming for consumers	SOUNDAC Blockchain / XSD, RYLT, VIP	(PeerTracks, 2018)

	artists are paid form SOUNDAC royalty pool members can tip and connect with artists			
Choon* 	free membership Currently add and cost-free streaming, subscription as well as per play payment models Revenue generation for artists through streaming as mining, advertisement, subscriptions and direct payments Members can tip artists and earn tokens by creating monetized playlists and advertising artists	Licensing and distribution for artists & music streaming and downloading for consumers	Ethereum Blockchain / NOTES (ERC-20)	(Choon, 2018a)
DotBlockchain 	Data stored on a permanent blockchain record Synchronization services for artists Platform for all stakeholders of the music industry to share and own information related to music and artists	Information storing platform (Artists, Labels, Publishers, Collecting Societies, Distributors)	Bitcoin Blockchain/no tokens	(Dotblockchain, 2018)
Musicoin* 	Free, no ads, playback with no signup required Artists earn per stream from the pre-allocated Universal Basic Income pool (Pay-Per-Play) Artists also earn through listener tips (1 tip = 1 MUSIC)	Music streaming	Ethereum/ (\$)MUSIC	(Musicoin, 2017), (Bartmann, 2019)
Resonate 	Pay-per-play or optional annual membership for €5 (+ 23% VAT for EU countries) Track is downloadable after nine streams Open source platform Artists paid in fiat, not cryptocurrency	Music streaming and download	Not specified	(Resonate, 2015), (Resonate, 2018)
Opus* 	Visible amount of streams and monthly fans, provides a transparent revenue information Artists earn revenue share per stream and sale of premium digital content (e.g., high-quality audio) Encrypted music tracks stored on off-chain IPFS database Subscription by single payments or by OPUS Master Contract charging the fan's wallet with a fixed number of OPT tokens.	Music Streaming	Ethereum (hybrid) / OPT (ERC-23)	(Jia, Xu, & Mach, 2018)
Mycelia 	The Creative Passport contains profile information with artist's verified source of data and content, useful for media and services. Free for artists, subscription model for businesses.	Passport of artist's metadata	Ethereum	(Mycelifora music.org, n.d.)
Feedbands 	member subscription from \$0-4p/m only paying members can comment and vote highest ranked artists monthly get vinyl pressed and sent to fans	Music Streaming	Bitcoin	(Bartmann, 2019), (Feedbands, 2017)
 = digital music distribution (incl. streaming)  = live music  = information storing				

Note. Analysis of discovered BC-based music applications. Their novel features are put into perspective, offered services and blockchain they deploy. All information was collected through Internet sources February-March, 2019.

5.2. Application Selection and In-Depth Analysis

In order to execute an in-depth investigation of the value generated by blockchain application within the music industry, a case study analysis was taken (Zainal, 2007). As Table 3 showed, the predominant number of applications offer music streaming and downloading services. Due to this finding and the general growing trend of streaming in the recorded music industry, the case study focuses on the BBDMDS segment which consist of seven applications from the table.

To take full advantage of our approach and provide the most accurate analysis with up-to-date information, specific inclusion criteria were defined to select eligible cases:

- An application has launched at least a beta version of the platform
- The last public information update is not later than 1st of January 2019
- All three stages of Swan's (2015) developed blockchain generations model (see Table 2 in section 2.2.3.) must be included by the case companies
- An application is built on the Ethereum blockchain

This division allows to generalize and align applications for the case study. To begin with, only launched BBDMDSs are selected which were active in the media within the ongoing year. Second, applying Swan's (2015) proposed blockchain development stages means that a chosen case must utilize cryptocurrency, employ smart contracts, and hold files or intellectual property enabled with cryptographic hashes. In this case, it defines the application as multifaceted and aiming to serve for various needs. Lastly, the reasoning to select applications within Ethereum blockchain is that Ethereum already gained recognition among developers and entrepreneurs as a blockchain facilitating the development of other platforms (Lecky, 2018). Also, recently it was announced that the Ethereum team is working towards offering new and improved features including a transition from PoW to PoS (Benshahar, 2019).

Consequently, the total number of applications for the case study was reduced to four. They are UJO, Choon, Musicoin, and Opus. The applications are expounded in the following sections and are services that are considered BBDMDSs. To perform the analysis, we looked at application characteristics such as the specific service type and novelties. Lastly, we specified which problems of the music industry (see section 2.1.3.) they aim at solving and analyzed their strengths, weaknesses, opportunities and threats by employing a SWOT analysis.

5.2.1. Choon

Choon is a “music streaming service and digital payments ecosystem - designed to solve the music industry’s most fundamental problems” (Choon, 2019, unpaginated). Choon launched its service in May 2018 and is aiming at attracting mainly artists and their dedicated fans by offering a music streaming and downloading platform that is based on a fairer, more direct and more transparent payment system (Choon, 2018).

Their system is built on the Ethereum blockchain and deploys the NOTES token. NOTES are a utility token on the platform and are used to payout artists. The NOTES token is also used to incentivize artists to attract their fans to the platform. Choon introduces a concept called “streaming as mining” which distributes a predetermined amount of NOTES daily to artists, based on their number of streams that they have generated that day. The revenues from streaming as mining are complemented by advertising revenues, of which 80% are paid to artists in form of notes daily (ibid.).

The platform currently runs free of charge for consumers until they grow their music catalog to a size, where they are “comfortable charging users” (ibid., p. 9). Customers will be charged based on subscription packages (paid in fiat money and converted into NOTES automatically) and direct payments such as pay-per-download, tips and other direct artist to listener transactions (private concerts, merchandise, tickets). They offer further incentives for listeners to join the platform such as curating monetized playlists (receiving 5% of revenue from playlist plays) and getting paid to listen to promoted tracks (financed by artists – like a paid advertisement). It must be stated at this point, that upon testing the platform, solely the services of streaming music, creating playlists (non-monetized) and adding music to the catalog are enabled (as of March 24th, 2019).

Choon deploys the Ethereum blockchain with a standard ERC20 token. BCT is used to process NOTES transactions between users of the Choon platform. This includes smart contracts to distribute NOTES royalties in real time based on predetermined ownership, running processes of the streaming as mining allocation and storing ownership and transaction information (Choon, 2018). The company further states that some processes are run off-chain to mitigate “current downsides” of the blockchain (Choon, 2018, p. 16). Examples of off-chain processes are a NOTES ownership registry, revenue distribution contracts directly on the Choon platform

and a NOTES to voucher payout system for less famous artists with small revenue streams (ibid.).

The platform hosts 11.862 artists and a catalog of 41.862 tracks (as of March 26th, 2019) (Choon, 2019). Testimonials such as platinum-selling artist Darude and house DJ and producer Guy J are part of the catalog and featured in advertisements of the platform. The interface enables access to a music and artist search function, playlists, charts and music divided by genres. The overall structure is framed similarly to Spotify, and the platform is accessible through the web browser on laptops, tablets and mobile phones. A separate mobile app does not exist.

5.2.2. Ujo

Ujo defines its application as an open platform using the BCT “to create a transparent and decentralized database of rights and rights owners, automating royalty payments using smart contracts and cryptocurrency” (UjoMusic, 2018, unpaginated). Their current service covers uploading, licensing and selling music for artists. Fans can purchase music by paying with the Ether cryptocurrency, browse and stream music on the platform and engage in communities. The company has released its beta platform in early 2018 (de la Rouviere, 2018).

To use the Ujo platform, both artists and music listeners need to install MetaMask, a digital wallet service. After installing this, users can charge their wallets with Ether by exchanging their fiat money into the cryptocurrency with a service like Coinbase. As this seems to be an obstacle for the typical internet user, Ujo sees their platform currently targeting the Ethereum community (UjoMusic, 2018). Users can buy albums, single tracks or artist badges and tip artists on top of that. For the mere registration to the platform, no cryptocurrency is needed. The artist badge, similar to the NOTES token used by Choon, can be used to get ticket discounts or exclusive content like merchandise. As of right now, the artist badge token is not tradable and holds no monetary value (as of March 24th, 2019). Artists can upload their music to the platform and sell it there directly, whereby they get to keep 100% of the funds. Artists or bands can set up smart contracts, that automatically split and send revenues to all stakeholders of a particular music product. This process of directly licensing content to the distributing platform cuts out middlemen such as labels or publishers and leaves more revenue for the artists (de la Rouviere, 2018).

Ujo is using the Ethereum blockchain. The BCT is used to run smart contracts, which processing logic manages licensing, management of rights, and collective, economic, & self-organization of artists. This includes the automatic payment and splitting of royalties to predetermined rights holders under the defined conditions. This automatic process eliminates unnecessary administrative costs and enables direct and barrier-free revenue payouts and micropayments worth a fraction of a cent (UjoMusic, 2016). The smart contracts interact with an off-chain InterPlanetary File System (IPFS) where corresponding metadata (such as image & audio files) is stored. Furthermore, there is an off-chain back end (Nethereum) that monitors the rights that are registered and licensed (ibid.).

Ujo advertises its platform with the help of prominent examples such as Grammy-winning artist RAC. The artist has published a full-length album on the platform in 2017 (UjoMusic, 2018). As mentioned, users can stream and buy music on the platform, yet the interface does not offer streaming platform functions such as playlist creation and charts. By its specific service, Ujo can more precisely be compared to a platform like iTunes or Bandcamp, where the focus is on a digital music downloading marketplace (Gerard, 2017). The platform is only accessible through web browsers such as Chrome or Firefox that support the installation of MetaMask. There is no mobile phone app available.

5.2.3. Opus

Opus is a decentralized music sharing platform that employs BCT to provide a transparent and trustworthy payment system ensuring fair earnings for artists (Jia, Xu, & Mach, 2018). Its development started in July 2016, and the first beta of the Opus Web Player together with mobile applications for iOS and Android was released in 2018 (Opus Foundation, 2018). Their team is continuously working on platform improvements and is offering several communication channels to enable quality testing of the service (Opus Foundation, 2019).

Opus leverages the Ethereum blockchain and has introduced its own digital token, called OPT. OPUS Master Contract allows to charge the user's wallet with a set amount of OPT tokens - similarly like charging a credit card (Jia et al., 2018). According to Jia et al. (2018), the Ethereum smart contract "collects hashes of the statistics of the played songs" and executes revenue calculations for every artist (pg.3). Such data is publicly available, and it can be verified

by comparing hashes. Moreover, Opus token system provides more opportunities for platforms users. For example, artists can split revenues among band members or share their income with the fans, who support them in some way. On the other hand, the content is fully decentralized and kept on an off-chain repository which is an InterPlanetary File System (IPFS). To be more precise, IPFS swarm is used to store encrypted music files. Decryption keys, metadata and transaction data are stored on an off-chain database (ibid.).

In general, Opus provides streaming services for listeners and music publishing with a customized profile page for artists. Artists get paid over 90% of the generated revenue (ibid.). The user interface is minimalistic and straightforward. The most common streaming platform functions such as creating a playlists are available. In order to use the platform, fans need to create or import a cryptocurrency wallet. Moreover, the free version allows to stream tracks only for 20 seconds, so a subscription is needed for full services. The subscription fee for monthly music streaming is 20 OPT which equals to \$0.002 (as of March 27th, 2019).

5.2.4. Musicoin

Musicoin is a decentralized, peer-to-peer music streaming platform utilizing the Musicoin blockchain. The service was launched in February 2017. Through the use of BCT, it provides a fair share of revenue for artists and transparent contracts without intermediaries involved. (Musicoin, n.d.)

In fact, the Musicoin blockchain is a fork of the Ethereum blockchain and has its own token \$MUSIC. At the moment, cryptocurrency exchange services (like Coinbase) are the easiest way to trade local fiat money for \$MUSIC tokens. Smart contracts ensure direct payments operating on a Pay-Per-Play (PPP) basis: whenever a track is played, \$MUSIC is transferred to the artist or all parties of a group. In addition, the content is stored and distributed through a decentralized P2P system known as InterPlanetary File System (IPFS) rather than in centralized servers (Musicoin, 2017).

Moreover, the \$MUSIC tokens produced via mining are split into two fractions. The emission rate is about 314 \$MUSIC per block, of which 250 coins go to miners, and the remaining 64 coins go to a shared UBI pool (Musicoin, 2019). Universal Basic Income (UBI) is “an economic model to ensure each contributor to the platform is fairly rewarded in proportion to their

contribution“ (Musicoin, n.d., para.4). In Musicoin's context, a UBI pool is created to secure musicians' income from PPP on the platform, at a fixed rate that is fair, uninfluenced by market forces and higher than any other competing streaming platforms (see Appendix C). However, the exact revenue for musicians depends on the changing market value of \$MUSIC. For instance, when the market value of the token is less or equals to 0.099 US cents, musicians will receive 1 \$MUSIC per play, and 0.2 \$MUSIC if the market value is 0.10 - 1.00 US dollar. A detailed price range is provided in Appendix D. These set ranges are subject to change to ensure fair and competitive rates within the industry (Musicoin, 2017). Also it ensures free content for listeners.

The opportunities for listeners and musicians extend beyond streaming and publishing services. Fans can directly reach out to artists, provide feedback and even tip them. Tipping fosters musicians to communicate with their audience more actively and provide quality content. In fact, some favorable artists receive around 1,000 Musicoin tokens from listeners per play (ibid.). In addition, musicians' content rights are verified on the \$MUSIC Blockchain by creating a copyright license. This can also enable other stakeholders to license musicians and their content onto their platforms (ibid.). The platform consists of 5,500 musicians, includes 77,000 tracks, has generated 7,500,000 streams and 10,200,000 tips (Musicoin, 2019).

5.3. Findings

The conducted case analysis of four BBDMDSs envisioned a holistic view of BCT capabilities within the music industry. Briefly, the majority of applications advance in a similar direction by targeting niche markets, offering better transparency of transactions alongside automated payouts and higher income shares for artists. The SWOT analyses assisted in identifying recurring patterns in the setup of BBDMDSs and generated replicable findings that represent BC-enabled use cases within the examined field.

Hereinafter, the elaborated findings that emerged due to BCT adaptation are introduced and can be replicated from the internal factors (strengths) of the SWOT analyses (see Appendices E-H).

The findings will be evaluated by consumers throughout the primary data collection and the conjoint SWOTs, including analyzed internal and external factors, will assist in deriving strategic actions in the practical implications chapter.

The found BC-enabled use cases in DMDs are overviewed in the following:

- **Decentralization:** data is distributed and stored within the blockchain network; thus no intermediaries (e.g., labels, distributors) are needed. In addition, such a peer-to-peer network is capable of providing direct connections between artists and consumers
- **Utility tokens:** all platforms utilize tokens as currency to pay for artists, or for consumers to purchase particular services or goods (subscription plan, streams, downloads, tips for artists, other merchandise produced by artists). Tokens are kept in a digital wallet that can be imported to or created within the platform. Most of the platforms require to use external cryptocurrency exchange services (like Coinbase) in order to trade them from fiat money. Only in one application (Choon), consumers are offered a service which exchanges fiat money into the respective token automatically
- **Direct monetization:** eliminating intermediaries such as labels from the value chain enables direct and fast payouts. As a consequence, artists receive higher revenues which in the analyzed platforms were 80-100% of what consumers are paying
- **Transparency:** platform users can see the history of their streams, transactions and artists' actions within the platform. Creators can see where their data was utilized and how much money artists receive
- **Open Ecosystem:** the public Ethereum blockchain deploys open source data which enables building additional services on top for other service providers
- **Various revenue models:** platforms incorporate various income sources like PPP, PPD, standard subscription, UBI-pool, streaming as mining, advertising, tipping. Although some of the analyzed applications demand ridiculously small or even free membership, revenues are collected in different and legit ways. For example, Choon stated that income for artists is obtained from a "streaming as mining" concept, advertising, subscriptions, and direct payments. An even more advanced BC-empowered revenue model was presented by Musicoin, whereby the mining process automatically feeds a shared UBI pool as well as covers platforms maintenance costs with a particular amount of coins
- **Power of smart contracts:** smart contracts used in the platforms enable payments for artists, running on a pay-per-use basis, and are capable of splitting revenues instantly among creators of a music piece. Also, the preset rules in smart contracts can provide a basis for catalog licensing and verify musicians' ownership of content

- **Off-chain processes:** the analyzed applications deploy off-chain directories. The most commonly mentioned repository was the IPFS where encrypted music files and private data is stored

In accordance with these use cases, we aim to establish a new BC-enabled concept that could be used in several ways. Firstly, as a representative sample to better comprehend BCT possibilities within digital music distribution services. Secondly, as a practical implication for technology industry stakeholders in order to improve existing or build new BBDMDSs. Following that, the next chapter presents how we put these findings into action.

5.4. Conceptual Design

This section introduces an original concept that implements the best use-cases of the analyzed BBDMDSs. The concept aims at providing a platform, which enables stakeholders to build additional services on top (based on a blockchain ecosystem). This conceptual design will be used to present BBDMDSs to interviewees in our primary research and generate feedback. It makes use of BCT in order to generate a more transparent and fairer music streaming and downloading service. A focus is to offer transparent authorized data to all stakeholders of the platform according to their permission, making data accessible and usable for clearly defined needs. Also, the platform creates a fairer system for artists by eliminating the need for central controlling bodies that come in between music listeners and creators. It also offers new ways to generate revenue and provides several options for users to pay for the service they use.

The outline structure of this section is motivated by Faber, Michelet, Weidmann, Mukkamala and Vatrapsu's (2019) conceptual design of a BC-based Personal Data and Identity Management System. Additional potential of the construct such as a data repository will not be described in detail but only to the extent that it serves as the backend for the platform.

We structure the presentation of our conceptual design as follows: previously outlined use cases will be presented as the system design guidelines followed by a system overview consisting of system roles, system components, specifications on the user interface and a graphical depiction of the model. Lastly, the functionality and use case scenarios are presented.

5.3.1. System Design Guidelines

The design is constructed to serve in the best need for all stakeholders and incorporates the most advantageous BCT use cases discovered through real-life BBDMDS analysis.

The following system design guidelines are expected to help create such a system:

1. **Fair & direct economy:** eliminated intermediaries, direct and fair revenue distribution enabled by smart contracts
2. **Transparency:** platform users know exactly how revenue is distributed and how data/music is utilized
3. **Permissioned blockchain and open source ecosystem:** blockchain data repository with encrypted music data is accessible with predefined permissions, open source data enables building additional services on top
4. **Various income sources:** utility tokens are used for all different services, like PPP, PPD, standard subscription, streaming as mining, advertising, tipping system, merchandise
5. **Off-chain repository:** a distributed off-chain system is used for keeping music files and sensitive data (IPFS)

5.3.2. System Overview

Figure 11 illustrates the different roles, components, and functions of the proposed model with a primary focus on the platform as a BBDMDS. The model is explained in the following sections.

5.3.2.1. System Roles

There are three stakeholders in the proposed system:

1. *Consumers:* end users utilizing/purchasing data, e.g., streaming & downloading music
2. *Artists:* users providing data (music), using platform services for licensing music, monetization
3. *Service Providers:* additional entities using the data generated on the platform for their services (e.g., radio stations, movie directors, media agencies)

5.3.2.2. System Components

The proposed system is built on three components, which are a combination of a blockchain layer, an off-chain layer and a user interface. The blockchain layer is a blockchain (e.g., Ethereum, Hyperledger) that hosts a smart contract layer and an information layer. The off-chain components are an IPFS data repository for metadata (music files, images) and a user interface (platform). The system handles different kinds of *data types*. One type is the *static data*, which consists of consumer and artist identification data and music file data. Simplified, this can be understood as consumers' and artists' metadata. The other type is *dynamic consumers' and artists' data*, which is produced when using the platform. This includes streaming, tipping, licensing and transaction history data.

Followingly, the blockchain and off-chain layer of the system are presented with their constituting parts.

Blockchain layer

Smart contracts layer. This layer is used to store and process predefined conditions for data exchange and monetization between: (1) an artist and a consumer, which are agreements of data transactions; (2) the artist and the platform, which are agreements on revenue distribution and (3) the artist/platform and service providers, which are agreements on fees for the usage/licensing of music.

Dynamic data layer. This layer is used to store platform usage driven data such as streaming and downloading history of consumers, artist-consumer interaction data, history of artists releases, payment transactions.

Information layer. This layer is used to store music metadata (song title, creators, size, data type, length), licenses, ownership and artist's metadata (e.g., biography, discography).

Off-chain layer - IPFS repository (IPFS):

This layer is a distributed cloud storage database system to host metadata such as music files and corresponding images. An important reason to integrate cloud storage in the system is to provide off-chain storage for the large data amount handled in this example. The repository also holds consumers' and artists' identification data which refers to static data. It is essential to keep this type of data off-chain to ensure GDPR conformity and enable the erasure of consumers' private data when requested. The data in a IPFS is identified by data pointers which are connected to the blockchain layer. Also, this layer stores decryption keys and decrypts files before sending them to a consumer.

User Interface (Platform)

The user interface (UI) has different purposes for various stakeholders using the platform. For consumers, the UI provides the possibility to sign up to the platform, put money into the account, manage transactions and personal as well as transaction-based data. Most importantly it gives the consumer the ability to access all music streaming and downloading related functions. This includes playlist creation, catalog browsing, communication to other users and artists and access to charts.

For artists, the UI provides the possibility to license their music, manage their revenues, contracts, and licenses and view their streaming and downloading history of the uploaded content. It also provides a possibility for the artist to exchange the earned tokens into fiat money through an integrated cryptocurrency exchange service such as Coinbase.

Service providers can license music through the UI. They can obtain all information related to licensing a track such as the catalog of music open for licensing, ownership information and licensing conditions (e.g., price, time limitations).

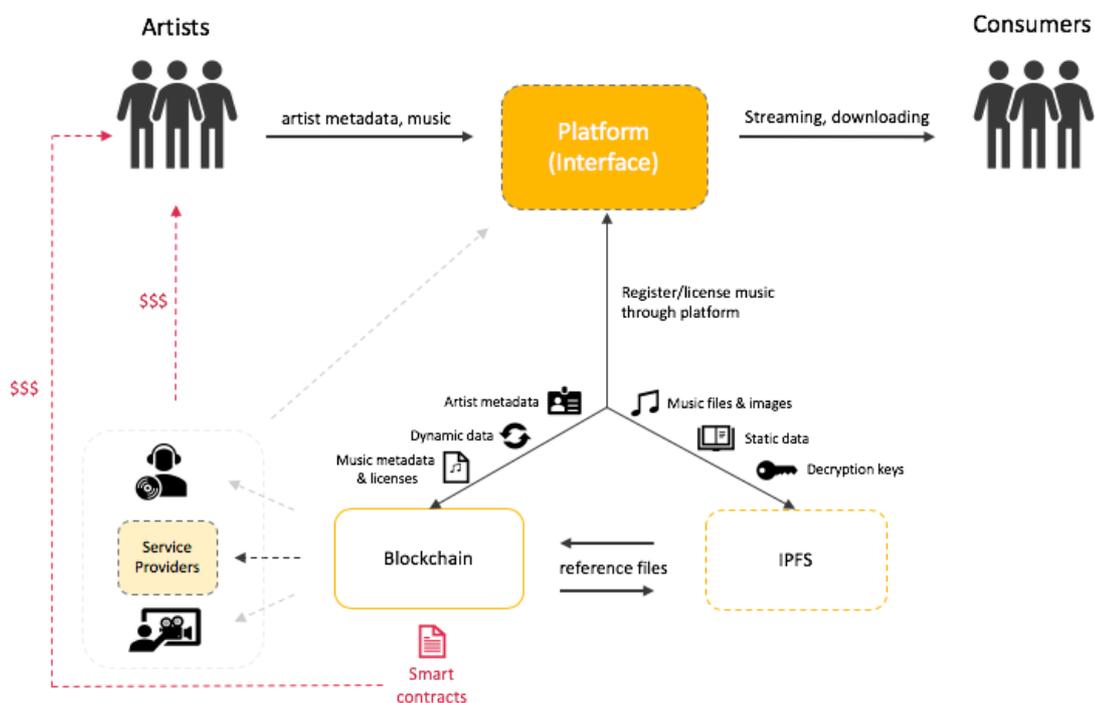


Figure 11. Conceptual design of a BBDMDS

5.3.3. Functionality and Use Case Scenarios

The functionalities and potential use case scenarios of the conceptual design are provided in the following section.

5.3.3.1. Adding and Processing Data

Music files are the most important content of the system as they enable all future processes. Artists can upload their music through the platform's interface and obtain ownership over their data. After the music is verified, the encrypted music file and corresponding images (static data) are added to the off-chain repository (IPFS). Musicians can define the conditions for data exchange and monetization. For example, artists can select the type of usage of their work on the platform or royalties can be split among involved music creators. This information is stored in the smart contract layer.

Each file in the IPFS is linked to immutable and permanent data pointers that are placed on the blockchain. Hereby, the content is time stamped and secured, and eliminates the need to store the data on the blockchain. This eliminates the problem of storage limitations on the blockchain (IPFS.io, n.d.). Thus, whenever a user or a service provider utilizes a song for their use, a command is triggered on the blockchain to release the reference data on the IPFS. Moreover, such action is instantly recorded on the dynamic data layer of the blockchain in order to provide a transparent system history. Both static and dynamic data can be retrieved only with the right key.

Through the platform interface artists can also add and edit their professional information, like biography and discography, which is stored on the information layer of the blockchain. In this way the information becomes immutable, and artists are the only ones responsible for keeping this information up-to-date. Creators can also design the rules about who can access and use this information meaning that service providers with specific permission could use the information for their services.

Consumers' personal data is anonymized due to blockchain specificity. This data is kept in the off-chain IPFS, so data can be deleted when consumers revoke their consent. Thereby it is conform with regulations of GDPR. Data in the IPFS is identified by data pointers which are connected to the blockchain layer.

5.3.3.2. Monetization

The value unit of the blockchain-based platform is a digital token. Users can exchange their fiat money to such tokens instantly on the platform. The concept is similar to receiving a “credit” to use the platform, like charging an account. For users, the possession of tokens enables them to stream music, tip favorite artists and purchase various goods. On the other hand, artists get paid by tokens.

To secure higher and fairer payments, the revenues are collected from different sources. The platform can be used by paying for the service in different ways. The first option is that every stream could be charged by pay-per-play (PPP) and each download by pay-per-download (PPD) fees which are predefined in the smart contracts layer. Secondly, as an alternative to the pay-per-use model, users can choose a subscription plan that enables unlimited streams. This option would be useful for heavy listeners. In order to strengthen the relationship between artists and fans as well as to create a multifaceted platform, there are additional income possibilities for creators like tipping and purchasing artist’s merchandise and tickets.

Total revenues for artists are calculated automatically by predefined rules of the smart contract. The dynamic data generated by end users (number of streams, downloads, tips) is processed to the blockchain where earnings are estimated mathematically and distributed to artists’ wallet. Artists are paid by tokens which can be exchanged via any exchange service provider. Moreover, the platform provides a way to incentivize fans. For instance, artists can offer a token for everyone who plays their song or shares it via a social network such as Facebook. In this way, both sides get additional value: users by exchanging their time/data for tokens, and artists by getting their content promoted through their fans on different channels.

5.3.3.3. Permission Management

As the platform possesses the permissioned blockchain with public visibility, various stakeholders can see content the platform holds. However, in order to access and gain the right to use the content, it is needed to pass corresponding permissions predefined by the content owner. The access is managed through smart contracts with the use of public/private keys. Their functionality is explained later in this section.

Registered consumers can stream or download music only when they have sufficient amounts of tokens in their accounts. Also, they are capable of seeing their transactions and streams/downloads statistics within the platform. For service providers, there is no need to create an account within the platform. Considering the type of services or industry, each stakeholder can access and operate different data on the blockchain in authorized ways. For instance, a radio station can browse the catalog of the platform where licensed content is provided. In order to start using the chosen assortment, the radio has to satisfy the conditions defined by the artist in the smart contract. The conditions can include the location, the time period to use the license and the fee that needs to be paid before gaining the right to use. Another scenario could be the permissions for media agencies which only cover access to artists' metadata like biography and discography. The artist is the only one who can change the rules of permissions. Moreover, since every transaction of data is recorded on the blockchain, artists can see full records of who, where and when their content was used and how much revenue was generated.

When a consumer wants to stream or buy music, he/she sends his/her address location as a public key to the artist. When the predefined rules for the usage of the data (music) are satisfied, in that case money was paid, the artist sends the data pointer of the file with his public key which altogether is encrypted by the consumer's public key. Now the consumer is able to access and use the file through the sent data pointer. The consumer can generate a new public key for every transaction which allows keeping his actions on the platform anonymous. The transferal of public and private keys happens in the same manner between musicians and service providers. On the contrary, service providers use the same public key for every transaction in order to provide visibility of the licenses and music files he/she owns.

