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MASTER'S THESIS

HYPE OR RIPE?

BLOCKCHAIN IN FOREIGN AID

A comprehensive research about the applicability of blockchain technology to Non-Governmental Organizations' financial processes

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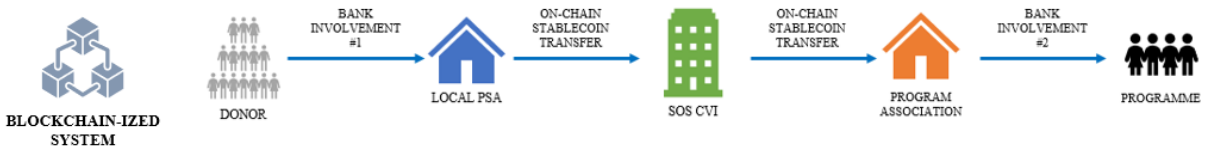
Abstract

In a digitalizing world, blockchain technology has emerged and been implemented to many use cases in various sectors, showing increased efficiency and streamlined processes. As such, the thesis investigates uncharted territories by researching how blockchain can be implemented to the foreign aid sector. More specifically, the thesis explores how NGOs can exploit blockchain technology to increase trust in their business model and streamline financial processes.

Preliminarily, it was discovered that traditional accounting processes consists of multiple manual steps. Moreover, various reports unveiled that donors' trust in NGOs have decreased in recent years. As such, the research supplemented existing theory with interviews with SOS Children's Villages. The interviews uncovered obvious potential for improvements in SOS' current transaction processes, in which multiple steps involves financial institutions. Additionally, SOS currently do not have a shared ERP system.

Hence, the research used these revelations and identified four main criteria for improvement: 1) increased transparency, which is an important factor of trust; 2) increased traceability, 3) lower transaction costs; and 4) streamlined transactions. With these four criteria the researchers used existing theory and interviews with blockchain experts, aiming to develop a strategy in which blockchain technology could help SOS improving their financial processes. The research culminated in a conceptual design.



The public-permissioned blockchain proposed ensures transparency to the transaction timeline, which in turn increases donors' trust in NGOs. Second, using a cryptographic stablecoin, each donation will be fully traceable throughout its journey to the beneficiaries. Third, the design omits several steps on the transaction timeline, which in turn decreases transaction costs and streamlines transactions.

Furthermore, blockchain technology has characteristics which may facilitate streamline traditional accounting processes. More specifically, referring to the eight steps of the accounting cycle, an ERP system on a shared blockchain ledger can affect positively the first three steps: 1) analyzing transactions by examining source documents; 2) journalizing transactions in the journal, and 3) posting journal entries to the accounts in the ledger. However, a shared ERP system could also be obtained by other digitalized platforms. Thus, whether a blockchain infrastructure is most effective, remains debatable.

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1. Introduction

Famine, wars and conflicts, poverty, inequalities, and premature deaths are major issues in the world, certainly in developing countries, but also in industrialized countries. To cope with these issues, the UN and its member countries have ratified the 2030 Sustainable Development Goals (SDGs) as a joint incentive for governments to mitigate poverty (United Nations, 2020). Additionally, independent organizations are working to accomplish these goals, both locally and globally, raising billions of US Dollars yearly (Takepart, 2020).

Meanwhile, industrialized countries are in a technological surge, where emerging technologies are being implemented into numerous businesses, sectors, and processes. These technologies help streamline systems but are also vital in improving the health care and other pro-life sectors. "Blockchain" has in recent years been one of the words creating significant hype in public debates regarding technological development. Thus, the question has arisen whether the technology is ripe enough and implementable to the foreign aid sector, with the aim of accomplishing the 2030 SDGs more efficiently. Additionally, as digitalizing financial processes, such as accounting, is on many firms' agendas, there is a question whether blockchain technology can help streamlining traditional accounting processes to ensure faster and more reliable accounting practices.

