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Value Propositions in the Cryptocurrency Ecosystem: A Stakeholder Analysis

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Abstract

With the emergence of the blockchain technology and Bitcoin, much attention has been placed on the development of the industry. Considerable hype has been placed around potential applications of blockchain solutions as well as the volatility of cryptocurrencies. With the industry entering a new growth stage, several challenges arise as well. These stem from a yet unclear regulatory framework, from undefined ecosystem members and the difficulty to outline value propositions. We find that these conditions inhibit its widespread adoption and the definition of clear value propositions.

Within this thesis, we address these conditions and adopt the perspective of one of the new actors in this ecosystem, the cryptocurrency exchanges. Through in-depth interviews with industry stakeholders and based on the review of prevalent literature, we identify the actors in this industry and categorize them in accordance with Savage et al. (1991) matrix. We find four different types of stakeholders and highlight the role they play with respect to the democratization of the technology.

Through a stakeholder map we showcase three different consequences of the current composition and highlight their impact on the creation of a value proposition.

The value proposition theory leads us to the inclusion of the network perspective. We find that banks, while likely to enter the industry themselves, are unlikely to support exchanges in their development. An emphasis is placed on the regulatory positions, which we identify as ambivalent. Their support to cryptocurrencies is crucial, which is why we argue for three different approaches cryptocurrency exchanges can take to develop conditions in their favor. We find that any proposition will need to account for stakeholder positions in the network and that it requires trust, need and transparency.

In short, we observe advances that enable the democratization of the technology and the development of value propositions, which are in turn subject to the conditions created within the industry.

1 Introduction

1.1 Historical Background

Exchanges have been around for the last couple of centuries and have been trading largely in securities and commodities. They have seen slow albeit steady change with the introduction of futures and other financial instruments for instance. Other changes also include the continuous introduction of regulations. With the advent of the computer and subsequent digitalization, the pace of change has increased and so has the regulatory scrutiny on those activities. That is because with the sheer size of some of the exchanges, the impact on a national economy can be, for better or worse, significant.

With the introduction of blockchain technology and cryptocurrencies, new potential financial instruments and exchanges have been introduced, which also raise concerns from a regulatory perspective. The lack of a regulatory framework and structure for cryptocurrency exchanges encourages an explorative approach with respect to services and compliance.

Today, there are hundreds of these exchanges and following multiple high-profile breaches and losses, they are increasingly facing stakeholder scrutiny, - raising questions as to how the exchange can continue to operate in the future.

1.2 Research Motivation and Question

In our examination of this topic we found that, despite the availability of the technology for several years, very little research has been conducted specifically targeting blockchain based exchange platforms. There appears to be no best practices or code of conduct that a platform provider could follow when developing their selling propositions.

With the accusation of tax evasion and money laundering, increasingly we observe a rise of regulatory involvement in the activities of the either directly related entities like exchange platforms or via proxy with respect to the services offered. In addition, through an analysis of current actors in the industry, we find that gradually services and propositions receive more attention. The industry is looking into perspectives

for legitimization and to that regard we asked ourselves the following research question:

How can cryptocurrency exchanges develop a value proposition that would allow their democratization?

In order to answer that question, we need to understand what would constitute a value proposition and which dependents it would have. We investigate relevant stakeholders within the domain and evaluate to what extent their needs would need to be met to allow for the formulation of a value proposition that could increase adoptions. Within a stakeholder analysis, we set out to explore who the relevant actors are and to what extent value co-creation with respect to the value proposition can align different stakeholder needs and requirements.

1.3 Thesis Structure

We commence our thesis with a literature review, including an appraisal of the concept of value propositions, stakeholder- and network theory, and the definition of platforms. With the literature review, we frame the scope of our analysis and apply it in the subsequent section with the examination of the cryptocurrency ecosystem. We identify relevant stakeholders and highlight conditions. Then, we continue with an outline of our research design followed by the presentation of our empirical findings. We examine our findings in our empirical analysis and lastly, conclude and summarize our findings.

2 Literature Review

2.1 Value Propositions

Actors in cryptocurrency ecosystem face changing conditions. Outlining the historical development, we find that the concept has seen significant progress since inception. Research on value propositions commenced with a concept of propositions with an application in advertising. Hopkins (1923) noted that advertising plays a key role in developing a proposition. The latter in turn builds

user commitment to a brand. From the roots in advertising, the concept was further developed into the unique selling proposition (USP) (Reeves, 1961). A USP comprises a unique advantage to consumers that cannot be provided by a competitor. The emphasis here is on rational decision making, which is a necessary substance to convince clients of a unique product quality. The origins in rational behavior stem from the concept of basic selling propositions (Ogilvy, 1947) and were eventually further developed into factors that would differentiate one product from another (Reeves, 1961).

A less rational, and not fully defined, approach was explored in form of the emotional selling proposition (ESP). Sellers attempt to appeal to clients, as the name suggest, on an emotive level. The purpose in this case is to build a given brand or organization around some form of sentiment.

Building on both rational decision-making and emotional elements, Urban and Houser (1980) introduced the core benefit proposition. They argue that this proposition allows for the development of a statement that reflects the product promises in physical form. The core benefits in this case should define key promotion elements and should convince consumers on benefits of the product provided.

These three approaches would later build the foundations of the concept of the customer value proposition (CVP). The CVP describes why a customer should buy a firm's goods or services (Lanning, 1998). In this report and together with Michaels & Lanning (1988), we argue that a value proposition should include a statement of benefits, but also on total costs. They elaborate, along with Ballantyne et al. (2011) and focus on the stages of the development of a value proposition, - from initial choice and value provision to communication. This shifts the focus of the CVP to one that concerns the experience that the product or service can deliver. The combination of these experiences, including the price, are what make the customer pick one alternative over another (Smith & Wheeler, 2002).

Flint and Mentzer (2006) further argue that value propositions require reciprocal conditions on usage situations and end goals. The argument is that services and

product propositions must be appraised from the client's perspective. The perceived value that the customer derives from a service or product is the service that the customer receives, - and ideally is also the one proposed (Skalen et al, 2015).

The emphasis on these customer-supplier relationships neglects the relevance of stakeholders that can influence both the value proposed and the value received. Mish and Scammon (2010) therefore argue that a broad range of stakeholders should be considered when creating a value proposition. Specifically, according to Emerson (2003), this includes stakeholders that are concerned on a social, environmental and ethical level. In defining the scope of relevant stakeholders, the authors attempt to be exhaustive. We follow that logic, and in order to identify which stakeholders are relevant for the value proposition, we consider the theory behind it next.

2.2 Stakeholder Theory - How are they defined

There are many ways by which a stakeholder can be identified and no consensus as to what that term means (Miles, 2012). The identification of them depends on the definition of a stakeholder. Significant research has been conducted into defining that group and that research has resulted in a broad and a narrow definition. An early broad definition defines them as entities in addition to stockholders, that do not hold any ownership (Jones, 1980). The author states multiple questions that should be answered in order to define these stakeholders. These questions allow a broad definition and they generally vary by scope, relevance, inclusiveness and narrowness. Building on that, Freeman (1984) argues that stakeholders can be any entity, individual or group, that can be affected by a focal organization's activities. Holding a stake as per definition, would be those who have something to lose or to gain from the activities of a company (Clarkson, 1998).

Freeman (1994) goes on to define who and what matters with respect to stakeholders and that corporations are enabled and managed with the interest of its employees, customers and communities in mind. The author considers the interactions to be independent within a dyadic relationship. Contributing to this perspective, Mitchell et al. (1997) defined the salience framework. It allows the classification of the stakeholders by their urgency claim to a focal firm, legitimacy of their relationship

to the firm, and their power to influence it. To identify who counts Mitchell et al. (1997) propose a normative approach, in that stakeholders are within scope if they hold an inherent value through a legitimate stake to the focal entity's activities. A bank customer for instance would have an interest in the activities of a bank, if that customer holds a bank account with them. This normative view is in line with Donaldson and Preston (1995) who categorize them with respect to their normative validity, descriptive accuracy and instrumental power.

That view however only considers stakeholders who hold an economic stake and have contractual relationships (Hill and Jones, 1992). It likely neglects stakeholders from a broader range of affiliations with respect to societal and demographic aspects for instance (Crane & Ruebottom, 2011).

Accounting for that broader definition, our arguments follow Buchholz & Rosenthal (1999) who claim that corporations and stakeholders should aim for a harmonious relation, in which the parties should aim to nurture and enrich their relations. This can be achieved by internalizing the perspective of other stakeholders, and would enable continued growth.

We regard a combination of interpretations as the most applicable to identify those relevant stakeholders for our analysis. The stakeholder analysis therefore goes beyond the pure economic-relevance perspective to also include actors that have no monetary stake. This includes banks, government entities and other regulatory bodies. It can include factors like the environmental sustainability orientation, which according to Danso et al. (2019) is a key mediator between financial performance and stakeholder integration. It also suggests that a stakeholder analysis should be made from a focal entity's perspective, which in turn reveals the proximity and stance of stakeholder entities. This goes along with Savage et al. (1991) stakeholder analysis, within which the authors classify competitors by threats and potential collaborations. We extend the application of this perspective to all relevant stakeholders and build a framework around the four types of entities: the supportive-, the marginal-, the non-supportive-, and the mixed blessing stakeholder.

Actively managing and influencing the stakeholders can increase the success of a project (Eskerod & Larsen, 2017). The authors argue that a project should not be viewed in isolation and should instead be viewed in the greater network of actors. This includes the consideration of their origins, their expected future and relationships. A specific objective according to the stakeholder theory suggests that organizations also aim to address reputational risks by partnering with significant stakeholders (Laplume, Sonpar, & Litz, 2008); Freeman, 1984). In order to identify what entities would then be considered, we apply the network theory perspective.

2.3 Network Theory

As outlined, we commence our approach from the perspective of a focal entity, - the cryptocurrency exchange. A network is defined as "a set of actors that are connected by a set of ties" (Borgatti & Foster, 2003). The actors represented by "nodes" can be individuals, concepts, teams or organizations. In the case of a cryptocurrency exchange, the platform connects two specific groups: the cryptocurrency investors and the cryptocurrency developers making this a two-sided market business model (Eisenmann, Parker, & Van Alstyne, 2006). It creates the core for any network of related entities.

This observation illustrates aspects of strategic networks: tie modality – norms and established understandings – form network structures that play important roles in the construction of relationships in a cryptocurrency exchange (Gulati, Nohria, & Zaheer, 2000). In this ecosystem many potential actors would likely build these relationships on a common platform, - similar to how regular financial exchanges are a gathering platform for different entities.

2.3.1 Network Effects and Platforms

The first advantage of a platform is through its network effects (Parker, Van Alstyne, & Choudary, 2016). Network effects have direct implications for the value that is created for each user. Some examples can be cost efficiency, more specifically, economies of scale. The cycle of demand growth contributing to economies of scale starts with the efficiency of the social network created. Developers will improve the

platform as the number of participants increases, making it more and more valuable to its users, contributing to a bigger network development.

There are four types of network effects. Relevant specifically to cryptocurrency exchanges are positive same-side effects. They regard an impact created by the users from one side of the market that will affect users from the same side of the market: as the number of investors increases, the value of the cryptocurrency increases. Relevant are also positive cross-side effects. As the number of investors increases, the credibility of cryptocurrencies grows, and the revenues generated by the latter increases. These cross-side effects can therefore also have an avalanche-like outcome.

2.4 Definition of Platforms

Cryptocurrency exchanges make use of platforms. These in turn would be digital and have likely seen many developments since their inception. Digital platforms have revolutionized the way customers interact with businesses (de Reuver, Sørensen, & Basole, 2018). They are defined as "technical elements of software and hardware and associated organizational processes and standards" (Tilson, Sørensen, & Lyytinen, 2012). In other words, these platforms have their unique characteristics originating from their digital nature, differentiating them from traditional platforms that were limited to mediating functions, - only contributing to coordinate information and tasks. Their nature provides an evolution from regular platforms. It enables real time synchronization of data, editability and distribution across the network (Yoo, Henfridsson, & Lyytinen, 2010). The consequence of this is that no single entity or organization can claim total ownership of the platform core.

The building blocks of blockchain technology are cryptography, ledgers, networks, consensus and incentives. These elements, which we will explain in section 3.1, provide similar properties to digital platforms. A cryptocurrency exchange can therefore be defined as a digital platform. It incorporates the idea of consensus through coordinated decision-making, where the ledgers would represent the data, where the network is created through the participants and in which incentives encourage socio-technical systems. In the case at hand, it would be the trading

mechanism. The cryptography, forming the backbone and securing the system, would correspond to the innovation of this new system.

2.4.1 Platforms as Networks

A platform intermediates different groups of users, such as buyers and sellers, as a multisided stage (Boudreau & Hagiu, 2009). With two-sided markets connecting two different groups in a relationship, value creation increases as both groups increase their respective number of participants (Evans, 2003).

As platforms bring together multiple user groups, they create the so-called network effects or network externalities. Network externalities imply that a technology's usefulness increases as its installed base of users grows (Katz & Shapiro, 1985). Increasing adoption levels can trigger positive feedback cycles that further increase the usefulness of the technology (Arthur, 1989).

3 Examination & Outlook – Blockchain Ecosystem

3.1 Blockchain Technology and Cryptocurrencies

Blockchain is known as the technology behind cryptocurrency. "A blockchain is a distributed ledger that records and secures data in a peer-to-peer network" (Chen, 2018). It is data stored in a ledger. Each block contains the data, a hash (which accounts for the identification and the uniqueness of the block, just like a signature), a timestamp and the hash of a previous block. This forms a chain of connected blocks that secures data and makes them traceable. An important attribute are also its distributed databases. They imply that there are copies of the data stored in the ledger that are transferred to every participant in a specific network. Every copy of the database is updated when a transaction occurs.

