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GET SMART; HOW MULTINATIONALS CAN USE SMART CONTRACTS TO GAIN A COMPETITIVE ADVANTAGE

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Abstract

Innovation has become the primary driver of staying competitive in the modern economy. A company can do everything "right" and still end up losing their market leadership, or even fail and eventually disappear. This is due to disruptive innovations, which have the power to create new markets and thereby disrupt the current value models, products, and even leading firms. One technology that is perceived to be the next disruptive innovation is blockchain technology, a distributed database of records that is keeping track of events and records. The technology has great potential to increase trust, transparency and immutability in business, but is not being adopted by companies due to the lack of use cases and proof of concept. Both clients and organization can benefit from the advantages of blockchains, but it is still an underdeveloped area. The research in the area has so far been focused on financial applications, so the purpose of this thesis has therefore been to examine what value smart contracts can provide to collaborative activities in business development and innovation. The findings of the thesis indicate that applying smart contracts in collaborations can provide higher efficiency, trust and transparency, leading to three potential use cases for a multinational organization. Two of the use cases provides a potential competitive advantage in differentiation and one use case provides a potential competitive advantage in cost leadership. However, implementing smart contracts and blockchain technology is hindered by organizational barriers and a lacking understanding for the benefits and value added of the technology compared to existing solutions.

Keywords: *collaboration, innovation, business development, blockchain technology, smart contracts, competitive advantage, multinational organizations*

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1. Introduction

This chapter initially describes the background and problem setting of innovation, blockchain and collaborations, which then leads to the research question that the study aims to answer. This is followed by a description of the delimitations of the study. Lastly, the disposition of the thesis is presented.

1.1 Background

1.1.1 Innovator's Dilemma

Innovation has become the primary driver of staying competitive in the modern economy. However, a company can do everything "right" and still end up losing their market leadership, or even fail and eventually disappear. In the year of 1997, Clayton Christensen published his book 'The Innovator's Dilemma: When New Technologies Cause Great Firms to Fail' where he describes this phenomenon. Christensen (1997) argues that disruptive innovations have the power to create new markets and thereby disrupting the current value models, products, and even leading firms. This relates to the theory 'Creative Destruction' of Schumpeter (1942) who argued that the free market economies and capitalism are as an evolutionary process, where the old structures eventually get replaced as new ones appear. Both Christensen (1997) and Schumpeter (1942) agree that the disruptive or destructive forces are caused by entrepreneurs and technologies that create a disequilibrium which is highlighting new profit opportunities. This is why market leading companies can do everything "right" and still be disrupted. Disruptive innovations bring a new value proposition to the market that the old companies cannot compete with (Christensen, 1997). Therefore, innovation is the primary driver of staying competitive and surviving in the long run.

1.1.2 Blockchain Technology

One technology that is perceived to be the next disruptive force is blockchain technology. Blockchain technology is a distributed database of records, a public ledger that is keeping track of all the events or transactions (Crosby et al., 2016). The technology emerged in conjunction with the financial crisis 2008 as a solution to the inherent shortcomings of the financial system. The solution was Bitcoin, a currency based on blockchain technology that could not be controlled by the consensus of the network, rather than by a central authority (Baghla, 2017). Some of the benefits that came along with the technology was transparency, immutability, and increased trust, the same factors that were lacking in 2008 and eventually lead to a financial

crisis. It was quickly realized that many of the benefits of the blockchain technology could also be applied in a business setting, and the pressure on organizations from customers to increase transparency was growing. As the technology developed, new applications within the technology appeared and one of the more recognized applications was 'smart contracts', a self-executing contract that could facilitate automation while increasing security (Butlers and Broersma, 2016). So why is blockchain technology disruptive? The theories of Christensen (1997) and Schumpeter (1942) argues that a disruptive innovation is usually less effective compared to the current solution when it is introduced, but over time it changes the value proposition which will eventually be the new standard, thus disrupting the old solutions. Blockchain technology is currently in that initial phase and is believed to change the current value proposition, and if the theories of Christensen (1997) and Schumpeter (1942) are true, it will eventually affect the way organizations do business.

1.1.3 Innovation Through Collaborations

So how does an organization survive a new disruptive innovation? It has for long been recognized that collaborations and networks are necessary in order to have successful innovation (Schilling and Phelps, 2007). Collaborations are especially important in high-technology sectors where one single organization is not likely to possess enough capabilities and resources to develop new significant innovations (Schiling, 2013). According to Christensen (1997), disruptive innovations tends to be produced by outsiders, such as entrepreneurs, rather than existing market-leading companies. Therefore, in order to stay competitive, organizations must learn how to make collaborations and how to do innovation together with these outsiders.

1.2 Problem Description

1.2.1 Diffusion of Innovation

According to Rogers (2003), diffusion of innovation is the process by which an innovation is communicated through certain channels over time among the members of a social system. Therefore, the theory of diffusion seeks to explain how, why and at what rate innovations spread on a large scale. So, when new technologies appear, and the diffusion is in an early phase, there is usually a confusion on how it works and what problems it can solve. Blockchain technology in no exception. There are many organizations that are having a hard time to understand how this new innovative and potentially disruptive technology might affect their current business model. Tidd (2010) argues that understanding why and how certain innovations that are adopted

can help us develop better and more realistic business plans and public policies. Thereby, by understanding and adopting blockchain technology, organizations can be early movers and have a better chance of adapting their business models and gaining a competitive advantage. However, according to Ohr and Mattes (2017), there is an internal organizational chasm when it comes to new innovations, resulting in a low transfer rate from turning promising innovations into substantial business. The business units of the core organization are designed to work with incremental innovation and have a risk-free way of doing business, allowing zero mistakes. Thereby, the organization is not designed to create leap-frogs and explorative innovations, which creates the internal chasm of innovation (ibid.). The way to cross this chasm is according to Ohr and Mattes (2017) to convince the senior leadership with a proven track record of an innovation and that it has a clear advantage to the existing solution.

1.3 Research Gap

We are in the middle of transforming the way of doing business. Digitalization and new technologies such as blockchain technology are believed to play a key part in how the future will evolve. Limited transparency from financial institutions eventually led to a financial crisis in 2008, where the level of trust plummeted. Blockchain technology and its applications are believed to solve these problems, but there is an evident lack of actual use cases. Also, there is a lack in how large organizations can adopt innovative technologies or how to collaborate with smaller outside players that are more likely to come up with these disruptive innovations. The topic of blockchain technology in a business development setting is important to study to increase the understanding of how organizations can use it for their own as well as the clients value.

1.4 Research Project Background

This study is conducted as a part of the ‘Coboom’ initiative by Stena, CGI, and Volvo Cars. It is a student-industry collaboration which is supported with the possibility of closer interaction and value from working together. The three companies are all interested in new technology and potential uses internally and externally but perceive an issue in technological development that even though capabilities may be known, the impact and application may largely be unknown. The initiative proves these companies believe that students possess a knowledge and understanding of these technologies, and the possibility to develop interesting ideas about emerging technologies to the benefit of companies. Performing this study in the collaboration with the ‘Coboom’ initiative, the impact and application of blockchain technology can be

researched to find value for Stena, CGI, Volvo Cars, and other organizations through graduate students with good understanding of the technology and societal developments in a qualitative multiple-case study. The findings from this study could in the future be of help when these organizations try to develop in blockchain technology, to give them a more in-depth knowledge of possibilities and areas to be on the lookout for.

1.5 Objective

The objective of this research on the subject of collaboration supported by smart contracts is to find out what benefits organizations gain from collaborating within business development, and how they can potentially gain a competitive advantage by the help of the functions and uses of smart contracts.

1.6 Research Question

That purpose has guided us through this research and led us to the following research question:

How can a multinational organization collaborate within a business development setting to gain a competitive advantage using smart contracts?

Gaining a competitive advantage from the actions of collaborating with the help of an emerging technology is highly dependent on the situation of how the organization utilizes the technology and how their business model is influenced from it. Seeing as the uses of technology in different divisions of an organization would influence the organization differently, to answer our research question we firstly need to further research which uses of blockchain technology and smart contracts currently discussed in literature. Thereafter, we need to find how technology diffuses in organizations, how and why collaborating is important, what parts within collaboration that are relevant for the study, and lastly what competitive advantages can derive from. By having done so, we are able to connect the uses of smart contracts to the parts of collaboration where the effect can be beneficial and thus lead towards a competitive advantage.

1.7 Delimitation

The subject of this study is specified towards the usage of smart contracts within blockchain technology, therefore not encompassing other functions of blockchain or other emerging technologies more than thought necessary for an overview of the area. In collaboration, we have chosen to stay within the area of business development in organizations as it is usually in this division that work with innovation and development is executed. The three organization in focus in this study are multinational corporations with possibilities to collaborate with small firms and startups, and the conclusion is therefore targeted towards uses for these large organizations. Since the study is largely conducted in Sweden and the Swedish functions of these organizations, a fairly local limitation has been set, but it should also be possible to implement the uses within other parts of the organizations without too much of an effort. The applicable uses deriving from this study is therefore generalized enough to be able to be used by organizations of similar large size in a multitude of industries.

2. Blockchain Technology

This chapter will describe blockchain technology. Firstly, the chapter will be initiated with a brief presentation of the history of the technology. Secondly, a section will explain the technological aspects, followed by the different configurations of blockchain and the potential application areas. The chapter will then be finished with a discussion regarding the challenges of blockchain technology.

2.1 History

In 2008, "Bitcoin: A Peer-to-Peer Electronic Cash System" was posted to a cryptography mailing list by one Satoshi Nakamoto (thought to be a pseudonym). This was the start of the cryptocurrency Bitcoin, which had the intention of being a peer-to-peer network to advance the technology of electronic transactions without relying on trust, as it was implied that trust, accountability, and oversight were not in demand if transacting agents did not have to know each other (Chohan, 2017). Taking out third-party payment processing intermediaries allows for simplifying the online transactions and to bypass government currency controls. The transactions in the peer-to-peer network of Bitcoin are stored and transferred with a distributed ledger which is anonymous, open, and public (Lucas, 2017). Following the paper, the release of the first open-source Bitcoin-Client was introduced, as well as the first issuing of Bitcoins. The first Bitcoin block was mined by Nakamoto, rewarding 50 bitcoins and creating the "genesis block" of the cryptocurrency. With the second user of the bitcoin client, Hal Finney, receiving 10 bitcoins from Nakamoto, the first Bitcoin transaction in history was performed (Chohan, 2017).

Now, is Bitcoin and Blockchain Technology the same? They are not, but part of the confusion derives from the terms cryptocurrencies and blockchain being introduced together. Bitcoin is a cryptocurrency while blockchain is the database used to record all the transactions made with the cryptocurrency (Lucas, 2017). The concept is closely related since blockchain was wrapped up in the same solution as the open source code that Bitcoin was released in. Bitcoin being the first application of blockchain, it is an understandable of the inadvertent misunderstanding of the terms. Since then, Blockchain technology has developed and introduced to a number of other industries and is now an independent technology that can used in applications not related to bitcoin (Lucas, 2017).

2.2 General Concepts of Blockchain Technology

Blockchain technology is a distributed database of records, a public ledger that is keeping track of all the events or transactions that have been executed among the participating parties (Crosby et al., 2016). The database consists of a chain of blocks where each block filled with information of transactions, agreements or intellectual property, hence the name blockchain (ibid). Furthermore, the Blockchain has two fundamental features. First of all, the blockchain is public, which means that anyone can have access to it and view it at any time while no single user can control it alone (The economist, 2015b). Secondly, the blockchain is encrypted, using the highest level of encryption to form public and private keys to ensure security (Higgins et al., 2017). Because of these fundamental features, the blockchain has many applications and can be used in many ways. However, as of now the most common use of blockchain technology is transferring money through cryptocurrencies such as Bitcoin. Figure 2.1 describes how the blockchain technology works from a wide perspective in the case of a transaction of a cryptocurrency between two parties.

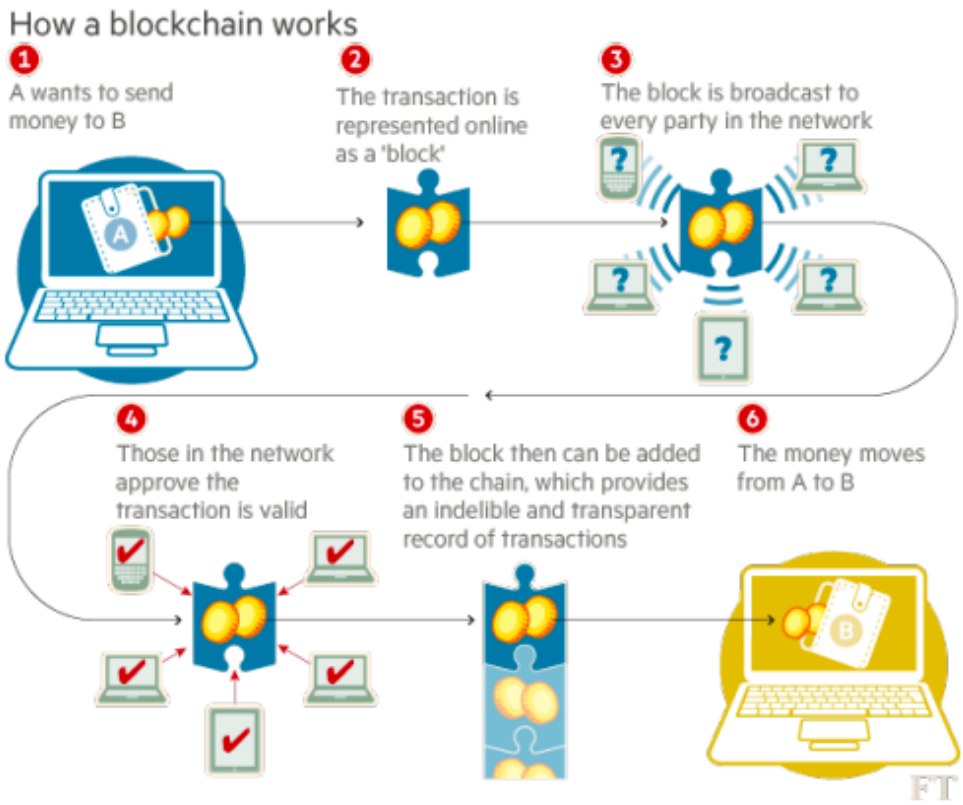

Figure 2.1: How a blockchain works (Crosby et al., 2016)

Once the transaction is performed, it is sorted into a block with other transactions that took place at the same time. The block is then linked to the previous block in time, creating a linear

and chronological chain of blocks (The economist, 2015b). Once information has been entered into the block and the block has been linked to the blockchain, it cannot be changed (Zhao et al., 2016).

2.3 The Blockchain Architecture

2.3.1 The Blocks

Data is permanently stored and recorded in blocks. It is the nodes in the network that are responsible for creating new blocks with information to the blockchain, which is called mining (Hertig, 2018). The mining process confirms that the transactions recorded in the block are legit by solving a complex mathematical puzzle by trial and error testing (The economist, 2015b). Once a node comes up with the solution the other nodes quickly check it and then spreads it through the network to update the blockchain. This procedure means that a new block is created in the blockchain and the information regarding the transactions in the block can never be changed once it has been confirmed (The economist, 2015b). The process of mining consumes a lot of energy as well as CPU time. Thus, as incentive to create blocks and support the network the node who solves the mathematical puzzle which confirms the transactions receives a coin in the currency of the blockchain as a reward (Nakamoto, 2008).

A block is built on three features: A reference to the previous block hash, a time stamp and a Merkle tree root (Tate, J. and Daniel, J., 2017). The reference point is there to connect the block to the previous block. The time stamp, also known as nonce, proves that the data existed at the time being (Nakamoto, 2008). Lastly, the Merkle tree root is a data structure which summarizes all the transactions in the block. Figure 2.2 shows how the structure looks like.

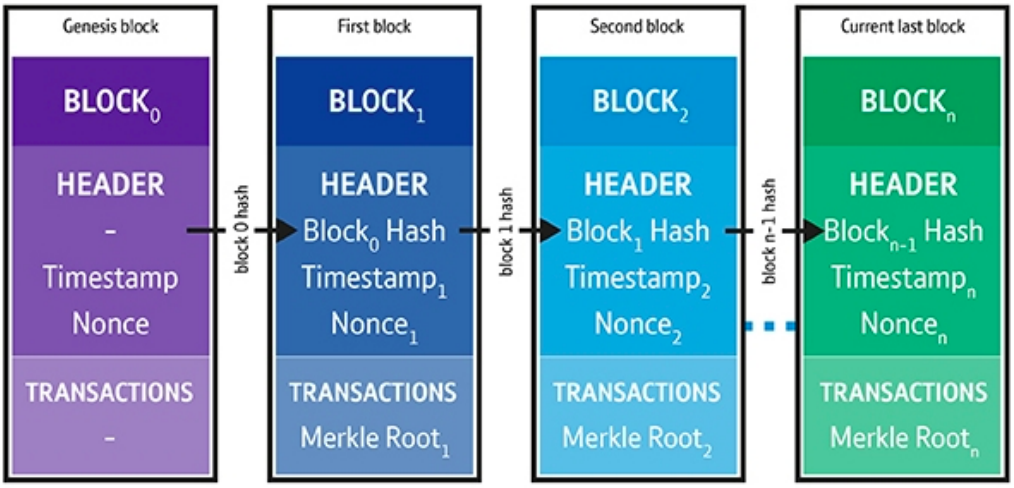

Figure 2.2: Block structure.

2.3.2 Distributed Network

One of the core ideas of the blockchain is that it is accessible for everyone but not controlled by any user alone. This is possible because the blockchain technology is based on a distributed network, meaning that all transactions need to be verified by the consensus of the participants (Crosby et al., 2016). Figure 2.3 shows how a distributed network is structured compared to a centralized or decentralized network. In the centralized structure everything is controlled by a powerful force where everyone is a passive recipient (Tapscott, 2016). The decentralized structure spreads the power to a few powerful forces instead of one (ibid.) However, the distributed structure is peer-to-peer; it does not depend on powerful intermediaries to authenticate or settle transactions (Konstantinos and Devetsikiotis, 2016). It can be compared to a global spreadsheet that runs on millions and millions of computers, and since it is an open source everyone can inspect but no single user can control (Tapscott, 2016). Peer-to-peer distributed networks leads to transparency and therefore the blockchain lets people who have no confidence in each other collaborate without a central authority, which is why the blockchain can create trust (The economist, 2015). The participants keep the blockchain updated in accordance with present time. The participants also collectively set rules and general agreements on how to enhance the blockchain and how it will be updated, which is called the consensus mechanism (The economist, 2015b).

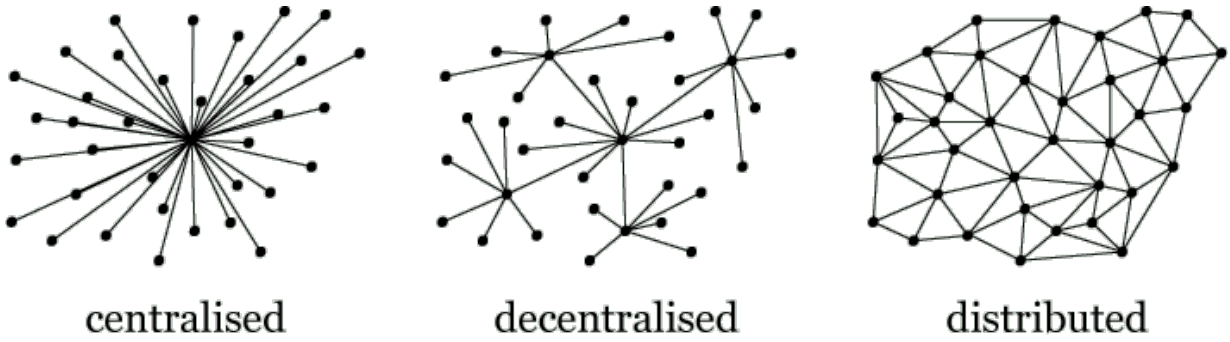

Figure 2.3: Different structures of networks

2.3.3 Types of Blockchain

There are three types of blockchains: private, public and consortium (Pilkington, 2016). Even though there are different types of blockchains, they still have many similarities. According to Jayachandran (2017), all the three types of blockchain still use decentralized peer-to-peer networks, who are maintaining the blockchain in sync through consensus and provide certain guarantees on the immutability of the ledger. The distinction between a public and private blockchain is who is allowed to participate in the blockchain. A public blockchain is open for everyone in the network to participate while a private blockchain requires an invitation to participate (Khatwani, 2017). However, between the private and public blockchain there is a hybrid alternative, also known as consortium blockchain (Buterin, 2015).