5.4. Chapter Summary

The carried out secondary data collection of real-life blockchain applications within the music domain provided a general view of the scope of such applications. The thorough case study analysis of the chosen BBDMDSs was executed in order to reveal patterns and explain complex components by breaking them down into smaller factors and processes. This step allowed us to distinguish platform use cases that are inherited due to blockchain implementation. Accordingly, a BC-empowered conceptual design of BBDMDS was established based on the best use cases. The detailed presentation of the conceptual design can be used to better

understand the system of BBDMDs and serve as practical guide for developers and entrepreneurs to improve or kick off related services.

6. Findings & Analysis of Consumer Interviews

In the following chapter, the empirical findings that emerged from primary data collection will be presented and analyzed in combination with the previously proposed theoretical framework of the TPB and the TAM. The variables in the theories were used as categories to allocate statements of interview respondents. Each category was further subdivided by emerging factors, e.g., opinion and influence (for SN). A full overview of the categories and factors is provided in Appendix N. Additional insights on participants' attitude towards BCT and their knowledge of current problems in the music industry in general were collected throughout the primary data collection. They will be referred to if reasonable throughout the subsequent discussion. The transcripts of consumer interviews can be found in Appendices I-M.

In the appended model, behavioral intention is determined by attitude (A), subjective norm (SN) and perceived behavioral control (PBC). Perceived ease of use (PEOU) and perceived usefulness (PU) in turn are antecedents of A. Transferred to the behavior of using BBDMDs, these factors relate to which degree each one of them has an influence on forming the intention to use such services. They will be analyzed factor by factor in relation to the respective category in the following sections.

6.1. Attitude Towards the behavior

In line with Ajzen's (2002) conceptual questionnaire guidelines, respondents were asked to express their positive as well as negative feelings towards using BBDMDs to assess the A variable. Those feelings emerged from perceived advantages and disadvantages of using a BC-based service versus a traditional service such as Spotify or Soundcloud. The obtained data shows that attitudes towards using a BBDMD are formed based on the following factors: *Product and Copyright Management, Anonymity, Democratization & Ethics, Transparency, Direct Connection, Additional Functionality, Price and Consumer Benefit* (Table 4).

Table 4. Overview of Attitude Factors

Main Category	Category	Definition	Example
	Attitude towards the behavior	Perceived advantages and disadvantages	
Subcategory	Product & Copyright management	BBDMDs are perceived to enable artists to better manage their product and have more control over the copyright	Michal: "It just offers more freedom to artists and more opportunities and like to control their own, change their own services online, what they want to show, and what would they want to share."
Subcategory	Anonymity	BBDMDs are perceived to enable consumers to stay anonymous and keep actions private	Peter: "I want to have the possibility to stay anonymous. To have all the music I am listening to not made public or to another middleman, advertising company or whatever"
Subcategory	Democratization & Ethics	BBDMDs are perceived to empower smaller artists and bring more fairness to the industry	Michal: "Well, for the artists it is better because they get better share of the revenue."
Subcategory	Transparency	BBDMDs are perceived to be more transparent than conventional services	Temur: "The advantage would be transparency. That I can see where is the money I'm paying, where is it going? That's very important."
Subcategory	Direct Connection	BBDMDs are perceived to facilitate direct connection and support from consumers to artists (through e.g., tipping)	Michal: "it gives opportunity to the fans to support artists directly"
Subcategory	Additional Functionality	The BBDMDs needs to have additional functionality over conventional services	Peter: "It has to have the functionality of current streaming platforms. It has to have additional functionality."
Subcategory	Price	A cheaper price is perceived as an incentive to use a BBDMDS	Bastian: "Let's say a blockchain based Soundcloud or Spotify in the end would only cost me three Euros per month. This would be something. Price really matters. This would be something super huge"
Subcategory	Consumer Benefit	BBDMDs are perceived to have no clear benefits for consumers over conventional services	Bastian: "It's actually hard for me to imagine what bigger impact would that have"

Note. Perceived advantages and disadvantages of consumers towards the use of BBDMDs

6.1.1. Product & Copyright management

As a first aspect, three participants mentioned product and copyright management in the course of reflecting on BBDMDs and their capabilities. One person mentioned an advantage for artists through the use of a BC-based service:

Michal: *“It just offers more freedom to artists and more opportunities to control their own, change their own services online. What they want to show and what would they want to share [...].”*

Similarly, another participant assessed this advantage:

Peter: *“[...] the artists got the possibility, without a middleman, to really say what he wants to offer to the public and what not. And you also have as an artist the possibility to manage your own copyright [...].”*

He further elaborated, that an industry-wide storage of music on a blockchain could have even more benefits, as blockchain as a database is able to detect incorrect copyright use:

Peter: *“[...] So the database would say, no you are not the producer of the song, you don't have the copyright. It would give an error on this upload [...].”*

Not in direct connection to BBDMDSs but more about BCT in general a participant stated that:

Bastian: *“[...] I think there are many cases where it might be especially helpful. In maybe copyright [...].”*

6.1.2. Anonymity

For two participants anonymity is an advantage they related to BBDMDSs. Comparing to his current situation, one interviewee found that through the use of BCT in a music service:

Peter: *“there is nothing such as privacy problems [...] I want to have the possibility to stay anonymous. To have all the music I am listening to not made public or to another middleman, advertising company or whatever [...].”*

Another student supported the capabilities of BCT to provide more anonymity and mentions the importance:

Karolis: “[...] everybody is slightly tired of the third eye from government that is watching everything [...]].”

6.1.3. Democratization & Ethics

For four out of five participants BBDMDSs deliver a possibility to democratize the music industry and provide a more ethical environment. Accordingly, an interviewee mentioned:

Temur: “[...] it seems like it would bring more power to upcoming artists, which is pretty cool [...]].”

Likewise, a student sees BBDMDSs providing more equal opportunities and a fairer pay especially for smaller artists:

Bastian: *“I think for artists it could be really really great. Especially for artists that are not that famous to receive more money for their work [...]].”*

Yet, one participant was in doubt, whether the artists would receive all revenues generated through streaming and downloading generated on the platform:

Temur: “[...] I really doubt that the artists will be able to get the 100% of it [...]].”

Though, providing fairer payment to artists than conventional services is perceived as an advantage and a reason to use a BC-based service for two participants:

Peter: “[...] If I would see that there is a change in the payment which the artist is getting, then I would say ok I will change. Because this is the positive thing with your system [...]].”

Temur: *“Yeah. But if there was an option where they could get bigger pay to definitely use that. [...]”*

For one interviewee this is perceived as the primary motivation for consumers to use a BBDMDS:

Bastian: *[...] as a consumer it would be more or less a moral aspect. Do I want to support the artist or I simply don't care [...].*"

In a similar manner, a student classified BC-based services to be made for people who want to act ethically correct and support artists (like him):

Peter: *"[...] I would say that the system you were you were talking about is more for people who are caring about the artists behind the track [...]."*

6.1.4. Transparency

Transparency was named as an advantage over conventional DMDS by three interviewees for both artists as well as users utilizing blockchain-based services. From his perspective a participant elaborated:

Temur: *"The advantage would be transparency. That I can see where is the money I'm paying, where is it going? That's very important [...]."*

Another student mentioned the perceived advantage from an artist perspective:

Michal: *"[...] Also the statistics and you can follow more, who bought what and for how much. More transparent [...]."*

He further stated the data that can be obtained from making processes more transparent and how he pictures the implementation:

"[...] It would be good to show a dashboard with the data for artists. I would give them the possibility to see that, and also to see how many transactions were made from this song or this album. Because then it gives you a lot of data."

One participant described transparency as a critical advantage and an important factor for future developments. He sees an advantage, especially when applying a PPP-model:

Peter: “[...] I would be interested in what I was listening to the last couple weeks if I would have to pay for every single song [...].”

A user of the platform Bandcamp described the demonstration of transparency by the service. This is a reason why he uses it, thus representing the importance of transparency for him:

Karolis: “[...] there you always see a track, like a price for a track or an album. But when you press buy now, eventually, you have to pay a fee for Bandcamp itself. So they are sort of saying that all the money you agreed to pay before, goes to the artists or the label, and we're just charging you extra which is going straight to us.”

6.1.5. Direct Connection

Over half of the participants believed that they are able to directly connect to artists and support them through the use of BBDMDs. This is perceived as an advantage over conventional services for all of them. Their statements referred mainly to the introduced tipping tool which they describe with the following words:

Michal: “[...] it gives opportunity to the fans to support artists directly [...].”

One participant described the feature by stating:

Temur: “[...] I could pay to some artists as a tip, you know, a bit more money [...] this young artist I want to support him. So being able to do that is a very interesting idea [...].”

And another one concluded:

Bastian: “[...] I think that's something that supports not famous artists actually because this is something you can relate to the artist. You are in a direct contact. You can tip him for his good work [...].”

6.1.6. Additional Functionality

Most participants believed that additional functionality helps BBDMDSs to have an advantage over conventional services. Some interviewees also gave specific features that they would perceive as advantageous. One person summarized what the service would need to have:

Bastian: “[...] *minimum same amount of features [...].*”

Two participants agreed that the service needs to provide more than this. They concluded:

Peter: “[...] *It has to have the functionality of current streaming platforms. It has to have additional functionality [...].*”

Additionally referring to price differences, the other one stated:

Michal: “[...] *if I in the end have to pay more here for the same use kind of, then it's not like something I would want, right? If I'm going to pay there even a little more, it has to have a good reason: It has to be fun or interactive, or it has to give me some special novelty [...].*”

For only one participant additional functionality has no facilitating effect as he mentioned that this:

Karolis: “[...] *gives me more options than I need then I just don't see any point switching to anything else.*”

Some probands gave specific features, that would facilitate or impede their use of a BBDMDS. From the proposed BC-based service, a German student mentioned the possibility to download music on his hard drive as a facilitating factor:

Peter: “[...] *It is a beneficial functionality over Spotify to download because on Spotify you cannot download something [...].*”

The presented commenting function was negatively judged by an E-Business student as he mentioned that:

Temur: “[...] comments like on YouTube and stuff, can become too toxic very fast [...] So it's not very easy to moderate and it brings up complications [...].”

Finally, an increased number of social features on BBDMDSs are mentioned as facilitating factors for two students. One concluded, that:

Michal: “[...] interact with the producers, interact with the listeners as well. [...] like maybe a hub, or marketplace. Now, it's still streaming service. But I think the listeners should be able to interact with each other in this way [...].”

The other respondent explained his idea of the social feature that would facilitate his use:

Bastian: “[...] something that would go into some sort of Instagram story level. Where you have artists more promoting themselves on a social basis. Some sort that you don't listen to the music only but for every track you make, you have some sort of a memo or some sort of a short video telling what you felt, what came to your mind, why you designed the song. That would be something more personal, that is lacking in this super fast, digital world.”

6.1.7. Price

For four out of five participants, the factor price was a perceived advantage and incentive to switch to a BBDMDS. For one student a cheaper price was the most persuasive argument to use the service:

Bastian: “[...] Let's say a blockchain based Soundcloud or Spotify in the end would only cost me three Euros per month. This would be something. Price really matters. This would be something super huge [...] I would say this is the best feature that somebody can deliver to me.”

Another participant generally assessed that financial incentives are an advantage. He stated:

Michal: “[...] also free trial, or just like some tracks or some credit”

For one out of five participants, cheaper prices make no difference as he concluded:

Peter: *“Since Spotify is so cheap right now with five euros per month and I can listen to all the music. I wouldn't say that this is appealing to me. [...] Fees are no additional benefit for me.”*

6.1.8. Consumer Benefit

Lastly, upon describing the perceived advantages and disadvantages of BBDMDSs, participants were lamenting a lack of consumer benefits in using the new service over what they are already using. One interviewee reflected, that:

Bastian: *“It's actually hard for me to imagine what bigger impact that would have. Because in the end as a user, I can see the same artist, I can access all the music as before, but through a different system. [...] So I only see in this the main beneficiary the artist. [...]”*

Similarly, another person concluded:

Peter: *“I wouldn't say that there's so much on the positive side for consumers. Because what do they have? [...] everything you're trying to get on the system, a system which is a blueprint of Spotify.”*

6.1.9. Analysis of Attitude and Related Factors

Transferred to the behavior at hand, collected data showed that consumers attitude towards the behavior is formed by a combination of perceived advantageous features and perceived benefits for themselves as well as others. The assessment of features and benefits usually occurred in a direct comparison between BBDMDS and conventional services. All participants were able to assess advantages of a BBDMDS over conventional services. Most of the positive attitudes towards the intention to use BBDMDSs stemmed from the belief that this new type of service can deliver advantages for artists.

These advantages for artists were seen in an improved way to self-administer the distribution of their music and manage the respective copyright. Most participants saw an advantage in a democratization of the industry through the use of BBDMDSs, as they are believed to offer a

possibility for artists to earn more money and obtain a fairer possibility to gain attention. Yet, participants were not in unison about how much share of revenue artists really receive from BBDMDSs. It seems important to recognize at this point, that the possibility for artists to earn more money through BBDMDSs is directly correlated with the number of consumers using the platform and thereby generating revenue. Hence, if the amount of users stays small, the relative revenue for artists will be low as well.

Furthermore, participants saw a democratization potential through the use of BBDMDSs, as intermediaries are cut out from the value chain. Yet, an interesting contradiction was brought up by one participant who mentioned that cutting out intermediaries such as labels can also have adverse effects. This is seen as a valid point, as it must be acknowledged that stakeholders such as labels actually add value for artists as they take care of the music distribution and marketing and can fall back on years of knowledge in this field. Indeed, cutting out these intermediaries saves costs and leaves a more significant share of the revenue for artists, though at the same time the value they add must be compensated somehow. This argument should be taken into consideration when evaluating the democratization potential. Nevertheless, democratization and ethics seem to be strong reasons for participants to use a BBDMDS, for the case that other circumstances are given (e.g., sufficient music catalog).

The possibility to support artists directly through features such as tipping was perceived as an advantage for both artists and consumers. A majority of participants believed that this is a positive aspect about BBDMDSs, because it offers the possibility for direct contact with, and support of artists and at the same time generates additional revenue for the artists. Conventional services do not offer such functions. In fact, direct interaction with artists is not possible through platforms such as Spotify.

The obtained data signals that all participants believe that consumers have an advantage through the use of BBDMDS regarding anonymity and transparency. Participants confirmed that the use of BCT offers them to use the service more freely and obtain more precise information on their actual use. Yet both factors seem to be interrelated, as at the same time more transparency would mean less anonymity. Thereby participants stressed the importance, that their actions could be made transparent as long as they are anonymized. The transparency they valued can be linked to the knowledge about how much of the money that they paid for the service is received by the artists.

The high number of participants lamenting a lack of consumer benefits could be an indicator that the previously mentioned advantages for consumers need to be discussed in further consideration of their perceived importance. From the obtained data it seems that participants first and foremost were concerned with the amount of music and artists available on a digital music distribution service. Thereby it can be assumed, that despite the fact that factors such as transparency, anonymity, and democratization were perceived advantages of BBDMDSs over conventional services, they do not seem to be cogent enough to trigger the use of BBDMDSs if they cannot listen to the music they like.

In light of the missing consumer benefits, consumers were not in unison about the need for additional features. Even though most of them mentioned a need for additional functionality over conventional services like Spotify, they also mentioned that they are very happy with their current possibilities on digital music distribution services. Therefore, it can be assumed that mentioned additional features such as the possibility to download and own music or social features such as an Instagram-like story would be nice additions to have but are no convincing factors to use a BBDMDS.

For the majority of the respondents, the factor price seemed to be a factor that can make a difference and is a valuable advantage of BBDMDSs over conventional services. Even a small reduction in price seemed to be a motivator to use another service. It must be considered, that BBDMDSs only hypothetically can offer a smaller price due to a reduction in cost and disintermediation. However, outgoing from the current information, BBDMDSs do not offer the same quality and quantity of music and functionality as services like Spotify. As this was one of the requirements under which price can be counted as an advantage for most participants, this argument must be put into perspective.

6.2. Perceived Usefulness

To assess the factor PU, interviewees were asked to describe in what ways BBDMDSs and their BC-related properties can enhance their consumption experience and to what extent they perceive them to be useful. As part of the TAM, the PU hereby refers to blockchain as a technology implemented in a digital music service, and the functions and processes it enables. Regarding the PU, probands mentioned the *Speed* of BCT and the *PPP-model* (Table 5)

Table 5. Overview of Perceived Usefulness Factors

Main Category	Category	Definition	Example
	Perceived Usefulness	Perceived advantages and disadvantages	
Subcategory	Pay per play model (PPP-model)	A pay per play model is not perceived as valuable alternative to a subscription-based model.	Bastian: "I think in the end, I when you have a monthly based tariff, it always works out better for everyone."
Subcategory	Speed	The speed of BCT can have a useful impact on the BBDMDSs	Peter: "another positive thing with blockchain is that it's really fast."

Note. Consumer perception towards the usefulness of using BCT in BBDMDSs.

6.2.1. Pay-per-play (PPP)

The presented PPP-model, which enables users of the BBDMDSs to pay only for the songs they have played (and downloaded) instead of paying a monthly subscription rate, was evaluated as useful by only one participant. Referring to users that just want to listen to music occasionally, he stated:

Michal: *"[...] it could cut costs for those niche or occasional listeners [...] and the consumers have more to choose in terms of payment models."*

Three other participants on the contrary, were not able to assign any usefulness to this model. One student defended the subscription-based model over PPP by mentioning:

Bastian: *"[...] I think in the end, I when you have a monthly based tariff, it always works out better for everyone. [...] one decision for a one-year plan, I think it's one big step but in the end of the day it all goes away. [...]."*

Another proband skeptically reviewed the additional model:

Karolis: *"[...] if I don't have a token, I cannot play the next track. So I have to deposit some amount which sort of makes me more subscribed than actually having a subscription. [...]."*

The third critic mentioned psychological reasoning problems he connects to the PPP-model:

Temur: *“It's also just the mindset of people. You don't want to have that thought that if I'm listening, I'm paying more. No, you just want to have this thing that OK, I can play music anytime. There is some fixed amount that I paid. And now I can play as much as I want. [...]”*

6.2.2. Speed

Further, interviewees mentioned that BCT helps to speed up processes and thereby can be useful. A student described the perceived usefulness by explaining a use case of BCT:

Peter: *“[...] another positive thing with blockchain is that it's really fast. Sometimes you don't need to have an institution verifying transactions, because it's done by the blockchain which makes it obviously very fast. [...]”*

6.2.3. Analysis of Perceived Usefulness and Related Factors

For the majority of the respondents, the PPP-model is not a useful addition to the service. Most participants pictured this model as difficult to handle and preferred the traditional subscription-based model. Regarding the PU of BCT in terms of speeding up processes in BBDMDSs, only two participants mentioned this topic in the course of the interviews. Most likely due to minimal latency in current digital music distribution services, this property of BCT was not prominently assessed. Furthermore, the use of BCT (and related smart contracts) to speed up processes such as verifying transactions or obtaining a data file from a database hardly concerns and affects the consumer. This has a more significant effect on, for example, the time that is needed to pay out revenues to artists, based on the streams that they have generated on the platform. Thus, the speed enabled by BCT can be hypothesized to have only little effect on consumers' PU and therefore their attitude on the use of BBDMDSs.

6.3. Perceived Ease of Use

To get insights about the interviewees' PEOU of the BBDMDSs, they were asked to assess how easy or difficult it would be for them to start using such a service and what obstacles they might face. Again, as PEOU is part of the TAM, the factor assesses both the technology in use and the way it is used and implemented in the BBDMDSs. Regarding PEOU, participants mentioned *Technology Involvement* as an influencing variable (Table 6).

Table 6. Overview of Perceived Ease of Use Factor

Main Category	Category	Definition	Example
	Perceived Ease of Use	Perceived advantages and disadvantages	
Subcategory	Technology involvement	The inclusion of BC-related functions such as creating a wallet or the use of tokens are easy to handle	Bastian: “Yes, it was pretty straight forward. You can do it in maybe 10 minutes.”

Note. Consumer perception towards the ease of using BCT in BBDMDs.

6.3.1. Technology involvement

The involvement of BCT related functions like setting up a wallet were mentioned to be straightforward to understand and use according to all 5 participants. They reflected by mentioning:

Bastian: *“Yes, it was pretty straight forward. You can do it in maybe 10 minutes.”*

An IT-student had a similar conception and placed particular importance on the time factor:

Michal: *“It depends. If I can do it within two minutes, maybe that's fine.”*

Yet, for using such function in relation to setting up an account for a music service or starting to use it, one participant concluded:

Temur: *“[...] it depends how easy is it. How the platform is set up. Because the majority of music listeners, they don't want to deal with opening some digital wallet.”*

Regarding the functionality of using a wallet and the usage of tokens, another participant stated:

Karolis: *“Depends how would the wallet work. If it would be easy to exchange my fiat currency to that specific token [...].”*

One participant summarized that the user should have minimal friction with BCT and further elaborated how he pictures the easiest way to make use of the BC-related functions:

Temur: “[...] It should just say, okay, register and when you are registered, your wallet is maybe created automatically. Then just top it up with your credit card or something like that. Blockchain should not be an issue for the customer.”

6.3.2. Analysis of Perceived Ease of Use and Related Factors

Regarding the PEOU, consumers discussed whether they would actually use BC-related functions such as setting up a wallet or using tokens in the BBDMDS. The obtained data made it evident that setting up a wallet was no issue for any participant. Regarding the use of tokens and exchange services to receive tokens, participants agreed that it must be made as easy as possible to exercise such processes with a minimal needed effort. Further, it is important to recognize, that all participants had prior experience in processes such as setting up a wallet or using/exchanging tokens. This is likely to influence the evaluation of the PEOU variable. Thus, as also noticed by one interviewee, an average music consumer will probably not want to deal with such technological processes and might perceive them as more difficult.

6.4. Subjective Norm

To analyze the influence of the SN on forming an intention to use BBDMDSs, participants were asked to discuss their beliefs about the opinion of family and friends on BBDMDSs and the importance of their beliefs when it comes to using such a service. This resulted in the emergence of two categories: *Influence* and *Opinion* (Table 7).

Table 7. Overview of Subjective Norm Factors

Main Category	Category	Definition	Example
	Subjective Norm	Approval or disapproval towards using BBDMDSs	
Subcategory	Influence	The social environment has no influence on the decision whether or not to use a BBDMDS	Temur: “I don't care what my friend is using for his music streaming app. And he doesn't care about what I'm using.”
Subcategory	Opinion	My social environment has no opinion about BBDMDSs	Michal: “I just don't have anyone who would tell me anything like stop using

traditional streaming services or start using a different one."

Note. Consumers perceptions about the presence of subjective norms towards the use of BBDMDSs.

6.4.1. Influence

Regarding their close social environment, four out of five participants saw no influence of their environment on their intention to use BBDMDSs. One participant summarized this opinion

Temur: *"I don't care what my friend is using for his music streaming app. And he doesn't care about what I'm using [...]."*

One interviewee sees an influence of his environment when it is in regard to health and health related services. Yet, for the present case he concluded:

Bastian: *"Not connected with music [...]."*

One student justified the lack of influence of his environment by elaborating on missing social factors when it comes to music consumption:

Peter: *"[...] This is the thing most different from comparing streaming services to instant messaging. Instant messaging is all about who's on the platform, who is in the groups. Who can I easily message to. And Streaming is different. I don't know how I got into Spotify to be honest. I don't know why I used Spotify instead of Apple Music and the only thing I can think about is the money spending [...]."*

One participant contrarily mentioned that friends with a good music taste and knowledge do have an influence on what his decision towards using music services and hence a BBDMDS. He stated:

Karolis: *"[...] it depends what kind of friend is referring. My friends from the music circle, then of course it is very interesting. And if it is from my dad, then no. So in total it depends on how I'm perceiving that person in the music section. [...]."*

6.4.2. Opinion

As a second aspect, participants were evaluating the opinion of their families and friends about BBDMDSs and what they would think about the participant using it. Unanimously they agreed, that their family and friends have no real opinion on this matter. One student summarized:

Michal: *“Well, they don't have any opinions. [...] I just don't have anyone who would tell me anything like stop using traditional streaming services or start using a different one.”*

Another student backed this up by stating:

Bastian: *“I think everyone would approve that I use it. Like I don't care. I think my family and friends also don't care about how I listen to music.”*

6.4.3. Analysis of Subjective Norm and Related Factors

The majority of the participants saw no influence of their friends and family in connection to their decision to use a BBDMDS. This lack of influence seems to originate from general missing social variables when it comes to listening to music or the use of music distribution services like Spotify. Unlike, for example, messaging services where individuals are dependent on others to have the same application to be able to use it, music distribution services do not operate on such dependence. Only one participant mentioned that friends that have vast knowledge related to music have some potential influence to point him towards new services. Even though it is not very significant, it can be hypothesized that knowledge in the field of music might affect the influencing power.

Also, none of the participants think that their family and friends have an opinion about what music distribution service they are using and therefore also have no opinion on their usage of BBDMDSs. There seems to be no connection between the use of such services and the opinion of others. The lacking opinion about BBDMDSs could also originate from the novelty of such services and the missing awareness of such.

6.5. Perceived Behavioral Control (PBC)

As the last variable, PBC towards the use of BBDMDSs was assessed by asking participants about factors that would facilitate or impede their use of such services. These factors refer to the beliefs about the availability of skills, resources, and opportunities. Participants also mentioned their beliefs in regard to factors that facilitate or impede a switch from their current service to the BC-based service. The obtained data shows that the PBC towards using a BBDMDS mainly depends on the following five categories: *User Interface*, *Availability*, *Accessibility and Experience*, *Convenience* and *Volatility of Currency* (Table 8).

Table 8. Overview of Perceived Behavioral Control Factors

Main Category	Category	Definition	Example
	Perceived Behavioral Control	Factors that facilitate or impede using BBDMDSs	
Subcategory	User Interface	A good user experience (e.g., good UI) helps to get used to a new service quicker	Peter: "you have to have a user interface which blocks out the technology"
Subcategory	Availability (Songs)	The BBDMDS needs to have at least the same amount of songs	Peter: "You need all the artists the consumer is interested in. All the artists I want to listen to. And if not, I am very fast changing to another platform."
Subcategory	Accessibility (device) & Experience	The BBDMDS is available on several devices (phone, laptop, tablet), can be used online and offline,	Karolis: "can I use it via the phone, as a streaming. Or can I download it to the computer. Do I need to be online all the time? Or can I do that offline?"
Subcategory	Convenience	The ability to exchange or transfer your profile (e.g., playlists) from old to the new service	Michal: "being able to exchange playlist."
Subcategory	Volatility of Currency	Price differences in the service due to the volatility of tokens are a problem	Peter: "So one thing about cryptocurrencies is that they are very volatile. So this is one problem obviously."

Note. Consumers perceptions of factors that could facilitate or impede the use of BBDMDSs.

6.5.1. User Interface

With regard to the whole sample group, three probands stressed the importance of a clear and easy to use interface as a facilitating factor to use a BBDMDS. For one participant the look of the interface is particularly important:

Temur: “[...] if it looks shitty, the user interface, I wouldn't do that. [...].”

For another student the functionality of the interface is in the foreground:

Michal: “[...] if it's too much effort to accommodate myself there. That's the thing, if it takes time again to find all the artists that I follow. If the interface is not intuitive [...].”

For yet another participant, it is an important factor that the interface is simple and does not show technology used in the BBDMDS:

Peter: “[...] you have to have a user interface which blocks out the technology [...].”

6.5.2. Content

The majority of participants stated that the content available on the platform is very decisive. Hereby they referred to songs, artists and exclusive content they are not able to find on other services in the same wealth and significance. One participant summarized this viewpoint:

Bastian: *“If I switch to the new, the other product in the end, do they have the same amount of music? And is the quality of the product the same as before? It cannot be lower, it at least has to be the same quality, the same amount of music.”*

He substantiated this need by mentioning:

Bastian: “[...] you never know what you want to listen to next somehow so I cannot tell you what can be cut off. [...].”

For another interviewee this is substantial to keep consumers on a platform:

Peter: “[...] You need all the artists the consumer is interested in. All the artists I want to listen to. And if not, I am very fast changing to another platform. [...].”

Furthermore, participants mentioned that exclusive content is a facilitating factor in using a new service and is important to make the whole system work. One participant summarized this as follows:

Peter: “[...] you need to put a constraint on all the other platforms so for example if somebody would be using your streaming platform and is not willed to pay a certain amount for music and he could go easily to YouTube or Soundcloud or some other streaming service and listen to the song he is looking for then I think this isn’t really solving any problems [...].”

6.5.3. Accessibility (Device) & Experience

Four out of five participants mentioned the accessibility and experience of the BBDMDSs through all kinds of devices as a facilitating factor. One interviewee summarized convenience by saying:

Temur: “[...] if I can find curated playlists, and if the platform has a good engine to let me discover new music, new music based on my taste, preferences, and then my music history. So that's very important. [...].”