It contains a permanent incorruptible record of all transactions and effectively makes entities like clearing houses and escrows redundant (Mougayar & Buterin, 2016). This entails significant implications for the market infrastructure in terms of regulatory requirements and the change of roles of intermediary parties (Surujnath, 2017).

In our case, we are tackling a computer network: digital telecommunications networks that enable computers to transfer and share resources and information.

Most cryptocurrency networks are peer-to-peer: there is no central server, clients are connected to one or more peers, adding information to the ledger.

Ledgers are a collection of data - all participants within a ledger have an account from which they can receive credits or debits. Within that cryptography is the art and science of keeping information secure from people that are not part of the network. It enables a comparatively fixed money supply, enabling cryptocurrencies to grow at regular intervals through mining. Consensus is what a transaction needs for the new block to be formed and validated. While not necessarily true for all cryptocurrencies, about 50% of the network are required to validate the transaction for it to be valid.

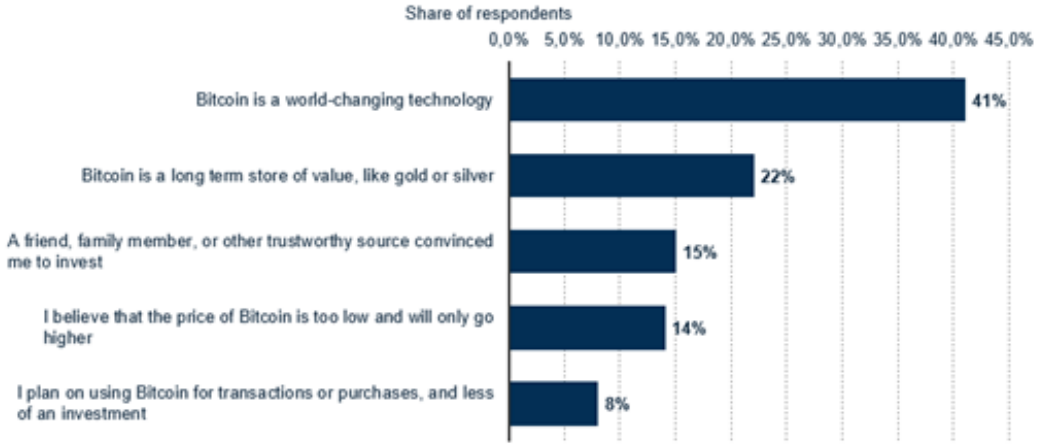
3.2 Cryptocurrency exchange definition

Considering the recent literature on platforms and networks, we can define a cryptocurrency exchange as an online digital platform that in their primary function´, connect cryptocurrency investors and developers, - as per the two-sided market view. More precisely, they provide spaces of exchanges where users can trade cryptocurrencies for other cryptocurrency or for fiat money, - similar to a regular stock - or currency exchange (DeMichele, 2019).

3.3 Prospects in cryptocurrency exchanges

The potential of Bitcoin and other cryptocurrencies stems from the innovative technology Blockchain has introduced. As the survey below underlines, most people willing to invest in Bitcoin regard it as a gamechanger and disruptive enough to shape different industries in the future. Other reasons for motivation of investment concern long-term value or mimetic behavior.

Graph 1 What motivates consumers to invest in Bitcoin?



Source: Statista

3.3.1 Reception of New Payment Systems

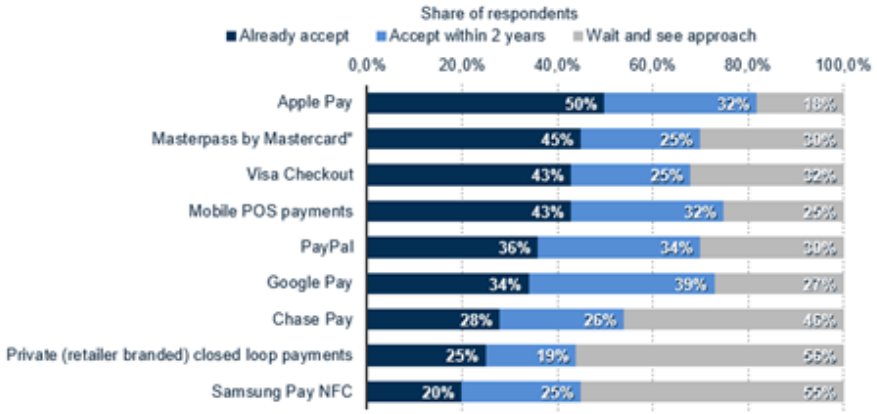
The standardization of a disruptive technology passes through different phases. The challenge lies in finding customers for new applications.

This challenge is significant and includes the fact that the new technology is competing against non-consumption. That is because people do not know or do not recognize their need for the service. Creating demand is therefore essential (Christensen & Raynor, 2003). For the need to be created for cryptocurrency payments, there are two conditions that must be met: user- and vendor acceptance (Devries, 2016).

Concerning vendor acceptance, we considered the survey shown in Graph 2. It shows a study of 500 retailers in North America concerning their position on digital payment system. Less than half of them accept Visa as a method of payment. There are also several payment systems competing for adoption by these vendors, highlighting potential competitors of cryptocurrency payment methods. In addition, large enterprises like Amazon and Starbucks have entered the payment service field as well. Amazon's subsidiary Whole Foods for instance will start to accept Bitcoin payments as well as three other cryptocurrencies. These are done through

collaborations with Flexa, a payment startup, and Gemini, a digital currency company (Nji, 2019).

Graph 2 Digital payment methods that North American Retailers accept or plan to accept as of December 2018

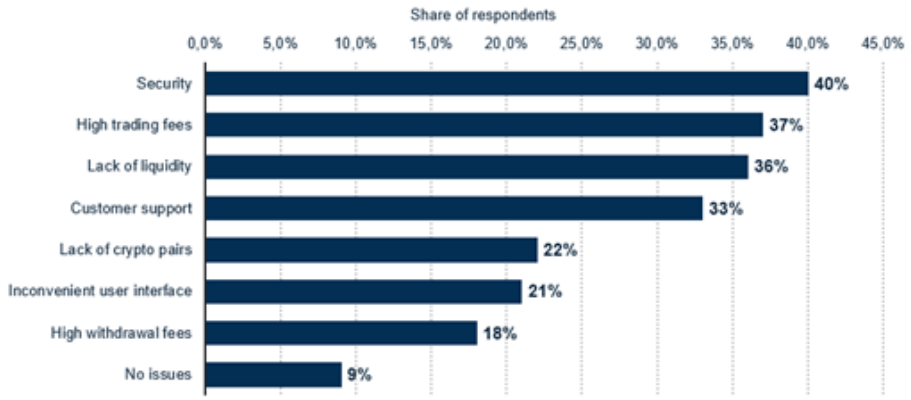


Source: Statista

3.3.2. Adoption Challenges

The challenges in standardizing cryptocurrency stems from the theorized hype cycle of Blockchain. Due to the novelty of the innovation, people do not understand how it works at first. Going beyond the basic issue of awareness, our focus will be on more tangible adoption challenges. From current cryptocurrency traders' perspective, the main concerns, in order of importance, for existing exchanges are security, high trading fees, a lack of liquidity and customer support. If cryptocurrency exchanges wish to attract customers, they would have to invest in security measures first.

Graph 3 Survey on the biggest problems that cryptocurrency traders see in currently available exchanges



Source: Statista

Miners, on the other hand, have a different perspective on the threats of the current cryptocurrency ecosystem. According to a survey in 2018, this includes the centralization of control and location as well as state-sponsored attacks to crypto asset systems. This would shape the way cryptocurrency will be institutionalized. Centralization would occur with respect to hashing power.

"Hashing power is the power that your computer or hardware uses to run and solve different hashing algorithms. These algorithms are used for generating new cryptocurrencies and allowing transactions between them. This process is also called mining." (NiceHash, 2019)

This effectively opposes the central objective of decentralization by cryptocurrencies, as transactions will only be concentrated within a restricted network.

Graph 4 Survey on challenges affecting cryptocurrencies worldwide in 2018

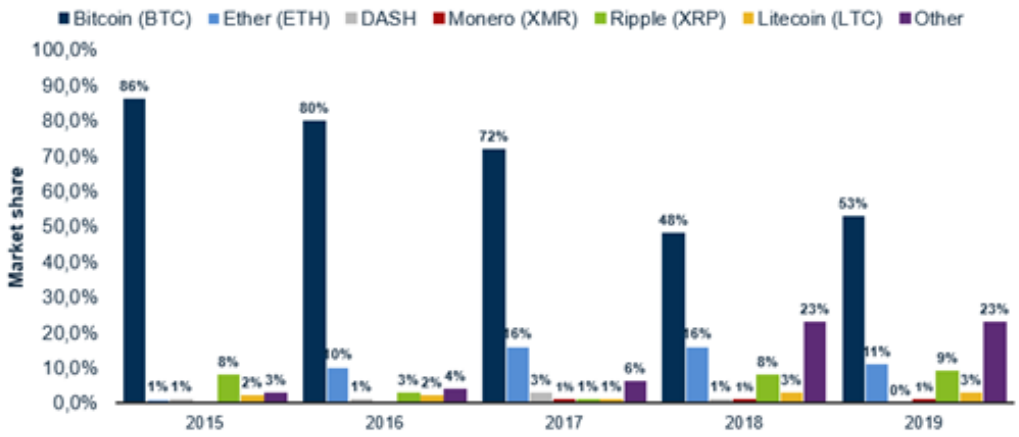
Source: Statista

3.4 Market Overview

The total market capitalization for cryptocurrency as of April 2018 is $277bn. The cryptocurrencies' inherent volatility means that this capitalization can change significantly even on a day to day basis. Bitcoin is the most significant cryptocurrency representing about 57% of the total actual market capitalization.

Other major cryptocurrencies include Ethereum, XRP Ripple and EOS. There are 2186 different of cryptocurrency as of May 2019.

Graph 5 Distribution of leading cryptocurrencies my market capitalization



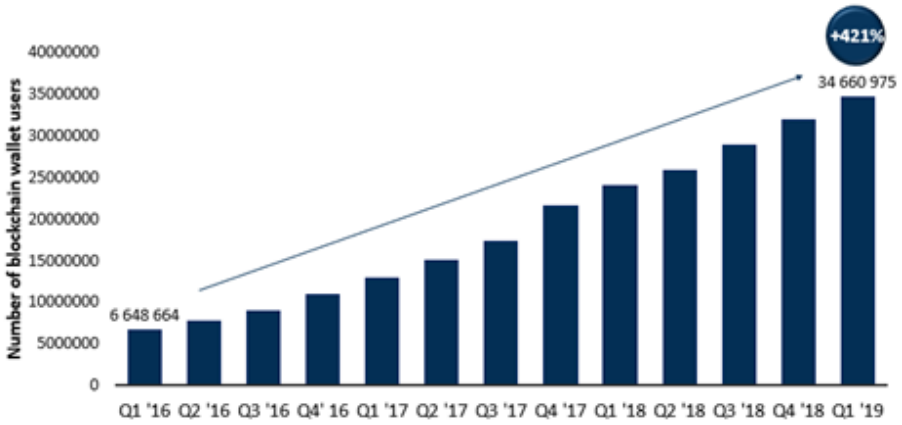
Source: Statista

On the graph above, we can see the evolution of leading cryptocurrencies' distribution in the last three years. Though Bitcoin has skyrocketed in value in comparison to other cryptocurrencies earlier in 2015, the gaps are slowly narrowing in 2018. This suggests a market normalization trend in which volatility spikes become a less frequent occurrence.

There are currently more than 500 exchanges and CoinMarketCap lists 260 on their watchlist. Next to global exchanges, there are regional exchanges that primarily serve local customers.

Regarding the number of cryptocurrency users worldwide, we investigate the number of wallet users. An increase of +421% can be seen from 2016, at a time when Bitcoin was worth well below $1000 at 6,6 million users to currently around 34,6 million wallet users with Bitcoin worth around 9000$.

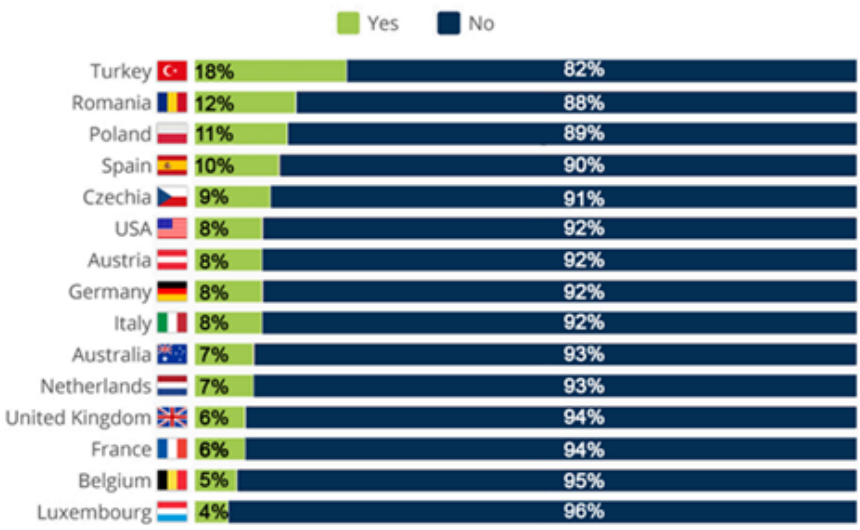
Graph 6 Number of Blockchain wallet users worldwide from 2016-2019



Source: Statista

The distribution by countries of the cryptocurrency user population can be tracked as well. Prime locations are Turkey, Romania and Poland with 18%, 12% and 11% respectively of the population owning cryptocurrencies (Joseph, 2019). The high number of owners in Turkey may be explained by the national currency's significant devaluation and the populations endeavor to invest in alternative instruments (Butler & Kucukgocmen, 2018).