Public

A public blockchain is open for anyone to participate. Since it is an open-source and public to all, anyone can be a part of the consensus process of decisions made in the blockchain and anyone can send and read transactions in the blockchain (Buterin, 2015). Thus, anyone in the blockchain can join or leave the network and it will still remain trustless: there is no need for a trusted party or entity to overlook the operations (Khatwani, 2017). According to Jayachandran (2017), a good example of a public blockchain is Bitcoin, which is currently the largest network. According to Buterin (2015), there are two main advantages of a public compared to a private blockchain. First of all, a public blockchain can provide more protection to the users from the developers as there is a need for a consensus which limits a single user to control the blockchain. This increases the level of trust in the network. Secondly, as public blockchains are open for everyone they can benefit from network effects and become very big. This is an important advantage as the costs of a transactions between two parties becomes much lower if they are active in the same network, which is less likely in the case of private blockchains. On the other

hand, there are also drawbacks of a public blockchain. According to Khatwani (2017), a public blockchain requires a substantial amount of computational power as all the nodes need to solve resource-intensive cryptographics to achieve consensus in the network. This correlates with Jayachandran (2017) who also adds that public blockchains can be too open, which implies low privacy for transactions and therefore lower security which are important considerations for businesses.

Private

A private blockchain is a permissioned network as participants need to obtain an invitation or permission to join. Once an entity has joined the network, it will play a role in maintaining the blockchain in a decentralized manner (Jayachandran, 2017). Therefore, the private blockchain is the opposite of the public blockchain as not anyone is allowed to read, write or audit unless one has the permission to do so (Khatwani, 2017). As the owner is a single entity which can override and delete commands on the blockchain, a private blockchain is in its true sense not a distributed ledger (ibid.). However, according to Buterin (2015) there are advantages with having a fully private blockchain. First of all, the main entity running the blockchain can easily change the rules of the blockchain, revert transactions and modify balances which sometimes becomes necessary. Secondly, transactions are cheaper as the transactions does not need to be controlled by millions of nodes around the world. This also means that transactions can be performed much faster. Thirdly, if participation and permission is restricted, private blockchains can provide a greater level of privacy. On the other hand, Khatwani (2017) argues that some of the advantages of the private blockchain can be seen as drawbacks. For example, the central authority controlling the network can become biased and change the rules as wished in favor of the benefitting parties.

Consortium

A consortium blockchain is a hybrid between public and private. The right to read the blockchain may be open for anyone or restricted to the participants. In a consortium blockchain the consensus process is controlled by a pre-selected set of nodes (Buterin, 2015). According to Gratzke, Schatsky and Piscini (2017), creating a consortium blockchain is common for groups of companies joining together to set standards to enable the development of new infrastructures. As an example, if 15 companies would go together and form a consortium, each company would serve as a node and of which 10 must sign every block in order for it to be valid. Therefore, the blockchain can be partly controlled by the creators of the consortium and

are therefore “partially decentralized” (Buterin, 2015). The benefits of a consortium is that it allows companies to collaborate and work together on blockchain technology (Gratzke, Schatsky and Piscini, 2017). Therefore, you can have the privacy and efficiency of a private blockchain without leaving all the power to only one central authority.

2.4 Applications of Blockchains

Bitcoin, as mentioned earlier, was one of the first real uses of blockchain technology. Being used as a tool for financial applications, and due to its recognized benefits of transparency and decentralization, more uses of blockchain was developed for different applications, mainly financial ones. The development of blockchain is even more noticeable today, with the interest of the technology growing and a higher degree of development of financial- as well as non-financial applications. Continuing on, we will explore more of the two segments: financial and non-financial applications of blockchain technology.

2.4.1 Financial Applications

Digital Payment System

Bitcoin being the most widely known example of a financial application of blockchain technology, it represents the growing segment of digital payment systems. The disrupting systems are different compared to banks conventional payment systems and other financial organizations. Digital currencies have the advantage that it doubles as a new currency and as a decentralized payment system. Cryptocurrencies also includes the visibility aspect, where the ledger is shared over the network, and the validation process is more secure where it requires transactions to be validated through user’s acceptance (Gov.uk, 2015).

Smart Contract

One of the more interesting applications with blockchains is smart contracts. It is meant to be a computer program that can verify, facilitate, or enforce the execution or negotiation of an agreement. Being similar enough to common contractual contracts, these can be made self-executing, self-enforcing, or both of them, either partially or completely (Bulters & Broersma, 2016). In other words, smart contracts are fully autonomous, meaning inputted actions that match contract criteria leads to a contract response, automatically triggering pre-specified actions and outcomes of the contract (Kückelhaus & Chung, 2018). The major benefit of a smart contract is that it cuts out the middlemen, decreasing the overall transaction costs. Further, it makes use of the security aspect of blockchains, making it more secure than current contract

law. The condition still exists however that the output of a contract cannot be of better quality than the input. The contracts can still include flaws and loopholes and does not understand user intent. Therefore, users must still be careful with it (Bulters & Broersma, 2016).

Another interesting usage of smart contracts is the possibility of creating a corporation on the blockchain by pooling resources. This is structured with the contract through coding in instructions of how the resources can be used by either manager and what permissions are distributed (Tapscott & Tapscott, 2016).

Crowdfunding

The current usage of services like Kickstarter and Indiegogo can be disrupted by blockchain technology (Swan, 2015). Crowdfunding is however plagued by issues where security can be questionable, investor abuse is possible, and illegal transactions complicate the format (Zhao & Coffie, 2018). Using blockchain, it enables the removal of these intermediaries in crowdfunding. Instead, blockchain technology can be used to create new digital currencies and sell "cryptographic shares" to backers. Tokens then represents the shares of the startup they have funded (Swan, 2015). With the help of blockchain technology, crowdfunding can be made more efficient and safe for investors, platforms, and fundraisers (Zhao & Coffie, 2018). Further, it is argued and reinforced that blockchain can be positive for crowdfunding by improving security, more accessibility, transparency, and making it less expensive to use (howtotoken, 2018).

2.4.2 Non-Financial Applications

Attestation

Blockchain technology allows for the key functions of hashing and secure timestamping to be brought together. With this, it can serve as a better document registry than what is available today. Hashing grants, the action of making a content file such as a document, a video, or a genome file, to a compressed string of alphanumeric characters. The string represents the same content as the original file and is able to be included in a single blockchain transaction, allowing the secure timestamping to attest the exact time of the occurrence. The string is then encoded and registered in the blockchain (Crosby et al., 2016).

Further, blockchain technology could be of great benefit in governance services for elections and e-voting. Using the security and transparency aspects of blockchains, it would have the

potential to aid in finding illegitimate votes and allow for governmental transparency (Boucher, 2016).

Decentralizing IoT

Currently, one of the biggest issues with IoT is the centralized ecosystem which is in use. The technology is still useful as it works today for small scale device connection but faces issues with a growing network. With IoT development heating up, blockchains allows for support for a much larger network of IoT connected devices. Centralized cloud solutions, equipment, and server farms for IoT quickly add up to high costs in infrastructure and maintenance (Dickson, 2016). These costs can be reduced with peer-to-peer decentralized IoT platforms facilitated by blockchain technology. Records of all message exchanges between devices can then be kept in the general ledger that is the blockchain, affecting the cost of installation and maintenance of data centers as it distributes computation and storage demands over all the devices in the network (Crosby et al., 2016).

Mobility Services

The implementation of car sharing within the automotive industry has been around for some time, but to use blockchain technology to facilitate the service through recording vehicle ownership, logging the vehicles use, influence insurance costs, and possibly other transaction as well, is in the early stages of being developed. EY has announced that they are able to deploy a system based on blockchain they have been working on that enables easier shared ownership and access to cars and trucks by groups of people or companies. The test of the system was planned for the end of 2017 (White, 2017).

2.5 The Challenges

Being a developing technology, blockchain is not without its flaws and all effects of implementing the technology in an exemplary case is not known. Using blockchain for the applications mentioned will directly cause implications in several of the cases such as new business models in car sharing or the removal of intermediaries in crowdfunding. In car sharing for example, both the manufacturer and everyone in its value chain would be affected somehow by improved car sharing with the help of blockchain. Possible impacts could be decreased workforce in sales, or increased need of developers in digital development. Some implications are more serious, and some will presumably solve themselves out with expanded attention to the technology.

Performance

Blockchains will always be slower than centralized databases. Processing transactions requires the same tasks for a blockchain as it does for a regular database, but blockchains has another three tasks it has to complete within the same process:

1. Signature verification

As transactions in blockchains is propagated in a peer-to-peer mode between the nodes as the way to prove their source, the transactions have to be signed digitally with a public-private cryptography scheme. Seeing as the verification process is computationally complex, it results in the primary bottleneck. Using a centralized database, the verification process of individual transactions is not required after the connection has been establishes, saving time and effort.

2. Consensus mechanisms

Consensus between the nodes in a decentralized database is another issue. Blockchains operate the network of nodes that require communication back and forth between the nodes and dealing with forks. The communication means additional effort to make the network reliable, and it also depends on which consensus mechanism which is in use. Centralized databases also struggle with consensus but being centralized means that the transactions can be queued and processed on one location instead of several ones.

3. Redundancy

Centralized databases require processing transactions once or twice, while decentralized databases require every node in the network to process the transaction. Performing this does lead to a number of benefits, but it also requires a lot more effort for the same result.

One major factor for the performance issues of blockchain is, as shown, the change from centralized- to decentralized databases. Processing the transactions in the decentralized database takes more time than the conventional method, as a result of greater complexity from signature verification, consensus mechanisms, and redundancies (Woochul et al., 2016).

3. Theoretical Framework

This chapter will describe the theoretical framework, starting with a description of technological change and innovation, followed by the description of a competitive advantage. Lastly, the chapter will describe collaborations. The theoretical framework will then be summarized in a compilation.

3.1 Technological Change

3.1.1 Diffusion of Innovation

According to Rogers (2003), diffusion is the process by which an innovation is communicated through certain channels over time among the members of a social system. Therefore, the theory of diffusion seeks to explain how, why, and at what rate innovations spread on a large scale. The research of Tidd (2010) also adds that diffusion of innovation explains how new innovations are adopted. However, Robertsson (1967) emphasizes that it is hard to build a theoretical model around diffusion of innovation as there are so many variables involved. Even though a theoretical model regarding innovation would not be all-encompassing, it is still important to try and develop a general model of the diffusion process and target the key variables involved (ibid.). Tidd (2010) agrees as understanding why and how certain innovations are adopted can help us develop better and more realistic business plans and public policies. However, there are barriers to diffusion of innovations where economic, behavioral, organizational and structural problems which can affect the success of the innovation. The economic barriers are based on personal costs versus social benefits. Behavioral barriers are about motivations, rationality and prosperity for change or risk. Organizational barriers involve goals, routines, culture and power and influence. Finally, structural barriers focus on infrastructure, sunk costs and governance (Tidd, 2010). This correlates to the research of Rogers (2003) who discusses that organization's ability to adapt to changes as well as social structures and geographical locations are also creating barriers for the diffusion of innovations. Therefore, with all the obstacles and challenges for new innovations, most innovations will not be adopted as it is not superior compared to the existing solutions (Roberts, 1967).

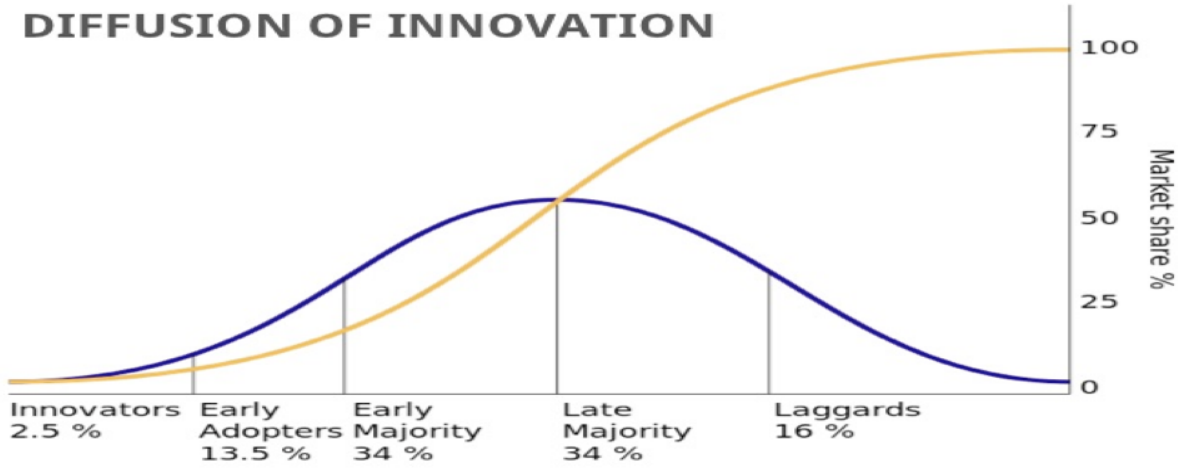

Figure 3.1: Diffusion of innovation (Rogers, 2003).

The process of diffusion of innovation is presented by Rogers (2003) as a diffusion curve (figure 3.1) which consists of five levels of adopters for a new innovation. The levels or segments of adopters proposed by Rogers (2003) are innovators, early adopters, early majority, late majority, and laggards, where the two 'Majority' segments represent the largest share of the population. Most new innovations or technologies go through these five phases and every group of adopters have their own characteristics. However, according to Moore (1999), there is a chasm between early adopters and early majority which needs to be crossed in order for the new innovation to survive. The reason behind this is that new innovations often succeed with the innovators and early adopters, as they are visionaries and thereby eager to try new ideas. But if the innovation is going to survive and thrive, it has to reach and convince the early majority part of the population (Moore 1999). This correlates to Rogers (1962) model, where diffusion occurs slowly until it reaches the early majority where it starts a "snowball" effect. It also correlates with the research of Robertson (1967) who found that the proportion of firms already using an innovation would increase the rate of adoption of it, creating a "bandwagon" effect. This is because the early majority are pragmatists, they do not like to take risks and wants to buy an already established product with proven track record and supporting infrastructure. To win their confidence and cross the chasm, an innovation needs to have a clear advantage and focus on a strategic target market which can be used as a springboard to conquer other markets (Moore, 1999).

The theory of crossing the chasm is not only applicable for the diffusion of a product on a market, it is also applicable for crossing the internal chasm in corporate innovation. According to Ohr and Mattes (2017), there is an internal organizational chasm when it comes to new innovations, resulting in a low transfer rate from turning promising innovations into substantial business. The business units of the core organization are designed to work with incremental innovation and have a risk-free way of doing business, allowing zero mistakes. Thereby, the organization is not designed to create leap-frogs and explorative innovations, which creates the internal chasm of innovation (ibid.). Brocks (2017) also argues that the internal chasm in corporate innovation exist because of organizational barriers, which are created by low effectiveness and efficiency in developing and designing new capabilities. Thereby, the internal obstacles of diffusion are similar to the ones described by Tidd (2010), Rogers, (2003) and Robertson (1967). According to Ohr and Mattes (2017), the way to cross the chasm relates to the strategies of Moore (1999) to convince the senior leadership with a proven track record of an innovation and that it has a clear advantage to the existing solution.

3.1.2 Gartner Hype Cycle for Emerging Technologies

To get a better understanding of diffusion of disruptive innovations, the Gartner hype cycle will be used to get a better understanding of how blockchain technology might develop in the coming years. The Gartner hype cycle provides a graphic representation over the maturity and adoption of technologies and applications and how likely they are to solve real business problems (Gartner, 2017a). The Gartner hype cycle is divided into five phases which each technology goes through (Figure 3.2). The first phase is ‘Innovation trigger’, which means a technological breakthrough that ignites a spark and gains a lot of attention. However, there are no existing usable products and the commercial viability is not proven. The second phase is ‘Peak of inflated expectations’, which is where success stories can be seen and some companies who are early adopters take action. The third phase is ‘Trough of disillusionment’, which is where the expectations are lowered as experiments fail to deliver the expected results. Many producers fail at this stage and investments continues only if improvements can be made. The fourth phase is ‘Slope of enlightenment’, where the technology and how it actually can benefit the company becomes more widely understood. Second and third generation products start appearing in the market and more enterprises start funding pilots. However, the conservative companies are still passive. The fifth and final phase is ‘Plateau of productivity’, which is where mainstream adoption starts taking off and the technology’s applicability and relevance are known.

The blockchain technology is still in an early stage of its development and companies are still exploring the opportunities within the technology. According to Gartner (2017), blockchain technology is now at the end of the second phase 'Peak of inflated expectations' and is moving into the phase third phase 'Trough of Disillusionment' (see figure 3.2). Enterprises are trying to navigate the technology and there is still a lack of proven use cases, which creates concerns regarding the viability of the technology (Gartner, 2017). This can be related to the previous discussion of diffusion of innovation where Brocks (2017) argue that there is an internal chasm to the adoption of innovations, such as blockchain technology, created by organizational barriers. Both Gartner, (2017) and Brocks (2017) can thereby agree that a proven track record or "proof of concept" is the way for a technology to move forward in the diffusion process.

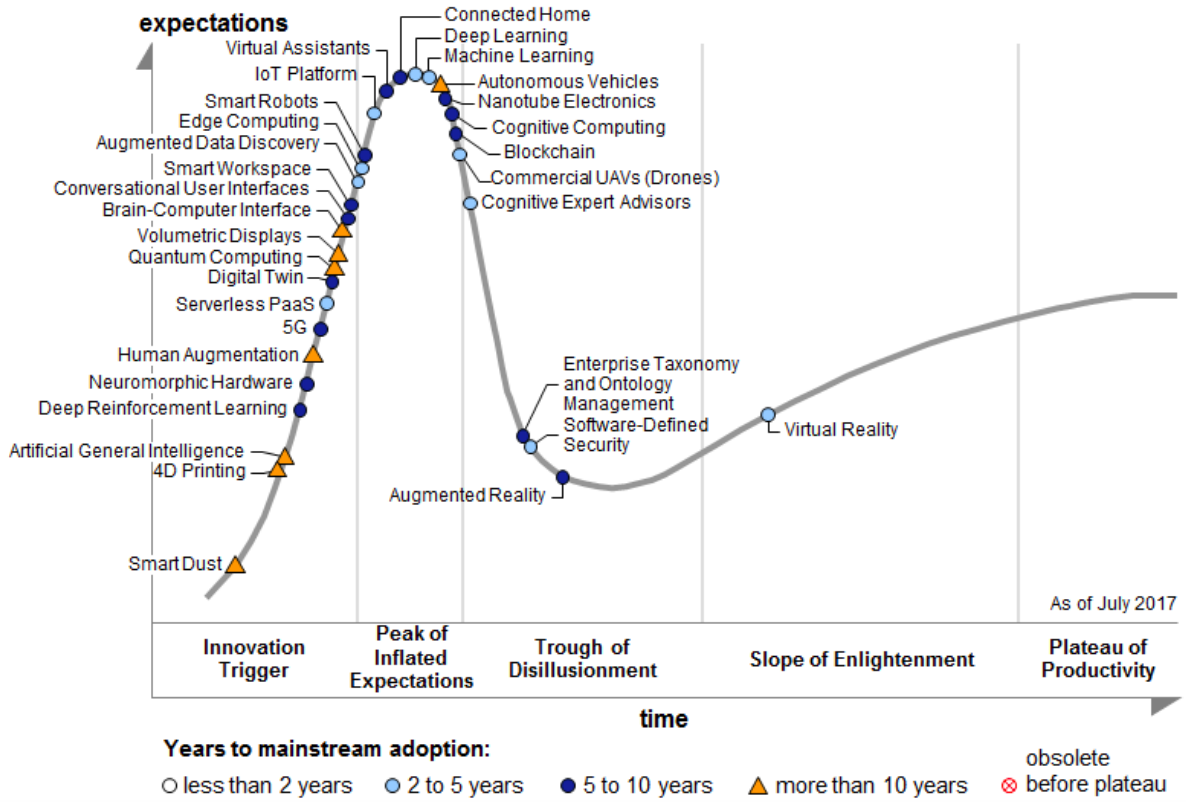

Figure 3.2: Gartner Hype Cycle (Gartner, 2017).