A student argued that the service has to be accessible on all devices:

Karolis: “[...] can I use it via the phone, as streaming. Or can I download it to the computer. Do I need to be online all the time? Or can I do that offline? [...].”

6.5.4. Convenience

In regard to the PBC variable, most probands mentioned convenience as an important factor facilitating the use of BBDMDSs. Hereby the participants referred to usage specific compatibility between services such as:

Michal: “[...] being able to exchange playlist. [...].”

or

Michal: “[...] if there was a way to get information and switch with the new one, it would be great.”

For another interviewee compatibility is very important as he explained:

Karolis: “I think the biggest obstacle is always the switch itself. You know, when you are used to the platform, you already have a set up that satisfies you. I think you always have your playlist, favorite artist, and so on and so forth. For me personally, like, it's always the biggest obstacle to start something new when you have to sort of create your own profile, which fits you. [...].”

For one participant convenience is decisive on the choice of service; therefore a more convenient service facilitates the use for him. He stated:

Peter: “[...] I would say the argument is more if the streaming service is convenient or not. So why do they use Spotify over Apple music? Because I'd say because Spotify is maybe cheaper and convenient, more convenient.”

6.5.5. Volatility

Two participants evaluated the volatility of tokens as an impeding factor regarding the use of BBDMDS. One interviewee explained his doubts regarding the change in value by mentioning:

Michal: “[...] I would think about the volatility. Because there could be people who just buy a lot of them now, and then they will change the value.”

In connection to the PPP-model, a participant raised his concerns by stating:

Peter: “[...] if one day you can listen to a song for 50 cents and another day it would be a euro or a euro fifty. [...].”

6.5.6. Analysis of Perceived Behavioral Control and Related Factors

The obtained data showed that the PBC variable was mostly related to specific resources and opportunities needed to act out the behavior at hand. Also, it must be mentioned that the

intention to use a BBDMDSs was often assessed in connection to what would facilitate or impede a switch from the service consumers currently use to a BBDMDS.

For most of the participants, a good user interface was perceived as a facilitating factor towards the use of a BBDMDS. Thereby, it seemed important for the interviewees that the interface is intuitive and blocks out the underlying BCT.

A good user interface was found out to have a positive influence on the user experience and the perceived ease of use. Therefore, a connection between the variables of PBC and PEOU was established. This also seems applicable in our case as participants mentioned the need for easy processes through the interface related to both PEOU and PBC.

The lack of content availability was perceived as an impeding factor by the majority of participants. As mentioned before, most additional functionality or ability of BBDMDSs was only perceived as advantageous given the fact that the service contains at least the same music as consumers are used from their current services. Thereby, a lack of content availability can be assumed as a strong impeding factor to use BBDMDSs when seen as a substitute for conventional services.

The accessibility and experience of the service were mentioned as facilitating factors to use BBDMDSs by 80% of the participants. They referred to the use of the service on all kinds of devices online and offline and well-functioning music related tools such as curated playlists, precise search engine and recommendation system, and a history of the consumed music. The need for such tools and features seems to originate from what users can currently expect from services such as Spotify. This underlines that BBDMDSs are expected to be equipped like conventional services.

For over half of the participants, the convenience of the services is an important factor that would facilitate their use of a BBDMDS. This refers to the transfer of data such as user information, usage information or created playlists. It seems to be a barrier for consumers to set up a new user account in a new service because they would have to start from zero modifying and creating settings and getting used to the new environment. The analyzed BBDMDSs currently have no option to transfer such data.

Based on the findings, the volatility of tokens was evaluated as an impeding factor towards the use of BBDMDs by two participants. Accordingly, for these individuals it would be problematic if the currency that is used to pay for the service could rapidly change its value, potentially even in the course of listening to one song. This is assessed particularly impractical for the proposed PPP-model.

6.6. General Findings

In addition to the findings generated through the application of the TPB and TAM, some additional insights were gathered on the general awareness of participants about problems in the music industry and their general perception of BCT.

In regard to the interviewees' awareness about problems in the music industry, the majority stated their lack of knowledge on this topic. Two participants mentioned some potential problems they could see regarding artist payment and piracy issues:

Michal: “[...] *It could be that while the producers could be losing profits because the people will download your music without paying for it.*”

and

Karolis: “[...] *So right now the income for the artist is super Limited [...].*”

Concerning participants general view on BCT, all of them agreed, that the technology has its good and bad sides but overall can be useful in potentially every industry. One participant summarized:

Bastian: “*I think it was hyped to a point. And on the other hand [...] because of the crash of the Bitcoins some point people lost faith in it, even though it might have a real good impact in several industries. [...] I think there are many cases where it might be especially helpful [...].*”

6.7. Chapter Summary

This section applied the TPB (Ajzen, 1985) and TAM (Davis, 1989) to the context of BBDMDS usage. In particular, it aimed at finding factors underlying the variables proposed by the two theoretical models. The findings suggest that the variables *A* towards the behavior and *PBC* play an important role in forming the intention to use BBDMDSs. *PU* and *PEOU* seem to have a weaker influence and *SN* on the contrary seemed to be no critical variable in the given context. Furthermore, the factors of content, user interface, direct connection, price, compatibility, and technology involvement seemed to play a very decisive role. The findings will be further elaborated in the subsequent discussion.

7. Discussion

In this section, the findings are interpreted and placed in relation to the research question. Thereby, each research sub-question is discussed in-depth.

7.1. Blockchain Use Cases & Created Value

Many of the discovered current issues in the music industry are targeted to be solved by BBDMDSs; thus they could be credited to have the potential to surpass traditional digital music distributors. This part is devoted to the discussion of the values that blockchain implementation in digital music distribution services can bring to the music industry. Thereby the first research sub-question is answered:

Q1: What value do blockchain-based use cases add to the music industry?

Facilitating Processes

The BCT application in digital music distribution services seems to be capable of simplifying, securing and accelerating current operations. The implementation of BCT enables to store data in the network across personal computers, which makes the system decentralized and distributed. In that case, creators' works are much more secure than before because the data is spread throughout the whole network together with the records of transactions. Hence, BBDMDSs are capable to solve the discovered problem of the lack of transparency in revenue

distribution systems. However, an elaboration if BCT solves existing piracy problems in the music industry is not covered by this study.

Furthermore, there is no need for central bodies validating music files. In BBDMDSs licensing is done automatically through the use of smart contracts. In that case, intermediaries, like labels, publishers or collecting societies, are no longer required in the value chain; thus the process of licensing-publishing-using the music file is much faster. This is a solid argument that the existence of BBDMDSs can facilitate licensing and distribution of copyrighted music files which was found as a current challenge for collecting societies and labels. Moreover, due to blockchain specificity, network nodes have to validate every incoming transaction. Thus, users of BBDMDS platform become validators themselves instead of trusting third-parties for content or transactions approval. In this case, all service users are fully responsible for their actions and contribute to a more decentralized and credible platform. Consequently, BBDMDSs become platform providers for peer-to-peer interactions.

Value for Artists

The decentralization factor of BBDMDSs provides more power for artists compared to conventional services. First, the absence of intermediaries means that artists can get a higher income since no third-parties are involved taking a piece of the revenue. Also, the use of smart contracts enables an immediate payout of revenues after consumers have streamed or downloaded a song. This is an advantage compared to conventional services, where artist revenue payouts can take up to several months. Besides, independent artists can be in full control of the data they upload to a service platform. Because of the transparency factor in a blockchain, artists can see all transactions, whether they are payments or song streams. This means that an artist can verify his/her revenue by comparing hashes: the smart contract stores hashes of every played song and distributes revenues to artists by providing the whole chain of calculations. In this way, the credibility of BBDMDSs is established, and a higher level of fairness is promoted, which was one of the main issues related to current digital music distribution services. However, other alternative sources of capital introduced by O'Dair et al. (2016) like crowdfunding were not found in existing BBDMDSs; thus such options can only be assessed as unexploited potential.

Furthermore, the previously mentioned value of disintermediation must be put into perspective as through cutting out stakeholders the added value, that they usually contribute to the value

chain, is lost. Therefore, the problem is not simply solved by cutting every stakeholder in between the musician and the consumer. Rather more, BBDMDSs need to find ways to replace their services and know-how.

Value for Consumers

The application of BCT provides new payment possibilities for consumers. In combination with a standard subscription fee, consumers can choose to be charged only for the exact amount of songs they have listened to or downloaded. However, it is a controversial subject whether a novel PPP-model would be adopted by consumers. Another innovative way to support artists is offered through a tipping system, which shows the potential to strengthen the relationship between artists and their fans. To summarize, such direct ways of payments are enabled through the elimination of intermediaries. This also enables faster and frictionless transactions that could be tracked across the blockchain network. Thus alternative ways of revenue generation found in BBDMDSs are impossible or rarely adopted by traditional streaming services.

Furthermore, the value of tokenization is arguable. In most of the business cases, it was stated that users have to exchange their fiat money to a specific token in a cryptocurrency exchange services off-side the platform. This could be argued to make the use of BBDMDSs more complex. Accordingly, this and more consumer-related insights will be discussed in the second part of the discussion.

Value for Service Providers

By design, blockchain is a multi-user system where all nodes can interact with each other. Hence, in the context of BBDMDSs, the employed open source permissioned blockchain with public visibility opens up opportunities for various stakeholders to enter the blockchain and utilize data produced by artists. The open source characteristic allows the construction of additional services on top. Furthermore, functioning like main engines, smart contracts contain the predefined rules of permissions related to particular stakeholders. In that case, smart contracts can significantly facilitate the licensing for radio stations, movie producers or others who wish to use musicians' content for their own needs. Only the fulfilled rules enable the automatic provision of specific data, so no data breaches are possible. Furthermore, smart contracts can automatically process financial transactions and thereby reduce the cost for service providers related to observing and executing such transactions.

Moreover, if various BBDMDSs came up to standardized permissions of access, a faster, frictionless and fairer payment system would be brought alongside a BC-based global music database. This aligned with previously discussed potentials in the related study by O'Dair et al. (2016), who introduced the idea of a progressing BC-based database of copyright data. As we found out, similar attempts have failed in the past with the Global Repertoire Database (GRD). In fact, the discussion if BCT can assist in creating such a database has already started (Edwards, 2016). In regards of who could provide the standards and guidelines, the possibilities are compared to two successful examples of the World Wide Web Consortium (W3C) and the Internet Corporation for Assigned Names and Numbers (ICANN) back in 90' which was the result of the World Wide Web (ibid.). The benefit of a BC-based GRD would be that data transactions from the database recorded on the blockchain would provide an immutable track of where and when the music was utilized and how much money was generated. In this case, BBDMDSs would operate as data providers for the unifying copyright database for music. Yet, this would presuppose, that all service providers agree on the use of one particular blockchain to store all the data. If every single service employs their own, the conjoint power will be lost.

To conclude, blockchain application in DMDs is useful as a digital journal for tracking every action on the platform, whereas sensitive data and large size files should be kept in off-chain repositories. The thorough analyses of real-life BBDMDSs confirmed the predictive potentials of blockchain application in the music industry that were revealed from the literature review. There is no doubt that BCT improves processes of digital music distribution and can provide a solution to existing issues such as slow payments, data processing and lack of transparency. However, the question remains unsolved whether the industry stakeholders are willing to adapt BBDMDSs.

7.2. Consumers' Intention to Use BBDMDSs

The applied TPB states that in order to predict an individual's intention to perform a behavior, it is needed to know whether the person is in favor of performing the behavior, how much the person feels the social pressure to do it and whether the person feels in control of the behavior at hand. In the context of this study, the perceived ease of using and usefulness of the technology underlying the behavior are also included in the prediction of intention. Therefore, each variable will be discussed by consulting the obtained data to answer the second research sub-question:

Q2: What determines the intention of consumers to use blockchain based digital music distribution services and how do they evaluate them?

Attitudes

Based on the given facts, it cannot be fully assessed whether the attitude of the participants towards using BBDMDSs is positive or negative, though it seems possible to classify that benefits for artists, direct support, additional social features, increased transparency and anonymity add to a positive attitude towards the intention to use BBDMDSs. Though, they must be weighed against the importance of other factors such as content. A difference in price, if feasible, seems to be the most significant perceived advantage and motivator to use a BBDMDS. Yet, this presupposes that consumers have the same functionality, quality and amount of content as in conventional services. Overall missing consumer benefits seem to be the most significant perceived disadvantage and thereby triggering a negative attitude towards the use of BBDMDSs. The attitudes of consumers towards BBDMDSs must be further categorized as preliminary as none of the participants have yet used such a service and due to Beta versions of services most factors are not testable.

Perceived Easy of Use & Perceived Usefulness

From our findings, it can be argued that the PEOU varies depending on the amount of interaction consumers have with BC-related processes while using the service. Furthermore, it seems like the PEOU of BBDMDSs is linked to the experience level of consumers with BC-related processes. For more inexperienced consumers, the PEOU is likely to have a bigger impact. This is consistent with the findings of Taylor and Todd (1995) who observed that PEOU has a greater effect on inexperienced users.

Yet, it seems that the variable has only little influence on the overall attitude towards using BBDMDSs. As stated by Davis (1989), a positive PEOU does not necessarily mean, that participants will adopt the technology because the PU of it plays a further role in the adoption process. The influence of PU seems to be low as the discussed PPP-model and the enhanced speed through BCT were not perceived as useful. This points a direction regarding the previously outlined question of Tapscott and Tapscott (2016) about the potential of such a PPP-model as an alternative to subscription plans. Yet, to extensively evaluate the potential of such a model, a higher consumer sample size would be helpful.

Hence, it is assumed that both PEOU and PU have no big influence on the attitude towards using BBDMDSs. Nevertheless, from this study, it seems arguable that an increased confrontation of consumers with BC-related processes triggers a negative attitude towards the use especially for consumers with little experience in BC-related processes.

Perceived Behavioral Control

After investigating the factors that influence the PBC, it seems that this variable of the appended model plays an essential role on the intention to use BBDMDSs. Many factors mentioned towards this variable, such as content or user interface, appear like must-have factors and essential circumstances for users to form an intention. The findings on the importance of a proper user interface are consistent with Kwong and Park (2008) and Paws et al. (2000) who also mentioned the particular importance of a user-friendly interface. Found insights about the importance of content are also consistent with prior research which found that content availability is the most critical factor in mobile music service use (Vlachos & Vrechopoulos, 2003). Furthermore, it seems to be important for consumers to be offered compatibility between services as this would facilitate switching from one to another. All the customizing they do on one platform can be seen as a lock-in factor, therefore enabling to take all of this customized data to a new service makes forming the intention a lot easier.

As claimed by Ajzen (1991), PBC can predict behavior directly and not only indirectly through intention. From the obtained data it can be argued that a few necessary resources are needed for consumers to actually use a BBDMDS, thereby validating previous research findings. Uppermost a substantial amount of qualitative content (music) and a good user interface are important resources.

Subjective Norm

The obtained data showed an apparent lack of influence of SN on the intention to use BBDMDSs. The social environment of consumers seems to have no strong opinion about what music distribution service to use and thus also has no influence on their choice of service. Based on the collected data, social pressure in this context is non-existent. This is in line with the findings of previous research, which states that the influence of variables varies across different behaviors and situations (Ajzen, 1991).

Consumer Evaluation

From the obtained findings, insights can be drawn about how consumers evaluate the presented BBDMDSs. Participants seem to have a generally positive attitude towards the use of BBDMDSs and can assign many advantages of the new service over conventional services. The most valued factors seemed to be a more direct connection to artist, transparency, and anonymity. Contrarily, the use of BC-related functions and a lack of content quality as well as quantity add to a more negative evaluation of the BBDMDSs. The lack of content seemed to reduce the value of many other previously mentioned perceived advantages. Summarizing on this, a clear consumer evaluation cannot be derived from the present study especially because many circumstances regarding the BBDMDSs are not settled yet and hypothetical assumptions had to be made. It must be recognized, that participants had difficulties addressing specific features and processes of BBDMDSs as they had no prior experience in using them. Yet, given the satisfaction of consumers with their current possibilities and the state of development of BBDMDSs, it can be assumed that the evaluation would be rather negative to neutral.

8. Research Implications

In the following chapter, the obtained insights of this thesis will be merged and transferred into practical and theoretical implications, illustrating the significance of the study's findings.

8.1. Practical Implications

From a holistic perspective, BBDMDSs can make substantial contributions by solving some of the problems of the music industry. Yet, to allow for a sophisticated BBDMDS solution, some key principles need to be obeyed. Those will be elaborated in the following.

Availability of Content

Collected findings suggest that consumers are very sensitive when it comes to the availability of content on their music distribution service of choice. As an outcome of our case study, we have realized that most BBDMDSs lack precisely that – a good assortment of qualitative content. It must be acknowledged that most BBDMDSs are still in a development stage, though in order for them to grow, content is a crucial factor. Obtaining such quality content is possible

either through direct licensing from artists or through catalog licensing deals with record labels. These seem to be two possible paths for BBDMDSs to take.

Enhancing the content through catalog licensing deals, especially with major labels holding rights to the most famous artists, can be a difficult and costly task (Auchard, 2017). As the analyzed businesses can be classified as smaller startup companies, their available financial resources are assumed to be quite limited. Therefore, the first path seems to be out of reach. Even though there is a chance that current catalog licensing agreements between major labels and conventional services like Spotify will not get extended, this scenario is unlikely to happen as the interdependency between labels and conventional services is seen as very strong.

On the contrary, sourcing content directly from artists, as currently done by the majority of BBDMDSs, yields the possibility to obtain more content with a lower investment. Though, this would signify that BBDMDSs could not compete with services like Spotify as content quality cannot be offered on the same level (regarding famous artists). In order to cope with the content related expectations of consumers, BBDMDSs should follow a niche market strategy. This strategy should follow the notion of disruption theory (Christensen, Raynor, & Rory, 2015), whereby new entrants start targeting low-end or unserved customers and eventually reach mainstream attention. It is further advised to limit the content to a specific genre and focus on a wide selection of artists in a specific field to seize the advantage of specialization and occupy a market niche. An example could be the digital music downloading platform Beatport, which specializes in electronic music. This also offers the potential to target a specific community and appeal to their exact needs. A niche market strategy further seems adequate in light of the vast competition in the market of DMDSs. Next to big players like Spotify, YouTube, Amazon, and Soundcloud, the amount of new BC-based services is growing steadily.

Pricing

Considering the existing landscape of applications, the competition in the market is also reflected in the pricing. For consumers, even a small reduction in price is perceived as an advantage. Combining this argument with the limited amount of content of BBDMDSs in comparison to conventional services, the set price for monthly subscriptions is recommended to stay below the competition.

The previously outlined PPP model is advised to be discarded due to missing user adoption potential and perceived complexity. Therefore, BBDMDSs should focus on a variety of subscription plans and free trial options to strengthen the democratization potential of BBDMDSs in the way, that consumers can freely choose how they prefer to pay for the service depending on their needs.

Providing Marketing Services for Artists

As the direct approach of BBDMDSs cuts out intermediaries, we see increased importance in offering tools on the platform that can compensate for the loss of expertise and services provided by these entities. First and foremost, BBDMDSs need to compensate for the loss in marketing and distribution power. Therefore, it is advised to offer possibilities for artists to promote their music directly on the platform. This can happen, for example, through incentivizing consumers to share music or by offering paid marketing services that push the product within or outside of the service.

Social Functionality, Value Proposition & Communication Strategy

Regarding the most significant points of difference (POD) between BBDMDSs and conventional DMDSs, the BC-based services seem to have an advantage due to a fairer, more transparent system and a more direct artist to consumer approach. Yet, it seems like the current value propositions are not clearly elaborated and communicated to consumers, and social factors provided by the platform can be enhanced. Therefore, we recommend BC-based service providers to work on enhanced social functionality, a clear value proposition, and a corresponding communication strategy. This should most effectively go hand in hand with the previously outlined niche market strategy.

BBDMDSs can make more use of their direct artist-to-consumer approach by working up on specific features that enhance the social interaction on the platform. Currently offered tipping tools should be kept, as they were evaluated highly valued for a closer consumer-artist relationship as well as additional revenue for artists. Furthermore, consumers should be given incentives to socialize on the platform. This could be implemented through enabling to share music directly on the platform instead of using social media platforms for this. Additionally, users should be enabled to customize their profile and share their favorite music on this profile

directly. This can also trigger an increased lock-in factor to the platform beyond measures of price or content.

Regarding the communication, a focus can remain on advertising the clear advantages for artists, but the perspective of consumers must be internalized more intensively. It must be easy for consumers to understand, what advantages they receive from using a BBDMDS over conventional services. To achieve this, BC-based services can exploit the current shortcomings in the music industry, such as poor artist revenue shares and at the same time shed light on their fairer system. Though, as found in this study, there is a lack of knowledge and awareness of these shortcomings. Therefore, we recommend running an **educational marketing campaign** that brings the topic closer to consumers and at the same time communicates the solutions BBDMDSs offer. The growing popularity of paid DMDSs can further drive the success of such a campaign (cf. Figure 1).

Strengthen the Convenience

For consumers, it seems to be an obstacle switching to a BBDMDS when they have already extensively customized their profile on the platform they are currently using. Therefore, service providers and developers are advised to work on a tool that enables to transfer customized user data, such as music playlists, to their application. This can simplify the switching process for consumers and make their decision a lot easier. A difficulty in this endeavor could be the conventional services that own the customized user data.

Conceptual Design use

The previously outlined conceptual design can be seen as a guide for new entrants as well as for developers of current services. When making use of the concept, a couple of principles are advised to be followed.

Outgoing from obtained findings, the service should make sure to apply only **minimal friction between BC-related features and consumers**, as this can add increased insecurity or unwillingness to use a BBDMDS. This means that instead of marketing the service as a BCT use case, the advantages of the technology should be seized but not communicated extensively to potential customers. We found out that consumers are not able to derive any value from that

information. As consumers will access the service through the user interface, we advise application developers to deploy BC-related processes, such as setting up a wallet or the exchange of fiat money into cryptocurrency, as intuitive and smooth as possible. A proposed solution for that is to make use of an automated token-up system. Furthermore, the interface should be appealing and easy to use. The setup and look can be guided by the current best use cases of conventional services. To correspond optimally to the needs of consumers, the application should be accessible through all digital devices such as laptops, mobile phones, and tablets.

To provide a universal blockchain that could be deployed by various stakeholders, BBDMDSSs can **make use of the permission management system**. This means that data on the platform can be used only when predefined contract rules are fulfilled, which are established regarding specific type of users. Due to blockchain specificities, it can be further assured that consumers have an option to retain their anonymity, processes are made comprehensible, and the service is perceived as secure and credible.

When making use of smart contracts to manage copyright, licensing and revenue distribution, a **standardized data format** should be used. This can assist in making the service compatible with other services and facilitate a possible development of a Global Repertoire Database.

For developers, we highly recommend looking into environment-friendly solutions of consensus protocols. Therefore, instead of using the inefficient PoW consensus protocol, developers should rather **adopt the PoS or PoA protocols**, or look into blockchains that deploy them. Eliminating the unsustainable way of work could encourage more entities to join the blockchain ecosystem and support further development.

Secondly, the fear that BCT could intensify existing privacy problems should be carefully considered. Fortunately, the use of distributed **off-chain repositories** like IPFS offer not only storage for music files, but also secure ways to handle private data and comply with GDPR. The use of such systems is advised in order to minimize societal concerns about privacy within BCT and avoid governmental restrictions

8.2. Theoretical Implications

By applying the TPB and TAM with qualitative research, this research has extended the knowledge about the applicability of both in such a setting. It was shown, that the theories can assist in finding factors underlying consumer behavior in the BBDMDS use context.

This study documents several key findings that contribute to the establishment of constructive knowledge. First, the *attitude* of consumers plays an important role when forming the intention to use a BBDMDS. An even stronger influencing factor in the given context seems to be the *PBC*. *PU* and *PEOU* only play a minor role in forming an attitude; however this seems to be influenced by the prior experience of participants with BCT. This implies the value of potentially extending the models with the factor of previous experience. Contrarily, *SN* as a variable influencing the intention to use a BBDMDS can be clearly discarded in the given context. Nevertheless, this insight was useful to derive recommendations for some practical implications.

Furthermore, this research showed the compatibility of the TPB and TAM. Though it must be mentioned, that through the connection of both models a connection between *PEOU* and *PBC* becomes apparent. In the given context, it is important to take this connection into account as the ease of using BCT (through the interface) seems to be correlated with the *PBC* an individual has in using a BBDMDS.

9. Conclusion

A vast amount of services has emerged over the past few years trying to solve the most fundamental problems of the music industry by applying the BCT. Due to the novelty of both the BCT and services applying it, research on the topic remains limited despite the growing interest to apply the technology to the music context and increased occurrence of the topic in societal discussions. In particular, the perspective of consumers on the applicability and interest in BBDMDSs remains widely disregarded. Therefore, the purpose of this study was to investigate what value BCT can bring to the music industry through the application in digital music distribution services and what determines consumers' intention to use them.

To explore the context of this study, extensive theoretical background research was conducted. This revealed detailed information about current shortcomings and trends in the music industry and a fundamental technical background, and scope of BCT applications within various sectors including the music industry.

Through an in-depth analysis of current applications of BCT within the music industry, the application group of BBDMDSs was evaluated as the most significant adopters. With the help of a multiple case study, it was possible to determine several improvements these services bring to the music industry and derive a conceptual design consisting of the most valuable use-cases. Our study demonstrates, that the significant value that is delivered by BBDMDSs through the application of BCT, is an increase in the credibility and security for service providers, cost savings on financial transactions and the enablement of instant revenue payouts to artists. Many other improvements can be linked to BBDMDSs; however, they are not exclusively attributable to BCT.

To determine consumers' intention to use BBDMDSs, this study relied on an appended model consisting of the TPB and TAM. In this regard, our findings demonstrate that the factors of content, user interface, direct connection, price, compatibility, and technology involvement most strongly influence consumers intention to use BBDMDSs. Moreover, the findings bring to light that a lack of content quality and quantity has a decreasing effect on the influence of other perceived advantages such as transparency or democratization potential.

By connecting the findings about the value offered by BBDMDSs with the evaluations of the latter by consumers, we were able to identify strategies to strengthen the position of BBDMDSs in the music industry and exploit their potential. The strategies include a niche market strategy, focusing on licensing music of independent artists situated in only one specific music genre, a low-level pricing model and a communication strategy focusing on educating society and marketing the value proposition.

9.1. Limitations

Limitations in data access and limited time are possible reasons for errors and biases that might have influenced particular processes and outcomes of this study. For this reason, we would like to address them so that future research can enact despite them.

One of the objectives of this study was to establish knowledge of real-life BBDMDSs which was done through secondary resources. Accordingly, it is not possible to generalize findings to the entire scope of BC-based applications in the music industry but only to BBDMDSs. However, representing exploratory research, this method was identified as the most effective way to collect preliminary information.

Moreover, it can be seen as a limitation that information about BBDMDSs was drawn from secondary data only. Consequently, this probably had an influence on the specificity of results of the case study.

Referring to Taylor and Todd (1995), results are more meaningful when participants have used the system that is subject to the analysis. Consequently, this is a limitation of this study as none of the participants held prior experience in the use of BBDMDSs.

Lastly, due to a relatively small sample size, the results from acquired primary data cannot be considered as representative for the whole sample population, thus lacking generalizability. However, the chosen sample size was found to fit the scope of the study.

9.2. Future Research

This study implies additional directions that can be gone by further research.

Information related to BBDMDSs was generated from the secondary data collection. Thus, we highly recommend future studies to carry out primary data collection within organizations in order to validate the acquired information. In fact, involving related stakeholders could have the benefit, that discovered practical implications are realized in the applications of analyzed businesses.

The derived findings from a qualitative research approach identified salient factors influencing consumers' intention to use BBDMDSs. These can be seen as information for the development of further quantitative research. Therefore, it would be interesting for further research to reconfirm these findings and quantitatively evaluate them.

Moreover, the study barely covered the analysis of conventional DMDSs. For this reason, the assessment of how advantageous are BBDMDSs is not holistic. This signifies the importance for future research to include both parties where the types of digital music distribution players are compared. In that way, the developed analysis of real-life BBDMDSs in this project could be taken as a starting point.

Another interesting scenario related to the value creation of BCT in the music industry is the adaption of the technology by the leading DMDSs. Future research could investigate the potential and possible outcomes if they adapt BCT to enable increased transparency or provision of a fairer and more direct payment system.

Even though the derived findings from consumers' perspective can be regarded as valuable, the whole ecosystem of related intermediaries needs to be analyzed to provide an integrated perspective on the potential of BBDMDSs. The capability of BCT to automate licensing, registry and payment distribution processes could bring disapproval from intermediaries such as collecting societies, labels, and distributors. For them, it could be seen as a threat to their job security. That is why the phenomenon should be further examined through the perspective of additional stakeholders.

This study looked at solving identified problems of the music industry from the standpoint of BC-based services. Yet, a broader perspective including all stakeholders of the music industry can shed further light on potential solutions to these problems.