Graph 7 Survey on cryptocurrency ownership in selected countries

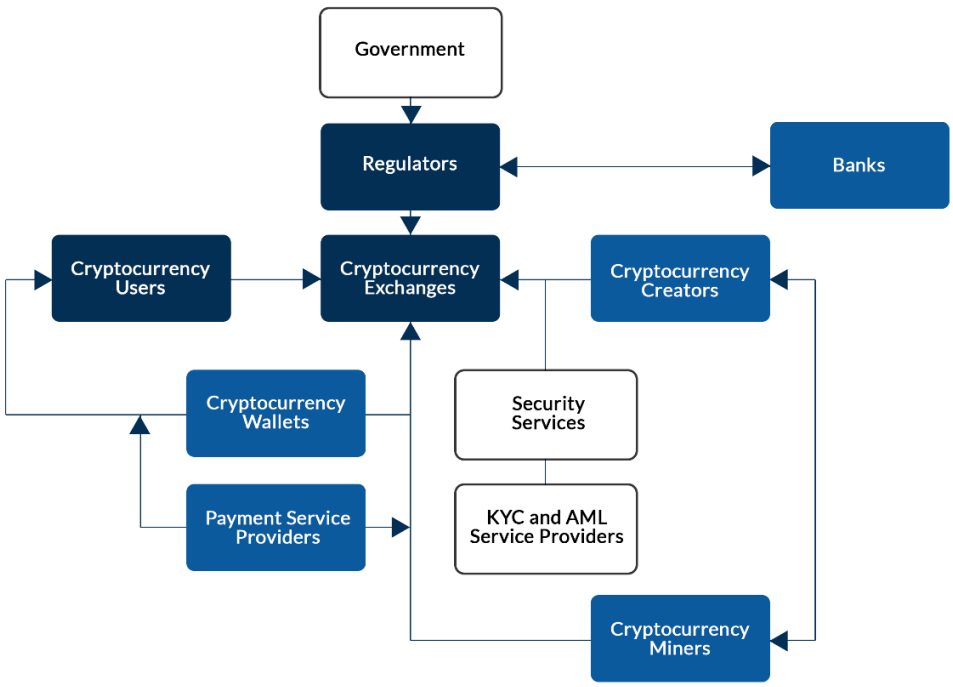


Source: Statista

3.5 Stakeholder Overview & Map

As outlined in the literature review, we follow the normative perspective of the stakeholder identification. We assume that stakeholders have an inherent value in that they hold a legitimate stake in the activity of an exchange platform. With that in mind, we attempt, with respect to the stakeholders to be considered in scope, to be as comprehensive as possible. At the same time, we are aware that we must apply limitations, as per stakeholder definition. Therefore, we consider stakeholders that directly or indirectly hold an economic or financial stake within the scope of the services offered. Further, we also consider entities that mediate or moderate that economic or financial relationship or would directly be affected by the activities of the actors. Our list corresponds to and is grounded on the Global Cryptocurrency Benchmark Study by Dr Garrick Hileman and Michel Rauchs (2017) (Donaldson & Preston, 1995). On the following pages, we will first provide a quick overview of actors and then describe some of the key actors in the ecosystem.

Figure 1 Stakeholder Map in the Cryptocurrency Ecosystem



Source: Team Analysis

With the cryptocurrency exchange at the center, we can observe which entities are of relevance from their perspective. The arrows in the above figure 1 indicate dependencies and direct relations. Mapping out the stakeholders, the categorization of them is from most to least relevant, following the color scheme from dark to bright. Based on that, we consider the most elemental stakeholders below.

3.5.1 The Exchange Platform

Considered the focal entity, it is the primary stakeholder within the network of actors. It is from the exchange platforms perspective that will be our point of reference when we draw action requirements.

The exchange platform engages in and enables the trading, purchase and sale of cryptocurrencies and fiat currencies. It therefore can set a reference price and offers liquidity. They are one of the first products of the cryptocurrency market and only a small number of exchanges, most of which are in Europe, dominate global cryptocurrency trade volumes. The most popular supported national currencies are, in order, the US Dollar, the Euro and the British Pound. There are significant differences between small and large exchanges with respect to their service focus, objectives and security measures. Generally, their services cover three categories, including order-book exchange services, brokerage services and asset trading.

Order-book exchange

A platform that would allow automated matching between buying and selling order made by users

Brokerage Service

A service that allows the sale and acquisition of cryptocurrencies at a given price.

Trading Platform

A platform that offers an interface accessed by multiple exchanges on which users can make use of numerous financial instruments, including derivatives and leveraged trades.

Table 1 Cryptocurrency Exchange Ranking by Daily Trade Volume

Name	Trade Volume (24h)	Coins	Bitcoin Price
Binance	$ 1,530,323,535.48	144	$ 9,429.73
BW	$ 1,338,875,124.86	44	$ 9,373.00
DigiFinex	$ 1,290,754,478.75	73	$ 9,387.59
OKEx	$ 1,263,975,282.91	145	$ 9,447.70
CoinBene	$ 1,181,925,232.50	97	$ 9,446.84

Source: CoinMarketCap

These services allow the trading of cryptocurrencies across platforms, in between users and with derivative assets. A small selection of major exchanges can be observed in Table 1. The bitcoin cryptocurrency is listed on all identified exchanges and we observe that quotations for it have noteworthy variations. This hints at little collaboration between the exchanges and the lack of a central entity that would provide pricing guidance. Most exchanges offer custodian services, - with only about 23% of funds actually held by user keys.

3.5.1.1 Small Exchanges

Small exchanges primarily service their national markets and are characterized by their focus on one or two of the services at most, which in most cases are brokerage services. They limit the number of listed cryptocurrencies to either bitcoin only or one additional cryptocurrency. 52% of small exchanges also hold some form of government license.

With respect to security, they tend to spend more proportionally to larger exchanges and about 69% of them contract external security providers, like multi-signature wallet service providers and code reviewers. This goes along with small exchanges rating security breaches as the largest risk factor. Other important operational risk factors according to them are deteriorating banking relationships and fraud. With respect to internal security measures however, small exchanges use fewer security measures like cold storage funds and physical on-site security measures. In addition, of those exchanges that offer custodial services only 53% have a policy outlining a procedure in a case of a breach and loss of customer keys. This may in part be due to higher capital requirements that cannot be met by smaller exchanges (Hileman & Rauchs, 2017).

CoinCorner

This cryptocurrency exchange would be part of the small exchanges. Its goal is to provide an easy minimum effort solution to trade cryptocurrencies on a trustworthy platform. The exchange only trades in the major cryptocurrencies Bitcoin, Ethereum, Litecoin and Ripple. It has a daily trading volume of about $187 K. The company is registered on the Isle of Man and primarily serves UK customers. They offer wallet services and brokerage services and market themselves as a trustworthy alternative to foreign cryptocurrency exchanges. Trust generators are mentions in major media outlets by proxy of their reputation. CoinCorner also claims compliance to anti-money laundering and know-your-client standards defined by the Isle of Man Financial Service Authority. This includes the requirements for users to upload official documentation before an account is unlocked. CoinCorner does not take responsibility for the loss of cryptocurrencies in case of breaches. It would favor to preserve the regulatory burden at a minimum (Ross, 2019).

Coinut

Another example of a small exchange would be Coinut. It aims to offer a secure cryptocurrency exchange platform that is faster and easier to use than alternatives. The exchange proposes trades in major cryptocurrencies, including Bitcoin, Ethereum and Litecoin. The company is registered and based in Singapore and Canada and primarily serves users in those two countries. They offer wallet services with offline storage, semi-manual transaction processing and order-book services. Coinut is compliant with the Money Authority of Singapore's anti-money laundering and due diligence requirements. The company does not state any procedure in case of breaches and a potential subsequent loss of cryptocurrencies (Coinut, 2019).

3.5.1.2 Large Exchanges

Larger exchanges account for almost the entire global total trade volume of cryptocurrencies. The major actors among them are Binance, OKEx and DOBI and

they can focus on more activities and can cover two or more services. They pose regulations as the highest risk factor and potential business risk. This suggests that larger exchanges are less flexible to adapt to changes and that they would prefer a predictable regulatory framework. They consider the second and third most significant threats to be potential security breaches and the enforcement of anti-money laundering and know-your-client measures (KYC).

They apply factor authentications, and to a large extent use cold storage and physical site security. Of those exchanges that have custodial services, 78% have a written policy as to what happens in the case of a breach and loss of cryptocurrencies (Hileman & Rauchs, 2017).

BitMEX

BitMEX, one such large exchange, aims to offer a wide range of financial services like regular exchanges. With a daily trading volume of about $2,61 billion in Bitcoin alone, it is the largest cryptocurrency exchange platform in the world. They are based in Hong Kong and offer their services in multiple languages and regions. Their services cover a wide range in addition to the three major services, including futures trading.

In terms of security, they check every single withdrawal manually and apply cold storage solutions for all wallets. For system security they rely on external service providers like Amazon Web Services (AWS) and they halt operations for the entire platform in case of irregularities (BitMEX, 2019).

OKEx

This exchange aspires to provide consumers with a wide range of services covering hundreds of different cryptocurrencies. It is based in Malta and has daily trades north of $1.5 billion. They offer all major cryptocurrencies, order-book services and futures trading options. The company uses their self-developed cold storage wallet “OKEx vault”. OKEx does not disclose any procedure in case of a breach and subsequent loss of tokens. They commit to anti-money laundering and know your client requirements as per the Malta Virtual Financial Asset Act. For security, they

rely on community reports and they reward any contributions with crypto tokens (OKEx, 2019).

3.5.2 Cryptocurrency Creators

Digital currencies are based on concepts of cryptography and blockchain. Often started by a single individual the different cryptocurrencies gather followings and continue to develop. The Litecoin by Charlie Lee for instance, is an adapted version of Satoshi Nakamura's Bitcoin. Further, Ethereum, albeit based on the same technological principles, does not follow the same digital currency code, but rather provides a platform for smart contracts and other coins. The differences in coins, make a single classification difficult, which is part of the reason why the regulatory situation remains obscured. These difficulties in cryptocurrency classification may also deter users from investing, - a point that we will address within the scope of this paper as well (WCO, 2018).

3.5.3 Traders/Users

With significant volatility of cryptocurrency assets there is also a high risk of gains and losses attached. Regular derivative banks and exchanges require evidence on user fluency in financial tools upfront and offer at least some level of investor protection. These protection measures are covered under the so called "Markets in Financial Instruments Directive II" (MiFID II) (Strategy, 2019). They generally concern reporting requirements, operations and compliance procedures, the safeguarding of client financial instruments, and perhaps most importantly client classification. The same level of scrutiny is not applied to cryptocurrency exchanges and most users have little to no knowledge in financial assets and general investor experience (ESMA, 2019). The main user groups are young male adults and are primarily students, people who work in sales and marketing roles or people who are unemployed (ETORO, 2018).

They represent one side of the two-sided market model within the dyadic relationship and are of prime concern with respect to our thesis. With respect to the services that exchange platforms offer, their interests are largely of a monetary

nature. With recent crypto exchange platform fallouts, security and transparency are likely factors as well.

3.5.4 Banks

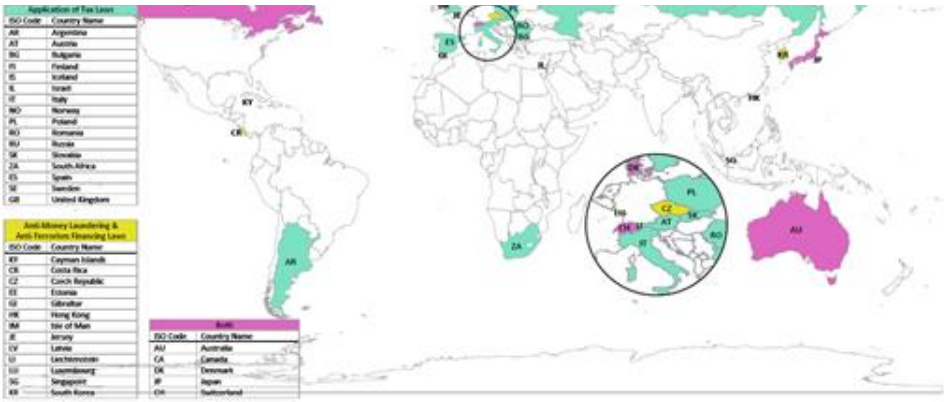
Banks are largely concerned with regulatory requirements and are therefore hesitant to engage with cryptocurrency exchanges. At most, crypto exchanges hold accounts with those banks. The banks strictly follow regulator guidance on how to treat cryptocurrencies and in some cases go beyond. Examples include Romanian banks responding to government discouragement of activities in cryptocurrencies by closing accounts of cryptocurrency exchanges. Another example is the blocking of cryptocurrency transfers by the Bank of Valletta, one of Malta's largest Banks, - despite general favorability of the Malta government (LLC, 2019).

The reluctance to cooperate with these exchanges may originate from the fact that exchange platforms offer services that overlap with bank activities, which are increasingly competing for the same clients. Legitimacy issues with respect to the exchanges likely come into play as well.

3.5.5 Regulators

Regulators come into play as cryptocurrencies grow increasingly relevant, raising compliance and user identification concerns. These two concerns precede the introduction of two types of regulation, one on tax laws and the other on anti-money laundering and anti-terrorism financing laws. A number of countries have introduced tax laws on cryptocurrencies, Norway and many other European countries included. However, many large economies have yet to introduce any specific regulatory measures. Anti-money laundering and anti-terrorism financing taxes have been introduced primarily by small tax-haven countries like the Cayman Islands, Liechtenstein and Luxembourg. So far only a handful of countries have introduced regulations for both, and those are Australia, Canada, Denmark, Japan and Switzerland (LLC, 2019). Several countries, primarily in the Middle East, have also introduced at least an implicit ban on cryptocurrencies.