3.2 Competitive Advantage

By offering clients higher value than competitors, competitive advantage can effectively be created. Companies can create this by keeping the price lower or raising the quality, or to focus on a certain business area or segment. By comparing to other actors in the same market or

industry, and performing at a higher level, the company can gain the superiority through resources and attributes. Michael Porter mentions two types of competitive advantage: having a cost advantage or through differentiation, but he also stresses the importance of sustainability of the advantage established. Through these two types, three generic strategies emerge which are used for achieving a performance which is above industry average, i.e. a competitive advantage: cost leadership, differentiation, and focus, whereas focus consists of either cost focus or differentiation focus (Porter, 1985).

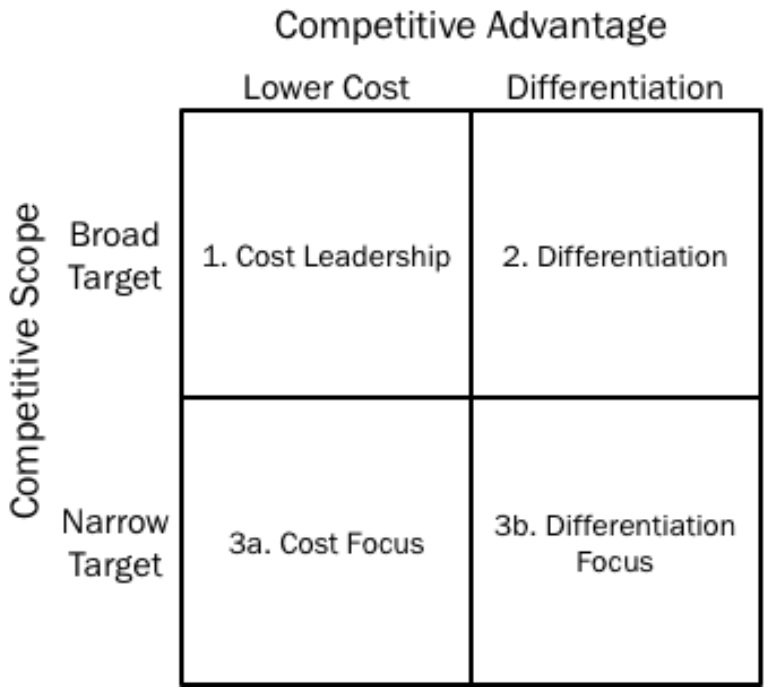

Figure 3.3: Porter's Generic Competitive Strategies (Porter, 1985).

Cost Leadership

Having a cost leadership, the firm has the target of becoming the lowest cost producer in the industry. Creating the cost advantage can origin from different methods, depending on the firm's industry structure. Examples are to pursuit economies of scale, proprietary technologies, preferential access to raw materials, and other factors. Managing a cost advantage requires the firm to find and exploit any possible source of cost improvements. By constantly pursuing lower costs and commanding prices near industry average, the firm can achieve an above average industry performance (ibid.).

Differentiation

In differentiation strategies, the firms focus is to be different and unique from industry competitors in a manner that is deemed valuable by customers. The firm can position itself to cater to the needs of a majority of buyers, separating itself from other actors. The uniqueness from the firm rewards itself by allowing for a premium price (ibid.).

Focus

The last strategy relies on targeting a segment with a narrow competitive scope. Focusing on a segment or segment groups in an industry and adapting the strategy to the chosen few, excluding part of the potential mass customer base. The focus strategy has however two differing varieties:

a) The firm focuses on the cost, pursuing a cost advantage in the target segment.
b) The firm focuses on differentiation, pursuing uniqueness within the target segment.

Using one of the focus strategies, the firm relies on differences between the target segment and remaining segments in the industry. The buyers in the target segment must either have a rare demand or require a specialized delivery and production system that industry competitors are not tailored to. The cost focus makes use of the differences in a segments cost behavior, while a focus on differentiation makes use of a buyer's special needs in the target segment (ibid.).

Competitive advantage can be argued to be either temporary or sustained, depending on the aim of the organization pursuing it and the strategic choices made (Beal, 2011). Wernerfelt argues in his article "A Resource-Based View of the Firm" for the importance of a firm's resources and the possibility for a firm to differentiate using different resources than competitors. The Resource-Based View (RBV) is connected more in depth with competitive advantage by Barney's "Firm resources and sustained competitive advantage" by discussing the applications of RBV to the competitive strategy of businesses (Wernerfelt, 1984; Barney, 1991). It is stated that strategic choice is dependent on the structure of the industry, the attributes of the firm's resources, and on the likelihood of future stages in the product life cycle, which is disregarded if the industry is in the final stage, decline (Beal, 2011). This is mainly argued to be important when investigating sustainable competitive advantage. For temporary competitive advantages in situations where the possibilities are in a fixed time, only the current competitive strategy appropriateness and industry life cycle stage are required to be determined (ibid.). Organizations wanting a yielded temporary strategic advantage require strategic change. To be successful in strategic change, the organizations need to find and choose an appropriate

competitive strategy, evaluate required resources to implement the strategy, acquire required resources, and implement the strategy with the newfound resources. The process of strategic change is derived from concepts of traditional RBV. Further, sustainability of the competitive advantage is ignored by using the concepts of RBV, with the added comment that a competitive advantage only exists as long as competitors does not replicate the advantage, meaning that the competitive advantage is idiosyncratic (Barney, 1991). Dynamic capabilities are argued by Eisenhardt and Martin to be resources that can be sources for competitive advantage. Moreover, they explain that different dynamic capabilities owned by different firms has the possibility to result in common features. Therefore, firms can reach similar competitive advantages with the help of their dynamic capabilities, which can be reached through multiple paths (equifinality). Lastly, they argued that "equifinality renders inimitability irrelevant for sustained advantages", meaning that even though a competitive advantage is thought inimitable if the competing firms does not possess similar resources (as traditional RBV views it), they could in fact reach the competitive advantage through differing dynamic capabilities (Eisenhardt & Martin, 2011; Wernerfelt, 1984; Barney, 1991).

Making use of the theories mentioned, this study is focused on temporary competitive advantages as the technology in question is under rapid development, making it difficult to sustain competitive advantages for any longer period of time.

3.3 Collaboration

3.3.1 Collaboration in Networks

It has for long been recognized that collaborations and networks are necessary in order to have successful innovation (Schilling and Phelps, 2007). Collaborations are especially important in high-technology sectors where one single organization is not likely to possess enough capabilities and resources to develop new significant innovations (Schiling, 2013). As blockchain technology and smart contracts are high-technology innovations, it is therefore important to collaborate to create proof of concept as previously discussed by Gartner, (2017) and Brocks (2017). Dodgson (2014) agrees on the importance of collaborations and networks and goes one step further saying that no firm can innovate alone today. Thus, by combining capabilities and resources in a network the firms can come up with much more at a faster rate compared to what they could have done individually while simultaneously lowering costs and risks (Schilling, 2013). In addition, collaborations and open innovation are becoming more common as companies can get an early mover advantage if they work together (Hill and Jones,

2008). Therefore, the researchers all agree that collaborations are crucial in the modern economy if a company wants to stay competitive (Schilling and Phelps, 2007; Schilling, 2013; Dodgson, 2014; Hill and Jones, 2008).

However, collaborations are not risk free and there are many challenges involved. According to Schilling (2013), these risks involve reducing the degree of control, sharing the rewards of new innovations and being vulnerable for malfeasance by the collaboration partners. Dodgson (2014) also argues that the biggest issue in collaborations is the partner selection, as different agendas and future goals of the collaborating entities can cause problems in the partnership. Another obstacle to collaborations are more focused on structural problems, such as social structures, languages, cultures and geography. Burt (1992) calls these "structural holes" and are commonly causing problems for innovation in collaborations (Kastelle and Steen, 2014; Ahuja; 2000). Luckily, there are various ways to overcome these obstacles. Kastelle and Steen (2014) suggests Innovation Network Management as the optimal way to overcome challenges, which involves performing a 'network analysis'. This means that you measure the network, design an intervention to the problem and then measure the outcomes. This is done to gain a better understanding of how the network works, which is critical in order to manage the network as different network structures needs different methods of management (ibid.). Schilling (2013) adds two more suggestions for managing networks and collaborations in order to mitigate the risks and challenges involved. The first suggestion for a successful collaboration is choosing partners that have both a strategic fit and a resource fit. This is necessary as the businesses in the collaboration needs to strive towards the same goals and complement each other's resources. The second suggestion for a successful collaboration involves contracting theory, which means creating clear and flexible monitoring and governance mechanisms. This is necessary to ensure that partners understand their rights and obligations and that there are tools to use in order to evaluate and enforce the partners in the collaboration to fulfill their obligations. The first recommendation of from Schilling (2013) relates to the research of Dodgson (2014), who also claims that it is important to having complementary cultures which does not cause any clashes, which is important to reach mutual trust and empathy. Dodgson (2014) also confirms the second recommendation by saying that many disputes and conflicts can be mitigated by early in the collaboration agreeing on mutual contracts of intellectual property rights etc. Finally, Dodgson (2014) claims that collaborations work best when there is mutual respect among the partners, which he means working together with partners that sits on similar levels of knowledge and expertise in order to avoid powershifts. This can be confirmed

by Vagen and Huxham (2003), who argues that differences in experience and knowledge can have negative effects on a collaboration. Therefore, by following these suggestions a firm can reduce the risks involved in collaborations while simultaneously increasing the benefits of faster innovation at a lower risk with lower costs.

3.3.2 Crowdsourcing

Crowdsourcing is an online, distributed problem-solving and production model which harnesses the creative solutions of a distributed network of individuals through proposals (Brabham, 2008). It is included in the theoretical framework as it has become an efficient and popular way to collaborate within innovation. According to Howe (2006), crowdsourcing takes the functions once performed in-house by employees and outsources it out to a large undefined network of people in the form of an open call. Thereby, companies can post their problems online and a vast number of people can come up with solutions to the problem in exchange for a reward (Brabham, 2008). According to Estellés and González (2012), crowdsourcing is thereby a form of internet-based collaborative activity, allowing for improved user innovation and co-creation. Furthermore, using crowdsourcing can provide many benefits for organizations. Gasca (2013) argues that crowdsourcing reduces costs as the organization does not have to employ someone and pay salaries, payroll taxes, benefits, thereby reducing overheads. Also, an employee might not be fully utilized during times with lower demand. Thieringer (2017) agrees that crowdsourcing can save time and money as it is significantly cheaper when people come together digitally. Thieringer (2017) also argues that crowdsourcing is a good strategy to gather valuable input from actual users of the product and that people can work on the project from anywhere in the world. Gasca (2013) confirms this by crowdsourcing maximizes the options and creativity by having thousands of individuals with different backgrounds give their solutions to a problem. Another benefit of crowdsourcing is that it is fueled by the use of web-based services, leading to more crowdsourcing platforms, better applications and structure, more users and more complex solutions (Doan, Ramakrishnan, and Halevy, 2011). However, crowdsourcing is not perfect, and it comes with drawbacks. According to Doan, Ramakrishnan, and Halevy (2011), it is difficult to evaluate the background of users and contributors to see if they are qualified. Thieringer (2017) agrees on the issue and argues that it can lead to abuse, manipulation and false feedback if the "crowd" is not trustworthy. Li, Weng et al. (2018) argues that a blockchain based crowdsourcing option could be the solution to these problems and a few more. Li, Weng et al. (2018) claims that a blockchain solution would handle the problems of privacy disclosure and single point of failure

which comes from having a centralized solution. Also, the solution would increase user security, service availability, increasing the flexibility with the use of smart contracts (ibid.). Furthermore, a blockchain technology would also solve the problem of abuse, manipulation and trust as a blockchain is transparent and immutable (the economist, 2015). Thereby, the usage of crowdsourcing is gaining momentum because of its many advantages and with the help of blockchain technology and smart contracts, it can become even better.

3.3.3 Trust in Collaborations

Another tool to gain a collaborative advantage is to ensure trust between the collaborating partners (Vagen and Huxham, 2003; Cahill et al. 2003; Dodgson, 1993). Fundamentally, the ability to trust is what lets entities accept the risk that comes with interacting with each other (Cahill et al. 2003). As collaborations are risky by nature, trust is the key required to initiate them, but also the key to making them work long-term (Vagen and Huxham, 2003). Dodgson (1993) agrees that trust is the key to successful collaborations but argues, in contrast to the other researchers, that a firm must first achieve a high degree of inter-organizational trust in order to collaborate successfully with other entities. This high degree of inter-organizational trust is characterized by having a community of interest, an organizational culture receptive to external inputs and lastly a widespread and continually supplemented knowledge among employees of the status and purpose of the collaboration. By achieving inter-organizational trust, collaborations can transcend individual relationships and avoid being disrupted by labor turnover and communication flaws between individuals (Dodgson, 1993). According to Cahill et al. (2003) and Vagen and Huxham (2003), the individual interaction is still important however, as it is the key to initiating trust between different entities. Vagen and Huxham (2003) also argues that in the later stages of sustaining the collaboration, it is important to agree on the aims of the collaboration meaning that there should be clear and agreed aims on why the collaboration exists, why different organizations are a part of it, what their roles are within it and finally what they expect from each other. Thereby, Vagen and Huxham (2003) and Dodgson (1993) agrees on the fact that nurturing successful collaborations involves being clear on the collaborative aims and objectives.

But how do you create the initial trust when starting a collaboration with a new entity? Cahill et al. (2003) argues that recommendations from trustworthy third parties can propagate trust in unknown entities by providing supporting evidence, but that is not always possible. Instead, a common strategy is to engage in small low-risk interactions over time in order to build a range

of commitments and bonds through social exchanges (Håkansson and Johansson, 1992; Dodgson, 1993; Vagen and Huxham, 2003; Cahill et al. 2003). Vagen and Huxham, (2003) provides a framework on how to initiate this process and how to continue building trust among entities (Figure 3.4). According to the framework, trust building is a cyclic process where each time the partners act in a collaboration and the outcome reaches the expectations, trust attitudes are reinforced. This can be confirmed by the research of Cahill et al. (2003) that previous outcomes of interactions are essential in creating trust. Håkansson and Johanson (1988) also argue that interactions over time are the key to building trust. When it comes to initiating trust when there is no previous track record to rely on, Vagen and Huxham (2003) argues that companies must be willing to accept risk, but the risk can be mitigated by using the small-wins strategy, which means engaging in smaller risk-free project to start the trust building loop in figure 3.4.

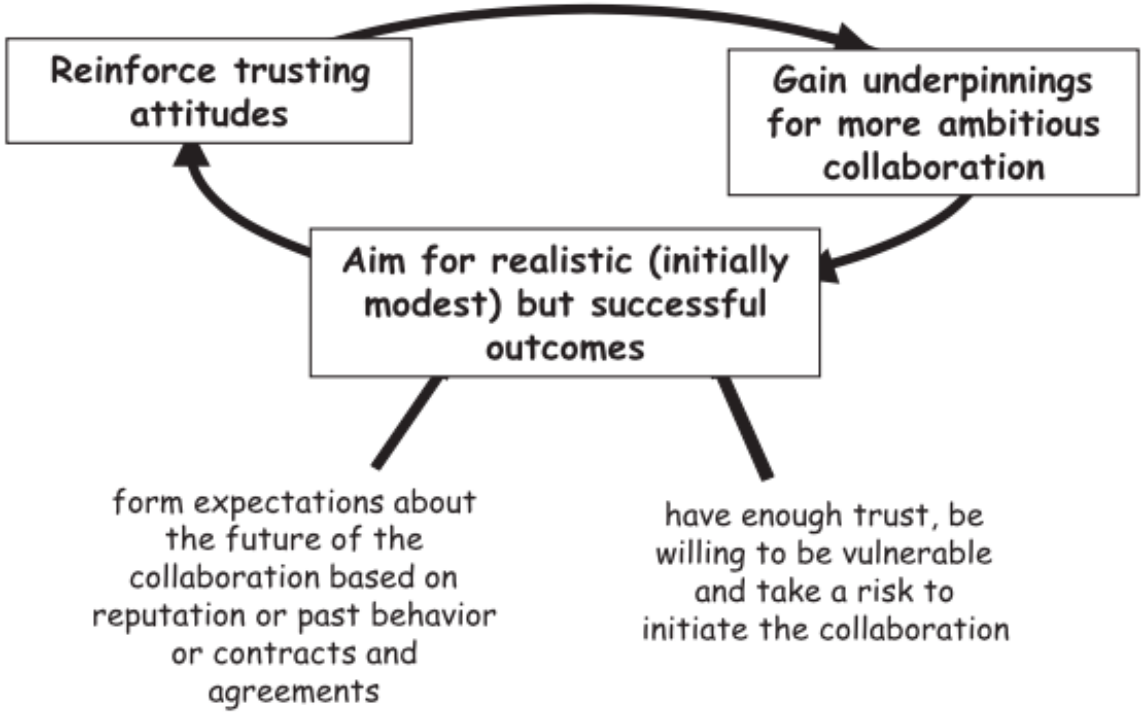

Figure 3.4: The cyclical trust building loop (Vagen and Huxham, 2003).

3.3.4 Communication in Collaborations

In order to have a good collaboration, good communication is essential. Rise (2018) argues that communication is the most crucial factor in collaboration as regular communication makes sure that all partners in a collaboration are on the same page and can work towards a common goal. Mahon (2017) agrees that you must be able to communicate in order to collaborate and continues with arguing that for communication to be effective, all the partners should be

communicating with the same tools to have all the information gathered in one place. However, even if the usage of digital tools for communication is growing, there is still a need for face-to-face meetings and interactions. According to Sage (2018), face-to-face meetings lead to deeper insights and develops transparency and trust while building a stronger business relationship. According to a study made by Hiltz, Johnson and Turoff (1986), it was found that groups in face-to-face meetings are more likely to reach agreements compared to groups communicating in computerized conferences. Thereby, communication is crucial in order for a collaboration to be successful and when possible, face-to-face meetings are preferred as they lead to more efficient decision making and increases personal relations and trust.

3.4 Summary of Theoretical Framework

The theoretical framework has discussed and combined theories in the areas of technological change, competitive advantage and collaboration in order to answer the research question of how a multinational organization can collaborate in a business development setting to gain a competitive advantage using smart contracts. Based on the theories above, starting with technological change, we know that new technologies such as blockchain and smart contracts face difficulties regarding adoption due to organizational barriers and that the solution is to create proof of concept by innovating. This can be related to the theories relating to collaboration, as collaborations are the key to innovate in the modern economy. In these collaborations, the key to success is to build up trust and a strong relationship. Finally, the theories regarding competitive advantage are used to distinguish how the benefits of collaborating and implementing blockchain technology and smart contracts could eventually lead to a temporary competitive advantage, either through a cost leadership or through differentiation strategy. Based on the knowledge from the theories above, we can compare this to the findings from the empirical data and answer the research question.

4. Methodology

This chapter will go through the methodology, which covers the ground for how this thesis was conducted used, starting with the research strategy and research design. This will be followed by a description of the methods used for collecting and analyzing the data. Finally, the quality of the research, such as validity and reliability, will be presented.

4.1 Research Strategy

4.1.1 Qualitative Approach

A qualitative approach has been chosen to conduct this research as it according to Bryman and Bell (2011) is the best way to achieve a deeper understanding of a subject by enabling the study to be more exploratory while using more flexible and open research methods. By allowing the research to be more exploratory and flexible, it increases the possibility of gathering unexpected data compared to using a quantitative approach where the parameters are usually predetermined. Also, according to Yin (2011), a qualitative approach studies the views and perspectives of people under real-world conditions while gathering data from multiple source of evidence in order to explain and give better insights into existing or emerging concepts. Therefore, a qualitative study has the characteristics to deliver insights into emerging concepts and technologies such as blockchain technology, something that was very valuable for this study. Furthermore, as a complement to the research strategy, an interpretivist perspective has been the basis for our epistemological position as researchers. By taking this approach, the aim of the research was to explore and understand the concepts of blockchain and collaborations rather than trying to change the way organizations are working with the concepts. Our research strategy therefore differs from a positivistic approach since interpretivism is a contrasting epistemology to positivism (Bryman and Bell, 2011). Instead, the research strategy focused more on a heuristic approach with an open-ended research question in order to find connections of new ideas in collaborations within blockchain technology.