All in all, it becomes apparent that many different perspectives exist for future research. This proves the fact that the field of study within blockchain adoption in music industry is yearning for more attention and the analysis of use cases.

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Appendix A - Demographics of Interview Participants

Porband	Age	Sex	Origin	Residence	Occupation	Streaming Plattform	Music consumption (h/d)	Streaming/ Downloading %
Bastian	26	M	Germany	Munich	Student - AI	Spotify / Soundcloud / Youtube	2-3 h/d	100/0
Peter	25	M	Germany	Munich	Student - Informatics	Spotify / Soundcloud / Youtube	3-4 h/d	95/5
Temur	23	M	Uzbekistan	Copenhagen	Student - E-Business	Spotify / Youtube	3-4 h/d	100/0
Michal	26	M	Czech Republic	Copenhagen	Student - IT	Spotify / Soundcloud	2-3 h/d	100/0
Karolis	31	M	Lithuania	Copenhagen	Sutdent - Marketing	Soundcloud	1 h/d	90/10

Note. Demographic data and individual music consumption of the research participants.

Appendix B - Interview Structure

Hello and thank you for taking your time to participate in our study. We are Henri and Monika and we are currently writing our Master's thesis in which research you've been invited to participate.

The purpose of our study is to investigate the potential and limitations of BC-based applications in the music industry. Also we aim to find out about consumers' intentions to use such applications. That is why your personal opinion and knowledge about blockchain is much appreciated here. It is important to notice that you don't have to know correct answers to all of the questions - we also want to find out your perception of particular subjects.

1) Getting participant's consent:

1. Are you ok with us recording this interview?
2. Can we make use of your name and some general information in our thesis?

To get to know more about you and your background, we would like to ask some basic demographic questions.

2) Demographics

Name		Origin	
Age		City of Residence	
Occupation		Side jobs	

3) Individual music consumption

1. Which music streaming and/or downloading services do you use? (*give examples*) Please name approx. how frequently by hours per day.

List of streaming services to give examples: Spotify, Youtube (only music), Soundcloud, Apple Music, Amazon Music, Deezer.

2. What are the reasons that you choose one over another? / This one?
3. How much music do you stream and download (by percentage)?
4. What are your favorite music genres?
5. How would you describe your music interest referring to how enthusiastic you are about music related news?

4) Music industry & music streaming

6. Could you name some positive developments in the music industry during the last 20 years?

7. Please name some negative developments in the music industry, if noticed?
from artists'/consumers' perspective

8. Some people argue, that Streaming services like Spotify don't provide fair and transparent payments for artists. According to that argument there is no transparency in the system neither for artists nor for consumers. Have you heard of such arguments? If so, what is your opinion towards it?

9. What technological advancements in music industry did you notice during the last 20 years?

10. How satisfied are you with your current possibilities of consuming music? What comes to your mind that you would like to change/improve? (*elaborate if necessary: platforms, connection to artists, alternative subscription models etc.*)

5) Blockchain technology

If the participant is familiar only with cryptocurrencies, it is needed to shortly introduce blockchain capabilities which are actually the same that crypto embodies: computational power to create value units, smart contracts enabling transactions/records, transparency of the history of transactions/records, fast, eliminating middleman, no or very minimized transaction fees, anonymity, immutable.

11. What keywords do you associate with BCT?

12. What is your general impression about BTC – more good associations or bad?

13. What blockchain applications do you know?

14. What good things do you associate with BCT?

15. What bad things do you associate with BCT?

16. In your opinion, what views do your friends/family have about BCT?

17. What issues do you think you could face when using BCT? (*give example if necessary: e.g. any technical knowledge that is missing*)

18. What cases could you name that blockchain technology is the most useful for? / How useful does the BCT appear to you? In what ways?

19. If you as an entrepreneur would think about implementing blockchain-technology in your business, how easy or difficult do you expect this to be?

6) Usage of BC-based applications in music industry

Introduce concept:

In the following we will talk about alternative streaming applications that deploy the BCT. I will shortly tell you some information about such alternative applications.

Imagine a streaming platform interface that you are used to. Also think of functions like playlists, charts, artist profiles like on Spotify or the possibility to comment under each track like on Soundcloud and leave feedback, the possibility to reach the artists. These are the functions of the platform. You can join the platform for free but before starting to use the services, you need to create a (crypto) wallet. Multiple options to pay for the service:

First, there is a subscription fee which enables the unlimited access to all services for a month or another particular period. Services – stream, comment, reduced prices on downloads. Second, you pay as you use for example PPP, PPDownload, tip artists. The unit value is a token, which is similar to cryptocurrency. It can be exchanged through various exchange services or used to charge the wallet with tokens exchanging them from your fiat money. For consumers – transparent history of streams, also can see all the history of artists actions on the platform. No middleman. Artists put their music directly on the platform - thereby Artists get a higher percentage of revenue that their music generates from streams, downloads, tips. Music you pay goes directly to the artists (direct payment)

20. Are you familiar with any BC-based applications in the music industry? If yes, give names.

Attitude (A)

21. Tell me about the good things you associate with using BC-based music applications. **(A)** (*if participant has problems to answer this, remind him of the concept you just explained, and if he has the feeling that certain things from that seem positive/negative.*)

22. What do you believe are the disadvantages of using BC-based music applications? **(A)**

23. Anything else you can associate with your **own** views about using BC-based applications in music industry? **(A)**

24. Do you believe that using BCT has positive outcomes for the music industry? **(Measuring)**

Social norms (SN)

25. If you think of your family and friends, is there anyone who has a negative opinion towards traditional streaming services (such as Spotify)? **(G)**

26. If you think of your family and friends, is there anyone who would approve of your usage of alternative streaming platforms? **(SN)**

27. If you think of your family and acquaintances, is there anyone who is a big fan of traditional streaming services and would like you to keep using them and would disapprove of you switching to alternative ones? **(SN)**

28. What else do you associate with other people's views about using alternative streaming platforms such as BC-based music applications? **(SN)**

29. Does the opinion of your family and friends have an impact on your choices about particular music applications usage? **(Measuring)**

Perceived Behavioral Control (PBC)

30. What factors would enable you to use an alternative or new music streaming services such as a BC-based music application? *What resources or opportunities would make it easy for you to use it? (e.g. money, skills, accessibility, promotion)* **(PBC)**

31. What factors would make it difficult or impossible for you to switch to an alternative streaming service and stay with the traditional ones? *The absence of what resources or opportunities would make it difficult for you?* **(PBC)**

32. What other personal issues come to your mind when you think about switching to an alternative music streaming service such as a BC-based music applications? *(What features or absence of features, barriers etc. would keep you away from joining a new streaming platform)*

33. Do you believe that your lack of (eg. technical knowledge or lack of knowledge) will affect your intention to switch to an alternative service? **(Measuring)**

Perceived Usefulness (U)

34. In what ways do you think can blockchain based music applications be useful for the whole music industry? From artists'/consumers' perspective. *Do you see any ways how bc based apps could solve the current issues in music industry?***(U)**

35. Please recall for yourself the issues you named that exist in the music industry, like *(remind answers for participant)*. What do you think, how blockchain based music applications can solve these problems? From artists' / consumers' perspective **(U)**

Perceived Ease of Use (EOU)

36. How easy would it be for you to use *(get familiar with)* an alternative music streaming service? Please name factors coming to your mind when imagining this process. *(based on described concept)* **(EOU)**

37. Do you have experience with creating a wallet? How was this process for you?

38. What obstacles do think could come up when using an alternative music streaming service? **(EOU)**

39. Would it be an obstacle for you to buy cryptocurrency prior to using the service? **(EOU)**

40. Would it be easy for you to get familiar with how to set up a digital wallet and by cryptocurrency? **(EOU)**

Additional questions - platform specific:

41. If a streaming platform provides a transparent history of your transactions of payments, how would you evaluate that?
42. If a streaming platform provides a transparent overview of each of your streams or downloads, how would you evaluate that?
43. If a streaming platform provides a history of your tips to artists, how would you evaluate that?
44. What factors would the new streaming service need to have that you consider switching to it?
45. What factors are important for you to have in a streaming/downloading service?
46. What features would keep you away from joining a new streaming platform?

Appendix C - Revenues from streaming services

STREAMING PLATFORM	UNSIGNED ARTISTS	SIGNED ARTISTS
Musicoin	\$0.0200	\$0.0200
Apple Music	\$0.0064	\$0.0073
Google Play Music	\$0.0059	\$0.0068
Deezer	\$0.0056	\$0.0064
Spotify	\$0.0070	\$0.0044
Pandora	\$0.0011	\$0.0013
YouTube	\$0.0006	\$0.0007

Note. Per Stream Rates from existing streaming platforms in 2017. Adapted from Musicoin Whitepaper (Musicoin, 2017)

Appendix D – Revenues Musicoin

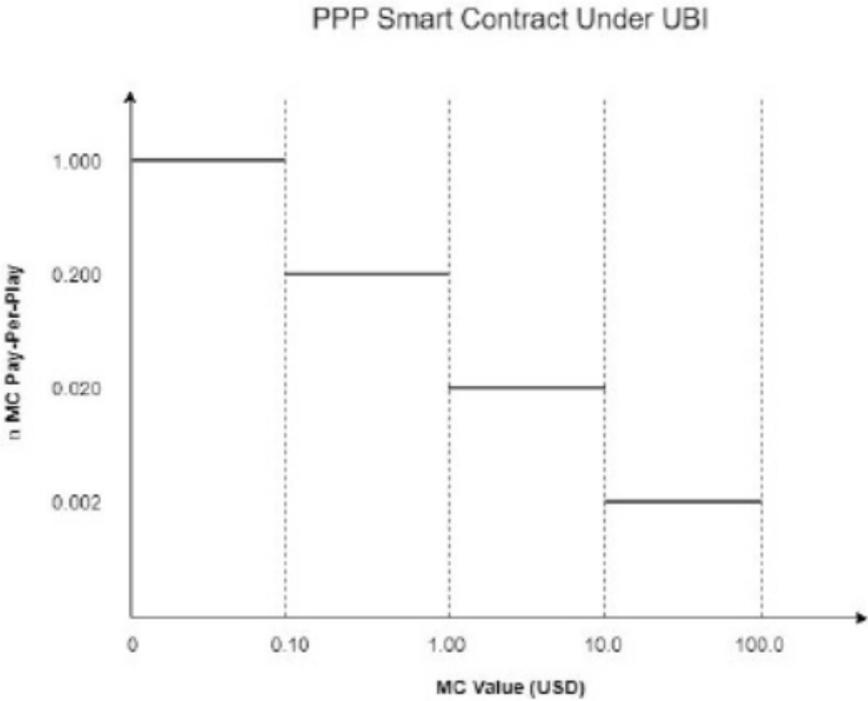


Figure D1. Revenue generated from PPP utilizing UBI-pool and MUSIC (MC) tokens. Adapted from Musicoin Whitepaper (Musicoin, 2017)

Appendix E – SWOT Analysis of BBDMDS Choon

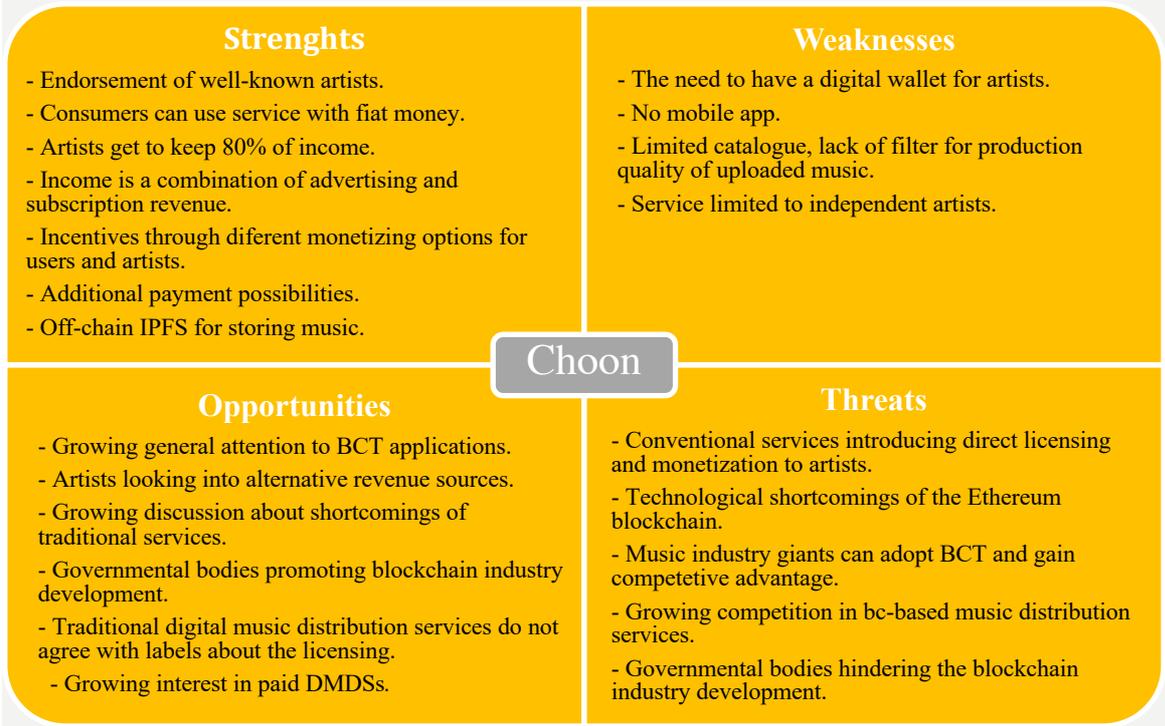


Figure E2. SWOT Analysis of BBDMDS Choon

Appendix F - SWOT Analysis of BBDMDS Ujo

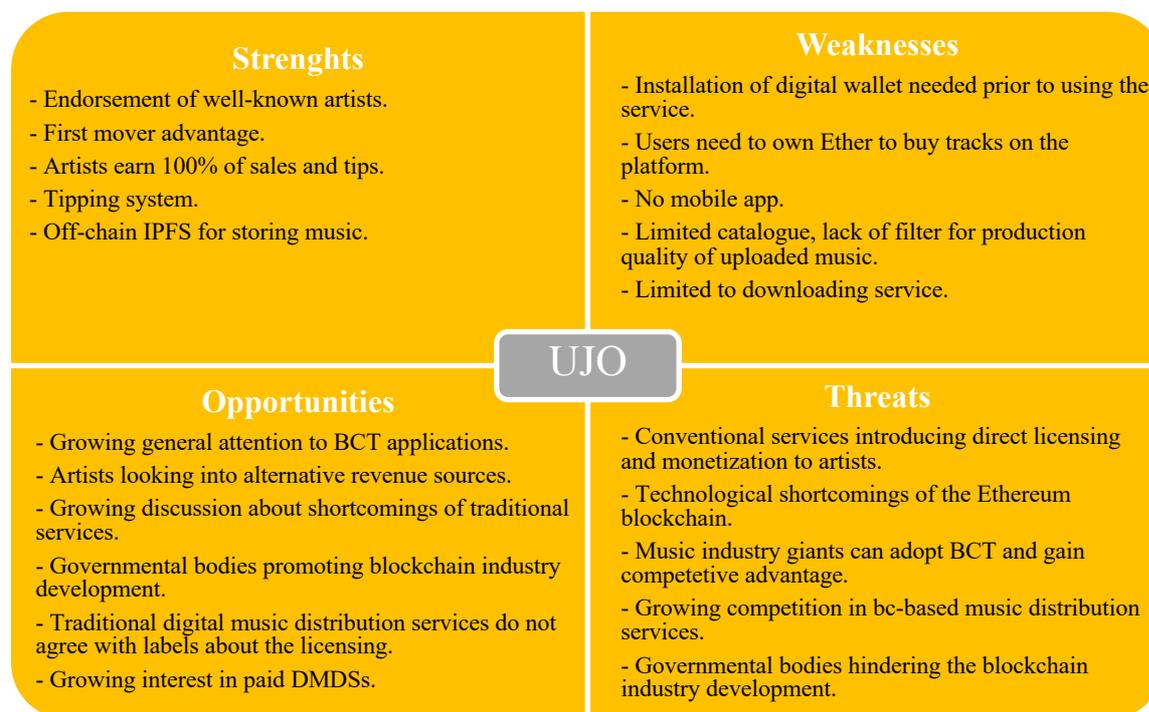


Figure F3. SWOT Analysis of BBDMDS Ujo

Appendix G – SWOT Analysis of BBDMDS Opus

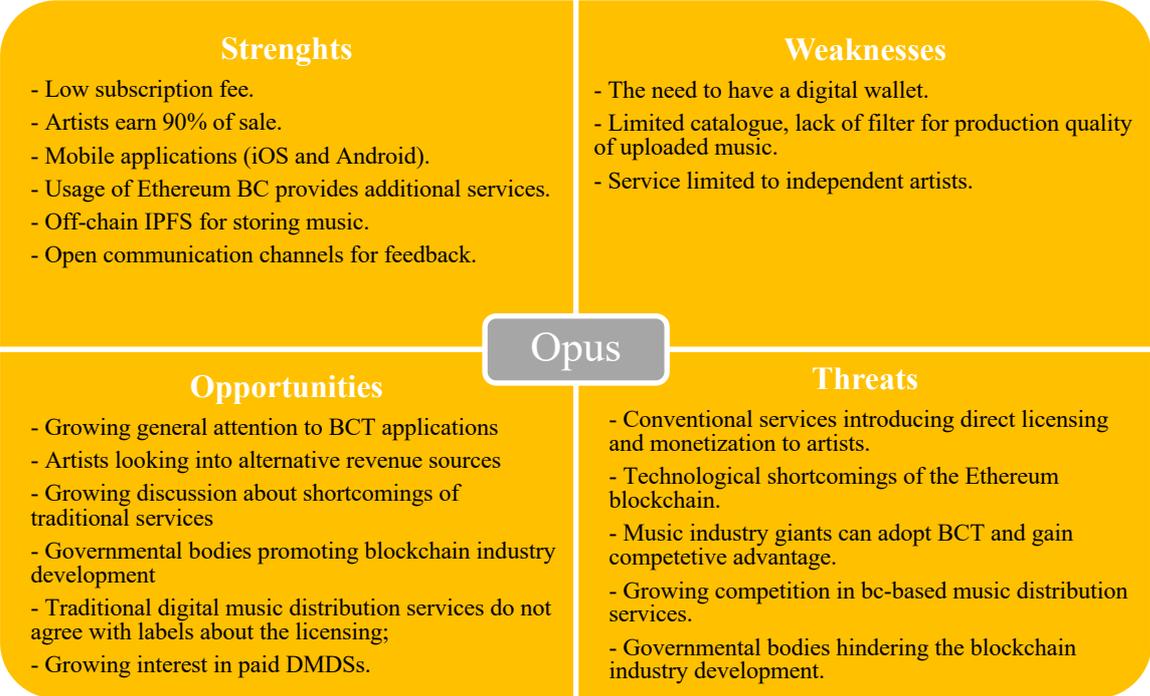


Figure G4. SWOT Analysis of BBDMDS Opus

Appendix H - SWOT Analysis of BBDMDS Musicoin



Figure H5. SWOT Analysis of BBDMDS Musicoin

Appendix I - Transcript of Consumer Interview, Proband 1 (15.04.2019)

Name	Bastian	Origin	Germany
Age	26	City of Residence	Munich
Occupation	Student – Mechanical Engineering	Side jobs	Self employed, artificial intelligence

Which music streaming services or music downloading services you're using at the moment? To give you some examples: Spotify YouTube, Soundcloud, all of the ones that you are familiar with.

Bastian: *I think use Soundcloud, Spotify and YouTube. I think also in that order.*

What are the reasons that you choose one over another or especially one?

Bastian: *I choose Soundcloud, mostly because they have like long techno sets, music sets or whatsoever. And Spotify, usually when I want to hear some very specific, probably copyrighted music that is not available somewhere else. And it is actually also some feature I used to listen to YouTube a lot, but I remember that at some point they killed the feature that when you lock your phone, then you basically cannot listen to the music or continue listening to it. So at that point, I started, I think somewhere around that, to switch to Spotify. And when I listen to music on YouTube, I don't know it's not very often anymore, but I think when I do that it's mostly when I also want to see the music video.*

How much music do you stream and download (by percentage)? Do you even download music anymore?

Bastian: *No, 100% streaming I would say. Oh downloading. I actually download it for my Apple Watch I remember. Because when I go running, then I listened to music and it has to be offline. And it doesn't work for Spotify. I download it on my Apple Watch and then I go running.*

How often does that happen? Downloading/updating your music?

Bastian: *Let's say once a week max or once every two weeks.*

How many songs do you download then?

Bastian: *Usually sets. That's one-hour sets*

What are your favorite music genres?

Bastian: *I like techno music, classic music and also classic rock, indie stuff.*

How would you describe your music interest referring to how enthusiastic you are about music related news?

Bastian: *No, not really into that.*

Could you name some positive developments in the music industry during the last 20 years?

Bastian: *I think one of the greatest positive developments comes with the internet itself and digitization because nowadays it's much easier to produce music with the things you can buy or the tools you can buy and the tools you can use online and programs and whatsoever. If you imagine basically 20 years ago you would need a lot more stuff and spend a lot more money to make the same quality of music. So all in all you have more of a democratization in the music industry which I definitely think is a good way.*

Please name some negative developments in the music industry. From an artist perspective and also from a consumer perspective.

Bastian: *I think one negative aspect is with the amount of data for example. It has become hugely attractive for artists to create music that is listened by many. And you can use data that is actually used for analyzing the behavior of consumers. I think as a consumer the artist should enjoy more his/her own music and its more about the aspect of art and not the aspect of getting the most money out of it. I think that is something that has a negative impact*

Some people argue, that Streaming services like Spotify don't provide fair and transparent payments for artists. According to that argument there is no transparency in the system neither for artists nor for consumers. Have you heard of such arguments? If so, what is your opinion towards it?

I actually don't know much about it. I haven't heard any of such arguments. It might be true but I don't know.

What technological advancements in music industry did you notice during the last 20 years? Besides the digitalization of music

I think the advancements are like we have more megabits on our phones and we have now 200 GB on our phones but we don't need it anymore. We have streaming now we have 4G, 5G is coming. So actually the advancements are that you can listen to any kind of music anytime from let's say any bigger city. So that's some big advancement

How satisfied are you with your current possibilities of consuming music? What comes to your mind that you would like to change/improve?

Right now I am quite satisfied. My standards are not so high so I use Spotify and when I go jogging I just use iTunes, some offline music and then Soundcloud for some techno music so I cannot image to change anything. I am quite satisfied with the thing right now.

The next section is going to be on blockchain technology. Just to make sure are you familiar with blockchain technology?

Bastian: *Yeah*

What keywords do you associate with blockchain technology?

Bastian: Bitcoin, Bitcoin and Bitcoin? No it's basically Bitcoin, Ethereum but mostly actually cash related stuff. Smart contracts, distributed systems, decentralized stuff

What is your general impression about BTC – more good associations or bad? (G)

Bastian: *I think it was hyped to a point. And on the other hand, it was also at the same time, I think because of the crash of the Bitcoins. At some point people lost faith in it, even though it might have a real good impact in several industries. But I think just to see it as an investment opportunity it might not be too beneficial. But I think there are many cases where it might be especially helpful. In maybe copyright and stuff like that IP and this could be something that could be used. Interesting fields for blockchain.*

What blockchain applications do you know?

Bastian: *Mostly I know cash related stuff like Bitcoin, Ethereum, Litecoin. This kind of stuff. There are also like smaller ones. A friend of mine, actually, he knows much about this Iota. It was quite an interesting concept because it worked quite differently. The theory behind it was quite interesting. But it was also cash related. But I think you could also make it work for smart contracts. There was one thing that was interesting regarding smart contracts a friend of mine pitch me the idea. It was for example you had a logistic center somewhere and usually you have*

a toothbrush or whatsoever, or some other parts you need as a company. And then you order it. And then the logistics center has to deliver it for you. And the idea in the future would be that you have a 3D printing machine at the logistics center and as soon as the order comes in, you get the 3D model file and print it on demand and then send it out. So as an example you would have a 3D printing machine right at DHL, UPS or FedEx and then somebody orders something and they will just deliver it. So the question at this point is who gets money and why. The 3D printer, the manufacturer of it obviously cannot get everything. But then when I want to print parts of a car. The designer of the part of the car has to somehow get some money for it. So the idea is then, how much does he get and how can he receive it. For example the customer wants a part for his car and the designer actually designed it previously. Maybe 5 years ago. Now the 3D printing machine actually uses the file of the engineer who designed it. And now the idea would be using some sort of blockchain or smart contract to distribute the money.

What good things do you associate with bc-technology?

Bastian: The good thing would be, somehow democratizing lets say money. Actually I don't know if that is a good thing because if you don't have somebody who governs it, it might be in the end that it completely fails because everybody goes just with trends and wants to save somehow their own the value of it's coin. So maybe if you don't have a central entity that somehow governs the money flow, it might happen that as soon as there's some bad news, everybody just buys gold instead and gets rid of the coin, stuff like that. So I'm not 100% but I'm not economist so I'm not hundred percent sure if it's a good thing actually to have only bitcoins instead of like Euros or US dollars. But it might be useful to some point. A very bad thing actually with Bitcoin is all the stuff that happens in the dark web like the drug trafficking, people trafficking. I don't know what happens there. Maybe you can order murder or whatsoever. I think there are many good cases but actually I know more bad cases.

What bad things do you associate with bc-technology?

Bastian: Yeah so that's dark net and all the stuff that happens there and what you can buy. And also in the end you can buy stuff from a criminal and help them. And through Blockchain you cannot really easily detect the criminal, right? He has like some sort of a wallet that doesn't really shows his name whatsoever. And he can make millions just by trafficking, I don't know, pills and whatsoever and cocaine and even worse. Like heroin and stuff like that. And yeah, this system actually helps those criminals to distribute their drugs and people.

In your opinion, what views do your friends/family have about BCT?

Bastian: Okay, let's start with my family, my parents. I think my dad knows nothing about it. And my mom actually just saw an investment opportunity in it but doesn't understand anything about the technical part about it. My friends are so so. I think my girlfriend knows nothing about it. She just knows some buzzwords. But I think the more my friends are into tech, like engineers, physicists, computer scientists, these kind of people, know pretty much stuff about it. But then again if my friends are not like familiar with tech and they are not so deep into technological stuff, they I would say, not so much understand what happens. They just see it as some sort of a digital currency.

Do you think they have a more positive or negative view towards it?

Bastian: Difficult to say. Actually, I would say they're so so.

What issues do you think you could face when using BCT?

Bastian: I mean, like, do you really need to understand how Bitcoin works on a low level, on a computer scientist level, right? Okay, let's say it was before the crash, I know the thing is going to go up, right? So why the fuck do I

need to know that it has to go up, right? I just want to invest like a stock trader. So basically I just want to know, like, okay, I just want to make money with it. I think with most of the things like stocks and whatever, people don't know, what they are actually doing. So even though for example, if I now do as I just mentioned, like the idea with the IP trading. Do I really need to know what is happening? Actually, I just need to get my stuff done, right? I just want to benefit from the system somehow.

But when you now use the system as a user not as the one making the system. And some things are going on that are based on the blockchain or you would have to get a wallet before using the system. Would that be an issue?

Bastian: *Getting a wallet? No that would definitely not be an issue.*

What cases could you name that blockchain technology is the most useful for? / How useful does the bc-technology appear to you? In what ways?

Bastian: *I think the smart contract thing could accelerate much communication between large corporates because most of the time I think it has to go into this law department then to another department. So this takes many weeks and now maybe through blockchain it is possible to cut this down to a two day or something. I think this can be something that's useful. When different entities want to communicate with each other but they barely trust each other. I think this is a good idea to use it. And there can be many cases as for an example, smart contracts within companies. When I worked at IBM, they have their in house blockchain they built and they have contracts with some other companies that could all use the blockchain and use it as some sort of a tool to where everybody somehow is on an equal level of trust. Besides that, I am not sure about the money thing if it is really a good thing but I think the contract thing could be the most useful.*

If you as an entrepreneur or working would think about implementing blockchain-technology in your business, how easy or difficult do you expect this to be?/ How easy Do you think it is for a company like IBM to use such a technology or for you also working in the company, how easy is it for you to use this technology?

Bastian: *I think it's really based on the specific task you want to actually do. I think there's some sort of a trend with blockchain that's really buzzwordy. Maybe the hype is a bit gone. But putting everything on a blockchain doesn't really make any sense. For example to have a database would it make sense for example to have every iPhone with the blockchain and so that your own images that you take are decentralized. So I have some of your images, you have some of mine. But I cannot access them. So our data is perfectly distributed. I don't know if that makes sense, actually, probably because you have so much up and downloading time because you have to download and upload. And so I think that's really task dependent if it makes sense to put something on a blockchain. It's not so easy, but you have to really understand the question and what understand what can blockchain solve.*

Next part is on the usage of blockchain applications in the music industry. Introducing the concept how it looks like in practice.