Figure 2 Global Regulatory Progress Map



Source: Law Library of Congress

The approach the countries have taken this far shows a diverse tactic to the definitions of cryptocurrencies and the aforementioned compliance and user identification concerns. We observe a similar level of diversity in the actions of individual countries and supranational institutions. Within the next two subsections, we will go through the regulator role and some of the effects they can have. It continues with examples of how cryptocurrencies are defined and handled on a supranational- and national jurisdiction level.

3.5.5.1 Regulator Role Significance

The effect of the introduction of these regulations can be substantive. Previously, the Chinese renminbi RMB was the most popular national currency in use, until regulations were introduced by the Peoples bank of China, after which the use plummeted (Seth, 2019). The regulator thus can have a significant impact on the operations of an exchange. Currently, only about half of all exchanges hold a government license of some kind it, - it follows that larger exchanges consider regulators as posing the highest risk (Hileman & Rauchs, 2017).

The digital exchange platforms allow the trading of financial assets like regular exchanges. They are therefore in some jurisdictions expected to fall under the same regulatory scrutiny as regular exchanges when it comes to the acquisition of service licenses for instance. The European union enables digital exchange platforms with the introduction of the second payment service directive to acquire trading licenses

(ECB, 2018). They further propose to extend the Anti-Money laundering directive to cryptocurrency exchanges, which would then obligate them to report suspicious activities. With the cryptocurrencies' high volatility, they also issue warnings to potential investors. Most national regulators have not gone much further than that. The Norwegian Financial Supervisory Authority for instance has not recognized cryptocurrencies but does require the reporting under the Norwegian Income Tax Act. The German Federal Ministry of Finance does not consider crypto-currencies as actual currency and currently evaluates ICOs on a by case basis. Malta is perhaps the closest country to the introduction of a regulatory framework with the formulation of the Virtual Currency Bill and the decision to appoint the Malta Digital Innovation Authority as the regulator. The first Bitcoin operator that has received a license in the from the UK Financial Conduct Authority (FCA) Circle.

Why regulations may be necessary can be understood when considering the two following examples. They cover incidents in recent history, including the liquidation of MtGox, an exchange platform which stopped trading following the theft of a significant number of Bitcoins (De, 2019) and QuadrigaCX (McKay, 2019). The latter being an exchange platform whose CEO was the sole person in knowledge of the platform's wallet keys. He unexpectedly died and effectively made millions worth of cryptocurrencies inaccessible. Among others, these two incidents have raised the issue of an insufficient auditing process as well as custodian requirements.

The regulatory situation today can be described as rather exploratory. Most national governments issue investment warnings and have yet to determine the classification of cryptocurrencies. Current examples like the ones in China and Japan point to the significant role that regulators will play in shaping the cryptocurrency ecosystem.

3.5.5.2 Regulator Stakeholders

The European Union

The European Commission proposed a legislative amendment to the existing anti-money laundering directive to bring cryptocurrency exchange platforms and wallet

providers within the scope of existing legislation (EC, 2016). The proposal was adopted by the European Parliament and is currently in effect (Khang, 2018).

Efforts to explore potential applications of cryptocurrencies and blockchain include an action plan launched with the EU Blockchain Observatory and Forum. Beyond the extension of existing legislation, European authorities have issued investment warnings due to volatility issues and suggest separate regulations specifically targeting virtual currencies (Enria, 2016). That however remains notional, with no practical application of any new legislation and no clear definition of cryptocurrencies.

Malta

Definition of cryptocurrency:

The Virtual Currency Bill aims to create a regulatory framework for cryptocurrencies which are not covered within existing regulations. It establishes a framework for regulations and initial coin offerings (ICOs) aiming for transparency and regular initial public offering (IPO) conditions.

The state does not have any legislation specific to cryptocurrencies but aims with its research into potential regulatory measures, to explore conditions that would promote industry conditions (Martin, 2018). To that extent, Malta is drafting bills that would endorse the development of the industry and technology under the Malta Financial Service Authority (MFSA). The latter would have the power to regulate, investigate and suspend ICOs and trading of cryptocurrencies.

That includes the Malta Digital Innovation Authority Bill (MDIA Bill) with which the country aims to promote policies that would favor technical innovation, while simultaneously protecting consumers (Advantage, 2018). In addition, they drafted the Technology Arrangements and Service bill (TAS) that would provide certification for technological arrangements including cryptocurrency exchanges. With respect to compliance and anti-money laundering measures, Malta appointed CyberTrace to assist in anti-money laundering measures (Partz, 2019).

Hong Kong

Definition of Cryptocurrencies:

The city state considers the dealing of cryptocurrencies equivalent to securities trading. They categorize digital tokens as virtual commodities. As per that definition and categorization they require issuers of ICOs to acquire a license and be registered with the Hong Kong Securities and Futures Commission (SFC) (SFC, 2017).

Hong Kong has not amended existing legislation, nor has it introduced new regulations on initial coin offerings and cryptocurrencies. The legislators claim that existing laws already provide a framework for sanctions against money laundering and cybercrimes for instance (HK, 2015). The SFC beyond that only highlights the risks associated with cryptocurrency exchanges and ICOs.

Isle of Man

Definition of Cryptocurrencies:

There are four different definitions for online currencies. The first of which are digital currencies, which correspond to any virtual representation of fiat currencies. Then there are virtual currencies, which differentiate themselves by the lack of a centralization body. Convertible currencies are cryptocurrencies that can be converted to fiat currency. Finally, non-convertible virtual currency can be defined as virtual currencies that are transferrable between individuals but cannot be exchanged for fiat currency (IFSA, 2019).

The Isle of Man was one of the first to adopt legislation specific to cryptocurrencies. This was done by the adaptation of the existing Proceeds of Crime Act (Shirveishyn & Vannin, 2018).

Under this act, the supervision authority lies with the Isle of Man Financial Service Authority (FSA) and it requires businesses to report their activities. This creates a full legal framework for cryptocurrency exchanges. It also includes anti-money laundering requirements and client checks (Vannin, 2015). The Isle of Man was the

first government to store data on the blockchain (Kahn, 2015) and is also among the first to differentiate between token functions. It will not register tokens that provide no benefit other than the token itself for instance (Vannin, 2008).

These above examples present some of the legislations that are more advanced in the cryptocurrency space. All these locations, and this is especially true for the Isle of Man and Malta, have significant cryptocurrency activities. The leads to the assumption that stakeholders, like exchanges, would prefer transparent and proactive regulatory measures in the ecosystem.

3.5.6 Wallets

Wallets are a measure to securely store cryptocurrencies. They can be an app, a website or device that would hold the owner's private keys that enable the access to the coins. They act like an interface, and 81% of wallet providers are located either in Europe or North America. There are two types of wallets, hardware and hot wallets. The former are offline devices, like cold funds for exchanges, and are considered to be more secure. The most popular hardware wallets include the Ledger Nano X and Trezor T and cost a fixed sum upfront. Web or Hot wallets accordingly are always online, are less secure, but are considered more liquid. Another benefit of a web wallet is its accessibility, as it only requires an internet connection (BBW, 2019).

3.5.7 Payments

Payment service providers act as an intermediate between cryptocurrency exchanges and the broader economy and facilitate cryptocurrency payments. The link between the legitimate economy, through payment service providers, and cryptocurrency exchanges have the ability to validate the latter. 79% of them for instance have existing relationships with banking institutions. 86% perform anti-money laundering and Know-Your-Client checks. Major service providers include Bitpay, Coingate and Coinsbank (Khatwani, 2019).

3.5.8 Mining

Mining entities hold a record for all transactions, adding them to the chain and thereby serving as a confirmation entity. For those services, the mining sector gets rewarded in cryptocurrency. While initially more of a hobby activity, it has transformed into a professional energy intensive industry. Most mining pools are in China and the United States and are increasingly geographically concentrated. Current mining operations appear satisfied with the current (lacking) regulatory situation and they accordingly consider stricter regulation the highest risk they currently face. The largest players currently are Bitmain, F2Pool and BTCC,- all of which are based in China (Hileman & Rauchs, 2017).

3.6 Democratization of the Blockchain Ecosystem

Initially used to describe the change in political regimen of a country towards a more democratic state, democratization also concerns a process of social change and revolution. The word democratization is used to describe the standardization of technology, data and software worldwide. The access to these services being initially restrictive, changes with growing user numbers and ever-decreasing costs enable the development of an infrastructure. It enables the formation of a facility or installation that forms the substance for the user population. Another term for democratization is popularization, which refers to "making a material widely understandable or acceptable" (Cambridge Online Dictionnary, 2019). Synonymous to the term is also the practice of widespread adoption.

For the democratization of cryptocurrencies, we are able to draw parallels to data democratization, which according to Bernard Marr, author of "Big Data in Practice, aims to "have anybody use data at any time to make decisions with no barriers to access or understanding" (Adobe, 2019).

Just like many other technologies, blockchain emerged as a disruptive digital infrastructure, challenging the need for financial institutions. Any company that connects a buyer and a seller in the market and that fosters trust between them, can have blockchain applications with legal services and auditing for instance. With lower transaction costs provided by the technology, there is room for new value

creation options: machine-to-machine transactions and data monetization are telling examples (Cohen, Amorós, & Lundy, 2017).

Following the democratization scheme outlined above, we identify a process with three different steps for blockchain democratization (Efanov & Roschin, 2018). The first phase of blockchain development would concern its establishment as a digital currency (Blockchain 1.0) through the advent of cryptocurrencies such as Bitcoin. Beyond payment solutions and transfers, it can be followed by the development a new digital economy (Blockchain 2.0), where smart contracts would replace any intermediate parties, - like notaries and custodians. The final step would be the formation as a digital society (Blockchain 3.0). This society would involve the creation of smart cities, "which enhances the quality of living of the citizens through smart technology" (Techopedia, 2019).

Up until this point we have described the cryptocurrency industry as an ecosystem. An ecosystem can be depicted as a metaphor for business networks that have specific relationships and characteristics, that can be used in the analysis of business relationships and strategic decision making (Iansiti & Levien, 2004).

Therefore, as we are currently between the first and second phases of blockchain democratization, we intend to study the existing ecosystem and stakeholders that play a role into standardizing user adoption.

4.0 Research Design

Within this thesis, one of our goals is to expand the understanding of the value propositions of the cryptocurrency exchanges to support a widespread adoption. First, by analyzing different stakeholders, we seek to clarify the value proposition for each of the actors of the industry and evaluate as to how their objectives harmonize and counteract each other.

4.1 Research Design and Research Strategy

Our study commences with an observation of the existing platforms that would help us establish a paradigm. It is therefore an inductive study, where the theory is the outcome of the generalizable data that we collect (Bell, Bryman, & Harley, 2018).

This method suits our study as blockchain-based exchanges only appear as the hype cycle, published by Gartner, of an emerging technology (Linden & Fenn, 2003).

To answer our research question, we need to gather data with regards to different stakeholders in the cryptocurrency industry, - which favors a qualitative approach. Qualitative research focuses on "words rather than numbers" (Bell, Bryman, & Harley, 2018) as opposed to a quantitative approach. Moreover, this strategy would help us gather different interpretations of the same ecosystem, - helping us to dive deeper into the roles of the actors, the stakes as well as the challenges. Further, in an ecosystem as volatile as the one at hand, relying purely on performance numbers is likely to provide a momentary image at best.

With the industry and ecosystem not fully explored yet, we also aim to explore the problems and find specific issues to resolve (Shields & Rangarajan, 2013). Therefore, our research design is explorative and descriptive. While a descriptive study would help us identify and distinguish best practices, the exploratory study would give us insights on how the current ecosystem would evolve in the future with regards to the stakeholder's mutual dependence and power imbalance. Beyond the stakeholder map, we aim to find connections and relationships between the different stakeholders.

Within this field, there is limited empirical evidence and field testing on applications and platforms. Companies may be reluctant to adopt cryptocurrencies due to their current inherent lack of transparency and a lack of a supporting regulatory framework. This raises the issue of credibility of these platforms and transactions, which especially is an issue within the financial service industry (Devlin, 2017).

Within the scope of the thesis, we address the validity and business limitations that cryptocurrency exchanges currently face. In consideration of the lack of research on the topic, the theoretical foundation is principally based on research on cases in which the companies are on a comparable development stage.

4.2 Data Collection

In order to answer our research question, we collected empirical evidence of service adoption through interviews. This involves asking a series of questions to different stakeholders of the cryptocurrency exchanges.

4.2.1 Primary Data

We are applying the theories of strategy as practice to distinguish the value propositions in the cryptocurrency industry. Whittington (2006) focuses on strategy as not something we have, but rather something we do with a focus on practice. The concept of practice is defined as "embodied, materially mediated arrays of human activities, centrally organized in shared practical understandings." (Schatzki & Cetina, 2001). Therefore, strategists not only focus on "what people do", but also on "how people do things".

We follow that logic, and that is why we have chosen interviews to be our primary source of data. Given the volatile nature of the industry the scope of the interview questions remained flexible with each interviewee. That means that next to our core questions, we would either have follow up- or stakeholder specific questions. Through this more flexible approach, we were able to gain insights that we might otherwise have missed within a rigid line of questions.

Through our interviews, we intend to discover how each stakeholder considers their role on the standardization of cryptocurrencies, whether it concerns the regulation of activities, the increase of user adoption or the race to be the leading cryptocurrency exchange.

With that in mind, we conducted our interviews with a wide range of stakeholders. That includes Leah Jonas, Director of Business Development at the Celsius Network, Torbjörn Josefsson and Martin Knutli, Blockchain- and Business Developers respectively at Blockchangers, Nathan Catania Technical Specialist at the GFSC and Stig Kjos-Mathisen, CEO of NBX. These interviews were augmented through comments and discussions collected at trade events, including the Oslo Blockchain Day and the Oslo CryptoFinance conference. Input from these events is gathered, specifically the input from Magnus Jones, an Ernst and Young consultant.