4.1.2 Inductive Iterative Process

A qualitative research approach is typically associated with an inductive way of linking data and theory (Bryman and Bell, 2011). As the qualitative approach requires an analysis of responses, an inductive approach is a good way to gain increased understanding of the subject (ibid.). Also, according to Yin (2011) an inductive approach tends to let the data collected lead to the emergence of new concepts. This matches the qualitative approach that this research has followed in a way that it is initiated by reviewing existing theories while gathering data for

analysis and interpretation in order to add new concepts into the existing body of knowledge. To further aid into the analysis, the data was iteratively processed, meaning that the researchers went through the data repeatedly, backtracking several times to tie empirical findings closer to theory, refining the thesis as a whole (Bryman and Bell, 2011). This also helped the researchers to make more sense out of the collected data to come up with better concepts and reveal new themes (ibid.). Also, the iterative approach is important when dealing with a new technology such as blockchain as new theories and concepts emerge at a high rate, which is why reviewing the theoretical framework became necessary. The aim for the study was to have the approach of analytic induction, collecting data until there are no more feasible findings and the universal explanations of the subject are found. However, due to time restrictions however, this was not the case. Bryman & Bell (2011) also relates to this in the issue that students actively working with their theses risk trying to reach too far, covering too much ground in their dissertation, resulting in the engaged theory and analysis of collected data to be superficial in the end, which would be grounds for deficient final findings. Therefore, because of the limited time frame and the chosen research strategy, a narrative review approach was taken as it complemented the inductive strategy in creating new ideas and findings. The initial theoretical framework was therefore more focused on giving initial impressions than being completely exhaustive in theories that are to be used in the study. This research strategy correlates with the advice of Bryman and Bell (2011) who claims that a narrative review is the most suitable approach for qualitative research with a research strategy based on an interpretative epistemology.

4.2 Research Design

A multiple-case study was chosen as a research design, which is increasingly common in business and management research. As an extension of single-case studies, the multiple-case study strives to find multiple sources of evidence instead of only relying on one single case (Yin, 2011). The researchers then had a better possibility to make comparisons to find common aspects across the cases. The multiple-case study has the benefit of focusing on each case individually, thus generating solutions adapted for each case, with the extended possibility of finding general solutions. Therefore, with the advanced technology involved in the study and the need to adjust it to be of benefit to each company, the multiple-case study design has been chosen (Bryman & Bell, 2011).

4.3 Research Context

Through the initiative 'Coboom' by Stena, CGI, and Volvo Cars, student-industry collaboration was supported with the possibility of closer interaction and value from working together. The three companies were all interested in blockchain technology but perceived an issue in technological development and that even though capabilities may be known, the impact and application may largely be unknown. The initiative proved that these companies believed that students possess a knowledge and understanding of these technologies, and the possibility to develop interesting ideas about emerging technologies to the benefit of companies. Performing this study in collaboration with the 'Coboom' initiative, the impact and application of blockchain technology was researched to find value for Stena, CGI, and Volvo Cars through graduate students with good understanding of the technology and societal developments in a qualitative multiple-case study.

4.4 Research Methods

Qualitative research is the method of studying a subject with more focus on words and meanings rather than the quantifiable collected and analyzed data. In the qualitative method, the research is inductivist, constructivist, and interpretivist, but it does not necessarily have to be all of them. Having the flexibility to choose from the three research methods can be highly rewarding. The inductive view means to have theory generated out of research. The constructivist approach points to interactions between individuals being the groundwork of social properties. Lastly, the interpretative approach (or epistemological) refers to individuals understand the social world through interpretation of participants of the same. Compared to quantitative research, qualitative relies more on the point of view of participants, emergent theory generation, a dynamic process, contextual understanding, and a deeper dive in the data. This study relied mainly on the inductive and interpretative approaches for theory creation and understanding the setting. The qualitative interview process was chosen as it allows the researchers to get closer to the interviewees and allows for epistemological positioning (ibid.).

4.4.1 Narrative Literature Review

Finding literature and including it in the study was done mainly through the use of a snowballing approach, whereas the researchers initiated the search with general literature, adapting and reducing it towards more focused literature of the subject in question. From there, related literature was continuously found which would add value to the study. Mainly electronic databases were used to find literature as it allows for a faster process of finding interesting

pieces and to deselect pieces of less relevance. Physical library resources were not used in this study as the same and more could be found on electronic sources. For the study, the researchers did not use specific inclusion or exclusion criteria, with the focus on relevance of literature and citations, and to deem if it is to be used).

4.4.2 Micro-Ethnography

Ethnography matters for the study in how the researchers involve themselves with the participants that they study. In ethnography, immersing oneself in the environment and daily interactions of the participants yields the possibility of understanding the situations thoroughly. However, while this would take a considerable amount of time and effort, it would not be viable. A micro-ethnography is instead conducted, targeting a specific subject within the organizations.

In ethnography, the researchers can take either a covert role, or an overt role. Having a covert role means that the researchers does not reveal their intentions as they would if they were overt. In this study, the researchers had the natural decision of being overt, as the 'Coboom' collaboration meant that finding connections and persons of interest that were willing to participate was accessible from the beginning. In terms of participation, this study was executed with the researchers adopting the observer-as-participant role, being interviewers but not participants in the researched organizations (ibid.)

4.4.3 Interviewing

In relation to the qualitative approach, qualitative interviews in a semi-structured manner was used to gather data. According to Bryman & Bell (2011), using semi-structured interviews is good when fairly specific topics need to be covered, but the interviewee still has freedom in how to reply whilst new follow up questions can be added if needed. As the research question in this qualitative research regards a fairly new appliance, the interviewee needs to be free in their discussion but still limited to a certain set of questions to avoid diverting from the main purpose of the interview (ibid.).

4.5 Data Collection

According to Yin (2011), there are many challenges of performing qualitative research, where one of the mentioned challenges for researchers is to collect their own data. This correlates with the research of Bryman and Bell (2011) who also argues that gaining access to organizations and experts who can provide data is one of greatest challenges in qualitative research. Luckily,

the researchers did not experience these challenges as they were involved in a network that gave them access to technology experts from three different companies: Volvo Cars, Stena and CGI. Therefore, the researchers did not have to engage in strategies such as snowball sampling as we already had connections and interviewees available.

4.5.1 Gaining Access

Gaining access to the three cases, Volvo Cars, Stena and CGI, was not difficult since we had a close collaboration with all of the companies. Thus, our contacts within the companies could help us locate the people with the most relevant knowledge and expertise to participate in the interviews. However, according to Bryman and Bell (2011), just because you have made an entrée to the organization, you still need access to the actual people. The next objective was therefore to establish good relationships with these contacts in order for them to better understand our needs and expectations for the interviews in order to connect us with the right people. To our delight, we were invited to share an office with representatives from the companies in order to improve relationships and enable knowledge spillover effects. This lead to better collaboration and also easier access to people and data from the three cases. After engaging and discussing the research topic with the representatives of the companies, they could identify the individuals with the right expertise for the interviews. As the representatives were setting up the interviews, it was easier to gain access to experts who would have been hard to reach otherwise. Once the respondents were informed by a representative from their own company, it was straightforward from there. The respondents were contacted in advance and an interview was scheduled and conducted either in person or through conference calls.

4.5.2 Stratified Sample

In order to ensure that each case is adequately represented in the data collection, a stratified sampling method was applied. According to Bryman and Bell (2011) an advantage of stratified sampling is that it ensures that the resulting sample will be distributed in the same way as the population, which is needed to make a fair representation of the real world. Furthermore, it also ensures a wide range of interviewees and that all the necessary key respondents are included in the sample. Therefore, the research was designed according to a stakeholder analysis framework based on three main groups as well as one extra. The main groups were made out of the three companies that the research aimed to compare: Volvo Cars, Stena and CGI. The extra group consist of experts from outside the cases in order to get an external perspective on the topic. Also, to avoid comparing representatives with different expertise in the research topic,

the respondents were chosen after their expertise and roles. A demand was therefore that the respondents were involved to some degree in collaborations, business development, innovation and also that they had some expertise in blockchain technology. By only including respondents with first-hand experience in the question, the interviews became more relevant, ensuring a high-quality result.

Semi-Structured Interviews at CGI

Respondent role	Date	Interview mode	Duration
Project Manager	4/4	Face-to-face	01:03
Director	9/4	Skype	00:58
Head of Innovation	11/4	Face-to-face	00:55

Semi-Structured Interviews at Volvo Cars

Respondent role	Date	Interview mode	Duration
Innovation & BD Manager	4/4	Skype	00:49
IT Innovation & BD Manager	4/4	Skype	00:39
Innovation Manager	9/4	Face-to-face	00:29
Senior Innovation Manager	10/4	Face-to-face	00:40
Strategy Analyst	3/4	Face-to-face	00:43

Semi-Structured Interviews at Stena

Respondent role	Date	Interview mode	Duration
Chief Digital Officer	9/4	Face-to-face	00:47
Treasury Manager	20/4	Face-to-face	00:39

Semi-Structured Interviews with experts

Respondent role	Date	Interview mode	Duration
Innovation Expert	12/4	Face-to-face	00:45
Data Scientist	17/4	Face-to-face	00:24

4.5.3 Gathering Ethnographic Data

In order for the researchers to get a better understanding of the data collected, an approach of ethnographic data collection was applied. According to Bryman and Bell (2011), this is useful in order to get a better understanding of the participants and their social settings. As one can

only store and remember impressions to a certain degree, the researchers decided to collect field notes and recordings that could be used in a later stage to analyze the situation. To further enhance the understanding of the situation and settings, visual tools such as photographs and videos were taken when it was permitted as it can capture elements that could otherwise be missed.

4.6 Methods of Data Analysis

4.6.1 Grounded Theory

In qualitative research, grounded theory has become one of the most used frameworks for analyzing data. With the combined use of data collection from in-depth interviews and micro-ethnography, grounded theory becomes very beneficiary for the study, and was therefore chosen for the thesis. Using the theory, the process was to break down collected data into concepts and categories, with the intention for the end result being the creation of new theory from the iterative process. Through the methodology, a completely exhaustive approach on the data collected to find recurring themes, continuously verifying the empirical evidence.

4.6.2 Stakeholder Framework

With several different stakeholders included in this study, we applied a stakeholder analysis approach as it could become difficult to know on whose behalf the study is directed. With stakeholder analysis, the goal was to include the stakeholders that should be taken into account when making a decision, as well as the reasoning for why they should be included. With this, stakeholder analysis contributes to the thesis as a basic framework for the data analysis (Crosby, 1992).

4.7 Research Quality

Qualitative research is exposed to the risk of being influenced by the researchers own interpretations, Bryan and Bell (2011) claims that this perception might differ from what the participants are trying to mediate. Yin (2011) agrees on the risks involved with qualitative research and that the researchers world-view can be biased. However, both Bryman and Bell (2011) and Yin (2011) agree that this is an integrated part of qualitative research which cannot be fully eliminated. The researchers can only try to limit the risk as much as possible. The best way to mitigate the risk is to have good research quality, which means working with transparency and acting methodically (Yin, 2011). The researchers of this study have tried to ensure a high level of research quality by backing statements with evidence while documenting

the research so that it can be reviewed by someone external and objective. Also, by examining each case in a similar approach, the researchers have mitigated the risks of getting different or skewed results from using various methodically approaches.

4.7.1 Validity and Reliability

Validity and reliability are commonly discussed in all types of research, but it is believed to be extra important when doing qualitative research. Noble and Smith (2015) claims that qualitative research is usually criticized for lacking transparency while being a collection of the researcher's personal opinions, hence being biased. Validity refers to whether a measure of a concept really measures that concept while reliability refers to that the data gathered is stable and consistent in repeatable cases (Bryman and Bell 2011). Therefore, qualitative researchers must prove that the research has validity while also being reliable in order to make sure that it is trustworthy (Guba and Lincoln, 1994). However, Noble and Smith (2015) argues that unlike quantitative research, who can apply statistical methods for establishing validity and reliability, qualitative research needs to incorporate other strategies to reach the same result. Therefore, the researchers of this study have incorporated these strategies into the research. First of all, the researchers have acknowledged and accounted for biases in the sampling while conducting critical reflection to ensure sufficient relevance and quality of the data collection and analysis. Secondly, the researchers have engaged and discussed the topic and data with other researchers to mitigate the risk of research bias. Thirdly, in order to ensure credibility, the researchers have applied respondent validation, which means inviting the participants to confirm the transcripts of records so that they do not differ from the actual interview. Lastly, the researchers have tried to limit what Bryman and Bell (2011) calls 'internal validity' and 'interviewer bias' by conducting all the interviews in pairs while confirming that everyone has the same opinions regarding the results.

4.7.2 Ethical Considerations

According to Bryman & Bell (2011) ethical question are critical to discuss as they can disturb the integrity of the whole piece of research. Therefore, ethical questions cannot be ignored. Ethical questions come in many forms and shapes, which is why the researchers in this report have been extra careful when setting up the research strategy and design. By ensuring that the research is ethically performed, the researcher's results from the qualitative research method can become more trustworthy by ensuring high integrity. Relevant ethical issues that are commonly encountered in the area of business research is for example how the people

participating in interviews are treated by the researchers and what activities the researchers are engaging in with the interviewees (Bryman & Bell, 2011). Resnik (2015) agrees and adds to the importance as a researcher to ensure honesty, objectivity, integrity, carefulness, openness, respect for intellectual property and non-discrimination. The researchers of this study acknowledge that they have a great responsibility of being ethical in dealing with these questions and the aim has therefore been to avoid breaking any codes of ethics. To mitigate the risk of breaking any codes, the researchers have strived for informed consent in interviews by informing about the purpose of the study and to which extent the results are to be used. Also, the interviewees have been offered anonymity in order for them to be able to more freely express their thoughts and opinions.

5. Empirical Findings

This chapter will present the empirical findings from the interviews with representatives from the cases and experts in the research topic. It is categorized and structured after the cases of observation. The chapter is introduced with a brief description of the three case companies, followed by the background of the interviewees and how their opinions on the research topic.

5.1 Background

As this research is based on a multiple case study design, it contains data from different companies, experiences and settings in order to have a large variety of perspectives on collaborations and smart contracts. The topic has been studied from the perspectives of CGI, Volvo Cars and Stena, who all have different backgrounds and experiences. However, the representatives from the companies are all in some way involved in innovation, business development and collaboration activities to make their experiences comparable. Also, two professionals from a more scientific background have been interviewed in order to get an external perspective on the topic.

The empirical findings are based on ten topics that are the result of an iterative research process to answer the research question of how collaborations using smart contracts could lead to a competitive advantage for a multinational organization. The researchers compared theoretical success factors for collaborations to see if they were related to the benefits of using smart contracts and if those results could eventually lead to a potential competitive advantage. As a number of topics were generated initially, the researchers continuously went back to the research question to make sure that the right topics were used in the empirical framework, leaving the final 10 which were deemed to be the most relevant for this thesis.

5.1.1 Introduction to CGI

The first case of the multiple case study is CGI, a global IT solution provider. CGI has more than 40 years of IT experience and more than 70,000 employees (CGI, 2018). In a fast-moving economy with new technologies around the corner, CGI needs to have the right competences themselves to guide their clients. Their business model is therefore to stay close to their customers by creating a strong relationship through good collaborations. As the business model is focused on having close collaboration with clients, the organization is decentralized to have a more local presence. What separates the case of CGI from the other cases is that CGI is a

consultancy and service provider with focus on IT. Therefore, CGI can provide the perspective of a company with an experience in implementing new technologies and collaborating closely together with clients in business development.

Name	Position
Respondent C1	Project Manager
Respondent C2	Director
Respondent C3	Head of Innovation

5.1.2 Introduction to Volvo Cars

The second case of the multiple case study is Volvo Cars, a global car manufacturer. Volvo Cars has been around since 1927 and has around 38,000 employees (Volvo, 2018). Volvo has an innovative history and has produced many of the technologies that we use in cars today. What separates the case of Volvo Cars from the other cases is that Volvo Cars is a manufacturer and has the goal of being an early adopter in blockchain technology. Therefore, Volvo Cars can provide the perspective of a global manufacturer that tries to be an early adopter.

Name	Position
Respondent V1	Digital Innovation & Business Development Manager
Respondent V2	IT Manager Innovation & Business Development
Respondent V3	Innovation Manager
Respondent V4	Senior Innovation Manager
Respondent V5	Strategy Analyst

5.1.3 Introduction to Stena

The third case of the multiple case study is Stena, a global and diversified organization that are involved in shipping, oil, finance, and much more. Stena has been around since 1962 and has around 15,000 employees (Stena, 2018). The business is privately owned by the founding family. As Stena is diversified into a lot of different areas, the business is decentralized with an entrepreneurial mindset. What separates the case of Stena is that it is a privately owned, diversified and entrepreneurial organization. Therefore, Stena can provide a third perspective of a more decentralized and entrepreneurial organization.

Name	Position
Respondent S1	Chief Digital Officer
Respondent S2	Treasury Manager

5.1.4 Introduction to External Actors

In addition to the three cases that are studied in this research, external professionals have been included to collect relevant information. The respondents are from the field of research and can provide a different perspective compared to the business perspectives in the original cases.

Name	Position
Respondent E1	Innovation Expert
Respondent E2	Data Scientist

5.2 Results of Empirical Findings

5.2.1 Background

The value of the background of interview subjects relay the competence they possess. By including persons with significant backgrounds, it can later be discussed the weight of their answers in certain questions, where a blockchain expert naturally knows more of the technology than a manager with experience in collaborations. Questions in this area were intentionally wide to include as much of the interviewees backgrounds as possible, as well as their current roles in their organizations.

The search for interview subjects focused on experts in blockchain technology and managers with involvement in collaborations, and resulted in this, but the respondents generally had knowledge in complementary areas as well. Visible from nearly all respondents is the theme of experience or interest in innovation. An extensive majority either worked or had worked directly or indirectly with innovation. The second largest know-how of respondents is involvement in IT, with formal positions in IT, software engineering, and technology consulting. Relevant is also previous education in computer science and founding of an application development company. Moreover, several respondents had experience as managers, some mentioned knowledgeability in finance and noticeable is also entrepreneurship proficiency.

Regarding the roles in their respective organizations, the respondents from CGI have a common theme of being more directed towards technological solutions, mixed with management and innovation efforts. Participants from Volvo Cars display a much higher focus in their roles towards endeavors of innovation management, with additional work with IT. Roles of the participants at Stena include spreading knowledge of innovation within the organization, building up innovation teams from participant S1, and focus towards internal and external finance from participant S2. The external experts work with collaboration, networks, and specific knowledge tied to the technology.

5.2.2 Blockchain Technology

As previously discussed in the thesis, the emerging technology of blockchain has been argued to have numerous amounts of use cases and possibilities to change business models. Although these use cases are oftentimes so far only speculations, investigating progress and potential uses of the technology in companies could either prove the conjecture of possible practices, or that the technology is not as dispersed as argued it could. For this purpose, the respondents were questioned why they believe that blockchain technology is interesting for companies, what their current involvement in the technology is, and lastly their own organization's motives and long-term goals of pursuing blockchain technology.