Are you familiar with any bc-based applications in the music industry? If yes, give names.

Bastian: *No, none.*

Tell me about the good things you associate with using bc-based music applications.

Bastian: *The idea to cut out middlemen and paying the artist directly instead of going through middleman. That would be the case that I know. But there is nothing that I would say the consumer would benefit from. I don't know, maybe passively through democratizing the market. I think the artist itself can benefit much from such a system.*

So from your consumer perspective you don't see any benefit?

Bastian: *It's actually hard for me to imagine what would like what bigger impact would that have. Because in the end as a user, I can see the same artist, I can access all the music as before, but through a different system. The main question is that I have comes to my mind is, will like larger labels have less influence or more influence? If they have less influence, maybe I will see more smaller artists that get more support through the blockchain. Spotify actually can use some sort of recommendation systems, AI system that you listen much to classic music, you listen to Beethoven whatsoever, and then they recommend you music that goes into this direction. They put together a playlist. So the thing is as a user, what kind of better feature do I have when I use a blockchain based system. So I only see in this the main beneficiary the artist. And then as a consumer it would be more or less a moral aspect. Do I want to support the artist or I simply don't care. I simply want to listen to any music.*

And this concept that I explained about paying per click is that something positive for consumers?

Bastian: *I think it could be good for consumers. But I think in the end, I when you have a monthly based tariff, it always works out better for everyone. Because then you have an average lower cost. Because many people don't listen so much. But everytime you have a consumer deciding to spend money on something they have these doubts, they have to make a decision. So I think it is a psychological factor that when you don't have to force consumers to make many decisions. So one decision for a one year plan, I think it's one big step but in the end of the day it all goes away. Maybe you can use some sort of easy to handle UI where you're able to pay like one euro and can listen to all the songs. Or 10 cents or whatever. That's the doubt I have*

What do you believe are the disadvantages of using bc-based music applications? (A)

Bastian: *I think that's something I mentioned before. Okay. Let's say Beyonce. She's already super rich. And now we cut out all the middlemen she needs. She has a team of four people. One is super good in marketing, one is super good in the engineering of sound and then they have two other people maybe the same, some other stuff like styling whatsoever. So then again, will she be able to even accumulate more money than before, because she can cut out everyone in the middle? Right? And then again you have not 5% of the most successful artists that make 90% of the money in the market but you have 1% because now they can even cut out more people. I don't know if that will happen or the opposite that you have more not so famous artists getting more money. Because what I've seen in digital companies in the end, there is always this five to 95 rule. You have one company that is ruling everything in one digital business. Like Facebook, you have one social media platform, or Twitter or Google having 95% of the search engine market. Stuff like that. So this is something I am super curious about in which direction it will go. But I think making a prediction that it will definitely democratize music, that's something I would be really really careful about*

Anything else you can associate with your own views about using bc-based applications in music industry? (A)

Bastian: *I'm actually looking forward to see technologies that can benefit humanity on a larger scale. I think there are many cases where it's not about pure entertainment, or only lifestyle, but maybe in medicine. In Germany for example we have a very, very big problem because of data privacy to share data. So every time you go to a doctor*

or a new doctor, you have to take some sort of analog data, like some piece of sheet to your next doctor, because they cannot share them. And this would be a brilliant case to use some sort of smart technology that doctors can share data.

Could you also see that in the music industry?

Bastian: *Yes definitely. But as I mentioned before. Who benefits from it and is it much better for the customer. Lets say a blockchain based Soundcloud or Spotify in the end would only cost me three Euros per month. This would be something. Price really matters. This would be something super huge. But if it is still nine Euros and has still the same exact features, then selling now we have a wallet, a coin it simply doesn't matter to me. It would be the same product with a different coin.*

Q24. Do you believe that using bc-technology has positive outcomes for the music industry? (Measuring)

Bastian: *Yes, it definitely can. But it might be misled. Let's say we would start on a blank page. There's no music, humanity has not yet discovered music. And now everybody starts but already with the blockchain then I would say okay, now it's pretty democratized. But now you have like an old system, where like, people are super, super rich. Labels and successful players. They can somehow already manipulate the system beforehand. Because there is still YouTube and marketing where they promote their own music. And artists that are not famous they just make like 1000 Euros per month or even less. And they never have the same amount of money to promote themselves. So why would I as a consumer start to google more for an unknown artist if the artist not somehow shown to me. And the platform itself, why should the platform start promoting artists that are unknown. Because Spotify also doesn't do it. They just recommend you something that is good for their product. So they recommend you stuff that is similar to what you listen to. So that's just the thing.*

If you think of your family and friends, is there anyone who has a negative opinion towards traditional streaming services (such as Spotify)? (G)

Bastian: *I think no. I think they have good opinions of it or no opinion at all. But I would say none of them has a negative opinion about it*

If you think of your family and friends, is there anyone who would approve of your usage of alternative streaming platforms? (SN)

Bastian: *I think everyone would approve that I use it. Like I don't care. I think my family and friends also don't care about how do I listen to music.*

If you think of your family and acquaintances, is there anyone who is a big fan of traditional streaming services and would like you to keep using them and would disapprove of you switching to alternative ones? (SN)

Bastian: *No*

What else do you associate with other people's views about using alternative streaming platforms such as bc-based music applications? (SN)

Bastian: *I simply don't know. But maybe because I don't care at all. But I've never heard a sideconversation or whatsoever. So I think they don't care.*

Does the opinion of your family and friends have an impact on your choices about particular music applications usage? (Measuring)

Bastian: *Not connected with music yeah. Like health I would say I think for example, when I, it's given the fact, a friend of mine recommends me and health app that he says, this is really something good? When maybe two people tell me that, or three, it is something that I will try out. Because I think for me health is something I would I value really high? So I would I would try it out definitely. So that would be something more important.*

What factors would enable you to use an alternative or new music streaming services such as a bc-based music application? What resources or opportunities would make it easy for you to use it? (e.g. money, skills, accessibility, promotion)

Bastian: *I think for me, because music for me, it's just like a luxury good. It's not like something I really, really need otherwise I die or something. So for me, it would be I think the most important part would be the price. I think, if the price could be cut, then I would say this is the best feature that somebody can deliver to me.*

If there is some sort of promotion, would that get you to try something else out?

Bastian: *Promotion like it is for free? Yes.*

What factors would make it difficult or impossible for you to switch to an alternative streaming service and stay with the traditional ones? So a plugin, or a wallet?

Bastian: *No, that is not something I would be worried about.*

What other personal issues come to your mind when you think about switching to an alternative music streaming service such as a bc-based music applications?

Bastian: *If I switch to the new, the other product in the end, do they have the same amount of music? And is the quality of the product the same as before? It cannot be lower, it at least has to be the same quality, the same amount of music, stuff like that.*

Do you believe that your lack of (eg. technical knowledge or lack of knowledge) will affect your intention to switch to an alternative service? (Measuring)

Bastian: *No answer*

In what ways do you think can blockchain based music applications be useful for the whole music industry? From artists'/consumers' perspective. Do you see any ways how bc based apps could solve the current issues in music industry?

Bastian: *I think for artists it could be really really great. Especially for artists that are not that famous to receive more money for their work. I think that's actually something that is really beneficial. But it is hard for me to understand what for a consumer besides the price and some moral aspects somebody might have because not paying enough for music. Because the features for me pretty much would stay the same. Just the background, the technology would change and the money flow. But I think for the users it could be less cost and the same amount of features.*

Please recall for yourself the issues you named that exist in the music industry, like (remind answers for participant). What do you think, how blockchain based music applications can solve these problems? From artists' / consumers' perspective

Bastian: *Not answered*

How easy would it be for you to use (get familiar with) an alternative (bc-based) music streaming service? Please name factors coming to your mind when imagining this process. (based on described concept) (EOU)

Bastian: *In the end, do I as a user really need to understand what happens in the background? I don't think so. So I will probably need no education or no time to get familiar with it.*

Do you have experience with creating a wallet? How was this process for you?

Bastian: *Yes, it was pretty straight forward. You can do it in maybe 10 minutes.*

What obstacles do think could come up when using an alternative music streaming service? (EOU)

Bastian: *No answer*

Would it be an obstacle for you to buy cryptocurrency prior to using the service? (EOU)

Bastian: *No answer*

Would it be easy for you to get familiar with how to set up a digital wallet and by cryptocurrency? (EOU)

Bastian: *No answer*

When it comes to your music listening habits how much do you want to act consistently with your family/friends etc.? (SN)

Bastian: *Never. The only thing what happens is when people friends of mine send me music, I listen to it, but I don't follow any of my friends, what they listen to and never got that feature. Never really understood that.*

If a streaming platform provides a transparent history of your transactions of payments, how would you evaluate that?

Bastian: *I pretty much think I don't care.*

If a streaming platform provides a transparent overview of each of your streams or downloads, how would you evaluate that?

Bastian: *I don't care also*

If a streaming platform provides a history of your tips to artists, how would you evaluate that?

Bastian: *That will be like the greatest feature. Yeah, yeah, I think it's really useful.*

Have you had experience with any case were transactions were involved, that you were lacking transparency?

Bastian: *Yeah definitely. I think the banking system is super intransparent. Also to understand for example when I wire money from Germany to the US. It was some sort of magic stuff how much fees I have to pay in the end. I have to call them and stuff like that. This would be something super nice if I know it beforehand. If I don't have to call three different people.*

What factors would the new streaming service need to have that you consider switching to it?

Bastian: *Price of course, minimum same amount of features and cheaper. And then I think now it makes sense to support the artist but lets say it is the same pricing as Spotify and it is the same as Spotify, then I wouldn't say I see much benefit to me besides supporting the artist. That would be the only argument for me. Less famous artists make more money. It is more fair for them. But this would be the only selling point. But when you can cut the price, then I would change.*

Any features you would be interested in?

Bastian: *I think the tipping thing is something is really cool. Even though I probably wouldn't use it much. But I think that's something that supports not famous artists actually because this is something you can relate to the artist. You are in a direct contact. You can tip him for his good work. And then maybe something that would go*

into some sort of Instagram story level. Where you have artist more promoting themselves on a social basis. Some sort that you don't listen to the music only but for every track you make you have some sort of a memo or some sort of a short video telling what you felt, what came to your mind, why you designed the song. That would be something more personal, that is lacking in this super fast, digital world.

What factors are important for you to have in a streaming/downloading service?

Bastian: I think the features I use are super basic actually. For example remembering songs. I listen to some songs and then I have a playlist and put them in. These are some basic features for me. But it is something that every platform usually has. So nothing super fancy. I think these are like a phone where I cannot call somebody. Everybody would always argue you need to have this with a phone. Lets say I want to look for music, I want to search for music, I want to look for an artist, I want to see every album of an artist, every single. I want to filter it and I want to have a history of the stuff I've listened to. I want to have a possibility to save the stuff I've listened to and I think this works good. So when listened to three tracks and one was good then I can push it to my playlist.

What features would keep you away from joining a new streaming platform?

Bastian: Yeah probably all the stuff that I've mentioned. I cannot look for any music, I cannot filter music, maybe I can only play it on one device instead of all of my devices. Maybe something like it is not available all the time, so when I go somewhere and the service is too far away. When I travel I want to listen to music. All these things. The availability. It doesn't have to have everything but it has to involve everything that I am interested in. You never know what you want to listen to next somehow so I cannot tell you what can be cut off. Maybe something super super heavy rock music that I don't listen to

Appendix J - Transcript of Consumer Interview, Proband 2 (12.04.2019)

Name	Peter	Origin	German
Age	25	City of Residence	Munich
Occupation	Student	Side jobs	Trainee in GDPR area for a startup

Which music streaming services or music downloading services are you using at the moment? To give you some examples: Spotify YouTube Soundcloud, all of the ones that you are familiar with.

Peter: So on daily basis, I'm using Spotify. And I'm also in a, in a member also got a Spotify membership, which means I'm paying for it, and I'm using Soundcloud and YouTube as a free service for all the music I don't get to hear on Spotify.

How frequently or how many hours per day do you listen to music?

Peter: I would assume that it's around two to three hours a day. On average

What are the reasons that you choose one over another or especially one?

Peter: I would say that it's on the one hand it's the quality of the music, which is better in the paid version of Spotify compared to YouTube or Soundcloud, and also the possibility to save, and don't have to reload or use the internet or your internet service all the time. You can also save it in the Spotify in the app, which is pretty easy and convenient. So I would say that it's not only quality but also the kind and under the data in order databases. Types of music you have in Spotify is way bigger than on YouTube or Soundcloud, which is more for specific as I said, specific types of music. So if I cannot find anything on Spotify I'm looking for. I'm looking at Soundcloud or YouTube and mostly I can find it there if it's not on Spotify.

How much music do you stream and download (by percentage)?

Peter: I would say 90/10 maybe if not 95/5. To be honest, in the last couple years I never paid for any music

Because you don't have the possibility or the don't have the need?

Peter: I feel the need sometimes because I want to not only download but I want to listen to music in the car for some so I need a CD obviously or putting it on a device to play it via USB plug. It's not about owning, it is just way more convenient to use Spotify because I don't have to plug my mobile to the laptop and have to transfer all the music from the laptop I was downloading there to my mobile phone. I mean I could download it on Apple Store. But Spotify really tries to keep me on their platform, which makes it so convenient. And if you start to have different playlists, if you have your own playlists, if you're following artists and you get information or there's new album. They are really trying to keep you on the platform. And the more you are individualizing the platform for yourself with your account, the more you are willing to stay on the platform I would say.

What are your favorite music genres?

Peter: Hip Hop, Electronic Music and Rock

How would you describe your music interest referring to how enthusiastic you are about music related news?

Peter: I would say that I'm enthusiastic. If it's in a matter of a certain artist, which means an artist I'm following, for example, I really like and I'm following over years now so there I am very enthusiastic. I wouldn't say that I'm staying up to up to date with news, but with music so with the, with the song itself. So if there's a new song and Spotify reminds me there's a new song of an artist you're following then I say, Okay, let's see let's check it out. I do it on a daily basis to keep up with all the new things

Music industry & music streaming

So now we're going a bit more into detail with the music industry and music streaming

Could you name some positive developments in the music industry during the last 20 years?

Peter: Starting with the rise of the Internet. Mp3 downloads were the thing from, I don't know, like 2005, to 2008 or 2009. I was using mp3 downloads paid unpaid, and free stuff. Then it changed over to streaming since you've got a quick and easy access to the internet and very good bandwidth. It has gotten more and more convenient. Easy to use. And with the rise of smartphones also on the outside of your Wi Fi environment, your home environment. You can listen to music everywhere.

Please name some negative developments in the music industry. From an artist perspective and also from a consumer perspective.

Peter: I think it's a decline in music euphoria. So I would say that for myself, I'm listening to a song which I really like and listening, over and over and over again and everywhere. So it gets a little bit meaningless. For example, 10 years ago, where you would have to try if all the ways, or to sit all the time in your living room listening to your CD. You had no chance to take it outside, take it with you everywhere you are. So I would say music is getting more and more meaningless compared to 10 years ago. And I think that's something also the artists are feeling. There's so much music on the market right now, and a single piece of music so single song isn't getting any, not that much attention as it has gotten like 20 years ago, 10 years ago. I would say it's depending on the amount of music on the market, which makes the individual song or each song a little bit more meaningless than it would have been 10 years ago. This is kind of the negative trend I am observing.

Some people argue, that Streaming services like Spotify don't provide fair and transparent payments for artists. According to that argument there is no transparency in the system neither for artists nor for consumers. Have you heard of such arguments? If so, what is your opinion towards it?

Peter: I strongly believe in such arguments, since it's not very transparent for me as a consumer to see for how much money I listened to or streamed a certain song. This would be interesting. I'm only getting on a yearly basis information about which song I was listening the most for example. Which artist I was listening to the most in the past year. I get the argument because I've never seen any numbers summing up how much I was listening to artist x, and how much money he derived from my streaming.

What technological advancements in music industry did you notice during the last 20 years? Besides the digitalization of music

Peter: It was due to the fact that, instead of having individual devices, such as mp3 players, mobile phone and I don't know navigation system. You now have everything together in one device, and which crossed out a lot of industries. You're more or less dependent on one device. I'm not sure whether there's anything I have observed,

which is other than going from analog to digital music and going from mp3 to streaming or decrease in CD sales worldwide. I wouldn't say that there's something else I'm observing

How satisfied are you with your current possibilities of consuming music? What comes to your mind that you would like to change/improve?

Peter: I'm very satisfied with Spotify, to be honest. But if I would have to pay not decreased, so the student price, discount price I would think about it in a different way. So it's for me it's all about monthly rate. If it's too high, then I'm not accepting the streaming service for example, Apple Music compared to Spotify. Spotify offered the student discount, way, way before Apple Music was offering it so my decision to use Spotify was based on this. Right now I'm satisfied with Spotify

Would you be up for different types of subscriptions or different types of paying money for services?

Peter: I would say yes. Every time I buy a CD or a whole album, digital or physical, it shows me that this is really an important artists for me, an important album. So I spent money on it and I would say that for all the other music, I'm not that enthusiastic in, using a streaming service. If there would be something which would work with both. So for example there would be the chance to stream and buy music on the same platform, this would be interesting for me. This would be kind of the change, I would look forward to. Apple Music would go in this direction I mean it would be kind of the thing I'm looking for. But still you would use Apple Music and Apple Store. which would be under the brand Apple but not the same platform. And Spotify doesn't offer any of the chances to buy music

Let's now move on to blockchain technology specific questions. You're familiar with blockchain technology?

Peter: Yes

What keywords do you associate with blockchain technology?

Peter: Security, distributed network distributed ledger, currencies, smart contracts and also kind of the verification processes and all the proofs of proof of work proof of stake etc.

What is your general impression about BTC – more good associations or bad?

Peter: So the crypto currency market and decrease in the market cap and all the stuff and things going on with the ICOs was very hyped, and all the, all the scam, all the shitty ICOs gave the whole blockchain environment a very negative picture, very negative image. Right now, it's not that hyped as it was one and a half years ago. I would say that the blockchain. is getting mixed up with cryptocurrencies. Cryptocurrencies are bad in the mind of the people. The people who are not in a technical environment. Not in my mind. So it's gotten mixed up. So then instead of having a bad picture about cryptocurrencies, you are having a bad picture of blockchain. And I think you have to give a lot of information and get out to the people to really change his mindset. I would say that it's getting more and more interesting in the future. It's really a key change. Could be a change. And I would say that you have to do way more research into this stuff, because it was already mentioned 20 years ago, and it was forgotten, and it came up with the rise of Bitcoin in 2012, 2013. And in 2018 it really peaked. I'd say that there's a big future, bright future for blockchain.

What blockchain applications do you know?

Peter: I know a lot of wallets that I am using, I also know the exchanges that I am using, I know some Ethereum stuff, some TC20. For example one of the first applications using the Ethereum platform which was crypto Kitty. You could buy crypto kitties to up to 100.000\$ and change them and they could get some kiddies. It was kind of a crazy thing. I was reading such stuff on the internet and I never used it. But I am using the exchanges and wallets.

I also did a lot of crypto transferring, which is also on the blockchain. Currently I am not using any but looking forward to have some very crucial things

What good things do you associate with bc-technology?

Peter: Obviously, the chance to have an insight into what what is happening on the network. So, if I do for example the crypto exchange. If you're using crypto exchanges and sell or buy some currency, some digital currency. I can easily understand where my money was, where my currency is coming from. When I bought it. It's all written down and it's very transparent. So I can easily see from which node to which the transfer was going to and also on a blockchain network I can see which node is for example is out of service and which one is in the service. So it is a very transparent system. But nevertheless, it's also very anonymous. Because I can only see the IDs of people and no, no names, no addresses. That's positive. To have the information but also stay anonymous or stay in privacy. Those are two positive aspects

What bad things do you associate with bc-technology?

Peter: First, the scam ICOs. Then I would say its compared to which proof algorithm you are using the high energy consumption. It's obviously the currency but still the blockchain is kind of the basis you're using. So I would say it's also the blockchain problem since you have to secure every single block and it's high energy consumption. This would be a negative aspect. As well to overhyping. I would say that there's not much research going on. For example, in my university to Munich there may be three to four blockchain seminars. And I would say that you have to do way more in this this area

Would you say it is a complicated construct? Is this a problem? That it is not easy to understand?

Peter: I wouldn't say it's hard to understand but you have to have a certain knowledge base to understand all the things going on on the blockchain since it's very technical. I would say that for most people it is hard to understand what it is and so they know digitalization is could be bad and they are all these hacks going on.

So they put it all together and mix it up and then there's blockchain coming in and then they say okay it's digitalization, it could be hacked so it could be and it's not safe. Then they getting a bad picture of all the stuff so I think you need a technical understanding to really understand it, and if not, you need to simplify it for, for other people to really use it. I mean for example, if you want to have a financial network using blockchain the single customer doesn't need to understand the technical things. I mean right now if I'm using mobile payment I'm not sure which transaction systems they're using. But I am using it. It has to be something like this. Something like this has to happen to blockchain as well. Not the technology in the foreground, but more in the background. In the front the user interfaces which are easy to work on.

In your opinion, what views do your friends/family have about BCT?

Peter: As I said before, technical people who are familiar with a technical environment or technical things who are pretty much into it they understand it. They are looking forward to see more and more blockchain technology. And I'd say my parents they just hear it in the news and that's it, and they don't have, I mean they probably don't have an opinion on that. Maybe neutral or maybe a little bit afraid of it. So I would say people who are not in a technical area, they trying to grasp it but they don't get it but they see the potential. I think the young people they see more potential than older people.

What issues do you think you could face when using BCT?

Peter: Yeah, so I mean it happens over and over again that people are trying to send money from their accounts on currency exchange on a crypto currency exchange and they are trying to send money to their wallets, forgetting to put the right IDs into the transaction. So sending it to some wallet and not their own, so the money gets lost on the way. This is one of the daily problems, the typical problems. You can read it all over the internet. People are messing up these transactions. So for example what happens if I would have to pay a bill and I would pay it online and I would send money to someone who's not the right person. So you send him some money but we don't have a bill, so we didn't bill you and so it's probably wrong. But in the blockchain area there's no such thing as security as in the mobile payment area right now. So I would say that you need to make it more convenient, less error prone. This is not depending on technical understanding or on something else. This could happen to everyone.

What cases could you name that blockchain technology is the most useful for?

Peter: I would say it is very useful in every area where you need to be certain. Or for example the place you are shipping the product to is stored in. So whenever you need to really make sure that you know where object y is, then a blockchain is a very good way to manage this. Could be everything. For financial things, for contracts for example. Like in the music industry. There was the idea to put Wikipedia on the blockchain. I think that doesn't make any sense because Wikipedia is an online collaboration system for certain people verifying at the wiki online servers or having the wiki account. So they can edit all the pages and make them error free or correct them or put pictures on it, more information etc. And if you would put it on a blockchain I don't get it because it would make it so redundand. Because every time you would put Wikipedia article on the blockchain you would have to put a new article on it if you edit something. There would be so much redundancy. And those are things I don't see on the blockchain.

If you as an entrepreneur would think about implementing blockchain-technology in your business, how easy or difficult do you expect this to be?

Peter: The blockchain technology itself isn't hard to implement but I think you need all the technical surroundings and they are very expensive. You have to have a very good internet connection. You have to have a lot of peers where you can store all the information as a distributed ledger network. And you have to have secure internet connection as well. Each and every peer has to be strong enough, so there has to be enough computational power to hash all the blocks and to verify them. You need to download either a part of the ledger or you need to download the full ledger depending on which blockchain you're using. So yeah I think blockchain itself, the technology, is not a problem but all the peripherals all the technology around it. It is expensive and you really need someone who knows how to implement it.

Next part is on the usage of blockchain applications in the music industry. Introducing the concept how it looks like in practice.

Are you familiar with any bc-based applications in the music industry? If yes, give names.

Peter: Yeah. So as you explained the system to me, I was thinking about the YouTube thing. I think it's called Foxtube. I can't remember right now but you have to have an amount of tokens to watch videos and those videos are uploaded by each and every person. So there's no middleman. And you just upload a video, and somebody can watch it after paying, I don't know, some tokens. So I was thinking about this system right now. And other, there are no others systems to me I'm using right now or I know of.

Tell me about the good things you associate with using bc-based music applications

Peter: I wouldn't say that there's so much on the positive side for consumers. Because what do they have? I mean, how do you how do you get somebody from Spotify to your system? What are your arguments? So I wouldn't say that there was much. Because everything you're trying to get them on the system, a system which is a blue blueprint of Spotify. But there's no further benefit of it. So there's no further benefit for the consumer. So I would say that the system you were you were talking about is more for people who are caring about the artists behind the track. And then it's different. So I would say for changing, for transferring from Spotify to your service, I would have to be more in the side of the artist, which I am. If I would see that there is a change in the payment which the artist is getting, then I would say ok I will change. Because this is the positive thing with your system. But for most of the consumers I would say that they are not willing to change because there is no additional benefit for them. No additional functionality.

What about the different payment methods? Is that appealing to you?

Peter: Since Spotify is so cheap right now with five euros per month and I can listen to all the music. I wouldn't say that this is appealing to me. You talked about cheap fees. But still, I mean five euros. Five Euros are cheap, cheap. So if it's two euros for example I would listen to music for two euros a month. No, I think price can make no difference. If you're talking about five euros or below five euros. Fees are not additional benefit for me.

What do you believe are the disadvantages of using bc-based music applications?

Peter: I wouldn't say that there are negative parts, I completely understand it, completely positive. It's way better than the system I'm using right now. But to get the consumers who are getting charged every month, who are getting charged on some basis, per stream, for example. You need to get them from the system Spotify to the system of a blockchain based streaming service.

Anything else you can associate with your own views about using bc-based applications in music industry?

Peter: Maybe I'm thinking very constricted but I don't get the argument for a consumer to change from a not blockchain based streaming service to a blockchain based streaming service. So if there's not such argument, there is no strong belief for me to change there.

Do you believe that using bc-technology has positive outcomes for the music industry?

Peter: Yes, but not for the consumer. I believe that the artists are getting paid for every stream and probably they can make a 100% on the streams and not only 20% like with Spotify right now. So it's a positive thing for the artists and also the artists got the possibility, without a middleman, to really say what he wants to offer to the public and what not. And you also have as an artist the possibility to manage your own copyright. Compared to YouTube or Soundcloud, where everyone can just upload something, you could easily handle in your system you would use something like an ID for a song. Right now on Spotify there are songs which are multiple times on Spotify but it's the same song. On different albums or kind of a cover, or same song but one is on a single and one is on an album. But way less redundancy on Spotify than on Youtube or Soundcloud where everyone can upload a song. So this would also be a positive thing – copyright for every artist. For his or her songs. There would be one database. You could easily derive if it is uploaded by the artists who's song it is. I have an account as an artist and upload or change a song or whatever and the database knows, this artist has copyright on this song. But there could also be another artist uploading a song from another artist. So the database would say, no you are not the producer of the song, you don't have the copyright. It would give an error on this upload.

If you think of your family and friends, is there anyone who has a negative opinion towards traditional streaming services (such as Spotify)?

Peter: I would say that everyone trying to earn money from music or from blogging or from something else or from doing social media or whatever is having concerns with these platforms. Friends of mine, who are artists themselves, they really have problems with it, probably. I don't know it in detail because it's not a topic for me on a daily basis. I'm always getting back to the question, what is in for the consumer. Where are the additional benefits? Friends of mine who aren't producing any music for them it's pretty convenient and they like it. But I don't think they have concerns for streaming to be honest. Except the friends that are doing music.

If you think of your family and friends, is there anyone who would approve of your usage of alternative streaming platforms?

Peter: The more I send songs with a Spotify link to someone else, knowing that he is using Spotify. And even if he's not using Spotify anymore, or never used it, he can still use it in a free version. So I send this Spotify link to someone saying okay this is a cool song, so for example. So there would be now change to do this when I am using a platform that no one is using. And I wouldn't say that I have the power or the meaning to really take people from Spotify or my friends and try to get them from Spotify to use another platform. I think it's the same thing as using Threema instead of WhatsApp. Your getting lost somewhere. I mean you cannot use the groups anymore that you were using before. Maybe you cannot message the same people as before because nobody is using Threema or not that many. And it's devastating in some way and it's more a problem for the one changing than the one staying.

If you think of your family and acquaintances, is there anyone who is a big fan of traditional streaming services and would like you to keep using them and would disapprove of you switching to alternative ones?

Peter: I don't think so. I think the only one trying to keep me on the platform is Spotify

What else do you associate with other people's views about using alternative streaming platforms such as bc-based music applications?