Concerning the interviews, each was conducted in English and lasted half an hour to one hour. Given some of the interviewee's geographic locations, we conducted the interviews via Skype. When possible however, we led interviews in person.

4.2.2 Secondary Data

Our secondary data acts principally in support of our primary data. It is collected to identify the stakeholders in the industry. Sources include industry reports, public regulatory websites, reference articles and books, publications by private institutions, press releases, conference proceedings, and information directly sourced from exchanges.

This information will also give a deeper understanding of the markets, the earnings in the industry, the threats as well as the opportunities. Since each stakeholder has their own understanding of the system, comparing their different viewpoints is likely going to deliver insights wherever we find overlaps or contradictions.

However, since the blockchain technology remains at an early development stage, we do not have a deep theoretical foundation on cryptocurrency exchanges and the system behind it in the business areas. Specific data sources include MarketLine, Statista, and CoinMarketCap. We also compare cryptocurrency exchanges directly via data gathered from their respective websites, online reviews and through Factiva.

4.3 Data Limitations

4.3.1 Limitations on qualitative research

The main issues that stem from a qualitative approach are lack of transparency, subjectivity, difficulty to generalize and replicability (Bell, Bryman, & Harley, 2018). Researchers may interpret data subjectively and can sometimes give more importance to some details than others. This subjectivity complicates the reproduction of a paradigm, but given the conditions of the industry, that might not be possible in the first place. Also, given the lack of a fully structured questionnaire, the quantification of the data is not possible.

In alleviating some of these drawbacks within the data collected and information gained, we attempt to address this potential bias, by applying widespread frameworks from relevant studies. These studies, within our literature review, define the scope and approach of our analysis. Further, we think that the unframed approach with our questionnaires enables us to gain insights that we would have otherwise missed.

4.3.2 Exchange Response Limitations

The most important limitation of our research is the lack of interviews from leading cryptocurrency exchanges that would help us understand their way of strategizing and making decisions on the current ecosystem with regards to different stakeholders. We do however use data from our interviews with other stakeholders such as consultants, regulators, and experts. This provides us with an external, and likely unbiased perspective. We support our findings in addition through secondary data, that we have gathered from different articles and databases.

5.0 Data Analysis

As the first part of our analysis, we develop the stakeholders' role in the cryptocurrency market. From the mapping out of our stakeholders, we attempted to fully understand the positions of the stakeholders. Applying these observations, we complement them with information gathered from outside these stakeholders.

5.1 Cryptocurrency Wallets

5.1.1 Company Profile: Celsius Network

As defined earlier, a cryptocurrency wallet is an application that can store tokens on- and offline. We conducted an interview with Leah Jonas, who is the director of business development of a cryptocurrency loan service, that also has its own wallet service: the Celsius Network. Through its mission statement: *"Celsius Network was founded in 2017 with the mission to harness blockchain technology to provide unprecedented financial freedom, economic opportunity and income equality for the 99%".*

They define the difference between Celsius and a traditional bank as:

"Celsius is allowing the 99% to access the tools to earn a passive income previously held for the 1%. By lending out from our community's pool, we are operating the same way any old-school financial institution would (plus most crypto exchanges and hot wallets). The difference is that instead of keeping the profits for ourselves and our shareholders, we distribute it amongst the community."

As of the 24th of June 2019, Celsius exceeded $300 million worth in deposits, over $2.3 billion in coin loans covered by 30 000 active wallets. From December 2018 on, deposits increased by 600% from $50 million and coin loan origination multiplied by 23 from $100 million. Regarding their services, Celsius network's segments are crypto bank loans and tokens as collateral for institutions.

The unique service of Celsius Network is that they connect people who want loans from people who hold tokens. It provides access to multiple denominations including the US Dollar, Japanese Yen, Real and Euro using their cryptocurrency as collateral. Celsius' objective is to make cryptocurrencies mainstream. In order to do so, several business configurations must be applied.

5.1.2 Best Practices

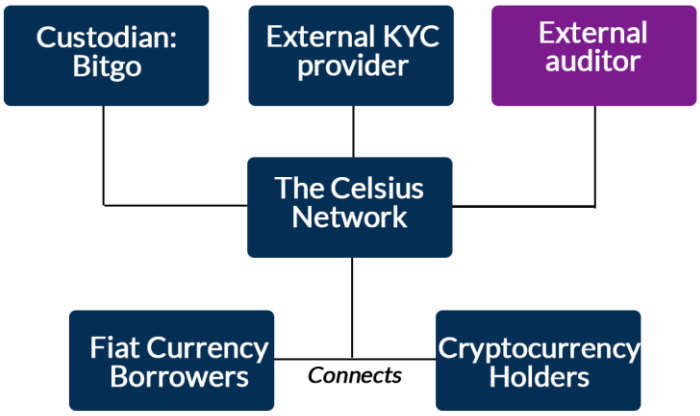
Transparency and security are two of the main values that the Celsius Network wants to foster with its customers in order to build trust. On safekeeping, Celsius uses BitGo as their custodian to store deposits securely. BitGo is a leading entity for deposit services. The software applies similar security measures to traditional banks, with passwords, identity verification, and two-factor authentications. The identity verification and KYC measures are performed by an external service provider as well. One transparency and security measure that has not been introduced yet, as of today, are external audits. As they aim to increase trust and legitimacy, they are currently in the process of signing an external auditor. It also currently does not have an insurance policy. On top of trust through legitimacy, user-friendliness and convenience are also what drive Celsius Network's strategy. Leah Jonas*, Director of Business Development:

"We have the first-mover advantage. We have an organic adoption. We move with the market, we can always ask for more transaction fees, but we won't do it. There are people who are less risk takers, so we'd allow stable coins. We always ask ourselves: How can we differ ourselves as a digital institution by giving them more benefits?"

Concerning the future of the cryptocurrency ecosystem, Ms. Jonas stated:

"We do not plan on seeking acquisition by other banks or bigger institutions due to our unique business model. Ultimately, the small players that are disrupting the way things work, should support each other."

Figure 3 Initial Understanding of the Celsius Network Ecosystem



Source: Team analysis

5.2 Cryptocurrency Exchanges

5.2.1 CoinMarketCap's perspective

CoinMarketCap lists the top cryptocurrency exchanges by trade volume. Its list of top exchanges is more complex than the traditional market capitalization measure. Liquidity in addition, is one of the most essential components for an exchange platform.

We have sent a questionnaire to Ms. Carolyne Chan, Head of Marketing at CoinMarketCap, and gained her team's viewpoints on cryptocurrency adoption and best practices of cryptocurrency exchanges.

"There are multiple factors that contribute to an exchange being a good one. Some of these include trading volume, trading pair coverage, how quickly cryptocurrencies get listed and traded, community interest and traction, team, product-market fit, customer support, and more. The key to a good exchange is having enough liquidity on the exchange such that users can trade efficiently."

These factors appear generally applicable to all exchanges. We will therefore not distinguish between small and large exchanges with the remainder of our analysis. The legitimacy of the figures in CoinMarketCap can also be proven by multiple factors.

"Reported volume is data taken from the exchanges, whereas adjusted volume is based on certain exclusions. (...) Our team works on the verification of these exclusions by speaking directly to the exchanges to check on things like fee structures and rebates, promotional activity, and other initiatives that might have significant impact on exchange volumes. We also have automated detection of data outliers and anomalies, which we take into account as volumes are adjusted."

CoinMarketCap, as a website that reports on cryptocurrency exchanges, aims to create more transparency in the industry. We assume that they represent an unbiased party, and that they contribute to the popularization of cryptocurrencies. With that in mind, we asked them what the website's major asset would be and how it plays an important role on the democratization of cryptocurrency.

"CoinMarketCap pioneered the use of "market capitalization" and "circulating supply" (analogous to public float in equity markets) in the cryptocurrency space; we also popularized the "Bitcoin dominance" metric. Last year we had 3.6 billion-page views and 125 million active users globally; I think with the adoption of users, we are fortunate to be in the position to help spread the word about cryptocurrencies worldwide and have made education a key focus at the company."

Regarding the different stakeholders of the cryptocurrency ecosystem, many are potential contributors to its democratization. In order to assess measures, it is important to differentiate blockchain and cryptocurrency when dealing with the

stakeholders of the ecosystem. We have asked what the role of airlines in democratizing cryptocurrency might be, to which Ms. Chan responded:

"For some of the stakeholders you've identified (e.g. airlines, etc) these tend to be in the camp of "blockchain not crypto", meaning they tend to focus on the underlying technology and less on the cryptocurrency aspect (as a store of value/medium of exchange/etc). Many of these have run proofs-of-concept using distributed ledger technology, and we find that these are useful for helping greater mainstream adoption of blockchain."

This suggests that blockchain applications that do not necessarily relate to cryptocurrencies can have a positive word of mouth effect for the latter. With wider applications, and consequently the consideration of multiple stakeholders, our approach to consider democratization requirements from multiple stakeholder perspectives appears justified.

"As with any industry, multiple players shape the crypto landscape: Cryptocurrency projects, exchanges, funds, influencers, media, data providers, research institutions, regulators, and more. (…) User adoption of cryptocurrencies itself may come from various points; banks, for one, could drive greater adoption, as we have seen from brokerage firms offering cryptocurrencies like Bitcoin in their offerings. Projects such as Baakt are also promising, as they tie together multiple mainstream companies and technology firms to bring it to market. Lastly, you know about Libra by Facebook, which is one way of involving large-scale consumer companies with an interest in payments, to drive greater awareness of cryptocurrencies, and eventually adoption/use of them in daily life."

5.2.2 Cryptocurrency Exchanges Best Practice Requirements

From the site CoinMarketCap, we have looked at the first five cryptocurrency exchanges based on their adjusted traded volume for the last 30 days from June 14th, 2019.

The exchanges with the largest trade volumes, dominate the global trade in cryptocurrencies. Within our examination of the existing exchanges in the ecosystem, we also noticed that finding data for larger exchanges was pointedly

easier. Given their better performance, this suggests a correlation between decent performances and transparency, - an aspect we will further consider within the assessment of our findings and results.

With their market significance and higher level of available information, we have therefore considered the below cryptocurrency exchanges. It is noteworthy to point out that despite OKEx starting three years before any of the other identified exchanges, it did not manage to scale its trade volume at the same rate.

Table 2 Five Top Exchanges ranked by Market Capitalization

	Vol 30d (Adjusted volume)	N° of Markets	Change (24h)	Launched
Binance	$62 397 768 774	493	30.94%	Jul 2017
BitMax	$58 516 443 091	128	8.70%	Jul 2018
OKEx	$56 665 245 185	416	-6.11%	Jan 2014
DOBI Exchange	$52 454 052 863	26	-0.43%	May 2018
DigiFinex	$42 568 876 149	170	0.15%	Apr 2018

Source: CoinMarketCap

This suggests that unique platform features may attract consumers at a faster rate. According to Dr. Garrick Hileman, Senior Researcher at the Cambridge Center for Alternative Finance this may be due to adoption challenges that the exchanges have addressed. These are fungibility, monetary policies with respect to regulation, scalability, governance and the user interface. Two foundations for that are trust and user need. The latter is important and not much addressed. An adoption of the service for instance must provide a clear benefit, as consumers are inertial with respect to new banking services.

In the next sections, we therefore investigate the leading exchanges and consider them with respect to the above factors within the value proposition, services, drawbacks, openness and security specifically. The categories were filled up by dint of data from different reviews and the exchanges' respective websites.

Regarding security, we have compared the leading cryptocurrency exchanges through their Cyber Security Score (CSS) provided by CER (CER Team, 2019). This score is the average of the following components: server security, user security and crowdsourced security. The latter is defined by the creation of programs that reward developers and users for the detection of anomalies and bugs.

Table 3 Binance (Japan)

Value proposition	Cheapest alternative with competitive rates: trader fee of 0.10% and withdrawal fee of 0.005 BTC. Regularly the most trusted exchange in the world Creation of Binance coin BNB that can be used to trade crypto and pay for fee. Partnership with Simplex, to authorize credit card purchases, with service fee of 3,5%
Services	Brokerage and trading services
Drawbacks	Does not allow wire transfer as a funding method. Slow customer support. Two-factor authentication technical issues. Does not support fiat currency.
Openness	Accept users all around the world.
Security	According to CER CSS study, Binance was the 2nd most secure exchange. On May 7, 2019, Binance suffered a major breach with 7000 Bitcoins stolen from the exchange. Binance has stated that all losses will be covered by its emergency insurance fund (aka Secure Asset Fund for Users).

Table 4 BitMax (Singapore)

Value proposition	Offers innovative trading methods such as: margin trading, transaction mining and reverse mining, for experienced users that would like to optimize their investments or pay lower fees.

	Flat fee per trade: 0.04% BTC-withdrawals: 0.0005 BTC (compared to the average 0.008) They also have their own utility token named BitMax Token. Offers financial product called BitTreasure for lending opportunities.
Services	Brokerage and trading services
Drawbacks	The exchange has not insured cryptocurrencies, meaning that capital is at risk. Wire transfer and credit card are not permitted for payment.
Openness	Does not accept US-investors on its platform.
Security	According to CER CSS study, BitMax is the 21st most secure exchange (out of 100).

Table 5 OKEx (Malta)

Value proposition	More than 180 cryptocurrencies supported Leverage trading and futures trading available. Trading fees: 0,15% to 0,20% Withdrawal fee: 0.004 BTC Simple and straightforward trading interface. Established and leading company, with large trading volume. Wire transfer, credit cards are allowed. Strategic partnership with US trust firm to form a stable coin.
Services	OKEx is a digital asset trading platform with tools and options designed to suit both beginner and experienced traders. Next to spot trading of cryptocurrencies, it also allows fiat-to-crypto transactions and futures trading.
Drawbacks	Mobile application is not yet released. Futures trading only for experienced traders.