Based on the interviewees answers on above questions, a mentioned opinion is that blockchain technology is believed to be in a hype or a buzz. The representatives at CGI believed that blockchain will be beneficiary for sharing economies, autonomous technologies, and for improving trust. Additionally, the technology was thought to be able to change future business models and how to do business through substantial benefits and efficiency gains, where current business models are slow and risky. A reasoning for the buzz is argued to be because blockchain is a direct threat to businesses today and there is a fear of being replaced by new emerging technologies. According to respondent V1 at Volvo Cars, blockchain technology is interesting because it has a number of good features such as decentralization, security, traceability, and can provide evidence for legal services. Respondent V2 concurred with V1 in that security through encryption, providing evidence, and decentralization being benefits, but also argued for storage and decreased transactional costs as additional benefits. AI-products and services is mentioned to gain from the technology. Further, verification of information and security thereafter is again supported by the other Volvo Cars respondents. V4 also had conflicting comments where the current safety level is argued to be good enough and that blockchain technology would

complicate more than benefit. The respondent continued by saying that the organization must mature more before the true benefits of the technology can be realized. Stena's representatives concurred that the technology will develop a lot in the future but added that it is more or less impossible to know for sure when. What is positively argued is that blockchain technology allows for middle hands in business to be removed, improvements in cybersecurity, and verification processes. However, adverse comments included that middle hands are on occasions preferable compared to not having them, and that standards within blockchain technology is needed for further development. Respondents within the external expert segment mentioned that a sought-after perk is increased efficiency and rapidness in collaborations, as well as decentralization, which has positive effects on immutability and causality issues of currently relying on a central partner.

When asked about their involvement in blockchain activities, the majority of respondents answered that they were in the process of researching the technology, trying to get a good understanding and increasing interest in their organizations. Respondents from CGI explained that they were promoting technology champions within the organization, focusing on blockchain mechanics and Business Model Innovation, and even being in early stages of consulting and advisory within the technology. In Volvo Cars, interviewees responded that they were mainly in the process of conducting pre-studies around the subject. V3 expressed involvement in a project about verification of information, but still being in early stages. According to respondent V5, the finance department has developed proof of concept for the technology but is unaware of the current progress. Respondent S1 from Stena conveyed that the importance is to get managers to start working with innovation and blockchain. The journey was argued to be more important than the physical tests of the technology. Respondent S2 had been investigating use cases in numerous areas but had so far not found any clear possible target.

The final question regarding blockchain technology was about the main motives and long-term goals. All respondents from CGI agreed that the focus of their organization is client centric. C1 explained that CGI wants to offer clients consultancy solutions, and in this case, offer blockchain solutions that the clients are in demand of. According to C3, the client centric focus also meant that the organization has to be well positioned in new technologies, as well as working together with clients to develop. At Volvo Cars, the focal point with blockchain technology development lies further into the future. The respondents believed in several use

cases for Volvo Cars, including car sharing, supply chain management, traceability, and security. Respondent V1 expressed a need for more efficiency in dealing with customers for the organization, where blockchains could be a potential solution. According to respondent V5, Volvo Cars wanted to be a first mover in the technology and has it as a long-term goal. Both respondents at Stena expressed that their organization does not have a clear strategy about the technology yet. So far, the focus has been to keep up with new developments and understanding what blockchain can do for Stena and their customers. Respondent S1 suggested that there is a considerable amount of potential uses for the technology and only creativity limits it, where maintenance of ships is an example. S2 pointed to trade finance as a reasonable goal and "low-hanging fruit" for Stena, but also means that the progress will happen at a comforting pace. The external experts answered this question from the perspective of how they believe companies should work with blockchain technology from there on. E1 explained that companies should strive for new ways to collaborate to bring new values to the business through blockchain activities, to enable value creation for users, partners, customers, etc. Respondent E2 offered a varied response where he argued that many companies research blockchain technology since it is a buzzword. He continued to explain that some companies may not need it, having no applications where it would be of sufficient benefit. Although, he did also mention that the technology can help the companies increase their security at least.

5.2.3 Smart Contracts

As an application within blockchain technology, exploring the knowledge diffusion of smart contracts within companies allows the researchers to go more into depth of possible use cases for the technology. Finding use cases for the technology then facilitates the prospect of discovering which changes and effects that smart contracts could have on business models, both incremental and radical. The participants were therefore asked how much experience they have regarding smart contracts, and how they believe that smart contracts could change their organization.

Respondent C1 explained that he had limited knowledge about the technology, only having read about it before. Respondent C2 argued for smart contracts by saying that it is a more flexible way to realize a traditional contract. Further, he explained that it allows for taking the most important information in a contract, making these into rules and applying these rules into code. Respondent C3 had had experience with early stage blockchain projects, touching upon smart contracts and working towards improving efficiency and enhancing automation.

Respondents from Volvo Cars generally had little experience with smart contracts, with only V1 responding that he had some knowledge through Ethereum, and V2 that the technology should be used in ecosystems and supply chain. He continued with saying that it seemed to be hard to get suppliers to start using these new technologies. S1 argued that he believes that smart contracts could help in making it possible for private persons to invest in ships and buildings, areas that Stena functions in. He also said that money can be returned with the use of the same tools, and that smart contracts will be the revolution of blockchain, but the focus must be on the output of the technology. E2 had experimented a bit with the technology, saying that it can be quite advanced but that the expression is in a hype today. He explained that it is just a contract and is therefore not revolutionary per say. The new thing is that it relies on blockchain technology, which has both pros and cons.

When asked how the respondent believe that smart contracts could change their organization, C1 answered that it could make CGI more efficient by making administrative tasks more automated, that it can increase trust through the immutability and by making the trust factor in business partnerships less of an issue. C1 believed that it is a way to strengthen collaborations, especially in small projects, but that it cannot fully replace human interaction. C2 explained that the biggest impact will be in the ecosystem and how companies interact with one another. Respondent C3 argued that the technology will aid four areas: Improving ownership of innovation and intellectual property, engaging people and increasing participation, driving innovations, and creating new ideas and values. Respondent V1 also argued that the business ecosystem is in focus of the technology and that smart contracts can shape the business relationships between players. In the process of identifying and evaluating new partners to collaborate with, the technology can facilitate. Lastly, V1 explained that Volvo Cars has buyers who go through a predefined buyer process, which can be changed with the technology. V2 agreed that Volvo Cars act in ecosystems, and with blockchain and smart contracts, much of business operations can be automated. The focus should then be on security aspects as more autonomous processes changed the whole business model. He also believes that some financial functions can be automated. V3 and V5 similarly explained that smart contracts will improve purchasing and increase automation and increase efficiency in many aspects. V4 believed that new business models will be generated out of the technology, perhaps through increased usage of shared economies and even the possibility of an internal currency. Respondent S1 described possible benefits as a new way of communication with suppliers and customers, and by working closer together with suppliers, delivering products and services together over a long time. S2

believed in storing contracts in a smarter way, but questions if there is enough value currently to use the technology. From the external experts, E1 explained that automatic processes increase efficiency, as well as improved access to conditions and information being gathered at one place. E2 commented that digitization in developed countries usually are far ahead and does not have as much need to smart contracts as developing countries where there could be traceability issues etc. that could be solved with the technology.

5.2.4 Diffusion of Innovation

The diffusion of innovations is important for organizations to understand in order to structure their business model for future technological shifts. It is therefore believed that companies must do their best to identify new technologies and innovations and understand how these factors might impact their business model. The interviewees were therefore asked to elaborate how they deal with the diffusion of new technologies, what barriers and challenges they might face, and how to overcome the barriers to implement new technologies in the organization.

Based on the statements of the interviews, it is evident that the diffusion of technology depends on the type of organization. The cases have different strategies of adopting new technologies as CGI is a decentralized IT firm, Volvo Cars is a centralized manufacturer and Stena is a diversified entrepreneurial organization. The external experts confirmed that diffusion of technology depends a lot of the type of organization. Early adopters are better at adopting new technologies as they are willing to take risks and try new ideas while larger organizations are generally hesitant to adopt new technologies because of the risk. However, CGI seems to have an advantage in adopting new technologies as they are an IT company, which means that they have a greater understanding of how technological solutions work. Furthermore, CGI has the strategy of creating competence groups for each new technology that can lead the progress of development while involving clients early on in the process to identify where value can be found. Volvo has a different perspective with an innovation department testing new technologies in an agile way and real implementations takes long time. As Stena is diversified and entrepreneurial, they wait for adoption until there are real prototypes. Therefore, the adoption process is different depending on how your organization looks like. However, there is consensus among all respondents across the cases that proof of concept is the key that leads to full diffusion of a new technology. The reason is that proof of concept provides evidence that the technology works, which is what the organizations want in order to fully invest. The external experts agreed that organizational and structural problems are the biggest challenges to

diffusion of technology. Respondent E1 argued that organizations are rigged to be stable, which is the opposite to taking in new technologies which makes it hard to integrate the two.

When it comes to the barriers and challenges to diffusion of new technologies, there is a consensus among all the cases that the main obstacles are structural, organizational and managerial problems. Respondent V3 exemplified this by saying that Volvo is working in the same way as in 1927, the structures are imprinted in the walls of the organization. Stena agreed that it is the effect of the management of an older generation and CGI points to organizational and structural problems and that there is a built-in resistance in most organizations. Respondent C2 argued that the logic follows the motto "why change something that works?". The only difference among the organizations is Stena, which has diversified and decentralized organization. It is therefore harder to make joint decisions and implement a technology across a widespread organization.

When it comes to the barriers to the diffusion of blockchain technology, there is a consensus among all the cases as well as the external experts that the organizations are not ready for the technology yet. CGI argued that the blockchain technology does not have a natural home in the organization, which makes it hard to adopt. Respondent C2 argued that the impact of the technology is big, which makes it even harder to adopt. Volvo argued that the problem is that the technology is too unknown at the moment. Lastly, Stena argued that the organization is just not ready for the technology.

So how do you solve the challenges of diffusion? It is evident that it all depends on proof of concept. Volvo and CGI emphasized the importance of targeting and convincing the top management. Respondent V3 argued that the rigidness of the organization requires top-to-bottom actions for things to happen. But with or without top management, all respondents agreed that if proof of concept is created and shows that it provides value to the stakeholders involved, it will be adopted. Promising words about how great a technology can be being not enough. Therefore, as respondent E1 explained, start small with initial successful projects to find the proof of concept.

5.2.5 Collaboration

Collaborations has become a more and more important part of doing business. It is therefore believed that companies must do their best to create new collaborations and nurture existing

ones in order to stay competitive. The interviewees were therefore asked to elaborate their thoughts on collaborations, what barriers and challenges they might face, and how to overcome the barriers to have successful collaborations.

Based on the statements of the interviews, it is evident that all respondents believed that collaborations are vital for staying competitive and surviving as an organization since it is impossible to work alone today. The respondents gave many examples on why it is better to collaborate than to work alone. Both CGI and Volvo argued that it is too costly to do everything by yourself, so by collaborating it is possible to lower costs. Also, collaboration leads to multiple competences working together, thereby increasing efficiency. Stena agreed that combining resources and collaborating creates win-win situations and that it is necessary for building a good future. Furthermore, respondent C2 explained that experience from other organizations is very useful because even if organizations are in different industries the problems faced are usually very similar. Another benefit with collaborations that was brought up by many of the respondents was that it is needed to create a seamless experience for the customer. Respondent V1 argued that it is no longer possible to create stand-alone services, business models must be developed as a part of an ecosystem where the customers experience needs to be seamless, which cannot be achieved without collaborations. The external experts confirmed that collaborations are indeed important, that they help organizations getting faster from point a to b and that collaborations are the key to creating a seamless experience for the customer.

Although the need to collaborate was evident among the respondents, it was equally evident that collaborations are limited by a large variety of challenges and barriers. The most common challenge is that expectations, motives and goals vary among the partners. Respondent E1 argued that different goals, agendas and historic background can cause clashes in the process. Another challenge is the lack of trust. The organizations want to protect their own business which sometimes can be an issue when sharing data with potential rivals. In Stena however, one of the biggest challenges is the limited resource of time. Respondent S1 called it “time-anorectic departments” and that employees spend most of their time in meetings, which is consuming a lot of time. Luckily, the respondents agreed that there are ways to overcome the challenges. They all argued that the main solution is to decide in advance and be clear on what needs to be done, how to do it and when to do it. Everyone needs to understand the purpose of the collaboration and the expectations needs to be on the same level. Although, according to

respondent C2 this required long and time-consuming negotiations. Respondent V1 added that in order to be able to collaborate efficiently, you need to develop an internal collaboration strategy so that everyone in the organization knows the collaborative strategy. Respondent E1 agreed on this by saying that the purpose and strategy of the collaboration must not only be clear externally, but also internally. Respondent E1 continued with mentioning that having balanced power between all the partners is also important for making the collaboration work efficiently without disputes, as the balance can become skewed if one partner tries to control the others in a collaboration.

A discussion brought up by CGI was the collaboration form of crowdsourcing. Both respondents C1 and C2 argued that crowdsourcing is a good alternative for short-term collaborations as you can skip the discussions, negotiations and relationship building. Respondent C2 continued by explaining that if you have the initial rules and conditions set for joining the collaboration, smart contracts could be used to make onboarding of new partners much faster.

5.2.6 Communication

Communication is one of the success factors behind building a good relationship and creating a good collaboration. The interviewees were therefore asked to elaborate how they communicate in collaboration, what settings they prefer and how important it actually is or if it could be replaced with a technological solution such as smart contracts.

Based on the statements of the interviews, it is evident that all respondents believe that communication is crucial. However, the way of communicating differed depending on the situation and type of collaboration. In a crowdsourcing example, the need for communication is less as the need to build a relationship is lower, said respondent C1. Although, all the respondents across all cases could agree that face-to-face communication and meetings is always preferred if possible. Respondent C1 argued that it creates a sense of trust while the individuals in the collaboration can get to know each other. Respondent V4 agreed and said that communicating face-to-face creates the feeling of working as a team. The only drawback with face-to-face meetings is that it is not very time efficient. The respondents mentioned other options as well, such as meetings over Skype, telephone, emails and virtual conference rooms.

When asked how important these meetings actually are, there was a strong consensus that these meetings are very important, at least in the initial phase of a collaboration. Respondent V2 argued that in innovation and business development collaborations, the meetings are needed to discuss problems and clarify details. Respondent S2 argued that it is needed in order to have discussions and give feedback, which was agreed on by respondent V5 and C2. However, when the initial phase of the collaboration is completed, the need for face-to-face meetings becomes less important. Respondent V3 argued that after the initial phase, sync-meetings every second week works as the only communication. Respondent S1 agreed that after a while there is not a need to meet every week and face-to-face can be replaced by digital meetings etc.

But could these meetings be replaced by smart contracts? There were mixed responses and no evident result to this question. The respondents of CGI, Volvo and Stena were not sure that it would work and that it depends on the context and type of relationship. The majority of these respondents claimed that these kinds of collaborations are too dependent on interacting and creating personal relations. Respondents V2 and V5 argued that smart contracts are better suited for mobility services and business transactions with high frequency. According to respondent C2, the conditions in a collaboration are too unclear in the beginning to be able to implement a smart contract. But once everyone in the collaboration knows their roles and functions, respondents C1, C2 and C3 all agreed on that smart contracts could be used to automate the process of check-up meetings, thereby increasing efficiency while also increasing transparency and trust. Respondent E1 agreed on this by claiming that some parts of business development should be face-to-face, but some parts could be automated with smart contracts, which would make the collaboration more efficient. Respondent E2 claimed that there is a lot of bureaucracy, intermediaries and unnecessary paperwork that could be automated with the help of smart contracts while increasing traceability and efficiency. This was something that respondent V4 could agree with, that following up protocols, stage-gates etc. could be made easier by gathering all the relevant information in one place. Respondent V1 also agreed on that in an ecosystem economy, a blockchain technology such as smart contracts can be used to increase traceability, transparency and trust, which can be a problem when initiating a collaboration with smaller players without reputation.

5.2.7 Documentation

When companies collaborate and communicate with one another, the process of documentation and transferring of information is important. However, the situations in which this is happening

have different levels of sensitivity involved, where some tools of communication may be less safe than others. To investigate this, the respondents were asked how their documentation process works, how information is transferred between firms, and if they believe that smart contracts could improve these functions in any way.

When asked how their documentation process was handled, respondents at CGI answered that they have a lot of structure around the processes and that storing and securing the data is critical. The processes are tightly controlled and administrative by nature, as well that the results of the documentation process are good. However, the "how" in the process could be challenged to be done in a better way. The importance is not to lose money by having bad processes. C2 added on that they either adopts to client's structure or vice versa. Respondents at Volvo Cars answered that the process is done by using digital solutions and hard copies and stored on SharePoint or OneNote. The tools offer both benefits and drawbacks where the use might be easy but connecting and sharing information is sometimes complicated. An issue with documentation is intellectual property. Since intellectual property is so important for Volvo Cars, security around it is high and does not allow as flexible sharing of information as sometimes needed, something both V1 and V4 would like to be improved. Respondents at Stena answered that documentation is done differently between suppliers and companies, and that it is manually saved. S1 also added on that documentation and maintenance would be excellent with smart contracts. E1 mentioned that he does it in a very ad hoc kind of way. He continued with explaining that if a project grows, you need platforms to gather and centralize information in order. There is a need for more efficiency, having information at one place, accessing it, and a quicker knowledge transfer process. E1 also acknowledged smart contracts as a potential solution for this.

Next, respondents were asked how information is transferred between firms. At CGI the respondents answered that they use different solutions depending on context, and that sometimes it is hard with solutions between companies where a lot of people are involved. C1 mentioned that they use email, but that it is not secure enough at times. Participants from Volvo Cars answered that they usually send emails for digital versions and posting printed copies, as well as giving out access to SharePoint or similar solution when it is needed. It is mentioned that some of these ways are definitely not the most optimal solutions but are the best ones in use at the company currently. S1 responded that he sends encrypted mail at times which works but having a blockchain based solution from the beginning would be helpful. Respondent E1

explained that he tries to work with different tools such as email, slack, and other digital solutions.

Lastly, respondents were asked if they believe that smart contracts could be used to improve these functions. Altogether, respondents at CGI were positive to the statement, stating that the security aspect of smart contracts is underestimated, whereas a function is to have a built-in encryption in the core, which C2 explained as a very powerful mechanism. Continuing, C3 added on the benefit of being able to classify information in different ways and trusting the information and trusting the people accessing it. Given the same question, respondents at Volvo Cars were also positive to it, answering that it should be able to improve the functions. V3 explained that it could make the process more efficient and possibly combine some meetings with the help of smart contracts. At Stena, the question was faced with two different opinions. S1 believed that it could if it is used in the correct way. S2 argued and it could be possible, but that simple transactions already use good processes and non-standardized transactions are too complicated and not frequent enough for a smart contract solution. Further, he said that a marginal benefit is not enough without an underlying critical mass. Continuing on, E1 argued documentation and transferring of information has a high value from a business development setting and that there could be a lot of value to gain from a potential solution. Respondent E2 explained that it could improve but that it depends. Lawyers would enjoy it and it could help to overcome the inflexibility of making new contracts, which could be done artificially in the future according to E2. However, it cannot change the current contract, but a new one can be made.

5.2.8 Trust

With the increase of collaborations in business, trust becomes more important to be able to work and share data, intellectual property and profits. It is therefore believed that companies must do their best to ensure trust in the ecosystem of businesses that they deal with. The interviewees were therefore asked to elaborate their thoughts on trust, how to create trust when it is not there and if smart contracts could be used to enforce trust when it is lacking.

Based on the statements of the interviews, it is evident that all respondents believed that trust is very important and that it is the foundation of every collaboration. Respondent E1 argued that the lack of trust is the reason why many collaborations fail. Other partners might have different agendas, so trust in needed to ensure that everyone works towards the same goals. But

the necessary trust is not always there from the start, so it has to be created somehow. Many different strategies are brought up on how to create trust, but the strategy which is mentioned in all cases is to build a personal relationship. Respondent S2 argued that the best process is to start collaborating in small transactions and then the value can increase over time as the trust builds up. CGI is providing another tool for providing trust, which is transparency. Respondents C2 and C3 argued that it is important for the partners to be transparent on what they can do in a collaboration and also be transparent on what they do once the collaboration is live. Respondent C2 added that the transparency needs to be trustable as well, which is where blockchain technology can be useful. This is something that respondent V1 agreed on, that blockchain and smart contracts can create trust if it is lacking. Moreover, respondent C1 mentioned that recommendations from others can provide trust and V5 claimed that it is the job of the CEO to create trust between the partners.