Peter: As I said in the beginning, music is getting more and more meaningless. But there is still a lot of music which has a meaning, or a greater meaning than other music. For example the music market is creating so much. It is so vital. There is so much music. Every Friday there is new music. And I would say that if someone is really putting meaning, or really likes a song and puts a lot of meaning into it and into the artist, then he is probably willing to change to the service. To a blockchain service and really get into it. But for me to really change it to really see the positive things you need to think from the artists to the consumer and not as a consumer. You normally think from the consumer to the artists. So for the platform, what do I get from it. How good is the streaming? How good is the quality? UX? Interfaces? How can I connect it to other services for example?

What do you think do people around you use as basis for their decision to use streaming services?

Peter: I wouldn't say in terms of social networking for streaming services, this is not an argument. So I would say the argument is more if the streaming service is convenient or not. So why do they use Spotify over Apple music? Because I'd say because Spotify is maybe cheaper and convenient, more convenient.

Does the opinion of your family and friends have an impact on your choices about particular music applications usage?

Peter: I would say no, there is no such thing. It's as I said before. This is the thing most different from comparing streaming services to instant messaging. Instant messaging is all about who's on the platform, who is in the groups.

Who can I easily message to. And Streaming is different. I don't know how I got into Spotify to be honest. I don't know why I used Spotify instead of Apple Music and the only thing I can think about is the money spending. So the monthly rate. Spotify tried to get into the Social networking stuff but it didn't work out, so they deleted the possibility to message someone. You can still follow somebody but who is following somebody if you cannot message them and cannot get in touch with them or send them music or whatever.

So if everyone around you is using one specific service and you're using another one, this wouldn't affect you if you're happy with what you have?

Peter: Only for the case that someone would send me music via a link for example a Spotify link but as I can use Spotify for free aswell. No I don't think so. It would be a bit less convenient since I couldn't listen it while I am outside or not at my PC so I think it would be getting a bit less convenient but still it would work out. And I wouldn't change to it only because I can send something or get in touch with people.

What factors would enable you to use an alternative or new music streaming services such as a bc-based music application? What resources or opportunities would make it easy for you to use it?

Peter: I would feel comfortable as I said in the beginning, you have to have a user interface which blocks out the technology, like mobile payment. Creating a wallet wouldn't be an obstacle for me as I have done it before. But somebody who has never done it before so for example somebody who never put or opened up a wallet. I wouldn't say that he is willed to really overcome this obstacle and use the service that you are offering.

What factors would make it difficult or impossible for you to switch to an alternative streaming service that involves bc-technology? The absence of which resources, for example you wouldn't have the technical knowledge. Would those factors make it difficult for you to switch?

Peter: Sure. So there is also some economic stuff about tokens, the idea of having a token. Because every time you put a new token you need a certain amount of money stored somewhere to really get the price of the token. So one thing about cryptocurrencies is that they are very volatile. So this is one problem obviously. If you one day can listen to a song for 50 cents and another day it would be a your or a euro fifty. This is also a very big problem with cryptocurrencies. Another problem is that you need to have a certain amount, securities to it. The cryptocurrency has to be backed up by securities so you can get a non-volatile price every time. And this is something every consumer wants to have. He wants to listen to music on a daily basis without having to pay different prices on different days or different hours, minutes or whatever. Or even during the song. The change of the price could happen as well if he stops the song and then started again he needs to pay something else for the last half minute compared to the first two minutes he was listening. I see a big problem with that.

What other personal issues come to your mind when you think about switching to an alternative music streaming service such as a bc-based music applications?

Peter: 1,5 years ago you had the possibility on Spotify to upload your own music but only locally so for example I could listen to my songs, locally stored on my laptop. I could listen to them via Spotify. And they were also listed in my Spotify music database. So if something like this would be possible with the new service, this would be very interesting. To be able to get the music you bought or got from wherever stored locally on the device, getting this music, playing this music into playlists you are using on the service. So having a playlist on the bc-streaming service which contains music which is locally stored, which you bought on for example the apple store and the playlist is containing such music and also the music you can stream without having to pay for every single

streaming. This would be a functionality which I'd say would be nice to have it all together in one streaming platform. And I don't know if it is possible or if technically possible. But since the blockchain is something really anonymous there is nothing such as privacy problems. Right now if I'm using Spotify and I am verified by my Facebook account, Facebook is getting every interaction I am doing with Spotify. Facebook knows about it. I mean they know when I log into Spotify. They know what I was listening to, how long, which artist and then they can put their advertising out there and remind me of new albums coming up or similar artists. And this would be something as well. If it is a bc-based streaming service I want to have the possibility to stay anonymous. To have all the music I am listening to not made public or to another middleman, advertising company or whatever.

Do you believe that your lack of technical knowledge of bc-technology (eg. technical knowledge or lack of knowledge) will affect your intention to switch to an alternative service?

Peter: I don't think so. I mean another positive thing with blockchain is that it's really fast. Sometimes you don't need to have an institution verifying transactions, because its done by the blockchain which makes it obviously very fast. I forgot it before. It is a beneficial functionality over Spotify to download because on Spotify you cannot download something. I mean you can download it on your device. You can listen wherever but you cannot transfer it from your device because you didn't pay for it. I wouldn't say that I am afraid that there is blockchain in the word for example that is says blockchain streaming service. I think some people could be worried about it but it is easy to explain. With the plus of functionality you have it is easy to explain.

In what ways do you think can blockchain based music applications be useful for the whole music industry? From artists'/consumers' perspective.

Peter: The copyright is one thing which could be solved and would be solved but also you need to put a constraint on all the other platforms so for example if somebody would be using your streaming platform and is not willed to pay a certain amount for music and he could go easily to YouTube or Soundcloud or some other streaming service and listen to the song he is looking for then I think this isn't really solving any problems. So you need to try to get music, which is on your system deleted from other platform services to really get people paying for the music, to get them on the new platform but also in case they are not willed to pay for it. So maybe if I am happy and I need the song right now and I want to listen, then maybe I am more willing to pay for it then for example right now watching videos on YouTube. Not only exclusive content but this would be a start of it.

Please recall for yourself the issues you named that exist in the music industry, like (remind answers for participant). What do you think, how blockchain based music applications can solve these problems?

Peter: Yeah. I think there's a possibility to solve this. I mean you have to ID every song, you have to check whether somebody is trying to upload a song you have to check with the database and if it says no it is not your song you cannot upload it and obviously nobody can listen to without paying for it because only the artists will upload it. And this would solve the problem with the copyright. Completely.

How easy would it be for you to use (get familiar with) an alternative (bc-based) music streaming service? Please name factors coming to your mind when imagining this process. (based on described concept)

Peter: Sure, I think it depends on if you are a digital native. Then it is easy to use a new platform and to get into something new. It still sounds complicated for someone who is not into it but I'm still raising a lot of questions.

Do you have experience with creating a wallet? How was this process for you?

No answer

What obstacles do think could come up when using an alternative music streaming service?

No answer

Would it be an obstacle for you to buy cryptocurrency prior to using the service? (EOU)

No answer

Q40. Would it be easy for you to get familiar with how to set up a digital wallet and by cryptocurrency?

No answer

When it comes to your music listening habits how much do you want to act consistently with your family/friends etc.?

Peter: It doesn't bother me. I used to listen to music on a mp3 player. This was the same thing. I was listening to music and there was no such thing as social interaction on the platform. And same thing with Spotify. I have not social interaction via Spotify. It all works over an additional messaging service where I can send my links to other people and so I would say that this doesn't bother me.

If the streaming platform provides a transparent history of your transactions of payments, how would you evaluate that?

Peter: Positive, transparency is the key for future developments it's the key. Spotify also tries to make it transparent but more to which music you listened to the past year. You can get your history but not that detailed. And I would be interested in what I was listening to the last couple week If I would have to pay for every single song. This would be interesting so I could see if they made a mistake and they billed me twice then you could see it from the history.

Have you had experience with any case were transactions were involved, that you were lacking transparency? When using Spotify?

Peter: A little bit but they bill me and I have transparency over the bills but I don't get that much transparency over the streams but I don't care as much. If they don't bill me more or more they're allowed to then it is fine for me. Since it is not depending on every stream I do it is not interesting to have full transparency. But it would but you don't need to. It is important if you pay for every stream but I pay monthly and not for every stream, it's not important to have transparency over the streams.

Would it be interesting to know what the artists get from your streams?

Peter: This would be interesting. Once. It would be interesting to see it once and it would be interesting to see if it would change for example if they would get more or less depending on the daytime and depending on the season to see such models. But to be honest, if I would see how Spotify is billing me and is paying money to the artist I would see it once, that would be enough. And I could Google it obviously, because somewhere it is around and everybody can see that if he wants to.

What factors would the new streaming service need to have that you consider switching to it?

Peter: It is a question I am asking myself all the time. It has to have the functionality of current streaming platforms. It has to have additional functionality. Such as downloading, which is an additional functionality compared to Spotify. Easy set up of an account and that you don't have to exchange. That the exchange of the tokens and the streaming platform is one service so not using another exchange where you have to use another account and then you have to verify yourself. Because that is also a point with crypto exchanges that you have to verify yourself. And it takes time and they don't have that much workforce so it takes time, the verification process. Bureaucracy.

So I would say those are the three points. Functionality, easy set-up and not that much technical involvement. The thing from having a account on the platform to really streaming something - this process shouldn't be that hard. Exchange tokens, where to get the tokens from, transferring fiat money to token, the paying token, tipping. Everything you said.

What factors are important for you to have in a streaming/downloading service?

Peter: Easy setup, nice UI, user experience, transparency, good streaming quality and convenience. To have it with all your devices. Maybe have a certain amount of cloud storage. And hopefully the mobile data contracts are getting better and better, cheaper and cheaper and bandwidth is getting bigger. Then you can easily stream out of the cloud so you can have it on any device.

Certain music has to be on there. Is that important? Or specific features like playlists?

Peter: Sure functionality, but I would sum that up under convenience. Everything Spotify is offering right now I can use with a paid subscription is perfect for me. I don't need more. And it is a KO argument to have limited music. You need to have the latest music on it. You need all the artists the consumer is interested in. All the artists I want to listen to. And if not I am very fast changing to another platform.

Music availability is not in the top three?

Peter: I wouldn't say. For example, there's also good audio books which are not the original audio books. But they are free, everywhere. And I would say if you can listen to podcasts on such a service for the beginning, it would be fine. So I love to listen to podcasts and they are free every. So if you can get some podcast producers for your platform and they are offering their podcasts over your platform and they get paid for it then they wouldn't be free anymore but maybe you could offer some more exclusive content. So it is way cheaper than a song. But you would start from podcasts. This could work without having all the famous artists, all the music everybody wants to listen to.

Would you switch to any other platform or are you happy with what you have?

Peter: If I get answers to all my questions about the new platform, then probably I would change, keeping in mind that I do something good for the artist. But if there are not enough answers to my questions, I wouldn't change, because I am very satisfied with what I have right now.

Appendix K - Transcript of Consumer Interview, Proband 3 (12.04.2019)

Name	Temur	Origin	Uzbekistan
Age	23	City of Residence	Copenhagen
Occupation	Student – E-Business	Side jobs	Student assistant in E-commerce company

Which music streaming or downloading services do you use? Please give examples and approximately prioritize which are you using the most.

Temur: Right. For music, I almost exclusively use Spotify. Yes, sometimes maybe I just want some music videos on YouTube.

Any music downloading services?

Temur: No.

And if you have to evaluate how frequently are you using the streaming services like Spotify and YouTube daily, could you evaluate by hours a day?

Temur: So by hours I definitely listen to Spotify 3-4 h/day. No, I mean YouTube I can't say for listening to music or watching video like I do it regularly, maybe once a week I listen to a music video, maybe once a month. So it's not that big.

Okay, if you can say by percentage, how much do you stream and download then it would be?

Temur: Streaming 100%. As you know on the Spotify you can add to your library and download that library. So I have my curated playlist created myself. And I also downloaded them in case I don't have the Internet, I would listen offline. So I don't know if that counts as downloading.

I see. Okay great. And then what are the reasons that you choose like let's say Spotify over maybe other streaming services like SoundCloud or Apple music.

Temur: So Spotify has, first of all, it has a student subscription, which is cheaper than regular subscription. And then I think it has a really good user experience, user interface. I like the design of it. And as far as I know, I'm not 100% sure, Spotify has the highest number of songs available. So like, in terms of accessibility. Spotify is the first. And yeah, those are the reasons I would say. And if you compare to, for example, SoundCloud, which is free service, right? You can't access the songs that you can access with Spotify. I think SoundCloud is more targeted towards young upcoming artists, some people, young upcoming artists, upload their songs, and there you can kind of discover new artists. I see personally SoundCloud like that. And yeah, I haven't tried Apple Music. But I think Spotify has bigger number of songs available.

Then next, could name your favorite music genres?

Temur: So right now, it's changing a lot. Right now I think it's more of house music. And lo-fi house maybe, deep house. Of course, some hip hop. I've been always hip hop fan. But lately, I've been listening to a lot more electronic music.

Great. And how would you describe your interest referring to how enthusiastic you are about music related news? Like, what's new is happening. Are you following everyday and reading the news related with music?

Temur: Right. I don't specifically follow some artists like, I don't follow any Instagram pages or like that. I'm not interested in that. I usually go, I don't know, maybe once or twice a week on some music website. Just to check out maybe some new releases and stuff. It's a Russian website, I don't think it makes too much sense to say the name, it's called (Russian name). Other than that, I don't follow a lot of news, per se. Yeah. I discovered music is that I have my favorite artists, I listened to them. Ah, actually one of the other advantages of Spotify is how it suggests your songs based on your listening history, your preferences and stuff, and also the curated playlists that Spotify has. And also the feature that says relevant. So if

you are checking out some artists, and it says "Similar artists", and I check similar artists, because I like this artists music. So that's how it goes basically.

Could you name some positive developments in the music industry during the last 20 years?

Temur: So positive development is that streaming services. So the accessibility part of it. Before when you liked the song, let's say, you had to buy a CD or disc, I don't know, anything. And then you had to purchase the whole album. If you like just one song and just listen to one song, you have to purchase 20 songs for \$10-20. And now with this streaming services, you pay \$10 a month, 10 euros a month, and you can access all music, almost, which was also from the history. You can listen to Elvis, Beatles, anytime you want. The accessibility part has been just revolutionary racing in the music industry. And also, because it's so accessible, it allowed for new upcoming artists to gain traction a bit more. For example, we were talking about SoundCloud. Lot of people use SoundCloud to just find out about new artists. New artists upload their music, and then you go to SoundCloud and you can listen to them. Well, so it in a way democratized the whole industry. It's not only artists that are on labels now able to reach customers. But also some artists in a garage. You can make your own music and put on SoundCloud, Spotify, and people can access it. So in that way, it democratized the whole industry, I guess. And those are the things, I think, what's good happened in the industry in recent years.

Awesome. And then on the opposite side, could you name some negative developments if you notice? Let's say from the artists perspective.

Temur: So negative development can be that these streaming services, they are, as I said, is extremely cheap. It's 10 euros a month. And that means you're paying quite little for music. And then you have to pay to a lot of parties. You are paying to Spotify, to Apple Music, to the platform that is providing you the music. And then you pay to label. Yeah, and then you pay to music artists. At the end of the day, artists get quite small percentage of what you're already paying, which is very small amount. In that way, probably now artists are making less money from their music maybe. I think it's a lot more distributed now in a way. Maybe before if some artists, some really good artists were making a lot of money, but now it's a bit more distributed. But like, as an individual artist, I think you're not getting a lot from what people are paying for music. So that's the bad part of it.

And from consumers perspective then, any negative developments you noticed?

Temur: No. I mean, for consumers just been amazing. I mean, the accessibility part that I talked about... Yeah, I don't see any. I don't see any negative thing as a consumer.

I see. What do you think what is then the main revenues or how the artists in general survive with what they are doing? If you named that the streaming services payments are very little.

Temur: I mean, big artists, they still make quite little money on streaming. Because when you're big people listen to you a lot. And as I know, on Spotify or other services, you get paid by how many times your song was streamed. So really the hitmakers, like, I don't know, Drake, they make quite a lot of money from streaming services as well. But for average artist, or like an upcoming artists, for sure it's just concerts, some gigs. Yeah, making concerts in clubs or bars. Yes. Just gigs.

Some people can argue that streaming services, like Spotify, don't provide fair and transparent payments for artists. And according to that argument, there is no transparency in the system, neither for consumers or for artists. That artists, especially not so famous artists, they don't know if for their streams they are going to get any money at all. Have you heard of such arguments? And if so, what could be your opinion towards it towards this untransparency?

Temur: I actually haven't heard about it. What I heard is just it's very complicated in a way, that artists get quite a little. But about intransparency I'm not really sure. But as I know, I think they (streaming services) are open about how much they're taking. So let's say Spotify takes certain percent, and they say that we are taking some of percent of what you're paying as a customer, 10 euros. But probably Spotify doesn't know how much other parties are getting. I don't know label, or studios, something like that. I'm not sure if it's their fault or not. Maybe it is. So yeah,

I think there is in transparency in that way, but not in the way that they're saying... As I know, they actually say how much of

steak of what you're paying they're taking as a service. Yeah, I actually checked out recently how much each pays and I think that information was based on surveys. So like, they surveyed, I don't know, 10,000 musicians, artists who use different platforms: Spotify, Apple Music... And they asked how much did they get. Then based on that, they show you money, how much each of them is getting, and what is the average or something like that. So yeah, definitely there is no transparent like, it's not very transparent in that way I guess.

Do you feel that it's a drawback? Or the industry stakeholders are fine with that?

Temur: I mean, if you depends on what perspective you take. As a musician, of course, there's a drawback. You want to know, how much of its going to him. Okay, Spotify saying 30 percent goes to Spotify. So, the 70%... I don't know how much I think they get, I don't know, maybe 2-5% of it. Or maybe even 1% as a musician. And where is the other 69-65% is going? To studios or where? So it's not a good thing for musicians, but maybe for studios it is a good thing. I'm not sure.

What technological advancements in music industry did you notice during the last 20 years?

Temur: It's streaming for sure.

That's good. And how satisfied are you with the current possibilities as a music consumer? Maybe you have something to add what can be changed or improved regarding the platforms?

Temur: What could be changed? Yeah, I mean, I am pretty satisfied because it's so easy for us as a consumer now. But I would be definitely happier if all this was more transparent. And if I knew that, for example, when I'm listening to the music of a new artists that the bigger part of my money will be going to him. Just to be able to know that what I'm paying, the majority part of it is going to artists rather than to all these middlemen in between. So that would be pretty cool. Because like, right now, I don't know. I mean I don't think about it a lot. But right now I'm listening to a lot of new upcoming musicians, not like only hitmakers and I really wonder how much they are making out of it. You know, it's not much, but a lot of people are still listening to them. So if the whole system would work better in that way, that upcoming artists get a lot more part of it, then it will encourage artists to put music in their service and stuff. So it's good for everyone, I guess.

What keywords do you associate with blockchain technology?

Temur: What keywords... I associate cryptocurrency, Bitcoin, transparency, trust, not trust per se, but actually a lack of trust. That you don't have to trust the system in a way. Blockchain takes out the trust out of the equation in a way. What else? Traceability, database, security.

What is your general impression about the technology? Do you have like more good associations or bad? If you think about this in general.

Temur: So yes. It's a bit difficult to say. Because before I was very enthusiastic about it, because I also did some projects on blockchain. And it seems like as a technology it has big value. But in other ways, you can't really see good real life business application, because at the end of the day, as a business tool, it needs to make money. I mean, all businesses exist to cover their costs and make money on top of it. And blockchain was hyped quite a lot. But nowadays, if you look at it, there is no one who is saying, "okay, we use blockchain in this way, we save this much cost - now, our businesses this much better". So, but I definitely think it might happen in the future. I think blockchain has a very big potential. So I'm, let's say I'm optimistic about the technology. Yes.

Could you name some blockchain applications that, you know, that currently exists?

Temur: So of course, all crypto currencies like Bitcoin, and Ethereum, which can also be as a platform and people can build applications on it. And I think the difference between them is that Bitcoin works on the idea of proof of work, and now Ethereum is changing to proof of stake as I know.

And then other applications, IBM has a lot of applications. As I know they did some project with Maersk to track their supply chain. What else is there? There are a lot there are some stable coins.

Could you specify what good things you associate with blockchain technology?

Temur: Yeah. The good things I associate is the technology is that as I said, it takes trust out of the equation. So when two

parties are making a transaction, you don't have to trust each other,, which is a revolutionary idea in a way. Because right now we always use middleman to do that: we use banks in order to trust each other. So let's say, when I'm buying something from you, I pay with my card, then the bank checks if I have some money, and then processes it. And with blockchain, the validation part of the transaction the public makes it, the miners. So you don't have to trust the other party for transactions anyway. Yeah. So that's the good part of it. And also, I mean, the whole idea of the internet at first was that it was kind of democracy in a way. it was kind of a libertarian idea that now we are taking power from government, we don't have to rely on government, we will just trade between each other and stuff. But then now we have this giant companies like Facebook, Google... So if you want to use social media, you just use some Facebook's product, whether it be Facebook or Instagram. If you want to buy something, it's just Amazon. If you want to search something, it's just Google. So the power is so much in the hands of like single entities. And I think the idea of blockchain is that as a protocol, it enables to take the power back to people in a way.

Any bad things and any disadvantages that you could name?

Temur: Yes. So in order to validate transactions in the proof of work, for example, mechanism, you have to do work, you have to solve some problem.

What do you mean by “you”?

Temur: The nodes in the database, in the data structure, when they receive some transaction, these nodes do work. It's also just using crypto systems. And based on this work, you solve some problem. And the first one who solves a problem, get some reward for it. Because he just validated a transaction, right? People validate a transaction in that way. So people are using so much processing power in order to solve these problems. That's just very inefficient, in a way, so that's a big part of it. And also as I said a lack of good use case is a big part of it as well. And I think cryptocurrencies, the speculative part of cryptocurrency, also damaged blockchain's reputation in a way.

How did they damage? Do you know, like, some use cases that you can relate with them? As I understood bad things that relate with technology?

Temur: So I mean, when the price of bitcoin was rising, people were taking loans, selling their houses to get bitcoins in order to earn money. But when it collapsed, a lot of people lost a lot of money. And so it just changes the perception of common people who don't know a lot of technology that blockchain is always some speculative, saying that it doesn't have any value. It's only related to Bitcoin in a way.

In your opinion, what views your friends or family, acquaintances, have about blockchain? What is the general image from your closest environment?

Temur: I think a lot of people are actually not very sure about what kind of use it can bring. As I said, so I think that speculative part of the cryptocurrency is a big part of it. And people will really doubt that it has a real application in businesses. I think people just saying it has been hyped a lot. That it doesn't have potential use case.

What the issues do you think you could face when using a blockchain application? Like, if you as a businessman would like to implement a blockchain application, what problems come to your mind that you could face?

Temur: What problem? First of all, I think you just need know why. Even if you need a blockchain, so do you need to eliminate the trust out of the system? The first question should be why you need it, so you need to touch the base. Or maybe just in a relation to database would be better in a way. And then the next would be, what kind of blockchain you would use. So you have public, private, enterprise. So most probably as a business, you would use enterprise. And then you need to choose a architecture based on your needs, what would be a good architecture? Also some providers, if you can use Ethereum? Or also maybe just a question, do you want to build it yourself on Ethereum? Or purchase some solution, which is developed by IBM, let's say. So yeah, that would be one question. What else?

But talking only about your personal perspective, do you feel that you would miss something before start using the blockchain? Like any particular technical knowledge that you could name as you would be lacking to use the blockchain

in your own like a business?

Temur: I think you just need to be really knowledgeable about data structure. So like, you need to have a good experts in data structures, in database. And that's, that's pretty important I would say. Yeah. And about technical knowledge, technical part of it is not that important, I would say, for as a business if you want to employ the blockchain.

But for yourself, do you have all the necessary technical knowledge?

Temur: I mean, I wouldn't be able to do it. If I had a business, which needed some blockchain solution, I would definitely go to third party. Yeah.

And could you name some use cases, which you see are the most useful at the moment within blockchain implementation?

Temur: Of course the finance industry. That's where cryptocurrency started in a way. Also, it looks like it's pretty useful for supply chain management, because of the fact that you can track the goods. It's traceable, there is a transparency. Also, the idea of smart contracts. So which might be very useful in supply chain, because let's say you are sending some container from some countries, from African country to Europe, right. And in order not to wait for customs, smart contract will be automated. So when the ship reaches the some destination, it will be automatically executed in a way based on some predefined requirements you set. So that might be pretty useful. So it's supply chain, finance. Those are the two biggest industries I see being applied.

Let's also imagine you as an entrepreneur. If you think to implement blockchain technology in your business, how easy or difficult do you expect this to be? With your current knowledge.

Temur: For me it would be difficult. I mean, for a lot of businesses it will be difficult. Because, yeah, we still lack knowledge. So it's not too easy to understand blockchain, first of all. And then I think the best way to go for business would be to first understand the technology really well. What does it bring on a table? What are the advantages? It's taking out trust, okay, it's bringing transparency, traceability and stuff. And then you look at what do you need? So do you need to take out some middleman out of some system? Okay. Then it might be useful. So then really understand your needs. And then based on that, maybe choose what kind of architecture you need. So should be only public? Should it be private? And then maybe you look at the solution providers like IBM or there are some others. Microsoft I think also provides probably. And then if you decide that it's a good, then go with it.

But do you also mean that maybe the general comprehension of the technology is still low, and maybe in the future it will increase to make this as it is now this difficult barrier to seem easier?

Temur: Yeah, I mean, I think now, all these companies like IBM, Accenture, they're really trying to make aware of businesses that they might need blockchain. I think it's just time will show whether they really need the blockchain. Because it seems like people really forcing it saying, okay, it's a very hyped so maybe we need blockchain, we need to do it. But if your business really needs it, you will see it in a way as a requirement or as just to stay on top on the competition. But if we will see that blockchain might be not as applicable, as it seems to be now, maybe in some very specific cases we will see that the technology is not what it promises to be. Yeah, but definitely in the future with these big companies pushing it maybe we will see the bigger understanding of the technology and business will have a better knowledge about it and how to use it.

And starting with the questions, are you familiar with this kind of applications in the music industry?

Nope.

Okay. And from this concept, could you please tell me some good things, advantages that you can associate with this application?

Temur: The advantage would be transparency that I can see where is the money I'm paying, where's it going? That's very important. The second part I liked is that I could pay to some artists as a tip, you know, a bit more money, if I like their music a lot. Maybe because that makes it so much better in a way that right now, when you're listening to Spotify, you're paying same amount to Drake, you're paying same amount to new upcoming artists, who is just surviving on the edge. But it would be cool

to know that let's say, Okay, I'm listening to Drake, I like him. But I mean, he's already making a lot of money in a way, so I will not pay additional, but to this young artist I want to support him. So being able to do that is a very interesting idea. I'm not so sure about - maybe there will be a question about negative - but I'm not sure about the comment part. Because, I think, music should be kind of different thing. Listening to music should be just listening to music. And because, as you know, comments like on YouTube and stuff, can become too toxic very fast. And people can hate each other and make bad comments. So it's not very easy to moderate and it brings up complications, seems a bit too much. But yeah, those two parts I think it's very interesting, the first things that I mentioned, yeah.

Tipping and transparency.

Temur: Yeah, exactly.

Then, you already touched their disadvantages. You mentioned comments, do you see any other within the concept?

Temur: Merchandise as well. I mean, I think making service too complicated is not a good thing. Just as a consumer to be too confusing for you.

You mean like additional services, like merchandise?

Temur: Exactly. I think listening to music should be just listening to music. I mean, if I'm going to application, I want to listen to music. I don't want to do anything else. Yeah. So merchandise and comments - I didn't like those ideas.

So if there is like, a concept, that you can have everything there... Like you can see the musicians' profile on Spotify, which you can also open the profile, where actually you see only the music that you can stream or download, right? And in this alternative concept, you could see everything that is related with an artist: the touring, the merchandise, biography. So just to be clear, do you see that it's already making the application too complex?

Temur: No, no, no, I actually think merchandise could be okay. Because it will be kind of additional revenue for artists, right? I'm not sure how exactly it will look like. Yeah, but merchandise might be fine. I mean, concerts also pretty cool. I mean, Spotify already has it I think.

That's true. But they just redirect to other services, I think, they don't have everything on the same platform.

Temur: Right, right. Because I think it's difficult to also organize concerts, sell tickets on the same platform, but...

But if you are an artist and if you have like a particular amount of tickets to sell...

Temur: Right, when you are pretty small. Yeah, yeah. Yeah, it would be definitely really cool. I mean, if I can go to an artist profile. And if I like her music, if I can tip him or her. And then maybe there is some cool merchandise that I want to buy also, by that means also support artists. And then maybe artist just post something like where they can post "I am having this gig in this club next week. Just come", you know, and then you see it. And you're like, "Okay, that's cool". So I think it gives so much power to upcoming artists. So I see big value in that.