Openness	Does not allow US investors. But OKEx opens its crypto trading services to users from 100 countries around the world, including Australia.
Security	According to CER CSS study, OKEX is the 49th most secure exchange (out of 100). Partnership with Prime Trust providing compliance services and asset protection.

Table 6 DOBI Exchange (China)

Value proposition	It offers trading in many different cryptocurrencies that other exchanges don't. Cheap trading fee with 0,10% and withdrawal fee of 0,3%. Exchange offers service for mobile users.
Services	Brokerage and trading services.
Drawbacks	Only cryptocurrencies are allowed as a funding method. Only 29 cryptocurrencies supported.
Openness	US investors are permitted.
Security	DOBI Trade's security score is C, when performing the test at Observatory by Mozilla. Most exchanges score an F. On the CER CSS study, DOBI Exchange is ranked at 93rd out of 100.

Table 7 DigiFinex (Seychellen)

Value proposition	Cheap withdrawal fees of 0.0003 BTC and trading fees of 0.20%. Has its own token: DigiFinexToken. A well-experienced CEO and well-built site.
Services	Brokerage and trading services
Drawbacks	Wire transfer and credit cards are not accepted as a payment solution. Only 34 cryptocurrencies are supported.

	Slow response to queries and cryptocurrencies are not insured.
Openness	US-investors are permitted.
Security	CER Cyber Security Study ranks DigiFinex 25 out of 100 on security.

5.3 Norwegian exchange: An Original Strategy for Mass Adoption

On February 2018, the Norwegian Block Exchange project initiated. Its objectives are to create a cryptocurrency exchange, and a payment and blockchain solutions advisory. Having had the opportunity to obtain insights from the company before its launch gave us the unique opportunity to observe the conception phase of a cryptocurrency exchange.

Norwegian Block Exchange was introduced to us as a marketplace where users, both corporate and private, can exchange digital assets. Initially, there will solely be exchange services with the primary objective of covering service areas from regular financial institutions today.

Once NBX Exchange has raised enough funds, the objective is to extend services with smart contracts. First, applications will be with airlines, which will use the smart contract's inherent self-activation function. This is valuable for an airline that faces multiple costs which include gate fees, fuel refill, lift-off and landing fees, maintenance, and hanger costs. NBX will be able to centralize handling of all these services in one platform that will increase the automation of the plane turnaround in different stages.

Achieving that level of blockchain implementation would present an illustration of the digital society (Blockchain 3.0), with airports working as "smart airports", - as described in section 3.6. With this being the most advanced level of blockchain development, we limit our study on mass adoption of this exchange (from Blockchain 1.0 to Blockchain 2.0). Efforts in that by the Norwegian Block Exchange primarily include the introduction of a payment system.

According to Mr. Stig Aleksander Kjos-Mathisen, the Managing Director of Norwegian Block Exchange:

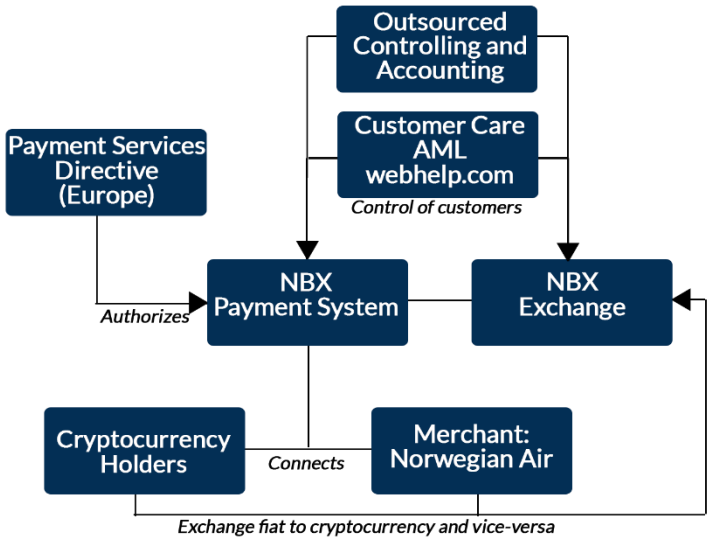
"The payment solution system will accept cryptocurrencies and fiat money. If a customer wants to pay with cryptocurrency to a merchant, he presses a button, which sends a request to the server. He receives the exchange rate, the address and the transaction order hash, through a form of QR code. The merchant will then scan the QR code provided on the phone of the customer, as it provides the traceability of the cryptocurrency. The address information would then be verified by the NBX server, which would then validate the transaction, thanks to the blockchain technology."

What differentiates NBX from other cryptocurrency exchanges are the complementary services it offers with other organizations, - the first supporter being Norwegian Airlines. When a customer uses NBX, he will automatically earn Norwegian Cashpoints.

The three values of NBX are security, stability and transparency, as underlined in their website:

"NBX has worked to be best-in-class in compliance and regulatory transparency, putting AML/KYC due diligence front and center, making it clear how we operate. This gives not only consumers but also institutional customers, who demand stability, robust security and risk mitigation, the confidence to use NBX technology to trade and use payment services securely."

Figure 4 Norwegian Block Exchange Ecosystem



Source: Team analysis and NBX internal data

To protect merchants from volatility, the payment solution will provide instant transfer from cryptocurrencies to fiat money, via Norwegian Block Exchange. After completing a transaction, the merchant's received cryptocurrencies will be automatically converted into fiat money. The merchant then holds fiat money in his account, while the exchange stores the cryptocurrency in its wallet. Withdrawals can be made at any time, suggesting a hot wallet.

Regarding security, the company has a Security Director (SD), and a Legal and Compliance Director (LCD), functions that they believe to be a critical success factor. Beside these functions, NBX outsourced a Customer Care Team and an Anti-Money Laundering Compliance Team, which both work as a financial-crime investigation team. Other tasks they have outsourced are controlling and accounting.

5.4. Regulation

Case - Gibraltar's Distributed Ledger Technology Providers

"Technology is moving faster than regulators" is a comment we have heard from Magnus Jones, a consultant at EY. He argues that the regulator should serve guidance and advisory purposes and apply a more "hands-on/down to earth" approach. A closer involvement will likely entail a more proactive approach to comprehension and regulation. It is argued that regulation is suffering from a lack of understanding and that their current approach is "narrow and rear-view minded". The Gibraltar Financial Services Commission (GFSC) is one regulatory entity that appears to have accounted for these fallacies. It was created under the GFSC Act 2007 and aims to increase Gibraltar's reputation as a qualified environment for financial services and businesses. The GFSC was an initiative by the government that symbolizes its objective to monitor and control unregulated activities. By fighting money laundering and terrorist financing, it is an institution that ensures the relationship and trust between firms and consumers. The GFSC strategic plan 2018-2021 states:

"The promotion of market confidence, the reduction of systemic risk, the promotion of public awareness, the protection of the good reputation of Gibraltar, the protection of consumers, and the reduction of financial crime".

Firms would apply to obtain an authorization, which in turn verifies the applicant's credibility in the eyes of the consumers. An application comes in four stages (cf. Appendix), and it takes at least three months to obtain a license. If the records prove compliance and the interview answers to the GFSC inspection are satisfactory, the license will be granted. If there are any uncertainties, additional procedures follow. Those can extend that process by additional five to six months.

Since the 1st of January 2018, cryptocurrency-related businesses further need to get an authorization as a DLT Provider under the Distributed Ledger Technology Framework. Nine regulatory principles have been established to guide these new businesses. These are in order of importance, honesty and integrity, customer care, resources, risk management, protection of client assets, corporate governance, systems and securities access, non-involvement to financial crime and resilience.

According to the GFSC, following those principles eases institutional involvement and raises the quality standard for DLT providers. However, with no existing benchmark, the GFSC is still a learning institution. According to Mr. Nathan Catania, technical specialist at the GFSC:

"The government felt it beneficial to have a safe environment for all institutions. That is why there are key principles. It makes institutional players more comfortable with businesses (…) These principles add value on other exchanges in the world. It would dictate the quality on the industry."

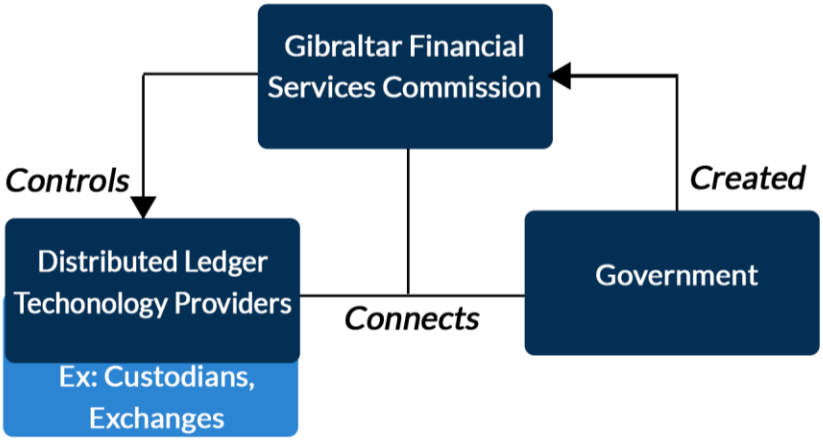
Regarding the adoption of these rules, though they are certainly strict, flexibility and adaptability remain their guiding principle: "*We are constantly learning. We have high standards, but we adopt to changes. We also adopt to the specific configurations of companies applying for authorization. We hire an expert on this industry. We do a lot of work with international stakeholders, to show and at the same time be aware of what is being developed."*

The application for a license is only the first step to become part of Gibraltar's DLT ecosystem. With the eight companies that obtained their licenses, weekly meetings and onsite visits are organized to ensure continuous compliance. As per the relationship that they have with these companies, their role primarily concerns monitoring and cooperating. The GFSC ensures compliance with the nine principles but at the same time, it also accompanies organizations and helps them to comply.

The GFSC also takes direct actions to create consumer legitimacy. Through its website, consumers can find out if a firm is authorized. The presence of guides such as "how your investment is protected" or "how your bank account is protected" shows the transparency that would increase consumers' trust in the institution. When asked about its impact on user adoption of cryptocurrencies, though, Mr. Catania underlined that it is still too early to measure the consequences of the actions, but the overall objective is to build trust in this ecosystem that still represents too much volatility and uncertainty. Simultaneously it is evident from the comments, that the GFSC aims to establish a global benchmark, potentially placing already compliant local companies in an advantageous position, - should other regulators follow suit.

This suggests us that from a regulatory perspective, compliance is a key factor in defining and driving a future cryptocurrency space. It could also imply that exchanges wishing to obtain legitimacy through compliance, will likely settle in countries that provide them the most advanced framework, - as evident by comparatively the large number of license applicants.

Figure 5 GFSC Ecosystem



Source: Team analysis and GFSC data

5.5 Best Practices: Consultant Perspective

Outside the stakeholders identified we also consider an external consultants' perspective. We had the opportunity to interview Mr. Torbjörn Josefsson and Mr. Martin Knutli, respectively Blockchain- and Business Developers at the Blockchain advisory company Blockchangers in Norway. We contrast their input and viewpoints with the material we have collected from other stakeholders.

5.5.1 The Government's Role

We tend to perceive the government's role as an adversary on the standardization of cryptocurrency. Afterall, the rise of cryptocurrencies challenges the traditional system that currently support a government's control and structure. Not having that control with these new instruments limits their role on regulating digital asset-related activities. However, another viewpoint that we had from our Blockchangers consultants revealed potential advantages for governments in adopting cryptocurrencies.

"Governments are not only institutions that will look upon the possibilities of restraining the standardization of cryptocurrency. The debate lies upon governmental needs and to what they extent they can experiment and test it out.

If they can save money with this, then they would be encouraged to use it. For instance, Altein would be able to harmonize processes in public registry and databases."

5.5.2 Regulatory Position

"Know Your Customer", "Anti Money Laundering", and "Compliance". Almost every cryptocurrency exchange uses these or similar keywords to reassure buyers and demonstrate that they are secure and trustworthy. However, these measures are not fully developed and applicable yet. The chairman of the finance department at New York University's School of Business, David L. Cermack said:

"These are new assets. No one really knows what to make of them… If you're a consumer, there nothing to protect you… "(Stecklow, Harney, Irrera, & Kelly, 2017)

That was in late 2017, however, as we learned from our interview with Mr. Martin Knutli, conditions remain a challenge:

"…It is very difficult to have complete control on cryptocurrency owners. It is easy to regulate some parts, like verification of identity, even though it is very easy to trick KYC systems of exchanges. Moreover, a lot of exchanges would examine your profile only after a problem occurs…"

It should be in the best interest of cryptocurrency exchanges to achieve compliance levels that are satisfactory from a regulatory perspective. According to KYC Global Technologies, only then might they create a scenario in which other stakeholders like banks would be willing to participate.

"…As a market differentiator for this burgeoning industry, effective and efficient compliance programs should also help to stabilize and legitimize cryptocurrency's purchasing power… "(KYC360, 2018)

5.5.3 Adoption Position

As for further adoption, the main issue resides on the credibility of these exchanges as discussed earlier. Credibility that can be achieved through customer support, time and user-friendliness, - all of which play an important role in the adoption of cryptocurrencies.

Moreover, both cryptocurrencies and the blockchain technology should answer a specific need to be understood and adopted by institutions and investors.