When the respondents were asked if smart contracts could be used to improve trust, all the respondents were positive and agreed that smart contracts could improve trust. However, smart contracts could not replace trust fully, only enforce it. Respondent E1 claimed that technology will never be able to replace a real lack of trust. Regarding the improvements on the other hand, there are two user cases that are brought up in all of the cases. The first one is regarding immutability and transparency and how smart contracts can lead increased trust in a collaboration. Respondent V3 argued that with smart contracts, information cannot be manipulated and V4 agreed that this would lead to more trustworthy information. Respondent E2 added that if someone would violate a smart contract, it would be known to everyone involved, which is good for ensuring the trust. Also, respondent V2 argued that transparency and immutability would simplify checking the reputation and track record of suppliers etc. that you want to collaborate with. The second user case brought up by a large share of the respondents is the short-term collaborations. Respondent C1 argued that there is not always time or need for building up long-term relationships from the start and test them. In these situations, smart contracts could be used to automate the onboarding process which would save time and make it more efficient. Respondent C3 agreed that this would lead to increased efficiency and innovation instead of worrying about trust. Respondent V1 also agreed by saying that smart contracts might be able to make it easier to establish relationships more autonomously. Respondent S2 also thought that smart contracts would be useful in the beginning of a collaboration when you do not know each other. Moreover, there are other examples of how smart contracts can increase the level of trust in a collaboration. Respondent

E1 argued that arranging so that partners do their parts in a collaboration, such as solving that payments arrive in time etc. which means that the partners do not have to worry about such things. Respondent E2 argued that contracts today require lawyers, which costs a lot of money and takes a lot of time, which can be replaced with smart contracts. So, in general, you cannot replace trust, but you can enforce it.

5.2.9 Competitive Advantage

By completing the interview up until now, participants have had time to think about the possibilities of blockchain technology and smart contracts in different settings. By asking the question whether or not they believe that any kind of competitive advantage could be a result of usage of the technology allows for a more in-depth view of the usability and potential currently and in the future, or if it only is a hype waiting to go under.

Based on the statements from the interviews, participants had a lot to conclude in this question and let to a wide array of answers. C1 answered that he does believe it will lead to an initial competitive advantage, but not once everyone uses the same technology. He argued that the technology would allow for having collaborations with partners that you otherwise would not have, reduced costs of setting up collaborations, being faster to market, and increased flexibility and speed. C1 continued by saying that use cases are probably better for smaller companies that does not rely as much on reputation. Additionally, bilateral collaborations are extra risky but can be eased with smart contracts automating collaborations and processes. It also opens up the possibility to subcontract skills to solve problems instead of hiring people. C2 also argued that it can lead to a competitive advantage, but mainly since the world is moving faster and faster, resulting in companies having less time for checking and controlling, which can be argued as non-value creating activities. The technology can get the verification process done faster, which would be of great benefit. C3 is slightly more hesitant but explained that if a solution that helps the client be more efficient and worrying less is of value. Additionally, new ways of doing things, new pricing models, and more trust in using products, can be a positive result of the technology. Lastly, he argued that many services today try to squeeze in a lot of functions to satisfy everyone, which he believes that smart contracts can do better. From Volvo Cars, participant V1 believed that the competitive advantage is limited as it will become the standard in the industry as many companies has the possibility of adopting and providing the solution. However, he did argue that in the B2C area, there is a higher chance to gain a competitive advantage as smart contracts can provide new experience and services in unique ways. V1 also

believed in benefits in collaboration and business development areas, but that it depends on the readiness of the organization to do business with the help of the technology, not everyone has those capabilities. V2 did not believe in any competitive advantage, saying that the technology is currently more focused on standard work and that it is not intelligent enough for more advanced tasks, but that it could change in the future. Participant V3 added on that if it could improve efficiency, it would be a big benefit. V4 shared a similar view with V2, arguing that with the current business model, it will not lead to any competitive advantage, but perhaps in the future. He continued by saying that once shared cars are in use, smart contracts might be a mode of keeping it all together. Lastly among the participants from Volvo Cars, V5 explained that it absolutely can result in competitive advantages, especially if you can increase efficiency by making it more autonomous or use it to provide intellectual property protection. However, he did add on that the technology is not mature enough yet, and even increasing efficiency is not quite in reach yet. Respondent S1 argued that it could mean an advantage, but it is right now about timing for the technology. S1 believed that blockchain technology will take off within 5-10 years, and it is then that companies need to be ready for it. S2 shared a similar view, saying that it is important to not be behind in the developing of the technology, that one should stay close to the top to not risk being in a competitive disadvantage. The respondents in the external expert segment both stated that it in some cases would lead to an advantage. E1 argued that automating processes leading to more efficiency between firms is one way to do it, as well as making a slimmer and faster innovation process would help companies faster to market. E2 explained that for the technology to lead to a competitive advantage, companies need to look at what they can gain which they did not have before. The technology being application specific, some companies would gain an advantage by adopting a certain solution, while others already have solutions that are good enough and would not create additional value.

5.2.10 Personal View

As a finishing segment, the participants of the interviews were asked if they had any other suggestions regarding the technology and collaborations, and if there was anything they were thinking about that the researchers had missed.

Statements for the suggestions for smart contracts and collaborations question from C1 was that there are big cultural differences that affect collaborations, something that he believed that smart contracts should try to solve by lowering differences between firms and increasing trust. C2 mentioned that he thinks a neutral third party that parties in a collaboration could rely on

for stating the clearly defined rules would be beneficial. C3 argued that finding a client experience, improving an existing one, or finding user cases is the primary goal of the technology and solution. Respondent V1 argued that they need proof of concept of how blockchain and smart contract could be used. He continued by saying that companies today are not ready to implement yet. V2 explained that collaborations are related to feelings, which means that the technology has a long way to go before being fully usable. Respondent V3 argued that smart contracts can be quite complicated and would require that those setting up collaborative projects has an understanding of the contracts and definitions, as well as the outcome. V5 stated that it is not easy to monitor processes and suppliers at all times, and that the technology should aid in it. He also added on that they need more standardization to increase efficiency, wanting smart contracts to solve that too. S1 believed that the public sector could benefit from the system, as well as insurance companies to lower insurance costs. Respondent S2 argued that the technology should not be done over-complex and that the finance department focuses on cutting costs, being cost driven instead of revenue driven. Additionally, he said that it would be helpful if the technology could help in cutting costs and increasing security in documentation management. E2 stated that there are drawbacks to the technology. The number of transactions is an issue where one cannot have that many transactions per hour. Secondly, he said that proof of work is based on consensus, discussing that more than 50 % usage within an organization is required for the solution to become that favored one. It does however take a lot of energy and very high costs, and he is trying to find alternative solutions.

When asked if there was anything that the respondents though the researchers had missed, C3 mentioned that it is a big challenge for companies to be able to perform the massive change needed in order to adopt the new technology. Respondent C3 concluded that the ecosystem of the smart contract is important to understand. V3 argued that there could be both internal and external collaboration as use cases for the technology. Continuing to explain that machines could be facilitated to communicate with one another. V5 also argued that smart contracts could be used for machine-to-machine interaction, as well as there being opportunities in B2C in the future with the technology. Respondent S1 expressed that steaming services is an area that should be looked into with the technology, and that the time to act on blockchain technology is important once more. Further, he said that collaboration is a big part of the technology and timing of it, along with the choice of public, private, or consortium blockchain. E2 concluded by stating that the technological knowledge of smart contracts and blockchain exists, but what

is required is to involve lawyers, economists, and customers to develop the solution further, and that that is currently a big problem.

6. Analysis

In this chapter, the empirical findings and the theoretical framework are combined and compared to find answers to the research question. The chapter is structured according to the same themes as in the empirical findings, excluding background and personal views, as they are not comparable to the theoretical framework.

6.1 Analysis of Blockchain Technology

Based on the empirical findings, it becomes evident that respondents express a wide variety of thoughts about blockchain technology and its use cases. However, respondents also mention several factors that are less than positive for the current use of the technology. Literature mentions several use cases for blockchain technology, whereas several of these which are mentioned in background sources are also found in the empirical findings. Ben Dickson (2016) describes decentralized IoT in Decentralizing IoT Networks Through Blockchain, with the meaning that IoT faces major issues regarding the centralized ecosystem when it grows in size. Empirical findings proved that current companies are interested in the blockchain solution making use of decentralization, storage, decreased transactional costs, increasing efficiency, and immutability. Joseph White (2017) describes mobility services in Blockchain Technology Moves into Car Sharing, Mobility Services, where possible uses for the technology involves facilitating vehicle ownership services, logging vehicle use, and influencing insurance costs. Empirical findings show on similar interests in sharing economies, autonomous technologies, efficiency gains, changing future business models, security, traceability, and verification. Jeroen Bulters and Jacob Broersma (2016) describe in The Benefits of Smart Contracts about the self-enforcing and self-executing contracts and their potential benefits. Empirical findings found shared areas of interest from respondents in improving trust, business model innovation, security, removing middle hands, and immutability. Michael Crosby et al. (2016) describes in Blockchain Technology, Beyond Bitcoin about the usefulness of attestation within blockchain technology. With this, secure timestamping, creating content files, and document registry can be obtained. Empirical findings proved that respondents had seen these functions as valuable as well, mentioning security, traceability, encryption, storage, verification of information, and efficiency.

Brought up by respondents is also the belief that blockchain technology is a hype, a reasoning for it being as a direct threat to businesses and seen as a possible emerging technology that could move market shares rapidly in the respondent's view. Additionally, current safety levels

are argued to be good enough in some situations, meaning it would be wasteful to invest in new technologies already. Taking this together with the areas which respondents see opportunities and including challenges of blockchain technology that Song Woochul et al. (2016) explains in Advantages and Disadvantages of Blockchain Technology, there is an understanding that companies should create an understanding of the possibilities of the technology.

Continuing with the discussion regarding the involvement of the respondents from the three companies in blockchain technology, a trend is clearly displayed. Even though the respondents see areas which in they find value, the uses within the companies are far from complete solutions. Out of CGI, the current progress is explained as in early stages and in the process of becoming something. Volvo Cars describes similar situations where they are conducting pre-studies, being in some early stage projects, and that they supposedly have developed proof of concept within the finance department, but the respondent was unaware of the current progress, implying no major breakthroughs. Stena mentioned importance in managers starting to work with innovation and blockchain, previously investigating uses, but also that they have not found concrete targets yet. The Gartner Hype Cycle (Gartner, 2017) explaining maturity and adoption of technologies, as previously stated in the theoretical framework, positions blockchain between phase 2: 'Peak of inflated expectations' and phase 3: 'Trough of disillusionment'. Comparing the hype cycle to empirical findings, it would explain that blockchain is full of expectations, but now starts to be limited by the actual use case findings, which are few. Gartner's expectation is that blockchain technology will have mainstream adoption within 5-10 years, which seems to fit the current development in respondent's companies. To further solidify this, the answers that respondents gave regarding their companies' main motives and long-term goals had the characteristics of fairly unobtainable any time soon. Respondents at Volvo Cars expressed that want to be a first mover within the technology, but also stated that their focal point lies further into the future. Respondents at Stena stated that they do not have a clear strategy and focus lies on keeping up with the technology. Respondent E2 who had more insight in the subject, argued that the buzzword of blockchain means that some companies have high hopes and seek to use the technology, but they are actually lacking any applications which would benefit from it. This further agrees with Gartner stating that companies are in early stages and in some cases, even suffer from disillusionment about benefits of blockchain technology.

6.2 Analysis of Smart Contracts

The theory regarding smart contracts state that the technology is meant as a program that facilitates execution or negotiation of an agreement, with the added function of being self-executing, self-enforcing, partially or completely. Criteria that is fulfilled by another part leads to the contract automatically executing and performing pre-specified actions. With the security aspect of immutability, both security and trust are potentially increased. However, due to the immutability, the contract cannot understand user intent, making it inflexible once created (Bulters & Broersma, 2016; Kückelhaus & Chung, 2018). Findings from empirical data conclude that respondents see automation, increased trust through immutability, and strengthening collaborations, mainly in smaller projects, as some of the potential benefits from smart contracts. Further, company interactions, engagement in collaborations, and shaping business relationship with new and old partners is mentioned as possibilities. Both theory and empirical data share stated functions in immutability, security, and trust as helpful for companies and possible solutions to real issues. Respondents do however state expected functions in autonomous functions changing business models, general business model innovation, and improved access and centralization of information for more efficiency. Theory mentions transparency as a function that facilitates access improvements, and other benefits of smart contracts could potentially lead to business model innovation.

Are these benefits realizable with regards to the current knowledge in blockchain technology as a whole? Empirical data shows that respondents' experience in smart contracts is also limited, sharing similar development as blockchain technology. Although several of respondents had some knowledge in the subject, none had completed more than initialization of projects, without complete user cases. Based on theory and empirical data, the Gartner Hype Cycle (Gartner, 2017) is viable to explain the probable development of smart contracts within companies as well. With organizations being seemingly inexperienced and immature as of yet with the technology, late phase 2 or early phase 3 of the Hype Cycle should be explainable causes of the development. Therefore, the uses that companies see in the technology are more or less possible at some point, but with the lack of maturity and a need to be careful, it should probably be a few years of development before it takes off.

6.3 Analysis of Diffusion of Innovation

Both theory and the empirical data underlines that the diffusion of innovation depends on the type of organization and how it is structured, which is why it is important to know how it affects

the adoption of new technologies. According to theory (Tidd, 2010; Robertsson, 1967), by understanding how the diffusion process works organizations can develop better and more realistic business plans. As an example, both theory and the empirical data agrees on that early adopters are better at adopting new technologies as they are willing to try new ideas while large organizations are generally hesitant to adopt new technologies because of the risk.

The discussion continued with the barriers towards diffusion of innovation. What separates theory and the empirical data is that the theory brings up economic and behavioral barriers which are not brought up by the empirical data, while the empirical data emphasizes managerial problems as a main barrier. However, the main problem that was identified by both sides were the organizational and structural problems. According to the theory (Ohr and Mattes, 2017; Brocks, 2017), the business units of the core organization are designed to work with incremental innovation and have a risk-free way of doing business, allowing zero mistakes. Thereby, the organization is not designed to create leap-frogs and explorative innovations, which creates the internal chasm of innovation. This is further strengthened by the empirical findings where it was stated that organizations are rigged to be stable, which is the opposite of taking in new explorative technologies and therefore it becomes hard to integrate the two. When it comes to blockchain technology specifically, the main barrier is according to the empirical data that organizations are not ready for the technology. This relates to the theory (Gartner, 2017), which claims that blockchain technology is entering the third stage of the Gartner hype cycle, meaning that experiments fail to deliver the expected results and there is a lack of user cases. The actual benefit of the technology will come in the future when the organizations are ready for the technology.

So how does an organization get around the barriers towards diffusion of innovation? Both theory and the empirical data underlines that it comes down to creating proof of concept. It is evident among both sides that there is an internal organizational chasm which is controlling the rate of diffusion for new innovations and to cross it you need proof of concept that it will provide real user cases and value to clients and organization. The theory (Ohr and Mattes, 2017; Moore, 1999) argues the proof of concept needs to be used to convince the senior leadership with a proven track record of an innovation and that it has a clear advantage to the existing solution. This relates to the empirical findings where there is consensus of targeting and convincing the top management because the rigidness and organizational barriers requires top-bottom actions for diffusion to occur. Once the chasm of innovation is crossed, there is a

"snowball" effect of adoption and it becomes widely spread across the organization. Therefore, the empirical data suggests that it is important to start small with initial successful projects to find the proof of concept that can convince the top management and start the "snowball" effect.

6.4 Analysis of Collaboration

Both theory and the empirical data underlines that collaborations are crucial for doing business and staying competitive as it is impossible to work alone today. The theory (Schilling, 2013) even claims that it is extra important for high-technology organizations to collaborate today, which is true when looking at CGI who is doing all their work in collaboration with clients. Regarding the benefits of collaborating, the theory and empirical data agree that it can lead to lower costs, lower risk, and better innovations at a faster rate. Having many different competences working together also leads to better efficiency and thereby the possibility of being faster to market, increasing the chance of achieving an early mover advantage. A good insight from the empirical data that was not brought up by the theory was that experience from other organizations is very useful because even if organizations are in different industries the problems faced are usually very similar. Both theory and method also agree that innovation needs to happen in networks, but the empirical data stretches this even further saying that networks are not only good for sharing experiences, but also more and more to create a seamless experience for the customer in the ecosystem of businesses. It is no longer possible to create stand-alone services; business models must be part of this ecosystem which can only be achieved through collaborations.

Although there is a need for collaborations, they are not risk free and there are many challenges involved. Both the theory (Schiling, 2013; Dodgson 2014) and empirical data agree on the most common challenges in collaborations, such as partner selection, different agendas and future goals, and structural problems such as historic background etc. Another challenge was that was evident from both theory (Dodgson, 2014) and empirical data was that organizations wanted to protect their own business in the case of data sharing, degree of control, sharing rewards and being vulnerable for malfeasance. In relation to this discussion, lack of trust was brought up as a big challenge in the empirical data, as it is the foundation of the need of wanting to protect your own business. Moreover, one challenge that was emphasized by the theory was cultural problems, such as language and geography. This problem was however not found in the empirical data even though all the cases are individuals working in global organizations.

Fortunately, there are solutions to the challenges discussed above. Both theory and the empirical data underlines that choosing a partner that has a strategic fit and a resource fit so that everyone in the collaboration strives towards the same goal and can complement each other's resources. Also, everyone needs to understand the purpose of the collaboration and the expectations need to be on the same level. This is easier said than done, and the empirical data shows that the process is a lot more time consuming and difficult than what it seems according to theory. A solution that is discussed from both theory and the empirical data is having a predefined internal collaboration strategy. The theory (Dodgson, 1993) calls this inter-organizational trust and includes having a community of interest, an organizational culture receptive to external inputs and lastly a widespread and continually supplemented knowledge among employees of the status and purpose of the collaboration. This is further strengthened by the empirical data which claims that it is crucial to develop an internal collaboration strategy that needs to be adopted by the whole organization and that it is more important to have an internal collaboration strategy rather than an external collaboration strategy. Theory (Dodgson, 1993) then argues that the collaboration process can become organizational instead of being dependent on a few individuals in the organization. This could reduce the time and resources spent on negotiations in the initial phase of collaborations. Lastly, another solution which was discussed by both theory and the empirical data was power balances. Theory (Dodgson, 2013; Vagen and Huxham 2003) claims that collaborations work the best when there is a mutual respect among the partners, which means that there should be similar levels of knowledge and expertise among the partners to avoid powershifts. This is strengthened by the empirical data which confirms that balanced power is a key component to having an efficient collaboration without disputes and that a skewed power balance is often created by different sized partners in the collaboration that wants to have more power. Therefore, keeping the terms equal in a collaboration is important to keep it balanced.

A topic which was discussed a lot more in the theory was contracting theory and how it could be used to solve the challenges in a collaboration. The theory (Schiling, 2013; Dodgson 2014) argues that contracting theory is a good tool for governance, monitoring and to make sure that the partners fulfil their parts while mitigating the risk for disputes by agreeing on mutual contracts. Even if contracting theory itself is not mentioned in the empirical data, it confirms the importance of the same goals, i.e. that it is important to be clear on the rules and agree on everything in advance and that it is beneficial to have the rules gathered in one place.

Lastly, both theory and the empirical data underlines a good alternative to collaborations, which is crowdsourcing. Theory (Estellés and González, 2012; Doan, Ramakrishnan, and Halevy, 2011; Brabham, 2008) argues that the crowdsourcing can save time, costs and gather valuable insights. This is further strengthened by the empirical data that also argues that crowdsourcing is a good option for short-term collaborations as you do not have to build up a long-term relationship, something that demands time and resources. Furthermore, the theory (Li, Weng et al. 2018) argue that smart contracts could be used to make this process even more beneficial for organizations wanting to use crowdsourcing as a short-term collaboration method while it could also lead to improved efficiency and security. This is also strengthened by the empirical data which claims that if you set up the initial rules and conditions for joining a collaboration or network, smart contracts could make the onboarding process much more efficient. Therefore, both theory and empirical data agree that crowdsourcing could be a good way of collaborating with the network and that smart contracts could make the process more efficient by providing faster onboarding and increased safety.