Anything else you can associate with your own views about using these applications? Yeah, how to use specifically, about the concept of the wallet, that precondition is to have the wallet or create it within the platform. Would you see it as an obstacle? Or any other parts within using it?

Temur: No, I don't see it as an obstacle. But it depends on how it's done. It shouldn't be too difficult, it shouldn't be too technical, difficult for consumer to open a wallet, and then get to set it up. If it is difficult, people won't use it. So it should be very simple. And the other part is that you should be able to put money there very easily as well. So to purchase these tokens, maybe just with a swipe of your credit card, it should be very fast. So there should be the least amount of friction for me to use that. Yeah. If there is a little bit friction, and if there is like, it says, okay, you have to pay in this way. And it's difficult, I wouldn't use it. I would just go to Spotify or something like that. So that's very important part I guess.

Do you believe that implementing blockchain technology has positive outcomes for the music industry if we have such concept as I introduced?

Temur: Yeah, I mean, the concept sounds really interesting. And it seems like it would bring more power to upcoming artists, which is pretty cool. Yeah. Definitely. It's just a matter of the question of how it can be done.

And if you think of your family and friends, is there anyone who has negative opinion towards traditional streaming services?

Temur: Like Spotify? Negative opinion about Spotify... No, no, I don't hear it.

(talks about the concept) But I think if this kind of service is done, I see it as a very niche in a way. I think it will most likely to compete with SoundCloud in a way, because it's kind of for upcoming artists, that you might be able to support upcoming artists. So if it's made niche and very targeted, and very well done... Definitely I see a lot of value in it. But it should be really, really done for upcoming artists, I think. Yeah, I don't see a lot of value in it for big players.

But regarding your acquaintances and family, and friends, you don't feel like any negative opinions floating within traditional services, right?

Temur: I never heard of it. Everybody just loves it.

And would it be anyone who would approve your switch to alternative streaming platforms?

Temur: Who would approve? What they mean by that?

Like, if you start using any other platform like this concept. Do you think that anyone from your friends and family would approve and cheer for you? Talking about the social norms.

Temur: I mean, I don't think people care, right?. I mean, I don't care what my friend is using for his music streaming app. And he doesn't care about what I'm using. So yeah, I don't see any friction in it. I don't see any issues.

Ok, let's take an example from another industry. If you are using bottled water, and if you're buying every time a plastic bottle, some friends or people have already an idea that it's not good, not environmentally friendly. So there is a social norm. So taking this similar example in the music industry, in the streaming services?

Temur: I mean, if there was a service that really enabled you to support upcoming artists and then if you still use another service, I mean if both had the same accessibility, same things, I would definitely tell my friend, why don't you use the one where artists have more power? I think I would definitely do that.

If I got you right, you think that at the moment there are no services that enable such artist-to-consumer relationship that you can pay straight to the artists without having a middleman?

Temur: Yeah, not that I know of. I don't think so.

And in general, does the opinion of your family and friends have an impact on your choices about particular music application usage?

Temur: No.

Oh, okay. And then what factors would enable you to use an alternative streaming service, such as blockchain-based music applications? So, what factors would you focus on?

Temur: So by that, do you mean, switch to that new platform? From the existing one? Or use that new platform as a supporting, like, as a second platform?

Yeah, more like switching at all.

Temur: Okay, then definitely, the first thing is the accessibility, can I access the same songs, at least the same songs, you know, if it has even more songs, more content, and it's even better. And the second one is the price. So how more expensive that or is it cheaper. And the third one is user experience, it shouldn't be really good. And even before that if I can find curated playlists, and if the platform has a good engine to let me discover new music, new music based on my taste, preferences, and then my music history. So that's very important. And also, are my friends there as well, in a way. So I can follow them and see what they are listening.

What factors would make it difficult or even impossible for you to switch to an alternative streaming service?

Temur: If it's more expensive then I would think about it. Yeah, everything what I mentioned if it has less content, I wouldn't do it. Yeah, if it looks shitty, the user interface - I wouldn't do that. Also, actually, accessibility on devices. Can I listen to it on my

PC? Can I listen on my smartphone?

Which do you prefer actually?

Temur: Smartphone, of course, because it's mobile. And then also the stability- is this service Good, like, when I'm listening to music, will it be always without any problems? So that's also important. Performance. Also, how fast can I get the new music that is being released? So maybe if some other services always has updated music, content, and I would choose them.

Do you believe that, for example, lack of technical knowledge or any other specific your personal characteristics, could affect your intention to switch to such services?

Temur: Yeah, definitely. As I said, if it's too complicated to set it up, then I wouldn't do it. So it should be simple. And also, I think it would be really cool to transform the playlist you have to the new service. As now Spotify has locked me in a way because I have my favorite playlists and stuff. I would like to have the same in the new service. If I can't do that, it will be quite big problem for me. I don't want to create my playlist again.

And what ways do you think blockchain based music applications can be useful for the whole music industry?

Temur: I think it is probably transparency part of it. Other than that, I'm not really sure. It depends on what kind of solution is it. You can use blockchain for whatever. But specifically, how it will look like? And what kind of architecture, and what is bringing on table. So it's very dependent on those factors. I can't really say "okay, let's use blockchain for music". And you know, that would be really cool. So probably transparency, traceability parts of it will be pretty important.

And remember, you mentioned the issues that exists currently in the music industry. You mentioned more within the streaming services, like small payments for artists. And do you think that the blockchain in this case can solve these issues?

Temur: That's a really good question. I'm not really sure it can to be honest. Because I think what it can do is it can make it transparent. So you can exactly see how much of the money's getting where. But I really doubt that the artists will be able to get the 100% of it. Okay, let's say Spotify take 30 percent, probably, if it's fully free, somehow, the service, which is difficult, because some people need to work on service, they need to get money, service still should be a business. And business has costs, there needs to be some payment to it. So the platform will be taking some part of it for sure. And then why now artists get small part of it? Is that labels or studios? I mean, they provide marketing, they provide services, that's why they are getting their money. Artists are on labels, because there is a value that these labels are providing.

So it's not like when it's on blockchain, there will be no labels, they still have to get some money for their services.

So I'm not really sure how it will enable that artists will get bigger part of it. Maybe if the service is cheaper, then of course, from that 30 percent that Spotify takes, maybe it becomes 10%, then some 20% maybe can go to artists in that way.

But I think it can mostly help in a way of transparency. And also enable, as you said, just enable an easy direct payments to artists. When I want to pay more, in that sense, maybe to bring more money to artist when consumers intentionally want to pay more and they are able to do it. So that's probably good function. But other than that, there still needs to be some middle mentors, platform which will take some part of it. Studios, labels and stuff.

And if you imagine the process of start using these streaming services blockchain-enabled, could you name some factors coming in your mind when imagining what could make the process more difficult to you? You mentioned that that wallets wouldn't be a problem for you to install and start using...

Temur: It depends if it's easy. I mean, now in some crypto if you want to create a wallet, it's not too easy for every user. Depends how easy is it. How platform set it up. Because the majority of music listeners, they don't want to deal with opening some digital wallet.

And if we are thinking that the service provider did the job great. So from your perspective, maybe taking in regards your technical skills, how easy would it be for you to use this alternative music streaming services? Do you think you would manage or maybe having the blockchain in somehow can make the process to start using the services more difficult?

Temur: No, no, I mean, I wouldn't care. As a customer, you wouldn't care. And it shouldn't be enabled in that way that customer shouldn't think about blockchain or anything. So you just use a service, you don't care about the underlying protocol. When you are using internet, nobody's thinking about TCP protocol, or how sending email, nobody's thinking about SMB protocol or something like that. Just underlying technology. And it should be done in that way that customers will never even realize or think about. It should just say, okay, register and when you are registered, your wallet is maybe created automatically. Then just top it up with your credit card or something like that. Blockchain should not be an issue for customer.

And do you have experience with creating a digital wallet?

Temur: Yeah, I do have an experience.

How was this process for you?

Temur: It was not too difficult. But at the same time, it's not as easy as, let's say, signing up for Spotify. So it was not too easy.

Okay, if you can't close rate from zero, that it was very or impossible to five that it was very easy. Which rating would you go with?

Temur: 2 maybe.

So what obstacles do you think could come when using alternative streaming services?

Temur: I think it would have same obstacles as any streaming service have.

And if you have to name, let's say, five the most important factors that such alternative service would have, what those factors would it be?

Temur: I already mentioned it. (see Q29)

Okay. And also, talking about the concept I also mentioned, some alternative possibilities to pay for services. As a pay-per-play, pay-per-download. Do you have any perception on these concepts, comparing to the subscription that you are already use to? Yeah, if you have a possibility to choose, either you are using services within subscription or you are using services with PPP? Which do you prefer?

Temur: Subscription for sure. Nobody would use PPP, because it's all very expensive.

But if let's say it's like two cents per song, is it already too expensive?

Temur: No, it depends. It's also just the mindset of people. You don't want to have that thought that if I'm listening, I'm paying more. No, you just want to have this thing that OK, I can play music anytime. There is some fixed amount that I paid. And now I can play as much as I want. It does have to be back in my mind "Oh, if I play this one more time, I lose two more cents." Just about mindset.

Also, what is your opinion towards free music streaming services? For example, YouTube back in the time, that you don't have to pay for music streaming at all?

Temur: There can't be free service that provides what you want. Because artists want money. Labels want money. I mean, they're working for that. Yeah, you need to pay to get something unless you are doing pirating or something like that. And I think that is fair. Like the paying for what you're consuming in a way. Because, for example, in the free services, there's always a problem. On a SoundCloud, you can't access a lot of music, for example, right? If it's free, there will be always limitations, which is the way it should be.

Would it be an obstacle for you to buy cryptocurrency prior to using the service?

Temur: So if I had to buy cryptocurrency, to use a service like Bitcoin or Ether?

Or some other specifically to this platform, in order to start using. Because in this concept, it will be that you can create an account for free but in order to stream tracks fully or download them you have to have a particular amount of tokens or purchase a subscription plan, which is purchased only with the cryptocurrency. But do you see that as an obstacle?

Temur: I mean, if it has to be done like now, if I have to go to some exchange to buy cryptocurrency, then transfer it to apps, then of course it's an obstacle. But even if an app makes that if you pay in the app, if you just authorize your card, and it's taken from there or something like that. So it depends how it's done.

When it comes to your music listening habits, how much do you want to act consistently with your family and friends, according to their opinion?

Temur: I don't care about that.

If a streaming platform provides a transparent history of your transactions of payments, how would you evaluate that?

Temur: That would be really cool. For sure. I think that's a very big part of it.

If an app provides transparent overview of each of your streams and downloads, but only for you. What do you think about that?

Temur: It will be fine. Be good. But the biggest part is just transparency about where's my money going.

What is your opinion towards transparency of your streams to the other participants on the platform?

Temur: I don't care.

About the tipping system? It seemed that you kinda liked this?

Temur: For sure. Very good.

What do you think, what is the public opinion towards free music services? Because you talked about SoundCloud that in order to play music there, you do not pay any money. And you also mentioned the history that in order to listen to the music before you needed to own some. And now it's only streaming that costs some cents. Do you think that somehow changed the general opinion towards the music? Or what is the value of music?

Temur: No, I don't know, to be honest. I mean, I don't think people think about that a lot. It's just people saying, Okay, I like music - now I can access it easier. As an art form, I don't know.

What do you think is artists' opinion towards free music services?

Temur: Probably they don't like it? Yeah, because they are not getting anything. That's why they don't put their music there.

But we know that YouTube and Spotify is overflowed of various music and various artists. So they still are using these services. Although they know that the payment is very low, or even no payments exist there.

Temur: They are using it yet to get the awareness, I guess. Yeah. But if there was an option where they could get bigger pay to definitely use that. Right. So yeah. It's more of don't have choice in a way.

Appendix L - Transcript of Consumer Interview, Proband 4 (15.04.2019)

Name	Michal	Origin	The Czech Republic
Age	26	City of Residence	Copenhagen
Occupation	Student- IT	Side jobs	IT student assistance

Which streaming services or downloading services do you use? Approximately how frequent by hours a day.

Michal: Okay, Spotify I would say maybe 2-3 hours a day. I used to use SoundCloud lot. But maybe we could say like, half an hour. I don't use so much SoundCloud nowadays after I started using Spotify. And YouTube for music, for just entertainment. Also just half an hour, mainly Spotify.

What are the reasons that you chose one over another?

Michal: Spotify most because it's the easiest place to find songs and albums. And you have it all together. You don't have to download it. It's like saving time. You can play anything at any time.

Soundcloud because, well, I am listening to more electronic music or more alternative. Or just like remixes and or like mixes, like longer sets of music. So that's where SoundCloud is more dominant.

And YouTube sometimes you just like want to see the music video as well. I think it was mostly like before Spotify. If I didn't find it on Soundcloud then I used YouTube. And you can make also playlist on YouTube. And you can do recommendations, which you can do on Spotify as well. Spotify was after YouTube for me.

If you have to evaluate by percentage, how much music do you stream and download?

Michal: Now I just stream hundred percent.

What are your favorite music genres?

Michal: Okay. Well, I don't know if those are the correct genres but like hip hop, rock, EDM, or even just electronic music.

Would you say that you are mainstream music fan? Or More underground?

Michal: Well, I don't think I am a mainstream music fan. But occasionally I do like listen to something that's more popular, of course. Or, like, semi popular. It's like, maybe it's known, but it's not like the number one pop music. Or it's like maybe it's an older. I also listened like to rock and all their stuff.

How would you describe your music interest? Referring to how enthusiastic you are about music related news. Are you following some artists that you are a big fan of? Or you have like a particular blog about the latest music news?

Michal: Currently, I'm not doing that. I used to follow some electronic music producers a little bit. But it's not like I'm sitting and refreshing their blog every day. It's basically why I like somebody's Facebook page, or why I click on follow because then you can at some point get some email or you can get the recommendation that this artist has new music. I don't really do it intentionally. If I decide, okay, now I want to find the music, then I do it. I look for music, or check Spotify radio based on song I liked. But I think only search actively on Spotify now.

Did you notice some positive developments in the music industry during the last 20 years?

Michal: It's more accessible for consumers, but maybe copyright owners or not so happy sometimes. Because of that technology you can just distribute the music without having like control, or like, you're not really being controlled much. People can download illegally and upload. But at the same time...

Maybe more about positive developments?

Michal: It also allows the music's spreading more freely. So if you're not known producer or music author, you have more channels, ways to spread the word about your music. And also for the ones that are already existing or established (artists), I don't know, maybe it's better to put your music on Spotify or iTunes and get paid in exchange that not to have it there and try

to sell it some traditional way. But then people will always find ways how to download it. So you might be losing. It's maybe better just to go with the big platform. And put your music there. And that solves the problem a little bit because people nowadays are like getting lazy to download it. So they just find it on Spotify. It is easier, as I said, the fee is not high for almost Western countries. In Eastern Europe, where I am from, I don't think that many people have Spotify, or Netflix or something else there.

And then how about some negative developments or negative movements within music industry from artist perspective?

Michal: Well, I don't know how their agreements work. It could be that while the producers could be losing profits because the people will download your music without paying for it. They can at least put it up on this platform, and then they get some little share... Is it that they get paid for it from the platform?

From Spotify?

Michal: Yeah.

Yes, they do.

Michal: Then at least they are getting something instead of getting nothing. But maybe the platforms have too much power how much data they will give them.

Could you name something from consumers perspective, if you see some negative movements within music industry?

Michal: I think it is just easier for consumers now than it was before. To play music.

Some people argue that streaming services like Spotify don't provide fair and transparent payments for artists. But there are many cases in the media that Spotify owns some money which wasn't distributed for the artists. And usually the artists can see how much of streams they have. But the payment system is not transparent and not clear. Have you heard any of such arguments?

Michal: No, no, I haven't read about it.

What technological advancements in the music industry did you notice during last 20 years?

Michal: Well, we used to listen music analogically, now it's digital. We had some physical media, then mp3 players, phones and now we have platforms from music. And accessible from anywhere all the time.

How satisfied are you with current possibilities as a consumer of music? Maybe something comes to your mind that you could improve or change?

Michal: I mean, but if you compare it to 20 years ago, then I am happy. It's just sometimes you get a little bored of the music you have already. And then you want to explore something new. But sometimes you want something like new new, but sometimes you just want to like be suggested something based on the style you know. But then I feel it doesn't work. When you try to get recommendations based on favorite song, and then it's not really what you're looking for. So I don't know if that's just your mistake, that it's trying to look for the songs, but you don't like them. Or if it's just poor recommendation algorithm, or if this could be improved. So if there would be some better AI or something, could improve that.

So I mean, if you're saying that payment system for the producers is not transparent. Well, the algorithms are not transparent and clear for consumers, right? So you don't really know what are your recommendations based on. They could be also saying "we get those new offers that need to get more reach. Then we will push them forward, they will get a good feedback. And then they will bring more offers", for producers the platform would say. And they (platform provider) would get some from the part (money).

Okay, so let's move on then to my technological section about blockchain technology.

Okay, so then what keywords do you associate with blockchain technology?

Michal: transparency, safety, or like security. Maybe strengthening relationships. Trust, but also...hash, encryption. There is no owner or controller, without intermediaries. Smart contracts.

Great, then, what is your general impression about the technology? Do you have like more good associations or negative?

Michal: Well, I know some people have associations due to Bitcoin. Because how much electricity and power it spends for making the block work. But that's just one example of application. And then blockchain can be a different type. I think it's a nice idea but no one has really proven it, no one has really shown a functioning application. I'm not convinced sometimes that because there's lots of startups with blockchain, but they all have like white papers, or just prototypes, and they never build it. Because usually there is a problem that it can only work if there are lots of people using it. Or if there's everyone, and that's little bit naïve.

But I feel also, isn't the company managing the blockchain like an intermediary? Or not even intermediary. But like, it's some entity that has the new control because it can set some rules. Even though they don't know who owns what, and the content can't be affected and changed. But they can change maybe some effects in the network.

About your general impression, could you name it that it's more good or bad?

Michal: It would be good if it worked. I thought the point was to remove the ownership and the control. And then in many cases, there's still this new entity who creates the blockchain. Who is basically the one that could potentially change some, like the fees, or who gets how much share of these. And then I didn't like the energy consumption. But it depends how will the network work and like, how would you keep it running?

I think you just now answered to the following questions, what bad things do you associate with blockchain technology?

You mentioned that there is still some kind of middleman and volatility of the coins.

Michal: Yes. Also there were some cryptocurrencies that were just like created just for the sake of it, because somebody wanted to try to exploit the Bitcoin effect. And that maybe made people feel like blockchain it's the same worse.

What good things could you name about blockchain technology, if you see any?

Michal: Well, that only the with the sender and the receiver see the content, right? But I mean, it's about that the management of the network is easier, it should update with each transaction everywhere. You can probably cut costs and stuff, when you will be using different solution.

Transparent and the security.

Okay, great. And, in your opinion, what views do your friends or family have about blockchain technology? What is the social opinion among your closest friends?

Michal: My family doesn't know about it anything. My sister knows about Bitcoin. But she doesn't really know how it works. And my friends who study with us, they probably know something similar like I do. But I don't feel like there's anyone who knows a lot.

But do I mean, that maybe the social or general opinion is similar that you have? The general impression is neutral, because you named also both sides?

Michal: I don't know what it the general impression, but general population, I think, doesn't really know what it is apart from hearing about Bitcoin or Ethereum or cryptocurrencies, basically, which is very narrow use of blockchain. But otherwise, when they hear about like blockchain can be used for this, that's cool. But I don't think they really know what it means and how. And when you tell it to like business, or tech people, I think a lot of investors could be skeptical because there's lots of projects and I don't feel like none of the blockchain projects has got traction enough. They say like AI data and blockchain are like major technologies but I feel like blockchain hasn't showed so much as an AI, for instance, it didn't like wasn't like groundbreaking turnover some way.

What blockchain applications you know?

Michal: Kodak is using it, but I don't know, how did it go. Even if they use it, I don't feel it's like highlighted as much in general as AI. Because AI could really influence everyone. And blockchain is more it will improve this particular thing for us or for someone, process.

What issues do you think you could face when starting using blockchain technology?

Michal: Yeah, funding, technical knowledge.

But also, I don't have such a good knowledge about it now. So it's hard to define a business case for me. If I have some inefficient thing that is working right now, and I want to improve it, I'm not sure if I can evaluate if this system is the one that can be improved. Convincing somebody to use it given that there is tons hundred blockchain projects, probably more than half of them fail, I would assume. Cryptocurrencies could have bad influence on people's perception or opinions about blockchain.

Q18. What cases could you name that blockchain technology is the most useful for?

Michal: Maybe there were some projects that they were using blockchain for diamonds. I don't know how it works, I guess each Diamond has some identification, unique value in the system. And then you can if you're trying to buy it from someone you can easily check in the database if this diamond in ownership of this person? If not, then it's obviously stolen.

It's just it's for like tracking things. Maybe like in supply chain, logistics, or even some management of goods. But also, it can be management of digital goods, like the photos as Kodak did for the authorship. If you make a photo, you can put it on the network, and then somebody can buy it. And then he will get the token or he will get the information that He's the owner. Then somebody can use the picture, but then you can check if it's stolen, or it was not paid for or something. I don't know.

What do you think how easy or difficult would you expect to start using blockchain? Do you think you will find the needed knowledge or the needed process how to start using blockchain?

Michal: I don't really know. Maybe if you want to just create a prototype, then it could be feasible, because then you won't need a lot of processing power. Right? You will just need to set up something. And in terms of knowledge, I'm not sure. I guess there would be some in-depth, technical material, or discussion forums, or GitHub or somewhere. Or some maybe projects that encourage people to do something with the blockchain.

But for you, what do you think, it would be easy or difficult to use blockchain?

Michal: Difficult, for me difficult because I'm ordinary person.

First question, are you familiar with any blockchain based music applications?

Michal: No, I'm not.

Okay, please tell me some good things that you can associate with such platform that I just presented.

Michal: Did you mention can the consumer earn from it some money as well?

No, I didn't say that.

Michal: Well, for the artists it is better because they get better share of the revenue.

(interviewer reminds more about the application)

Michal: Yes, it gives opportunity to the fans to support artists directly. But also you don't have any the entry barriers for artists. Depends what do you need in order to create a profile or sign up there?

It's like quite easy and general for an artists. But they should also have a wallet the same as a consumer in order to use their services.

Michal: It just offers more freedom to artists and more opportunities and like to control their own, change their own services online, what they want to show, and what would they want to share.

Also the statistics and you can follow more, who bought what and for how much. More transparent. And the platform cannot make any scams, because that's the blockchain feature that you cannot change records, fraud prevention. Also, blockchain always creates like opportunities for third party services that can offer additional services within the blockchain. What I liked is that transparency. It would be good to show the dashboard with the data for artists. I would give them the possibility to see that, and also to see how many transactions were made from this song or this album. Because then it gives you a lot of data.

Q22. Great. And do you see any disadvantages within this platform?

Michal: Well, yeah, maybe some producers don't want to manage themselves. But they can get the person who will do it for them. Or they can get even some service. Disadvantages...Or I was thinking why don't let consumers to create artifacts. If I create a playlist, or maybe I can be a music finder for someone, and then I can get paid for the service. Like peer to peer, even between each other.

Anything else you can associate with your own views about using BC-based applications in music industry?

Michal: No, nothing else for now. I already mentioned what came to my mind.

Okay, then. Next question. Do you believe that using blockchain technology has positive outcomes for the music industry? Maybe you could evaluate from the concepts I presented?

Michal: yes, of course, if it will make the artists happier, the definitely. If you can create some system or platform where the quality for consumers will be still the same, or maybe even better. But if you at the same time can improve it for the artists, then definitely.

Great. And if you think again of your family and friends, is there anyone who has negative opinion towards traditional streaming services, such as Spotify, or SoundCloud?

Michal: I only know that some friends don't like SoundCloud because it doesn't offer what YouTube and Spotify offer music-wise. You can't expect to find their regular albums, mainstream artists are not there. And some of them don't like Spotify because they just don't want to pay, they are used to download their music or just play from YouTube. Because as I said, in some countries people are not used to pay for audio visual services. Because it's illegal to upload, but legal to download in my country. That's a big argument.

Okay. If you think again, of your family and friends, is there anyone who would approve of your usage of alternative streaming platforms?

Michal: I don't think I would have anyone who would really appreciate.

What do you think, what people around you use as a basis for their decision to use streaming services? Or, hypothetically would use as basis for deciding to switch to blockchain based streaming services?

Michal: I said very similar in the beginning. Again, it's easy, no effort, the fee is low. The price for it is low. Rewards are quite high.

Okay, and does the opinion of your family and friends have any impact for you to choose? particular music applications of streaming services or downloading?

Michal: Well, I they don't have any opinions. But if they would, and I would just consider it.

It's hard to imagine. I just don't have anyone who would tell me anything like stop using traditional streaming services or start using a different one.

I see. Okay, and what factors would enable you to use an alternative blockchain-based music applications? What would be important for you to decide to switch?

Michal: If it has some added value for me then just the traditional streaming service... maybe if I can engage more with the artist. It would be interesting if he would post some content extra, some added value. Or as I said, I think it would make sense just to allow people to exchange something in between them. Not the music, but just the information, the playlist or something. Maybe you could ask artists to pay consumers for recommendations (incentives for consumers). Also Free trial, or just like 23 tracks or some credit, or something.

What factors would you name that would make it difficult for you to switch to such alternative services?

Michal: Because you're used to the interface of the old ones. Like learning how to use it while you just want to listen to music. Maybe you could also use it on different platforms like phone and PC, and you have it all connected. Or maybe if you share it with some family account. Also if you follow people in current platforms already. So you would have to do that all over again in the new. If there was a way how to get this information and switch with the new one, it would be great.

What other personal issues come to your mind when you think about switching to an alternative music streaming service? What features or absence of these features would keep you away from joining a new platform?

Michal: if it requested to put my ID documents.

Would it be easy for you to get familiar with how to set up a digital wallet and buy cryptocurrency?

Michal: It depends. If I can do it within two minutes, maybe that's fine.

(continues talking, but more related with

What obstacles do think could come up when using an alternative music streaming service?) *Michal: If you need to, like put in your identification documents, then I'm not sure if people would be willing to do it. I think also people come with the idea, that if they are expected to create a wallet, they will think of it like paying continuously. Or like more than with just the other model, with just the card once a month. I would explain them how they can listen to music, how much could they spend monthly. Because right now I'm like... so you have to pay for each play?*

You can choose. Either have the subscription plan, or you choose to pay per use. If you are heavy music listener, then of course subscription plan is better. But if you are listening just few tracks a day, when you're cooking, then maybe it's cheaper for you to pay per play.

Michal: yeah, I see.

But do you believe that your lack of, for example, technical knowledge would affect your intention to switch to such service? If you know that there is a blockchain based music streaming now?

Michal: No. Because as a consumer, you don't really care.

That's true. In what ways blockchain-based music applications can be useful for the whole music industry? Can solve the current issues.

Michal: I think we mentioned already. The transparency of the payments. But also it could cut cut costs for those niche or occasional listeners, who, as you said, like somebody who just plays music when they cook. So they could pay per play or even pay per time on the being active on the app and playing music. So instead of paying 5 dol. Through the token exchange, it would be like 0.001 per play. It has to be decided how much it would be. And it's difficult maybe to decide what is acceptable for the consumer, acceptable price for play.

For the producers, they will finally can evaluate their music finally, because they know exactly how much was paid for what. And the consumers have more to choose in terms of payment models.

How easy for you it would be to start using such service? If you imagine that process?

Michal: Yeah, I think for me, personally, it would be quite easy.

You already mentioned that you have experience with creating a wallet? Do you remember the process? How easy or difficult was it?

Michal: Some it was easy, somewhere they wanted to get some more verification, it took time. It took even days, maybe.

Okay, but for you, the perception to create a wallet, it doesn't influence to create a wallet next time for other services?

Michal: No, no, I don't think so.

Would it be for you an obstacle to buy cryptocurrency before starting using the service? You get to create an account for free and you could stream maybe for 20 seconds every track. But in order to get full services, to tip artists, to comment, you would have to have some cryptocurrency.

Michal: Depends. For me it's illogical that you should buy tokens before. (imagining the process) First, I would register and then I would enter the system without being able to do anything, maybe only play some previews or whatever, there has to be something. And then I would go and get like five tokens, which can last a really long time if you don't really do much...

I guess you could. But it's just for me, I would think about the volatility. Because there could be people who just buy a lot of them now, and then they will change the value.

Then, talking about specific features. If a platform provides transparent history of your transactions of payments, how would you evaluate this feature as a consumer?

Michal: It's okay. I don't mind.

If a streaming platform provides transparent overview of each streams of your music or downloads, do you think it's also fine as a consumer that everyone can see what you are listening to?

Michal: Yes, but I would like to have an option to hide at least titles of this tracks.