"As of today, the blockchain hype has cooled down, and it is more about identifying a specific problem in an organization and creating a blockchain-based solution for the company that solves this specific problem, and subsequently makes some process more efficient. The timing is a lot more important. Implementing cryptocurrency as means for payment may help a country in crisis, like Venezuela. Traditional cryptocurrencies have been tricky due to their volatility. In response the ecosystem created stable coins. This will further help adoption. "

"We must also analyze the question from an investor's perspective: would tightening the rules make it more efficient? Due diligence? The protection of the investor must be the most important question, simple solutions such as reversable ICOs or money gain based on milestones can open these barriers."

These comments from the Blockchangers team once again highlight the importance of security and compliance. The creation of stable coins addresses the cryptocurrencies' volatile nature. It shows that the attempt to regularize the industry, would allow the development of legitimacy with regulators and clients.

5.5.4 Compliance as a Market Differentiator

With adoptions by large actors like Amazon and Starbucks, the number of transactions that benefit from blockchain advantages is growing. The threat of falling behind in adoption, will mean a competitive disadvantage for any actor that does not conform. KYC Global Technologies argue:

"Mass adoption of cryptocurrency by retailers, payment processors, and banks is key to the realization of the advantages cryptocurrencies pose, including speed of transactions, traceability, and transparency."

This threat of falling behind according to KYC Global Technologies, will push stakeholders to participate in the ecosystem. This effect is simultaneously amplified by the entrants' applied compliance measures.

By the same token, acting first may also differentiate entities from one another in form of competitive advantages. The GFSC efforts to establish the world's first fully accountable regulatory framework on cryptocurrencies certainly serve their own purpose, in that it sets a benchmark for other regulators. It further attracts stakeholders within the ecosystem.

6.0 Empirical Results

With the data we have collected from our secondary sources and through the interviews we have conducted, we studied the cryptocurrency industry for potential value propositions of exchanges. Following the arguments by the authors considered in the literature review, we highlight the development from relevant stakeholder viewpoints. In consent with the literature review, the value proposition is categorically dependent on the stakeholders involved. That is why we commence this analysis from the stakeholder perspective with the application of Savage et al. (1991) stakeholder analysis. Within the model we classify the previously identified stakeholders. This helps us determine the importance and relevance of the different actors with respect to democratization conditions.

6.1. Applying a stakeholder analysis framework

Savage et al. (1991) offer a stakeholder analysis based on the classification of competitors for threats and potential collaborations. Despite the focus of traditional strategic management issues like market and competition conditions, the evaluation of the environment of the external, internal, and interface stakeholders that are likely to influence the organization's decisions remains critical. We find this approach to be the best applicable in framing our findings and observations. (Savage, Nix, Whitehead, & Blair, 1991)

Its elements build a matrix that presents four different profiles of stakeholders, each with an approach suitable to that profile. In essence, it provides an analysis framework that we can apply to actors in the cryptocurrency ecosystem.

The first type is the supportive stakeholder, which "would support the organization's goals and actions". The supportive Stakeholder would consist of institutions and individuals that are within the organization's network: cryptocurrency investors, wallets, miners and developers. Their concern is the strengthening of the industry and cryptocurrency exchanges and they benefit from their actions taken by encountering more favorable conditions. Investors who are concerned with exchange liquidity and security, will benefit from the expansion of exchanges, as larger exchanges tend to deliver more on these features. From the cryptocurrency exchange perspective, the strategy would be to involve these stakeholders and empower them to further increase their benefit to the organization.

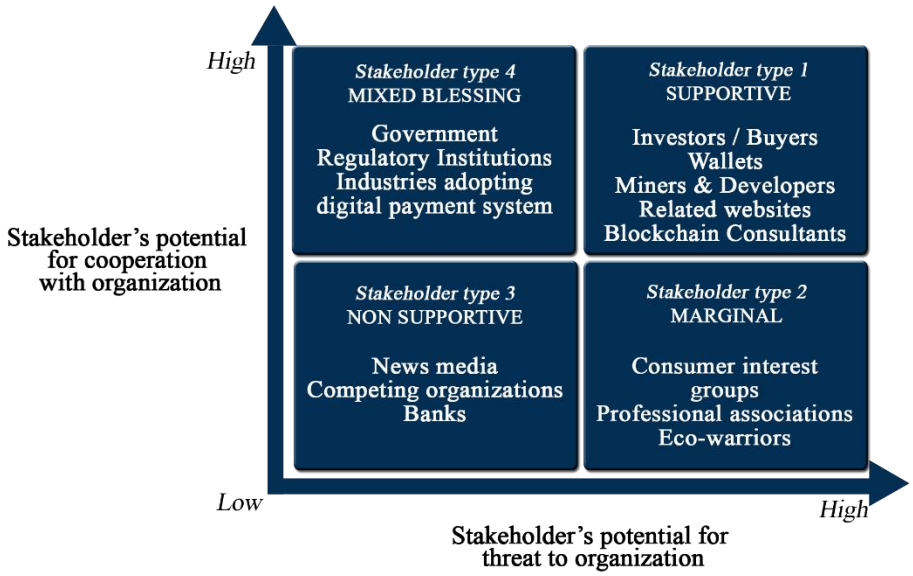
The second type is the marginal stakeholder, which "are neither highly threatening nor especially cooperative". In the case of cryptocurrency exchanges, examples of these stakeholders include consumer interest groups, or professional associations for employees. Environmentalists and ecology-related experts are also an important group of actors to consider in the future. Cryptocurrency mining is an energy intensive activity and will certainly raise the attention of environmental agencies. Issues such as cryptocurrency volatility and uncertainty can also activate one or more of these stakeholders. Monitoring these stakeholders would allow the exchanges to anticipate opposition and to respond to opportunities where these marginal stakeholders may be swayed to become supportive. Promoting the ethical benefits of the underlying blockchain technology can develop support from sustainability conscious consumer interest groups for instance. An anecdotal example would be a start-up that implemented blockchain applications to trace the origin of fish, enabling a sustainable fishing industry.

The third type is the non-supportive stakeholder. These actors can have a negative impact on the growth of a cryptocurrency exchange. These stakeholders include competing organizations and insurances. Banks, as shown earlier, would be oppose to their establishment if they are not directly involved, - aiming to avoid cannibalization issues. Insurance companies are reluctant to form partnerships with cryptocurrency companies due to significant risks posed through loss of assets and a lack of regulation.

There is little action the exchange could take to win opposing parties over. With our analysis, we attempted to find scenarios in which banks would support the development of cryptocurrency exchanges. From the perspective of the latter, that would be especially beneficial as the banks could provide them with a large pool of potential clients. However, it appears that in whatever capacity they may get involved, it will be on their own accord. For insurance companies, we consider the situation more favorable in that it only appears to be matter of regulations and conditions. We've shown that regulatory frameworks are being created, for some countries faster than for others, and that conditions in which stakeholders are non-supportive are changing.

The fourth type is the mixed-blessing stakeholder. As the name suggests stakeholders of the mixed blessing type can be either a potential threat or a potential ally. In the case at hand, this would include large corporations that can incorporate the services of a cryptocurrency exchange to their current payment systems. Primarily, those would be within the retail and airline industry. They would only adopt cryptocurrencies if it creates a benefit to their clients and consequently their businesses. As we have learned, that benefit must be concrete. Cryptocurrency exchanges need to actively instruct and attract these players. These industries will need to adopt new digital payments for cryptocurrencies to grow, - if they aim for any democratization. Within the framework, the government and other regulatory institutions are also mixed-blessing stakeholders, as cryptocurrency remains a grey area, regulation also remains exploratory in most countries. We show that single countries like Malta and Gibraltar take a proactive approach to the creation of a regulatory framework. From the data we have collected and the responses we have received, it appears that they want to set a benchmark for regulatory requirements. Compliance by local companies would then put them at an advantage to foreign ones. At the same time, we see an increase of stakeholders relocating to countries like Malta, which suggests that they favor a clear regulatory framework.

Graph 8 Stakeholder Analysis using Savage et al. (1991) Framework



6.2. Value propositions analysis

6.2.1 Statement of Benefit and Costs

The value proposition provides a benefit of some form to the client that can extend beyond tangible factors and external influences. In our literature review we highlighted four different approaches to the definition of the term. Along with the input we have received and the data we have collected we can define a value proposition for cryptocurrency exchanges that would satisfy the demands and conditions we have found. In principle, the value proposition of a cryptocurrency exchange must build trust and a sense of need. This goes along with the comments by Dr. Garrick Hileman and the article by Michaels and Lanning (1988). The users have the choice between different platforms. A factor that is considered at first glance is therefore the user interface. That determines ease of use and begins with registration requirements and access to exchange functions and tools. Two factors that need to be stressed are the currency exchangeability and liquidity of the exchange. The number of available currencies as well as the addition of new ones appear to play a role in adoption. The addition of new currencies can be achieved through sufficient financial liquidity, - the latter also enabling timely and frequent transactions.

6.2.2 Importance of Transparency

Since there is a large number of alternatives with respect to exchanges, we find that transparency is a significant proposition in order to enable democratization effects. The appraisal of potential value from a customer perspective, includes benefits like low transaction fees and profit-sharing schemes, but also transparency with respect to fund security measures and customer support. Larger exchanges are more transparent with the security measures they apply. They also seem more likely to share how they respond to breaches and subsequent loss of funds. This builds trust and legitimacy with clients.

Building need appears more difficult. While as we show in this thesis, user numbers are growing at a face pace, a significant widespread adoption requires certain conditions to be met first. Within the value propositions, those conditions include the above transparency conditions, the user experience through the user interface, the trade options offered, and security conditions.

Any value proposition by the cryptocurrency exchanges would need to address the above criteria. However, a democratization inhibitor regarding need is user inertia with respect to payment services and financial instruments. As we have learned, tapping into existing customer bases through banks will prove difficult. Alternatively, a value proposition can include potential benefits brought in from the supportive and mixed stakeholders. We regard regulatory compliance for instance as a potential attracting factor. Compliance gives users a sense of security and will drive traffic and trade volume. The latter in turn will improve liquidity and increase trade options. To achieve any of these benefits in the first place however, the exchanges will need to be transparent with their measures applied. Most of the exchanges we have identified, do stress the importance of security, but cannot show specific steps taken to ensure it.

Therefore, cryptocurrency exchanges would need to ensure that in addition to the ability to proposing and delivering their value, the user derives that value from the messaging of their value proposition. The latter, next to trust and need requirements, is only achievable by transparency with their operations and measures taken. These conditions would need to be met for a value proposition to be fruitful.

6.3. Measures to build User Confidence

Security breaches and embezzlements reflect negatively on the entire ecosystem, in which building trust is already difficult. Having mapped out the actors in the cryptocurrency ecosystem, we clearly see dependencies and relationships. Reorganizing the stakeholder map from section 3.5 reveals several insights. We find that we have many stakeholders, that already operate in an existing legal framework. Based on the interviews conducted, we can derive three potential consequences of this condition. As we have shown in this thesis, the regulatory approach differs between countries and authorities.

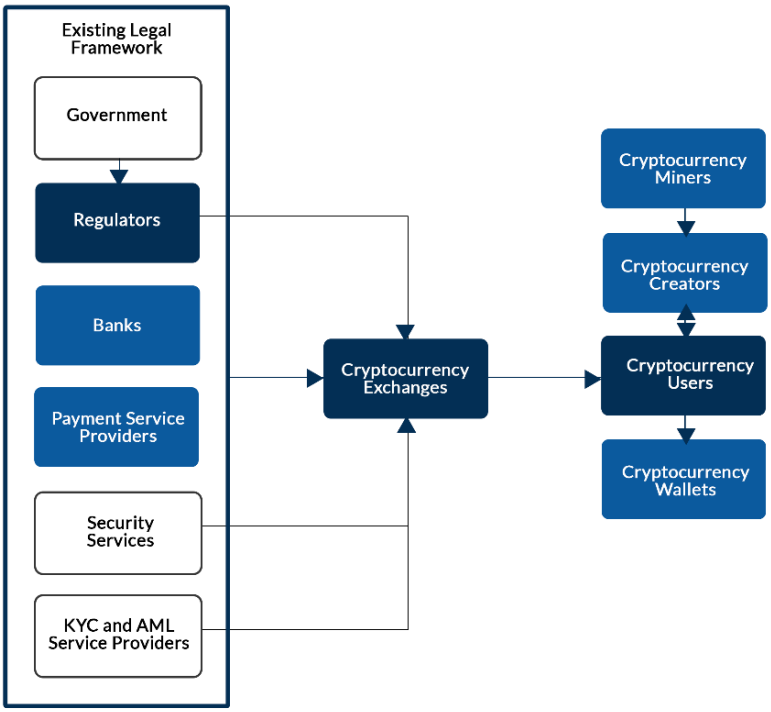
Mapping out the actors, we recognize that existing regulatory structures can serve as a reference point for potential regulations. The ability to trade digital assets like financial assets suggests the application of a framework similar to the one that concerns regular financial exchanges. That would entail that regulators have a foundation on which they can draft cryptocurrency specific regulations. This can build trust for cryptocurrency exchanges as users are then already familiar with elements of a potential new framework.

The map also reveals that with the current lack of regulation in the cryptocurrency space, exchanges can tap into and achieve regulatory legitimacy by proxy. Payment service providers in most jurisdiction for instance have the obligation to authorize and verify every transaction. If the exchanges leave operational challenges like these verifications entirely to the service provider, not only will it save costs but it can also legitimize operations.

Finally, we find that many stakeholders take a pro-active approach with respect to regulations. The Celsius Network, although not required, commits to external audits. Large cryptocurrency exchanges like BitMEX manually verify every single transaction and apply extensive security measures. With the lack of a clear regulatory framework, these measures are meant to build consumer confidence in the platform. Additional benefits of this proactivity concern the potential creation of best practices. With these practices possibly implemented into regulatory

frameworks, being compliant could even contribute to a significant first-mover advantage.