6.5 Analysis of Communication

Both theory and the empirical data underlines that communication is crucial in order to have a successful collaboration and that good communication creates a lot of benefits. Regarding the type of communication, the theory (Sage, 2018; Hiltz, Johnson and Turoff 1986) and the empirical data agree that face-to-face communication is the preferred and most effective type of communication. This is especially true in the early phase of a collaboration where there is a larger need to build a relationship and trust, but also be able to discuss and clarify details. This is further strengthened by theory (Sage, 2018; Hiltz, Johnson and Turoff, 1986) who agrees that face-to-face meetings are building stronger business relationships and that it is more likely to reach agreements. Although, the empirical data argues that it is more flexible in practice and that the mode of communication depends on the context, meaning that face-to-face is not always the most efficient way of communicating and then other digital options can be better. The empirical data adds that in cases of short-term collaborations and situations where there is no need to build a relationship, face-to-face meetings are too time consuming and emails or telephone meetings are actually preferred.

Regarding if smart contracts could replace face-to-face meetings, it will depend on the context of the collaboration. Both theory and the empirical data agree that when entering a long-term collaboration in business development or innovation, it is built up by trust, personal

relationships and human interactions which comes from face-to-face meetings. However, the empirical data argues that once this initial phase has passed, smart contracts could be used to automate the process of check-up meetings and paperwork, which would make the collaboration more efficient. This relates to the theory (Vagen and Huxham, 2003) of the cyclical trust building loop, which claims that the longer you collaborate, the more trust builds up and the need to interact and prove that you are a trustworthy partner to collaborate with becomes less. Furthermore, having all the information gathered in one place, such as a smart contract, that is transparent and accessible for everyone in the collaboration is beneficial according to both theory and the empirical data. The theory (Mahon, 2017) argues that having all information stored in one place and communicating on the same platform can increase efficiency, which relates to the empirical data which argues that collaborations could be made much better in this regard.

Finally, both the theory and the empirical data agreed that a good user case for smart contracts, in regard to communication, is crowdsourcing. According to theory and the empirical data, the more short-term the collaboration is, the less is the need for face-to-face meetings and building relationships. So, in a situation such as crowdsourcing, where there are no personal relationships and a large number or "transactions", smart contracts could be used as a good method to improve this system and make the process more automated. As mentioned in theory (Chohan, 2017), the transacting agents does not even have to know each other, and they will still have trust. Smart contracts could thereby be used to increase efficiency of when an organization wants to collaborate with the ecosystem in business development to source solutions from the crowd, as they do not need to communicate and build relationships. This is further strengthened by the empirical data, which argues that a blockchain technology such as smart contracts have many benefits in an ecosystem economy as it increases traceability, transparency and trust, which can otherwise be a problem when initiating collaborations with smaller partners with no reputation.

6.6 Analysis of Documentation

Through findings in the empirical data, documentation and transferring of information is seen as a function which is necessary to have but offers a limited added value. Respondents mentions that security requirements are creating difficulties in intellectual property handling. There are also complications in efficiency when it comes to growing projects, which requires more and more centralized accessible information. Sources of blockchain technology (Crosby et al.,

2016) describes possible attestation functions within the technology that would facilitate information handling. Intellectual property could also be able to be benefitted by the security aspects of blockchain technology with the help of smart contracts according to theory (Bulters & Broersma, 2016).

Respondents were in general positive to the inquiry if smart contracts could be of benefit within documentation and information transferring. It was argued that the security aspect is underestimated and highly useful, which theory agrees on. To be able to trust information and the users accessing it is another aspect required by respondents, which theory argues a peer-to-peer distributed network can mitigate, making use of transparency and security (The economist, 2015). Lastly, both empirical data and theory states that increased efficiency by merging meetings with the help of self-executing smart contracts would be a sought-after solution (Bulters & Broersma, 2016).

6.7 Analysis of Trust

Both theory and the empirical data underlines that trust is the foundation of collaboration. According to theory (Cahill et al. 2003), the ability to trust is what lets entities accept the risk that comes with interacting with each other. This is further strengthened by the empirical data which agrees that collaborations not created if there is a lack of trust between the entities. Also, the lack of trust in existing collaborations is usually the reason behind why many of them fail. Therefore, both theory and the empirical data can agree that trust is the key required to initiate collaborations, but also the key to making them work long-term.

Regarding how trust is created, the theory and empirical data agree on a few strategies. First, both sides argue that recommendations from trustworthy third parties are useful for creating trust. However, this is not always possible, and the organizations must turn to different techniques instead. Both theory and empirical data agree that human interaction and building a personal relation is the key towards creating trust in a collaboration. In the theoretical framework, the Cyclical trust building loop (Vagen and Huxham, 2003) is used to describe how this process works. According to the framework, trust is built by engaging in small low-risk interactions over time to slowly built up trust with the other partners. This theory is further strengthened by the empirical data which confirms that the best process to create trust is to start collaborating in small transactions and let trust build up over time. Also, the empirical data claims that the partners need to be transparent with what they can do and can’t do in a

collaboration. This correlates with the Cyclical trust building loop framework which claims that it is important to aim for realistic outcomes, which can only be achieved when everyone is transparent with what they can produce.

Regarding if trust can be improved with the help of smart contracts, the theory and empirical data agree that it could be used to increase the level of trust in a collaboration. The first user case brought up in the empirical data describes how smart contracts can increase the level of trust by providing immutability and transparency while removing the possibility of manipulating information. This is further strengthened by the theory which confirms that blockchain technology enforces transparency by being a peer-to-peer network which means that information cannot be changed or manipulated. Also, if a smart contract would be violated, everyone would know about it. Therefore, both theory and the empirical data agree on that blockchain can provide increased transparency, leading to an increased level of trust. The second user case mentioned in the empirical data is how smart contracts could improve short-term collaborations, where there is not always time or need for building up long-term collaborations from the start while also testing them. In these situations, the empirical data argues smart contracts could be used to automate the on-boarding process and make it more efficient which would save a lot of time. This is also further strengthened by theory (Vagen and Huxham, 2003) which agrees that building trust is a long and time-consuming process which in focused on building a strong relationship between the partners. So, if entering a short-term collaboration, such as crowdsourcing, using smart contracts would then be more efficient as it ensures trust while removing the need for building a relationship. Furthermore, the theory (Chohan, 2017) also confirms that smart contracts are good for allowing people with no confidence in each other collaborate, which further enforces the benefit of using smart contracts in order to increase the level of trust. Lastly, theory confirms that smart contracts can be used to make the on-boarding process more autonomous as smart contracts are self-executing, self-enforcing, meaning inputted actions that match contract criteria leads to a contract response, automatically triggering pre-specified actions and outcomes of the contract. However, both the theory (Håkansson and Johansson, 1992; Dodgson, 1993; Vagen and Huxham, 2003; Cahill et al. 2003) and the empirical data agree that trust is in the end built on relationships and human interaction, meaning that smart contracts only can increase the level of trust, not replace it fully. As the empirical data claims, technology will never be able to replace a real lack of trust. So, in conclusion, it is evident that theory and the empirical data believes that collaborations are

built on trust, and trust is enforced by smart contracts. Therefore, the result is that collaborations can become more efficient with the help of smart contracts.

6.8 Analysis of Competitive Advantage

Theory (Porter, 1985) states that a competitive advantage can be an advantage of cost leadership, differentiation, or a focus within one of these two in a smaller segment of a market or industry. From the empirical data, respondents mentioned several advantages that they believed would be a result of using smart contracts and blockchain technology. Respondents believed that amount of collaborations could be increased while the costs of setting them up could be reduced. Also, respondents believed that automation, increased efficiency, and companies being able to be faster to market where additional benefits that could lead to a competitive advantage. Additionally, facilitating the creation of solutions with a wider range of possible functions compared to competitors, as well as the creation of completely new experiences and unique services were also possible advantages. However, respondents also mentioned that some results would be out of necessity of a more rapid business environment, leading to a technological solution simply facilitating for a company not to fall into a competitive disadvantage. Further, the notion that companies would possibly not be aware of what they could gain from adopting the technology was added, where some would not be rewarded the expected additional value. Comparing empirical data and theory, gained advantages such as reduced collaboration costs and an increase in automation and efficiency would be helpful for a company pursuing cost leadership. A differentiation approach could be reinforced with new solutions and new experiences that customers would not have experienced before. Focus on either cost leadership or differentiation could be a result of lesser innovative services or cost reductions targeting a specific segment, with the help of smart contracts or blockchain technology.

Thus, by realizing technological advantages, there are several respondents who say that there will be competitive advantages through smart contracts and blockchain technology. However, they do concur generally that the technology simply is not mature enough and should probably not be used for a decisive competitive advantage at this stage. Porter states in his theory that a company can rely on cost leadership, differentiation, or focus for competitive advantages. With the right uses, it could be argued that smart contracts could facilitate in giving a company in the right situation a competitive advantage through any of the three.

6.9 Analysis of Personal View

From the empirical data, more attention was directed towards the importance and need of more proof of concept. Further, blockchain technology as well as smart contracts were believed to be complex, pointing towards a need for careful implementation of use, where it was stated that there is a need to understand both the technology and the complexity behind it. Moreover, arguments regarding drawbacks of blockchain technology included transactions volumes required per hour, which theory concurs with while it is required due to being able to maintain security aspects (Woocul et al., 2016). Empirical data also stated the challenge in performing a massive change in technology within an organization. Theory (Tidd, 2010) argues for structural barriers within organizations for the diffusion of innovation, which again argues for a need of careful implementation of smart contracts and blockchain technology. Importance lies in that organizations are mature enough and ready for new technology and solutions that comes with it.

7. Conclusion

This chapter will present the conclusion and key findings of the study. It will firstly go through the background and research objective before answering the research question. Lastly, recommendations and future research will be presented.

7.1 Research Objective

Collaborations have become the key to successful innovation as organizations are to a larger extent working in an ecosystem rather than by themselves. With potential disruptive technologies such as blockchain technology around the corner, organizations need to collaborate and put their ideas together to figure out how they can use this new technology to gain a competitive advantage and avoid falling behind in the digital economy. We started this project together with a group of three global organizations that expressed a desire to know more about blockchain technology, as it could potentially disrupt their current business models in the near future. We found this confounding, as many organizations are in the same situation. When looking into the benefits of blockchain technology and smart contracts in particular, we realized that many of the benefits with the technology are the same key factors required for successful collaborations: trust, transparency, safety and speed. We believed that this was a topic that deserved to be researched to find out if there were any opportunities on how this could lead to a competitive advantage. Therefore, the purpose of this study has been to examine the potential of using smart contracts when collaborating in business development. That purpose has guided us through this research and led us to the following research question:

How can a multinational organization collaborate within a business development setting to gain a competitive advantage using smart contracts?

With a multiple case study approach, we analyzed three organizations as well as interviewed external experts to see how collaborations in business development could be improved with the help of smart contracts. Even though the organizations had different structures, their collaborative strategies had many similarities. Although, we did not compare the cases against each other, but rather used several cases to have a more reliable basis to perform a qualitative analysis. As a result, we have identified a strategy of collaboration using smart contracts that could be used in theory by organizations across various industries.

7.2 Research Findings

Collaborations have become crucial for organizations to stay competitive as it is impossible to have all the necessary resources and capabilities yourself and because most services today need to be seamlessly integrated in the business ecosystem. Also, by participating in collaborations, organizations can receive valuable outcomes such as better innovations at lower cost and lower risk. However, the failure rate of collaborations is relatively high and after studying the topic and interviewing experts in the area, we found that the key to an ideal collaboration is having a strategic fit, clear goals, structure and a lot of trust. Trust was found especially important as it is the foundation of the collaboration, and trust is necessary to even accept the risk that comes with starting a collaboration, as many interviewees described it. Trust is achieved through recommendations when possible, but most commonly it is achieved through communication, such as face-to-face meetings, which will over time create a relationship leading to increased trust. This was explained in the theoretical framework 'Cyclical trust building loop', which argues that trust is built over time by engaging in projects together. However, the problem is that this process is very time consuming, and there is not always time or need to build up a long-term relationship. As a result, short-term collaborations, such as crowdsourcing, have become more common when doing innovation, where there is less need for face-to-face interactions, building long-term relationships and creating trust.

Regarding collaborations in relation to the implementation of smart contracts and blockchain technology, we have been able to establish situations where organizations can appropriate value, both in long-term and short-term collaborations. As a peer-to-peer distributed ledger technology, smart contracts were found to increase trust, transparency and immutability, which matches the key success factors behind a good collaboration. Although, smart contracts can be used differently depending on if it is a short-term or long-term collaboration. In the case of short-term collaborations and crowdsourcing, smart contracts could help enable more collaborative initiatives as the increased trust and transparency reduces the risk of entering the collaboration. Further, the short-term collaborations would not be required to put in the same time or effort to create long-term relationships through the 'Cyclical trust building loop' framework. Smart contracts could then be used as an alternative to the relationship, as the transparency and immutability ensured that the partners did their part of the collaboration. Also, the rules of the collaboration would be structured and available for everyone, which also increases the speed of joining the collaboration. Moreover, collaborating with unknown partners with no reputation was a common struggle, but a simple solution was to get a

recommendation from of trustworthy third partner. However, as these recommendations were rarely available, the smart contracts and blockchain technology could be used to provide an immutable and transparent track-record of the company's history, working as a substitute to the recommendation.

In the case of long-term collaborations, smart contracts add value in other cases as the context is different compared to the short-term collaborations. To begin with, as the trust in these collaborations is built on face-to-face interaction and personal relationships, it cannot be fully replaced by smart contracts. However, smart contracts can on the other hand enforce trust and efficiency by automating non-value adding tasks such as check-up meetings and administrative work, leaving more room to focus on value-adding tasks. Furthermore, structure and safety were also expressed as important factors for a good collaboration that could be improved by using smart contracts. Keeping all information structured, immutable, and available for the right people in a smart contract was also considered to be valuable as it reduced the time spent on non-value adding tasks while also increasing security.

Having analyzed the concepts in combination, our study has revealed three use cases that can lead to gaining a competitive advantage. Use case 1 suggests that smart contracts can be used to make short term collaborations more efficient. According to the findings, an organization can save a lot of time and resources in not having to build relationships which results in faster onboarding processes in collaborations. Thereby, the organization can be faster to market, gaining an early mover advantage and have a better chance to differentiate, setting up for an eventual competitive advantage. Use case 2 suggests that smart contracts can be used to reduce costs by spending less time and resources on non-value adding tasks that can be automated with the help of smart contracts. Thereby, the organization can lower their cost, gaining a better cost structure, setting up for an eventual competitive advantage. Use case 3 suggest that using smart contracts allows an organization to collaborate with partners that they otherwise would not collaborate with, such as smaller firms and startups without any reputation. By reducing the risk of collaborating with these firms, an organization can collaborate with more partners and thereby gain more experience and more innovative ideas that could potentially lead to differentiation, setting up for an eventual competitive advantage.

Use Case	1	2	3
Collaboration Scope	Short-term	Long-term	Short & Long-term
Use Case Area	Onboarding of new collaborations	Administration	Risky collaborations
Effects	Saving time and resources	Automation of non-value adding tasks	More collaboration partners
Benefits	Faster to market, early mover advantage	Reduced cost, more focus on value adding tasks	Gain experience, generate innovative ideas
Competitive Advantage	Differentiation	Cost Leadership	Differentiation

Thus, the answer to the research question is that using smart contracts in collaborations can lead to a competitive advantage for a multinational organization and that it can be done through the three use cases described in detail above.

Even though the study managed to answer the research question on how using smart contracts could lead to gaining a competitive advantage in theory, it would not work in practice. The main reason is because the technology is not mature enough and that organizations are rigged to be stable, which does not match with the uncertainty of implementing leapfrog innovations such as blockchain technology. In order to pass this internal chasm of innovation, proof of concept is needed to show that it can provide actual value compared to current solutions. Once this proof of concept is created, the technology can be adopted by more and more organizations, starting a "snowball" effect. Once the diffusion of the technology has reached its plateau of productivity, the actual benefits will come as smart contracts and blockchain technology benefit from network effect. Therefore, using smart contracts in collaborations could lead to a competitive advantage in theory, but the reality is that the technology is not mature enough and that proof of concept needs to be created before the technology can take off.

7.3 Future Research

This study has revealed three theoretical use cases for smart contracts and how it can be used to collaborate, but the area of blockchain technology is still widely unexplored and real use cases with proof of concept are missing. To move away from a period of inflated expectations,

blockchain technology needs to create use cases where it can be proved that it can extra value compared to the current solutions. This will not happen in theoretical research papers such as this one, it can only be achieved by testing and evaluating the theories in practice. Only then can blockchain technology reach its plateau of productivity in regard of diffusion.

Furthermore, when studying the barriers to adoption of innovation we found that there is an internal chasm, creating organizational barriers towards innovation due to the rigidness of the organization. Unfortunately, there was limited research performed in the area and a lack of guidelines on how an organization can manage the implementation of innovations in combination with their current core business. As innovation is one of the most important factors to stay competitive over time, researchers should do more research on how organizations can combine the two areas.

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9. Appendix

Appendix A – Interview Guide

Background

What is your background?

What is your role in the organization?

Blockchain

Why do you think Blockchain technology is interesting for a company?

What is your involvement in Blockchain activities?

What is your company's main motives and objectives with Blockchain? Long term goals?

Smart Contracts

Y/N What is your experience with smart contracts?

How do you believe smart contracts could change your organization?

Diffusion of Technology

When new innovations/technologies appear (such as blockchain), how does the adoption process work?

Are there any barriers to the diffusion of blockchain technology in your organization?

How do you convince the organization to adopt the technology?

Collaboration - In a Business Development Setting

Why do you think organizations should collaborate with others?

What is your involvement in business development?

What are the challenges/barriers when collaborating in business?
development?

Tell us a little about how you/your corporation collaborates internally or externally?

How do you communicate with other firms? How often? Which way (Skype meetings, telephone meetings, face-to-face)?

How important are face-to-face meetings, skype-meetings, phone etc.? 22.Could they be replaced with smart contracts?

Explain Concept of Documentation and Transfer of Information

How does the documentation process work? (Storing of information, intellectual property, contracts, attestation, notes from meetings etc.)

How is information transferred between firms? (Through emails, face to face etc.)

Do you think smart contracts could improve these functions and make it more efficient/better in any way? (Documentation, transferring information)

How important is trust in collaboration?

How do you create trust?

Could smart contracts improve any or all of these functions? (trust)

How do you believe that this could lead to a competitive advantage?

Personal View

Do you have any other suggestions regarding smart contracts how it could be used to collaborate better and how to gain a competitive advantage?

Are there any topics you feel that we have missed asking you about when it comes to smart contracts and collaborations?

Appendix B – Coded Interviews

No			
1	**Background**	6	**Communication**
2	**Blockchains**	7	**Documentation**
3	**Smart Contracts**	8	**Trust**
4	**Diffusion of Technology**	9	**Comparative Advantage**
5	**Collaboration**	10	**Personal View**

Q		CGI
i.	**Background**	
1	What is your background?	Innovation. IT. Collaboration. Consultant. Blockchain Expert.
2	What is your role in the organization?	Enhancing Collaborations. Blockchain Responsibility. Leading Innovation Work.
ii.	**Blockchains**	
3	Why do you think Blockchain technology is interesting for a company?	Buzz, don't want to miss out. Changing business models, don't want to get replaced. Benefits and Efficiency Gains. Increase trust.
4	What is your involvement in Blockchain activities?	Consulting in the area. Has interest in the area, trying to learn more.
5	What is company X's main motives and objectives with Blockchains? Long term goals?	To sell as a service. If clients need it, CGI needs to have blockchain expertise. No focus on internal usage, but it could be interesting in the future.
iii.	**Smart Contracts**	
6	What is your experience with smart contracts?	It is a more flexible way to realize a traditional contract. Apply the rules of a contract in coding. Increasing efficiency and automation. Have done early stage BTC projects.
7	How do you believe smart contracts could change your organization?	Will impact the ecosystem and how companies interact. Increase efficiency in administrative tasks. Increase trust because it is immutable. Thereby increasing ownership of innovation.