Okay, if a streaming platform provides a history of your tips to artists, how would you evaluate that?

Michal: again, the same. It's fine. But like, I think you should be able to choose. Yeah, I think I wouldn't mind.

What do you think is the public opinion about free music services? Or such services like YouTube that they can listen to music for free? Does it influence somehow the general opinion towards music consumption?

Michal: it's super accessible. So, of course, it's probably driving that more and more people listen to music. But yeah, they rather use free than paid service. But then again maybe they want to see the video as well. Maybe they feel there is more community feeling on YouTube, because of the comments, and all the interaction buttons you have. Also, it's easier to share YouTube video on social media, than the track from Spotify. Because not everyone can play.

And YouTube is a hub for everything so it's easy to switch from entertainment to just switch the music quickly, and then go back to something else. (talks more about Youtube features)

What factors would the new streaming service needs to have that you consider switching to it?

Michal: I think I mentioned it as well. No? Easy to use, interact with the producers, interact with the listeners as well. Or being able to exchange playlist or something... Also incentives for users, which would be actually not just a streaming service, but like an upgrade. Like maybe a hub, or marketplace. Now, it's still streaming service. But I think the listeners should be able to interact with each other in this way.

Or maybe the producers had opportunity to share their music only with Premium subscribers. Then you would just pay the artist more like extra fee. So that you have access to his unpublished content. And you can download it. It would be an exclusive content.

What features would keep you away from joining a new streaming platform?

Michal: Yeah, if it's just too much effort to get in. Or if it's too much effort to accommodate myself there. That's that's the thing about, if it takes time again to I find all the artists that I follow. If the interface is not intuitive. But if I compare it to my previous usage of the previous platform, if I in the end have to pay more here for the same use kind of, then it's not like something I would want, right? If I'm going to pay there even a little more, it has to have a good reason: It has to be fun or interactive, or it has to give me some special novelty. It could be also just access to pictures, tickets, or whatever.

Appendix M - Transcript of Consumer Interview, Proband 5 (10.04.2019)

Name	Karolis	Origin	Lithuania
Age	31	City	Copenhagen
Occupation	Student - branding	Side jobs	DJ, host, concerts

First, which music streaming or downloading services are you using? And could you give us approximately how frequently are you using such services per day?

Karolis: I'm not using Spotify that's the biggest one I would say. Mostly I'm using SoundCloud that's a streaming platform just because of my interest in music and what [content] I can find in Spotify versus SoundCloud. As a purchase platform I use mostly Bandcamp. Sometimes other shops, like Juno.co.uk or Beatport or something kind of similar to that.

But those Juno and Beatport only for downloading, right?

Karolis: Yeah. It's like stores for mp3 files.

Yeah, okay. How frequent are you using them?

Karolis: SoundCloud every single day.

How many hours a day?

Karolis: I'm mostly using when I'm driving. I don't listen to much music at home I would say so. Even if I do that, it's mostly SoundCloud again. It can be on average like an hour per day.

Awesome. Okay. How about Apple music? Amazon music or YouTube specifically for music listening?

Karolis: I do use YouTube sometimes but none of the others. This is because of my music interest which is more like underground electronic music. So I have an issue finding what I want and again about YouTube I would mostly listen to live dj mixes, whatever. But if I can find them on SoundCloud, I would rather prefer that due to the Quality.

Okay, so we actually jump onto the following question where I would like to find out about the reasons why you choose one over the other so you mentioned that SoundCloud you prefer because of quality, right?

Karolis: Yeah. It's like very user-friendly I would say, also you can write comments on the files itself because mostly I'm listening to like DJ mixes and DJ live performances or something like that. So, I think it's like a social network only to people who actually interested in a specific kind of music so you can hear like people searching for track IDs or something like that, which is kind of interesting.

And Bandcamp, Juno, Beatport - is there any differences between them? And why do you choose one over another?

Karolis: Bandcamp is ran by in the Indie labels, like every every single guy has a label can open your sort of shop in there. And you basically purchasing straight from him. So all the money goes to not the label but to the artist. That's why I like it. Yeah because like after you add tracks to your like card then like then Bandcamp add some extra piece for [their services]. Others are adding commission and I'm not sure how much artist is getting actually. So Bandcamp was like my favorite that I know all the artists are pushing you to purchase via Bandcamp rather than via bigger [entities].

If you have to evaluate how much music do you stream and download like by percentage? Are you more streaming music or downloading?

Karolis: Streaming. Mostly I'm downloading to play music cause I'm a DJ. And I'm kind of picky on those stuff and purchasing all the tracks I really like.

And if you have to validate by percentage, how much time do you spend for streaming music? In comparison to downloading.

Karolis: I would say 90 streaming and 10 downloading. Yeah, actually I'm purchasing music just to play that at the party because when you purchase at the Bandcamp you get like permission to stream it via Bandcamp in perfect quality. So kind of

like certificate to stream in a club. Because also the Bandcamp is very good for like digging music just because they allow you to hear the full track. Others for comparison get you like to listen to Snippets only one minute out of seven or whatever. Bandcamp gives you permission to listen to the track. But like I think three times at first and then they ask you to buy. But when you purchased it, then you have unlimited liability to listen on your phone. They do have a mobile version too.

You mentioned that you are a fan of electronic music. Some other genres you could name as your favorite?

Karolis: Subgenres can be easy EBM, techno, house, electro. Usually that music is released via indie labels. That's why Bandcamp is the place to find that music.

How would you describe your music interest referring to how enthusiastic you are about music related news?

Karolis: Yeah talking about like industry, I'm interested in it which is not that big I would say so it's not that hard not to follow everything. Like following new releases on BandCamp you can just follow the label and when they are doing something like any track comes out you can get a notification from them as well as Facebook and so on. I'm following a lot of artists I like, labels I like, DJs I like. I think like particularly the music I'm interested in this not that big listeners wise.

Do you see and could you name some positive developments in the music industry that you are aware of during last 20 years?

Karolis: I think when MP3 came out as a tool to play for DJs an electronic music, it wasn't that difficult for guy, you know to become a producer and to release something because before that he was very limited to labels which were basically vinyl and whatever. So when MP3 got popular, basically everybody could make a track create their own label and release music. So I think everything got like way bigger, but I'm not sure about the quality. Because you know again like I could make it track in five hours and make my own label the next day and release it and try to sell it. So the whole internet shops for music was full of stuff you just want to skip skipskipsskip. That 's what I see like sort of a good thing and a bad thing. And also like from artist's perspective about streaming like again SoundCloud. The reach got enormous. I remember like 10-12 years ago like for a particular release you would need to spend a few weeks probably before somebody drifted and uploaded it somewhere on the internet. Right now everything is doable much easier And all the streaming on on Facebook even live performances, or radios. Or like Boiler room, everything got live now. So I would call it again like a streaming platform.

What about positive developments from consumers perspective?

Karolis: From consumers perspective it's still the same. It was more difficult to get the quality stuff. Because when it was vinyl only or something especially in electronic dance music. It was that you know the labels which you can skip because it wasn't your taste but other ones you're pretty sure which ones you need to check out. When the amount of everything got like super big, it's rather impossible to know everything.

But how about music platforms? Maybe could you name some positive developments regarding the streaming as a service or downloading?

Karolis: I'm not a big fan of the the Spotify. I'm the biggest fan of some kind of niche market and I know how the Spotify is treating artists. Because I've seen a bunch of guys posting the payslip saying that the track was listened to like half a million times and I get like four dollars for that.

In Spotify I didn't find anything in particular very interesting for me. Now I know like even a lot of Indie labels are moving towards Spotify because they still can't avoid to be unheard nowadays.

How about negative developments in the music industry that you are aware of from the artists perspective?

Karolis: I don't think anybody who's not playing music is buying music at all right now. Everybody's using YouTube or using Spotify. I didn't try Apple music. I know YouTube launched their own music something, you know streaming platform. So right now the income for the artist is super Limited and they are kind of stuck in that thing because if you're not in Spotify, how would you be recognizable at all?

If we switch to Consumers perspective, do you say some negative impacts?

Karolis: I wouldn't say anything negative just because of that streaming thing when it started a consumer was able to get the music. For Them it's nice you just be like a fixed fee per month and you have all the possible music for a regular listener. You get everything you want to know kind of the radio. Like on Badcamp you can get one track per one euro. Also you can pay additional fee if you really enjoyed the track that time.

I think the whole streaming thing just got things moving from rather focused perspective from Sellers and I think like something should happen again.

Some people argue, that Streaming services like Spotify don't provide fair and transparent payments for artists. According to that argument there is no transparency in the system neither for artists nor for consumers. Have you heard of such arguments? If so, what is your opinion towards it?

Karolis: I don't feel any any consumer cares about that to be honest. Before Spotify and other streaming platforms there was YouTube which was basically in the beginning the video platform, but then people started putting tracks on it and everybody just got used to not paying for music. Before that there was Napster and Soulseek like parents of peer-to-peer platforms. People from 20 years ago got used to not to pay for music and they don't really care about what the audience getting. Again it might be a perception that they see all those superstars and know how rich they are so they never see an issue no to pay for music. So I think like these who paying 10 euros per month or something they justify themselves that it is okay because I'm still paying something. From the example of the band Weekend, the guy did everything in the beginning by himself and gave his music for free. And the he was noticed by Sony. So sometimes a transparent good amount of streams for some labels could mean that the artist is doing his job right. And then get to sign the contract or something. I think artists agrees to the fact that this way they will not earn tons of money. They're reaching for it to be noticed somehow, to get the reach.

What technological advancements in music industry did you notice during the last 20 years? Besides the digitalization of music.

Karolis: I'm not sure I could mention anything else what wasn't mentioned before.

How satisfied are you with your current possibilities of consuming music? What comes to your mind that you would like to change/improve?

Karolis: I think at the moment we are able to do with the music whatever we want or need. I'm not sure if like any big changes are needed.

And how about yourself? how satisfied are you with current possibilities?

Karolis: Yeah, I think I'm able to do anything I need to my specific needs, to be precise.

What keywords come to your mind when you hear blockchain technology. What do you associate with watching technology?

Karolis: Again I would relate with cryptocurrency first. I don't know to be honest how blockchain technology technologically works. I am more into cryptocurrency and financial part.

What is your general impression about BTC – more good associations or bad?

Karolis: I think it's good obviously, I couldn't mention any big drawbacks, why it shouldn't be used or why it should be considered as something negative. I always consider like new technologies as making a society and the industry's move forward. So that's obviously a good thing.

What Blockchain applications do you know?

Karolis: Mostly related to financial sector, I know also Lympo - sport and health app. Bitcoin, Ripple, Ethereum and many more.

And what good things do you associate with blocking technology?

Karolis: Speed. Anonymity as everybody is slightly tired of the third eye from government that is watching everything. That for some two euro services you sometimes even have to upload your ID or something.

What bad things you associated with the technology?

Karolis: Difficulty to understand.

When I mean blockchain technology you can also relate to the applications that you know to cryptocurrencies and everything in general.

Karolis: I would say instability again talking about cryptos. Because yeah, you're not really sure how trustworthy they are because there was a lot of bad things happening in the beginning of the cryptocurrencies. When it was known by very small amount of people and they were tricking, stealing and you're still not sure who created that stuff and what might happen with it and is it trustworthy eventually. In that anonymity might also work in bad ways. You may use that for buying in the black market or for terrorism.

What views of other people do you associate with blockchain technology?

Karolis: I think I should be an expert to answer that. I know that some apps are built on blockchain but since you are not familiar, you don't know that fact.

What do you think what issues could you face when using blockchain technology?

Karolis: Not being like really trustworthy about that and instability.

How useful the blockchain technology appears for you? In what ways do you see it's useful?

Karolis: People are saying it's the future. I do tend to believe that. But again, since I'm not that familiar of technological aspects and technology itself. I'm not sure how specifically that differs from anything else. But in financial sector it's becoming very useful already, it's implemented in the banking system because of the speed of the transfer and how cheap they are. I'm not discussing it as being unuseful. But for people who don't know that might seem as a mystical thing. Apparently a lot would be associating with crypto. Like if you are telling that you are building something on the blockchain and it has a situation like a negative impression, which you know, everybody was getting about two years ago when everything crashed. So it might be a very negative experience for them just to hear the word.

If you as an entrepreneur or working would think about implementing blockchain-technology in your business, how easy or difficult do you expect this to be? (EOU) / How easy Do you think it is for a company like IBM to use such a technology or for you also working in the company, how easy is it for you to use this technology?

Karolis: I think I mentioned before, I don't see any drawbacks. If it's a trustworthy platform or something like that. If the access is easy, the option to buy tokens or whatever is easy as well. So yeah, and if it's like trustworthy, of course. If you have any impression, you know, like you can trust the platform or the company.

Yeah. So do you think that somehow the technology itself doesn't influence much of the application, of the platform?

Karolis: I don't think it might have any negative aspects. Maybe consumer might need some thorough explanations, but sooner or later, I think it might be a common thing. So everybody will be acquainted with the whole blockchain.

Okay, I think then we can to the last section which starts talking or shaping the image of the blockchain applications in music industry. (Introducing the concept)

So first, I would ask if you are familiar with any such applications?

Karolis: No.

First tell me about good things that you associate with using blockchain-based applications in music industry.

Karolis: My first association would be that it has to be revolutionary. My first knowledge about blockchain was crypto and it was it was something different, anonymous, untraceable, super fast, you know, like when people are confirming the transfer by people, I mean computers. So yeah, it was something different. So in this field again it should offer something which would be unexpected maybe for more experienced people.

And then what about bad things that you could associate with such application?

Karolis: Again, like if your expectations fail when you see it. Like open it in as the same streaming or purchase platform as all others.

Anything else you can associate with your own views about using bc-based applications in music industry?

Karolis: I don't think I have already any associations for myself.

Do you believe that using blockchain technology has positive outcomes in music industry?

Karolis: Why not. I don't have any predefined position about blockchain. It can have very positive impact in every single industry.

If you think of your family and friends, is there anyone who has a negative opinion towards traditional streaming services (such as Spotify)?

Karolis: No, I don't think so.

Please think about your acquaintances, your family, friends, relatives. Who from them would approve your usage of alternative streaming platform such as blockchain based music applications?

Karolis: What do you mean by approval? To say it's a good thing?

Yes.

Karolis: Yeah, I would say I would be approved. Cannot tell by whom.

And who would disapprove such usage, such switch?

Karolis: Nobody. I don't think that's important thing in your life, you know.

What else do you associate with other people's views about using alternative streaming platforms such as bc-based music applications?

Karolis: No, to be honest I have one person who's talking about it. But yeah, she's into that. But apart from that, like from my music friends, I'm not sure that it ever came as an option.

Yeah, that actually was my next question. Do you think that social opinion has any impact for you to switch for such application?

Karolis: No. Does social opinion has anything to do with what you are using? Like I mean in app-wise.

Yeah, I guess so. An example could be Apple versus Android.

Karolis: I mean streaming wise. Is Apple better than Spotify, Amazon or YouTube? I think there you are just getting the same result, I don't think there is a gang who approves that one, an the gang who approves another one.

Here I meant like maybe we are in a similar social zone. All of our friends also may be using similar applications or has similar taste to music or the like, but there are also other group of people. We can take the example of Spotify. You mentioned that artists are getting kind of low income. So maybe there is some group of people who doesn't support like having this application or streaming the music from this application. So that's what I meant by this question. What your social community or your community that you belong in - what impact it has to your choices?

Karolis: I don't think there is any. As I told you I'm not very interested what your artist is getting like money-wise. But if the artists themselves approves being on Spotify, whatever, then you cannot complain Spotify. But I'm still not using Spotify because I'm so used to not use it that I just don't need it. When some new thing comes over and if you don't start using it like right away or with the first wave I would say, then you might just keep on living without it, as our parents without Facebook or kind of similar.

Okay, what factors or circumstances would enable you to switch to an alternative music streaming services?

Karolis: I don't know to be honest, like I'm thinking about myself about my usage. The thing is I don't have any issue. I think Switching is like searching for something new and currently I don't have enough time to listen for as much as I want you, so I didn't see a single point even going from SoundCloud for anything else. You know what I mean? Like I have an hour and I just open it and I see like I have seven hours of music I want to listen to. So I just don't want to get involved in four different platforms or whatever. or Again something new to find. Of course it gives you more options, but if particular one I'm liking gives me more options than I need then I just don't see any point switching to anything else.

But you mentioned that you are using different music services for both download and streaming. Would you then switch to a new platform if it has features of all of the services that you are using now?

Karolis: But you might be feeling like I'm using this for sort of different things, one is for streaming, one is for buying. And actually the one who offers you buying also offers you streaming as I mentioned before.

But are you using it for streaming (talking about Bandcamp platform)?

Karolis: No. I think there it's harder to find what you want to listen to. That's the key. I'm just going to particular label, artist, whatever and just check that. On Soundcloud it's like social platform. You can just follow everybody, all the artists and you always see the new feed what's uploaded. You can just open it, scroll down, the same as Facebook, see what new mixes, new tracks they have. They can even repost tracks they liked, you know, and you can just press play and just because it's your feed, there's no like advertising. So basically it's your feed which always will be up to your taste.

But would you prefer to have everything in one application or is it fine for you to have different applications for different needs?

Karolis: Again, in Soundcloud I'm listening to many DJ mixes, and in there a very big thing is like trying to find what they are playing like IDs. What's very interesting that usually they are playing unreleased tracks or something super fresh and people are asking for an ID. And who knows that, they share it like it's a common thing. And I think they could implement maybe a thing where you can buy the track instantly from the mix. That would be nice. If I do that, for example, I hear the track which is interesting for me, then I usually go to Bandcamp and find it when it was released. And then I buy from there if I want to buy it. But the combining thing might be like such as that you listen to the DJ mix, like the specific track and you can buy it right away.

What factors would make it difficult or even impossible for you to switch to another streaming service?

Karolis: I am not sure if I would be trying to find something new.

Okay, but let's imagine the situation if your dream platform comes up, what your three evaluation factors would be that you would decide to switch to it?

Karolis: If it is my perfect platform about the factors I mentioned before, I am not attached to platform, or in specific group or something. But it should have good content. Ease of use, availability all the time.

Do believe that your technical knowledge or lack of other knowledge could affect your intention to switch to blockchain-based application? Could you elaborate on that?

Karolis: Yeah. Since I'm limited in blockchain. I wouldn't be really sure how it would differ. You know in the marketing or whatever like the word blockchain would be something playing a lot. My lack of knowledge would be a disadvantage as I said because I would be looking for something like super revolutionary and if they wouldn't offer that, I would see like something similar, I would think then why did they use a blockchain as something to pop in my head and make my eyes look bigger?

Do you see any ways that blockchain-based music applications could solve some current issues in the music industry?
(also covers Q35 artist's perspective)

Karolis: From artists' perspective, if he's actually getting paid a lot more then it's great. I think it would be more interested just giving sort of special tracks that you cannot find on Spotify. It was thing a long while ago when Jay-Z or somebody else had their own streaming service. So they were releasing albums only to that one, not giving Spotify or anybody else. So they were tracking tons of people, Millions who want to have the album just as being a member.

But it depends also on how many listeners you can get. If you can get like 50 bucks more on that platform, but you don't have any big reach, then is it worth it to be on such platform only for bigger payment.

From consumers perspective, how blockchain-based apps could solve the problems in the music industry?

Karolis: I don't know if consumers have any issues. Money would be one key and what they can offer, again if there are any special releases, special artists or something. Maybe it can be very selective. You know, if it's selected specifically to your taste by some kind of professional, might be a good thing.

As I introduce the platform I mentioned that there is a necessity to create a wallet or to have particular cryptocurrencies that are common only for use as utility only on this platform. What do you think, how easy would it be for you to switch to such application? Please name factors coming to your mind when Imagining the process.

Karolis: Depends how would the Wallet work. If it would be easy to exchange my fiat currency to that specific token. Because if you're playing like PPP so apparently you have to deposit some amount of fiat and purchase it. So I'm not sure if people like that and I'm not sure if I like that. Because basically, you know, like Signing a contract, I will still have to use it eventually. If you paying subscription, then it's not an issue. If subscription is music tokens equivalent to \$20, so you just buy like that amount of tokens, you pay for subscription the next month. And then you again can buy more. But PPP, if I don't have a token, I cannot play the next track. So I have to deposit some amount which sort of makes me more subscribed than actually having a subscription. So you are kind of freezing your money which is not a good idea nowadays.

How would you perceive PPP model?

Karolis: I wouldn't like this thing just because it doesn't matter how much token is worth, the track has to be worth it. Watching a movie I think you kind of picky which one you are going to watch. It Is the same as going to cinema, when you're paying for it, like specific one, you kind of picking the one you want to watch. This might be the same with the track, you know, if you know as soon as you press play, you're going to lose some money, doesn't matter, I think it's psychologically. And if you don't like it, then you just feel like okay, I've just wasted something like not only my time, but also for hearing this music. But as well I had to pay for this crap, so it might be a big demotivation eventually.

What obstacles do think could come up when using an alternative music streaming service?

Karolis: I think the biggest obstacle is always the switch itself. You know, when you are used to the platform, you already have set up that satisfies you. I think you always have your whatever playlist, favorite artist, and so on and so forth. For me personally, like, it's always the biggest obstacle to start something new when you have to sort of create your own profile, which fits you. So I think that would be the biggest for me, when you always have to switch to something.

Would it be an obstacle for you to buy a cryptocurrency prior using the service?

Karolis: Maybe it would. You know, like when I should buy before even seeing what you have, what artists you have. At which point I need to buy tokens - before entering the web page and being able to see what you have and how it looks or when you can see.

I think I would need to have a trial.

Definitely there would be a trial. And the concept is that you can create an account for free. You can also see all the artists you can browse, but in order to listen to tracks you only have like 20 seconds for free version. When you have subscription or tokens, then you can listen freely and you can reach the artists, you can contact comment.

Karolis: Yeah, so then this wouldn't be an issue to buy tokens. If it would be like using a credit card, debit card.

Would it be easy for you to get familiar with how to set up a digital wallet?

Karolis: I think so it wouldn't be an issue.

How important is if someone from your friends or family recommends you to join such platform?

Karolis: Again it depends what kind of the friends referring. My friends from the music circle, then of course it is very interesting. And if it is from my dad, then no. So in totally it depends on how I'm perceiving that person in music section. I have very good friends, but I know they have a super bad taste in music.

And if a streaming platform provides a transparent history of your own transactions of payments, or maybe your tips for artists, how would you evaluate that?

Karolis: Yeah, I think it's fine, though to be honest, like, BandCamp has kinda similar thing that if you buy a track, for example, it can be in your profile, what you bought. I'm keeping that as a private one. I don't know why. But sometimes you can even find some really big names, who has a sort of open profile, and you basically can see the tracks he's buying. And I think in that

way he's showing some support to the artists he's buying music from, by making them more visible maybe. But i keep that profile as a personal one. Maybe I'm not a big fan of showing off, you know, every single track I played, for example.

And have you had experience with any case where transactions were involved, that you were lacking transparency? Like, transparency of where did your money go exactly?

Karolis: if you're buying records, so tracks from the webpage, you never see what's their margin or something like that. You basically just paying them and you have no clue what you are actually paying for the artists. But it's like in a regular business as well, you never know how much we actually paid for something they are reselling you. So, yeah, I think it's a lack of transparency everywhere.

Have you thought about it that you feeling maybe insecure or something is unfair, or you're just taking as it is?

Karolis: I think most of the times, it was taking as it is because you can't do nothing about it. Again talking about the Bandcamp, I'm using it mostly to buy mp3, and there you always see a track, like a price for a track or an album. But when you press Buy now, eventually, you have to pay a fee for Bandcamp itself. So they are sort of saying that all the money you agreed to pay before, goes to the artists or the label, and we're just charging you extra which is going straight to us.

What's factors with the new streaming service need to have that you consider switching to it?

Karolis: I think I've mentioned it in another answers, right? My biggest concern was, what they can offer music wise for me, artists database and music database. And the platform usability might work.

So, what factors are important for you to have in a streaming service? That would cover the same question?

Karolis: Yes. Yeah, it's the same, what can you offer? Music wise, which is interesting for me. If we're talking about something new as a streaming platform, then I would begin with that, what can they offer specifically for me, if I can find everything I want.

What are other factors? You mentioned first content, anything else?

Karolis: Then you would go to pricing, availability, can I use it via the phone, as a streaming. Or can I download it to the computer. Do I need to be online all the time? Or can I do that offline?

And what features would keep you away from joining a new streaming platform?

Karolis: If it would be similar to anything I'm using right now. As I mentioned, switching to something new for me was always no go if they cannot offer something very specific, which would imply to what I'm looking for. If it would be the same as Spotify and even \$1 cheaper, I wouldn't switch the whole profile. Because it takes time and I'm thinking I'm just used to something I'm using now.

– The recordings of the conducted interviews are available upon request –

Appendix N - Overview of the categories and the obtained factors

Variable	Factor	Definition	Example	Total Sum 1	Total Sum 0	Proband				
						P	B	T	M	K
Attitudes towards using BBDMS	Copyright management	BBDMS are perceived to enable artists to manage their product and have more control over copyright	Michal: "It just offers more freedom to artists and more opportunities and like to control their own," change their own services online, what they want to show, and what would they want to share	3	0	1	1	/	1	/
	Anonymity	BBDMS are perceived to enable consumers to stay anonymous and keep actions private	Peter: "I want to have the possibility to stay anonymous. To have all the music I am listening to not made public or to another middleman, advertising company or whatever"	2	0	1	/	/	/	1
	Democratization & Ethics	BBDMS are perceived to empower smaller artists and bring more fairness to the industry	Temur: "Well, for the artists it is better because they get better share of the revenue."	4	0	1	1	1	1	/
	Transparency	BBDMS are perceived to be more transparent than conventional services	Temur: "The advantage would be transparency. That I can see where is the money I'm paying, where is it going? That's very important."	3	0	1	/	1	1	/
	Direct Connection	BBDMS are perceived to facilitate direct support from consumers to artists (through e.g. tipping)	Michal: "it gives opportunity to the fans to support artists directly"	3	0	/	1	1	1	/
	Additional Functionality	The BBDMS needs to have additional functionality over conventional services	Peter: "It has to have the functionality of current streaming platforms. It has to have additional functionality."	3	1	1	1	/	1	0
	Price	A cheaper price is perceived as an incentive to use a BC-based digital music service	Bastian: "Let's say a blockchain based Soundcloud or Spotify in the end would only cost me three Euros per month. This would be something. Price really matters. This would be something super huge"	4	1	0	1	1	1	1
	Consumer Benefit	BBDMS are perceived to have no clear benefits for consumers over conventional services	Bastian: "There is nothing that I would say the consumer would benefit from"	3	0	1	1	/	1	/
Perceived Usefulness	Pay per play	A pay per play model is not perceived as valuable alternative to a subscription-based model.	Basti: "I think in the end, I when you have a monthly based tariff, it always works out better for everyone."	4	1	1	1	1	0	1
	Speed	The speed of BCT can have a useful impact on the bc-based digital music service	Peter: "another positive thing with blockchain is that it's really fast."	2	0	1	/	/	/	1
Perceived Ease of Use	Technology involvement	The inclusion of BCT related functions such as creating a wallet are easy to handle	Bastian: "Yes, it was pretty straight forward. You can do it in maybe 10 minutes."	5	0	1	1	1	1	1
Subjective Norm	Influence	The social environment has no influence on the decision whether to use or not use a BC-based digital music service	Temur: "I don't care what my friend is using for his music streaming app. And he doesn't care about what I'm using."	4	1	1	1	1	1	0
	Opinion	My social environment has no opinion about BC-based digital music services	Michal: "I just don't have anyone who would tell me anything like stop using traditional streaming services or start using a different one."	5	0	1	1	1	1	1
Perceived Behavioral Control	User Interface	A good user experience (e.g. good UI) helps to get used to a new service quicker	Peter: "you have to have a user interface which blocks out the technology"	3	0	1	/	1	1	/
	Content	The BBDMS needs to have at least the same amount of songs	Peter: "You need all the artists the consumer is interested in. All the artists I want to listen to. And if not, I am very fast changing to another platform."	4	0	1	1	1	/	1
	Accessibility (device) & Experience	The BBDMS is available on several devices (phone, laptop, tablet), can be used online and offline.	Karolis: "can I use it via the phone, as a streaming. Or can I download it to the computer. Do I need to be online all the time? Or can I do that offline?"	4	0	/	1	1	1	1
	Convenience	The ability to exchange or transfer your profile (e.g. playlists) from old to the new service	Michal: "being able to exchange playlist"	4	0	1	/	1	1	1
	Volatility	Price differences in the service due to volatility of tokens are a problem	Peter: "So one thing about cryptocurrencies is that they are very volatile. So this is one problem obviously."	2	0	1	/	/	1	/

Note. Coding meanings: 1 = agree; 0 = disagree; / = not applicable