Figure 6 Reorganized Stakeholder Map



Source: Team analysis

6.2.1. The cryptocurrency investor's perspective

From existing literature and studies, the consumer's primary expectation is to achieve a monetary benefit from their investments. In 2017, 22% of 564 American investors surveyed consider "Bitcoin a long-term store of value like gold or silver." With gold and silver commodity trading largely characterized by little arbitrage, the benefits are in part derived through the trading conditions. In accordance, one value proposition of an exchange is to offer competitive fees. We find support for this in that five of the top exchanges listed on CoinMarketCap offer the lowest fees in the market.

Given the trade volume of these large exchanges, we can assume that investors are also attracted by low transaction fees. This is not an apparent conclusion considering that cryptocurrency exchanges, despite growing efforts, had significant

shortcomings with respect to security. This includes major occurrences like the MtGox breach, and Binance losing the equivalent of $40 million as recent as last month (May 7, 2019). While MtGox is now defunct, investors at Binance were protected by an emergency insurance fund. The practice of fund security is not common across other stakeholders. Nonetheless, it presents a potential best practice that can prevent the loss of credibility and subsequent decline in trade volume.

Another important factor from the investor's perspective is time. The speed of transactions and customer support, in an environment as volatile as the cryptocurrency space, are essential. A responsive and transparent customer service is a potential major contributor to trust building. It is an element however that most exchanges lack. Contributing to this condition is likely risk related to accountability. This relates back to the lack of a legal framework in which the roles and obligations would be strictly defined. As long as that is not in place, consumers are more likely to use solutions which have a proactive approach to transparency and support.

Service speed can also be improved by application conditions themselves. The easier to navigate the user interface for instance, the faster consumer awareness of options can be created. Coinbase, one of the leading exchanges for beginners, applies a simplified user interface that shows all functions at a glance and is one of the most popular platforms in the world.

A pleasant user experience is also augmented with the services available. It can concern collaborations with other actors in the system. We found examples with the Celsius network that collaborates with custodians, and NBX that introduces a payment system. The augmentation of own services with third party ones can have promotional effects for an exchange. This links back to proxy legitimacy targets for consumer trust, but it can also be a market differentiator presenting a unique adoption criterion.

6.2.2 The traditional financial system's perspective

Different points of views have been stated during our study on the role of banks. Though they are likely going to remain non-supportive stakeholders in the cryptocurrency ecosystem, exchanges will have to anticipate and monitor their strategies, as they will pursue their own entry. Once banks incorporate cryptocurrencies in their systems, they will have instant access to millions of existing customers. Their legitimacy is their existing client history compliance track record. Having a significant user base allows the circumvention of user inertia with respect to financial products and presents them with a significant advantage.

Operating within the traditional payment services are also so-called hybrid organizations, that can boast sufficiency with both traditional banking applications and cryptocurrency services. Revolut Limited for instance, created in 2018, offers a platform that enables users to exchange currencies and transfer money with lower interbank fees. It also provides a cryptocurrency exchange, pioneering an exchange platform that incorporates both elements (MarketLine, 2019).

JPMorgan has introduced its own cryptocurrency in February 2019 and has even created a blockchain platform called Quorum (Merced & Popper, 2019). The interest into cryptocurrencies is therefore evident within traditional financial institutions. We find that actors like banks risk redundancy without adopting cryptocurrency exchanges' activities. Their advantage is the ability to tap into blockchain technology and the cryptocurrency industry, with internal and banking regulatory practices already in place. Yet initially, any endeavor into the cryptocurrency ecosystem would likely have, cannibalistic effects on the existing business.

According to Blockchangers:

"…Banks are threatened by this business model. If they adopt it, who would be held liable? There's also a difference of perspectives. Banks would disrupt their own business model..."

With respect to the impact they could have directly on the cryptocurrency exchanges, beyond cooperation, banks can also be a threat to the exchanges through acquisitions. The latter however appear unwilling to let that happen. Celsius

Network's coined objective "#Unbankyourself", clearly underlines the venture into a new ecosystem. A system, that aims to replace the current one, which from the outset puts them add odds with banks and other traditional finance institutions. Banks therefore still appear as the direct competition to cryptocurrency exchanges. Given their large customer bases and regulatory experience however, they are likely going to significantly contribute to the democratization of cryptocurrencies.

6.2.3 The Regulator's perspective

As shown by our research, the regulator's role remains undefinable on a global scale. Most Governments remain cautious concerning the uncertainty when it comes to cryptocurrencies and are slow to act in this new growing industry. Efforts remain localized, with the GFSC for instance attempting to bridge the new businesses that would venture in this field with the legitimate economy. As stated by the GFSC, they aim to accompany new actors in their quest for client legitimacy. It therefore presents a proactive, albeit rare, attempt from an official public entity in building trust between cryptocurrency exchanges and other stakeholders. We find however that regulatory support and framing are necessary elements for any cryptocurrency ecosystem to persist.

Our interview with cryptocurrency consultants also provided an alternative perspective on the adoption of cryptocurrencies through regulatory initiatives. They highlighted another objective, which is the incorporation of the new technologies. Estonia has incorporated the blockchain technology in administrative processes. The authorities in that country therefore show their goodwill and are likely perceived to attract industry stakeholders as well. Stakeholders in the cryptocurrency ecosystem vowing for regulatory support should therefore also consider promoting the potential benefit they can deliver to the regulator. Blockchain applications for instance can significantly reduce bureaucratic efforts. This in turn might provide regulators with the incentive to support the ecosystem in the first place.

" If exchanges can establish a compliance standard that meets or exceeds regulatory expectations, the risk perception for traditional financial institutions and payment processors may ease, and the path to mass adoption will become realized, ultimately fulfilling the vision of cryptocurrency's potential." (KYC360, 2018)

Regulatory authorities ultimately aim to reduce market uncertainty. With the growing cryptocurrency space, their role becomes increasingly more relevant for market conditions. If not for the benefit of the cryptocurrency stakeholders directly, it is in the general markets interest if the former can gain legitimacy through a set regulatory framework.

6.4. Discussions and Limitations

With a theoretical framework as our foundation, we collected input from secondary data, conducted interviews, and gathered comments in order to highlight the conditions within the cryptocurrency ecosystem. We defined our scope to include only relevant stakeholders and motivate our insights and comments, with the objective to answer our research question. Our results identify the stakeholder positions and necessary value proposition components that would enable democratization effects.

The stakeholder analysis was especially helpful in revealing positions. We find that regulators play a special role concerning democratization. Our thesis therefore emphasizes their role and presents them as de facto market enablers for the cryptocurrency exchanges. We find that their ambivalent nature classifies them as mixed blessing stakeholders. For one, their concerns are stable markets, which cryptocurrencies disrupt, and at the same time they draft regulatory frameworks for the latter to operate in. In order to address the first concern and improve the second, exchanges should adopt a proactive approach in educating decision makers. This will enable the creation of a framework that would support their operations.

Contrary to our prospects, while our initial findings hinted at it, we attempted to find scenarios in which banks would be enticed to support exchanges. Instead we find them in a rather antagonistic role. Given their reach and legitimacy however, they can significantly contribute to the democratization of cryptocurrency applications. Further studies should explore to what extent this can reflect on exchanges and other stakeholders in the industry.

In consideration of the complexity of this topic, we have placed a specific focus with our research on the development of value propositions and democratization conditions. One aspect that should receive more granular attention in future studies concerns localized differences. While we do identify the different levels and approaches by regulators and the distribution of the user population, we do not explore regulatory inferences for the latter. A government advising its population not to invest in cryptocurrencies, will effectively inhibit the development of local cryptocurrency stakeholders. Yet countries like China, which tend to show unreceptive stances have significant operations in mining for instance.

In spite of that, we believe that our results help cryptocurrency exchanges with the assessment of their environment as well as with the definition of their propositions. With a growing number of participants, the ecosystem will continue to reach new audiences, and our contribution can direct actors with their approaches with respect to their stakeholders.

7.0 Conclusion

We have commenced our thesis with a review of existing research and literature. Starting with an exploration of the development of the value proposition concept we find that in order to define necessary components of it, we need to consider the environment they operate in from a stakeholder's perspective. From the perspective we apply, we narrow down our scope to actors that can have a significant impact on the trajectory the ecosystem can take and identify relationship structures with the application of the network theory.

This approach enabled us to shed light on an emergent industry and answer our stated research question:

How can cryptocurrency exchanges develop a value proposition that would allow their democratization?

Following our structure, we commenced to answer this question from a stakeholder perspective. We categorized stakeholders according to their stance to

cryptocurrency exchanges. Our findings show that there are supportive-, marginal-, non-supportive-, and mixed blessing stakeholders. Each type will have implications for the development of a value proposition. Noteworthy here are two stakeholders that can have a direct impact on exchanges.

We find banks to have an ideal starting position. They have existing regulatory practices and access to significant numbers of users. However, they appear likely to be oppositional to cryptocurrency exchanges. That is because the emergence of this new ecosystem threatens their existing businesses, inviting them to approach new opportunities unilaterally. That is why we say that with respect to the value proposition development of cryptocurrency exchanges, they will contribute little to nothing. They will however, given the above-mentioned aspects, have positive effects on the cryptocurrency democratization, potentially paving the way for cryptocurrency exchanges as well.

The other important stakeholder are the regulators. As elaborated on in the discussion section, their role is a key factor for exchanges as they grant legitimacy. We find that they frame the playing field and can provide the necessary support for the ecosystem. The measures taken so far, differ considerably between different countries, and we believe there are significant first-mover advantages to be gained. From the stakeholder map, we identify three consequences from their involvement. The stakeholders involved in the cryptocurrency space indicate the nature of the industry. It resembles a traditional financial industry and can therefore be modeled accordingly from a regulatory perspective. For the exchange, this means that they can anticipate future ecosystem conditions, which they should incorporate within their value proposition.

The second consequence is legitimacy by proxy. Through the involvement of actors already operating within a legal framework, the exchanges can reflect their involvement within their value propositions. This would provide them with substitute security measures that they can promote within the value propositions. Finally, cryptocurrency exchanges can also take a proactive approach to regulation

as long as no framework is in place. While building legitimacy, another effect is the potential establishment of best practices within the ecosystem, - leading to a first-mover advantage and an important contribution to a value proposition.

The value proposition of an exchange needs to build trust with its users. We find that they can best do this by showing a proactive approach to compliance. This includes the adoption of measures for instance, that are not necessarily required like external audits and cold storage solutions. It can also be built by transparency measures including the disclosure of intended procedures in case of security breaches and the clarity of their fee structure. This creates legitimacy with clients and possibly with regulators as well.

Another important aspect of a value proposition is the emphasis on need. We find that consumers are inertial with respect to banking services and types of cryptocurrencies. Convincing clients of the benefits will therefore prove to be difficult. An approach could be the promotion of platform benefits, which enable same-side network effects. Allowing a fast and responsive use of the exchange's services can also be supported by an intuitive and accessible user interface. This in turn can enable major congregating factors like liquidity and transaction speed.

Ultimately, we believe that the above factors will contribute to the development of value propositions for cryptocurrency exchanges. The democratization of the technology will advance as regulators create the necessary conditions. Countries like Malta currently attract the largest players, as they demonstrate commitment to the ecosystem. This will reinforce the exchanges to emphasize value configurations that matter for users and will eventually shape the cryptocurrency ecosystem.

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9.0 Appendix

Question Guide:

General questions

Initial question asked to all interviewees was about their vision and mission:

Could you present us with the key activities of your organization and your role in the cryptocurrency ecosystem?

What would be the best practice of one exchange or a wallet over one another?

What differentiates your activity from the rest of the stakeholders?

How would you appraise the role of the government?

What is your opinion on regulations?

How would you evaluate the prospective evolution of the cryptocurrency ecosystem?

Specific Questions

NBX *(Interview in the context of our course Business Development and Innovation Management, which helped us learn more about disruption and discover the cryptocurrency industry)*

How did you come up with the idea?

How would NBX work as an exchange and as a payment service?

How would you argue for the non-volatility of cryptocurrencies?

What is your strategy roadmap?

Blockchangers

We can see that banks would be the traditional financial system that cryptocurrency will shape in the future. How would you describe banks' position in this aspect?

Many cryptocurrency exchanges state that regulation and security are two of the most important aspects, what do you think of the current situation?

How do you evaluate the current blockchain landscape and hype about blockchain and cryptocurrency?

What would be the best practices that you would recommend to any cryptocurrency exchange?

The Celsius Network

We can draw a two-sided market with the way the platform works: cryptocurrency holders and loaners, what is your strategy on growing both sides of the market?

What are the conditions for a cryptocurrency to be added to the platform?

In your opinion, what are the best practices in launching a cryptocurrency platform?

How would you evaluate the future of the Celsius Network?

Gibraltar Financial Services Commission

How would you describe the daily operations at the GFSC?

What relations do you have with DLT providers and custodians?

How would you monitor them?

Is the GFSC working with other stakeholders on monitoring these firms?

Are companies free to choose their external auditors? Or does the GFSC assign them?

In your opinion, can the 9 principles that the GFSC fosters, establish a global standard for cryptocurrencies?

Do you cooperate with other international stakeholders around regulation?

Did you have any reference point when building this regulatory framework?

You have mentioned that there are different types of firms. How different are your relations depending on the type of companies?

Regarding application, how long would the process take?

CoinMarketCap

CoinMarketCap lists the top cryptocurrency exchanges by Trade Volume reported and adjusted. According to you, what is the most important factor to that contributes to trade volume performance?

Is it just all about market capitalization? Or are there other criteria?

Are the numbers you post in the website from the exchanges themselves or do you have an external or your own verification tool for transactions? Is it automated?

In reference to the stakeholder map. Which relationship between stakeholders in your opinion would be the most relevant to increase user adoption?

Can CoinMarketCap become a bridge the gap between banks and cryptocurrency exchanges?