		Increased participation and innovation as it becomes easier to do business with partners that you otherwise would not trust. However, can't replace the human interaction fully, but can strengthen collaborations.
iv.	**Diffusion of Technology**	
8	When new innovations/technologies appear, how does the adoption process work?	Decentralized organization. Create competence groups that can lead the new technology. Involve clients early in the process.
9	Are there any barriers to the diffusion of blockchain technology in your organization?	Yes. Barriers are lower in technology-firms. Blockchain does not have a natural home in an organization, so it is hard to adopt for many large organizations. Blockchain has big impact, so it is hard to implement. Organizational and structural problems - there is a built-in resistance in most organizations. Why change something that works?
10	How do you convince the organization to adopt the technology?	Target the entity that makes decisions and convince the stakeholders why it's important to invest. Create proof of concept to show that it works. If it can provide value to the client and company, it will be adopted.
v.	**Collaboration**	
11	Why do you think organizations should collaborate with others?	The only way. Share assets, competences and resources. Too costly to have everything yourself. More flexible and faster to market. Gain experience from others - different industries, same problems.

12	What is your involvement in business development?	Business development in close relation to customers.
13	What are the challenges/barriers when collaborating in business development?	Goals/agendas/incentives/business models that are not matching. Trust issues, want to protect your own business. Decide in advance what will be done and how, which demands long negotiations. Crowdsourcing can be better as you skip the long negotiations. Smart contracts can then make the onboarding of new partners faster, but also more stiff. The rules and conditions for joining the ecosystem must be clear for this to work.
vi.	**Communication**	
14	Tell us a little about how you/your corporation collaborates internally or externally?	Collaborate by working close with clients. Invest together to share the risk. Agree on the agendas in advance, takes a lot of time and effort.
15	How do you communicate with other firms? How often? Which way (Skype meetings, telephone meetings, face-to-face)?	Face to face is preferred. Creates trust and a strong relationship, but is not efficient.
16	How important are face-to-face meetings, skype-meetings, phone etc.?	Really important. Meet frequently to create a constant feedback-loop. If it is a crowdsourcing project, there is not the same need for meeting.
17	Could they be replaced with smart contracts?	Not sure, it depends on what you want to achieve. Setting up collaborations takes a lot of time and effort. Smart contracts could help save time in administrative tasks and that no one can change their minds since it's immutable. If you have

		something up and running, smart contracts can make the onboarding for new partners easier and more efficient. But in new collaborations, the conditions are too unclear to fit in a smart contract. If everyone knows their roles and you want to share assets and resources, smart contracts could make this more automated and efficient while increasing trust. This would be a big benefit. Innovation is based on human interactions, so personal meetings are vital. But smart contracts can be used to replace follow-up meetings and negotiations and to make the it more transparent and clear, it can automated to a certain degree. Since everything is not 100% black or white as things change quickly, a smart contract would need to be flexible. But in a big network, it would be hard to reach consensus and thus very slow.
vii.	**Documentation and Transferring of Information**	
18	How does the documentation process work?	A strict and structured process with good security is critical. The processes today are tightly controlled and administrative.
19	How is information transferred between firms?	Different solutions, it depends on the context. Can be emails, but it's not very secure. It is hard when there are a lot of companies with many people involved.
20	Do you think smart contracts could improve these functions and make it more efficient/better in any way?	Yes! Transferring needs to be secure. If it could provide access to the right information for the right people, it would be very useful application. And it provides security as well.

iix.	**Trust**	
21	How important is trust in collaboration?	Very important. Collaborations build on trust.
22	How do you create trust?	Transparency. You also need to build a relationship with the individuals to trust the collaboration. Recommendations from others can also create trust.
23	Could smart contracts improve trust?	Yes. It is creating transparency and immutability, which leads to increased trust. Can work more efficiently and be more innovative if you don't have to worry as much about trust. Also, good for short term collaborations, when there is no need for a long-term relationship, such as crowdsourcing. No time for building up a relationship from the start and test it. Save time and become more efficient.
ix.	**Competitive Advantage**	
24	How do you believe that this could lead to a competitive advantage?	Yes, but maybe not if everyone can use the same technological solution. But it can lead to collaborations with partners you wouldn't otherwise collaborate with as you can reduce the cost, time and effort. Therefore you can be faster to market and more flexible. As the world is moving faster and faster, you don't have time to check and control. A smart contract could create a faster verification process. Be more efficient and worry less → good value. Instead of hiring people you can subcontract skills with smart contracts.

		Could be a competitive advantage for smaller firms that doesn't have a strong reputation. Bilateral collaborations are more risky as language and cultures are different. More unknown factors. Smart contracts could reduce the language and cultural barriers as it is in semantic language.
x.	**Personal View**	
25	Do you have any other suggestions regarding smart contracts how it could be used to collaborate better and how to gain a competitive advantage?	By reducing the barriers in bilateral collaborations, smart contracts could lead to a competitive advantage. More clearly defined rules and conditions in a collaboration could be good. But proof of concept is needed.
26	Are there any topics you feel that we have missed asking you about when it comes to smart contracts and collaborations?	Companies and the whole ecosystem need to go through big changes to adopt to this new technology, which is a big challenge.

Q		**Volvo Cars**
i.	**Background**	
1	What is your background?	Innovation. Business Development. IT. Security. Disruptive Innovation. Engineering.
2	What is your role in the organization?	Innovation Manager. Leading Projects. Creating Innovation Culture. Finding Blockchain Use Cases.

ii.	**Blockchains**	
3	Why do you think Blockchain technology is interesting for a company?	Trend. Good features, Decentralization, Security, Traceability. Beneficial for Legal Issues. Possibility to decrease transaction costs. Verification.
4	What is your involvement in Blockchain activities?	Pre-studies of the Blockchain concept. Use Cases. Verification Project Work. Proof of Concept in Finance Areas.
5	What is company X's main motives and objectives with Blockchains? Long term goals?	Provide Proof of Concepts, Prove Value of Blockchain Technology. Uses in Traceability, Security, Supply Chain Management and in Car Sharing Services. Continuous study of the technology depending on exploratory project outcomes. Financing Personal Cars. Trustworthy Environment and Protection for the Organization. First Mover.
iii.	**Smart Contracts**	
6	What is your experience with smart contracts?	Investigation of Ecosystem and Supply Chain uses, difficult to start using technology. Ethereum. Basic Knowledge.
7	How do you believe smart contracts could change your organization?	Business Ecosystem will change. Shaping Business Relationships between Partners. Aiding in Evaluation Potential Collaboration Partners. More Automation. More Focus on Security Aspects. Financial and Purchasing Automation. Shared Economy and Internal Currency. Improving Efficiency.
iv.	**Diffusion of Technology**	

8	When new innovations/technologies appear, how does the adoption process work?	Understanding that current systems have more uses than previously thought. Proof of Concept developed to prototype for Managers. Technology Driven instead of Business Driven. Innovation Department Testing Technologies in a more Agile and Nimble way initially. Long time before Implementations.
9	Are there any barriers to the diffusion of blockchain technology in your organization?	Processes have been the same for many years, working same way since 1927. New Technology has to be tried out in parallel to existing solutions. Risk calculations and implementations takes a lot of time. Blockchain Technology is still relatively unknown. Development is still dependent on personal interests.
10	How do you convince the organization to adopt the technology?	Executive Management has the responsibility, Firewall that cascades requirements downstream. Rigidness of the Organization requires Top-to-Bottom. Lead by Good Example and Good Projects.
v.	**Collaboration**	
11	Why do you think organizations should collaborate with others?	Developing Business Models as Ecosystems, Services are created together and Customer Experience needs to be seamless. Collaborative Ecosystem and Multiple Competences Working Together. Increasing Efficiency and Lowering Expenses.
12	What is your involvement in business development?	Working to create Ecosystems for Services with other firms. New Business Models

		through Collaboration. Developing Technology to change how VCC does Business.
13	What are the challenges/barriers when collaborating in business development?	Hard to find clear Shared Goals. Different Motives of Firms to Collaborate. Understanding other firms' Technologies and Competences. Intellectual Property Management. Different work procedures and systems. Volvo has more of department collaboration rather than company collaboration. Collaborating with Rivals, Trust in Data Sharing.
vi.	**Communication**	
14	Tell us a little about how you/your corporation collaborates internally or externally?	Internally mainly to develop Proof of Concepts. Employees are open to try new technologies, but with Time Limitations. Strives to work more with external partners. Collaborations with startup companies.
15	How do you communicate with other firms? How often? Which way (Skype meetings, telephone meetings, face-to-face)?	Face-to-face, working in collaborations as if you were the same team. Telephone Meetings. Skype. Emails.
16	How important are face-to-face meetings, skype-meetings, phone etc.?	Initial Meetings in Innovation are very important. Feedback and discussion is required. Pure Business Transaction meetings and Sync-meetings can be automated, but could become complex.
17	Could they be replaced with smart contracts?	Human Interaction is needed to build Trust in creative or innovative work. Smart Contracts could be suited for automated high

		frequency business transactions, early and late in projects, when human interaction is not as critical. In Business Ecosystems, Blockchain could be used in verifying company credentials before collaboration, improving trust.
vii.	**Documentation and Transferring of Information**	
18	How does the documentation process work?	Done through hard copies and stored digitally with different systems. Supply Management.
19	How is information transferred between firms?	Sharing information digitally by email and sending printed copies. IT Department limits allowed methods. Intellectual Property comes with issues in sharing, using a specific system for reading and sharing which makes it complicated. NDAs before exchanging information.
20	Do you think smart contracts could improve these functions and make it more efficient/better in any way?	Could make these functions more efficient. Meetings could be combined. Fairly unsure how the solution could look like.
iix.	**Trust**	
21	How important is trust in collaboration?	Trust is the Base for Collaboration. Stable Relationships depend on Trust. Important Performance Index with Suppliers. Important in Autonomous Driving as well.
22	How do you create trust?	Getting to know each other. Delivering on time with good quality. Managers has a heightened responsibility in creating trust.

23	Could smart contracts improve trust?	Generally Yes. Smart Contracts could be used to facilitate relationships, aid in company references, information genuinity, improving efficiency, but perhaps not mature enough.
ix.	**Competitive Advantage**	
24	How do you believe that this could lead to a competitive advantage?	Smart Contracts could lead to competitive advantage in customer experience, a great deal in standardized work, improving efficiency, car sharing, and Intellectual Property protection, but the technology is of yet not mature enough to provide these advantages, and is not intelligent enough to replace some of the current solutions.
x.	**Personal View**	
25	Do you have any other suggestions regarding smart contracts how it could be used to collaborate better and how to gain a competitive advantage?	Those working with Smart Contracts and Blockchain Technology needs to understand the concepts and definitions and their outcomes due to the complexity. Proof of Concepts are required to be developed for the technologies before any implementations can be planned. Collaborations are in general related to feelings, something that technology has a long way to go before reaching usability.
26	Are there any topics you feel that we have missed asking you about when it comes to smart contracts and collaborations?	External and internal collaboration could both be use cases. All the robots in the factory needs the information from R&D, instead of just having people working,

		maybe the machines could work together as well.

Q		**STENA**
i.	**Background**	
1	What is your background?	Finance. IT. CIO. CDO.
2	What is your role in the organization?	Incubating Innovation in the Organization. Spreading Knowledge of the Digital Era. Building Innovation Teams. Organizer for Internal Bank, Trading.
ii.	**Blockchains**	
3	Why do you think Blockchain technology is interesting for a company?	Technology will develop a lot, can change industries. Possible to cut out middle hands. Cybersecurity Solution. Verification. Hyped Technology now, needs to be explored before developed more.
4	What is your involvement in Blockchain activities?	Increasing Organization's interest in Blockchain Technology. Stena to investigate. Tests not the most important, it's the journey. Not a great deal of use cases found initially in Finance.
5	What is company X's main motives and objectives with Blockchains? Long term goals?	Not clear yet. Focus on understanding the technology, keeping up, and digitizing the organization. Finding possible use cases

		such as Maintenance, Trade Finance, Verification, Low Hanging Fruit.
iii.	**Smart Contracts**	
6	What is your experience with smart contracts?	Smart Contracts could be the Revolution of Blockchain. Output is the most Important.
7	How do you believe smart contracts could change your organization?	To Communicate with Suppliers and Customers. Storing Contracts, might not have enough value today.
iv.	**Diffusion of Technology**	
8	When new innovations/technologies appear, how does the adoption process work?	Stena being a very Entrepreneurial Company, good Adoption comes from good Prototypes. Proof of Concepts are important. Digital Awareness. Finding Use Cases.
9	Are there any barriers to the diffusion of blockchain technology in your organization?	Management of an Older Generation. Organization not ready for the new Technology yet. Decentralized Organization makes joint decision making harder. More Internal Collaboration needed. Time Limits and Resource Constraints.
10	How do you convince the organization to adopt the technology?	Proof of Concepts. Words aren't enough. Non-technical people pitching business-wise. Keep informing colleagues.
v.	**Collaboration**	
11	Why do you think organizations should collaborate with others?	Stronger Together. Collaboration facilitates a better future. Win-win situations. Long-term collaborations through mutual benefit.

12	What is your involvement in business development?	Showing feasibility of new technology in the organization. Networking.
13	What are the challenges/barriers when collaborating in business development?	Time required between departments and companies. “Time-Anorectic Departments”. Result Expectations from Collaborations if companies aren’t used to each other. People are in meetings all the time.
vi.	**Communication**	
14	Tell us a little about how you/your corporation collaborates internally or externally?	Working Externally with suppliers as “Partners”, influencing. Collaboration with Students, Entrepreneurs, Different People. Internally, what works in one company can be moved to other companies, Internal Knowledge Spillover. Need a project to collaborate around.
15	How do you communicate with other firms? How often? Which way (Skype meetings, telephone meetings, face-to-face)?	Face-to-face as much as possible. Virtual conference rooms. Skype. Checkup meetings over phone.
16	How important are face-to-face meetings, skype-meetings, phone etc.?	Initially crucial. Collaborations are improved by personal connections. Face-to-face meetings can be replaced with Digital Tools, but requires more of them. Important to be able to give feedback.
17	Could they be replaced with smart contracts?	Might not be the right place. Projects with crucial deliverables could be aided by Smart Contracts. Reducing Complexity by Automation. Good if Public Blockchains could be used.

vii.	**Documentation and Transferring of Information**	
18	How does the documentation process work?	Different between suppliers and companies. Documentation and maintenance is excellent with smart contracts.
19	How is information transferred between firms?	Encrypted emails. Original forms printed and posted.
20	Do you think smart contracts could improve these functions and make it more efficient/better in any way?	Yes, in the right way. Project Documentation and IP Owner Information could benefit from Blockchain Technology. Simple transactions already use good enough processes. Non-standardized transactions are too complicated. Marginal Benefit not enough without Critical Mass.
iix.	**Trust**	
21	How important is trust in collaboration?	Crucial. Collaboration builds upon trust.
22	How do you create trust?	The People make the Companies. Culture is a big part and every Company doesn't match another Company's Culture. Financially good shape and a long-term view by working together.
23	Could smart contracts improve trust?	Some parts of trust can be eased. Trade Finance could use it to know that you recieve what is stated.
ix.	**Competitive Advantage**	
24	How do you believe that this could lead to a competitive advantage?	It could lead to a Competitive Advantage, but like the Internet Boom, it's about timing when Blockchain Technology takes off.

		Maybe in 5-10 years. Important not to be behind, important to be close to the top to not suffer Competitive Disadvantages.
x.	**Personal View**	
25	Do you have any other suggestions regarding smart contracts how it could be used to collaborate better and how to gain a competitive advantage?	Important in Finance to Cut Costs and Increase Security in Documentation Management. Cost Driven, not Revenue Driven. Don't make it Over-Complex. Flow of Products might be more Important than for services. The Public Sector could benefit highly of it through better systems. Hospitals, Patient Journals, Adoption. Insurance Companies for Lowered Insurance Costs.
26	Are there any topics you feel that we have missed asking you about when it comes to smart contracts and collaborations?	Looking into Streaming Services. When is it time to act on Blockchain Technology? Collaboration is a big part of it, as well as Public, Private, or Consortium Blockchains.

Q		**External**
i.	**Background**	
1	What is your background?	Business administration, innovation. Verification, privacy, semantics and contracting.

2	What is your role in the organization?	Collaboration and innovation projects. Research in smart contracts.
ii.	**Blockchains**	
3	Why do you think Blockchain technology is interesting for a company?	Buzz, new interesting technology. Decentralization. More efficient collaborations. Good for immutability, can't change what you agreed on.
4	What is your involvement in Blockchain activities?	Research in smart contracts.
5	What is company X's main motives and objectives with Blockchains? Long term goals?	To find new value for yourself, users, partners etc. A new way to collaborate in the ecosystem. Could increase security. However, it's a buzz and far from everyone actually needs blockchain.
iii.	**Smart Contracts**	
6	What is your experience with smart contracts?	It is a bubble, because it is actually just a normal contract but it relies on the blockchain, which has pros and cons.
7	How do you believe smart contracts could change your organization?	It depends on the organization. In Sweden we are already quite far ahead and not as big problems with trust and traceability. But more automated processes and all information gathered and structured in one place would make organizations more efficient.
iv.	**Diffusion of Technology**	

8	When new innovations/technologies appear, how does the adoption process work?	Depends on the company and if they are early adopters or not. Early adopters are willing to try new things. But generally, most larger firms are hesitant because of insecurities. Want other to make mistakes first.
9	Are there any barriers to the diffusion of blockchain technology in your organization?	Companies are rigged to be stable, which is the opposite to taking in new technologies. It becomes difficult to integrate the two. It is a structural, management and mindset problem. Companies are not ready for blockchain technology.
10	How do you convince the organization to adopt the technology?	Gain an understanding of what value it can provide and show how urgent it is to start. Start small with initial successful projects to get proof of concept that it works.
v.	**Collaboration**	
11	Why do you think organizations should collaborate with others?	Impossible to work alone today. You have to collaborate with others to provide a seamless experience for the customer. Also to go quicker from point a → b.
12	What is your involvement in business development?	On a daily basis.
13	What are the challenges/barriers when collaborating in business development?	Depends on the setting. Different goals, agendas and history can cause a clash in the process. Everyone needs to understand the purpose of the collaboration. Power balances can also create barriers in collaborations.

vi.	**Communication**	
14	Tell us a little about how you/your corporation collaborates internally or externally?	Important to create win-win situations and share competences.
15	How do you communicate with other firms? How often? Which way (Skype meetings, telephone meetings, face-to-face)?	It depends. Mostly face-to-face.
16	How important are face-to-face meetings, skype-meetings, phone etc.?	Really important. You have to come together and discuss as companies have different structures and processes.
17	Could they be replaced with smart contracts?	Yes. There are many bureaucracies and intermediaries that can be replaced with smart contracts to make it more efficient. Reduce the amount of paperwork by automating the process. Also structure the collaboration and gather information in one place. Some parts of collaboration must be face to face but some can and should be automated.
vii.	**Documentation and Transferring of Information**	
18	How does the documentation process work?	Important to have all information gathered in one place and in a structured order. It would be more efficient if you could gather it all in one place and decide who can get access to it. A quicker knowledge transfer process.
19	How is information transferred between firms?	Different tools. Slack, emails etc.

20	Do you think smart contracts could improve these functions and make it more efficient/better in any way?	Yes, big potential value added by using smart contracts.
iix.	**Trust**	
21	How important is trust in collaboration?	It's very important, can't collaborate without it. That's why you have contracts, to ensure trust.
22	How do you create trust?	You make agreements and you must be clear on the goals of the collaboration. Create an understanding of each others way of working.
23	Could smart contracts improve trust?	It depends. Technology can't replace a real lack of trust. So it can't replace, but it can enhance by making sure both partners do their part.
ix.	**Competitive Advantage**	
24	How do you believe that this could lead to a competitive advantage?	Yes. If collaboration between partners can become more efficient by having more slim and faster innovation processes that helps you to be faster to market, it would be a competitive advantage. But companies have to analyse if they actually need smart contracts. What new value does it create? Reduce the amount of paperwork will be efficient, but maybe not competitive advantage.
x.	**Personal View**	
25	Do you have any other suggestions regarding smart contracts how it could be used to collaborate better	nope.

	and how to gain a competitive advantage?	
26	Are there any topics you feel that we have missed asking you about when it comes to smart contracts and collaborations?	There are drawbacks with smart contracts. 1. Transaction costs are high. Can't have too many transactions per hour. 2. Proof of work is based on consensus. You can boycut the contract with more than 51%.