Building on the previous two paragraphs, the purpose of this chapter is to provide the reader with preliminary information sufficient to understand the thesis in its entirety as well as give context as to why the topics are important and relevant to the NGO sector.

The abovementioned 2030 Sustainable Development Goals will be presented first, followed by a thorough explanation of the foreign aid sector, its history and current limitations and threats is provided. Then, the blockchain technology and the hype around Bitcoin will be introduced, along with current use cases for the technology. Furthermore, traditional accounting processes will be explained through introducing the eight steps of the accounting cycle. This preliminary information will create a thorough and understandable purpose for the thesis, and subsequently shape the research question.

Finally, the research question will then be subject for delimitation to create a concise and specific field of research, omitting aspects and areas that are not regarded as relevant for the research purpose. Last, Sub-Chapter 1.4 will provide an overview of the thesis structure.

1.1 Background

1.1.1 United Nations' Sustainable Development Goals

In 2015, all United Nations (UN) Member States adopted the 2030 Agenda for Sustainable Development, building upon the achievements from the Millennium Development Goals from 2000 (United Nations, 2020). The new agenda, promoting people, planet and prosperity, consists of 17 Sustainable Development Goals

(SDGs) providing a global partnership between both developing and developed nations. The aim of this partnership is to conquer fundamental issues in the world today, promote economic and environmental sustainability, protect human rights and equalities and strengthen universal peace (United Nations, 2015).

Among the biggest contributors to fulfil the SDGs, along with governmental bilateral aid, are foreign multilateral aid institutions. Charitable giving is a big and growing business, averaging a year-by-year increase of $8.94 billion between 1977 and 2017 – indicating a vast world-wide interest in fulfilling the UN's Agenda for Sustainable Development (Charity Navigator, 2018). Thus, there is a public interest of investigating the development of the foreign aid sector as well as their actual impact on the Sustainable Development Goals.

1.1.2 The Foreign Aid Sector

The first archetypes of foreign aid structures emerged more than 100 years ago as European colonialism became tied to aligning political and economic interests, as well as an increasing humanitarian movement (Phillips, 2013). Over these past 100 years, however, the world has changed drastically, seeing colonies becoming independent nations and thereby freeing the empires of self-interest in supporting these developing countries. Nevertheless, the foundation was set and the idea of foreign aid has been embedded on the industrialized countries' consciousnesses, meaning even countries who had never had colonies also joined the foreign development aid (Phillips, 2013).

Along with increased recognition of the need for humanitarian aid, rose the idea of donor-funded programs to ensure that people's basic needs in health, water, sanitation, and education are met (Phillips, 2013). Donors and donations have since come in all sizes, from private persons giving smaller contributions, to companies and governments contributing significantly larger sums, indicating that donating is possible for everyone willing to (Phillips, 2013).

Consequently, foreign aid has developed into a billion-dollar industry with numerous different organizations working with the same aim – to increase wealth and living conditions for the less privileged (Takepart, 2020). Foreign aid can generally be divided into two different forms, multilateral and bilateral. In the former, organizations bring together multiple countries and entities for collective action, whereas the latter involves money flow directly from one government to another (Takepart, 2020). Additionally, there are multiple different types of multilateral aid organizations with different characteristics and models working towards this aim: Charities, whose beneficiaries are often specified and who often experience certain tax benefits (Wieners, 2019); Non-profit organizations, which is an entity in which all cash-inflow must be reinvested in the business or provided to the beneficiaries; Social Businesses, whose primary goal is to solve a social problem, whilst still creating a profit for shareholders and remain self-sustainable (Yunus, Moingeon, & Lehmann-Ortega, 2010); and Non-Governmental Development Organizations, often only referred to as Non-Governmental

Organizations (NGOs), who are working independently of any governmental regimes, aiming to create bridges between the public and governments (Wieners, 2019).

There are multiple factors, such as political, environmental, cultural, and religious considerations that need to be accounted for when organizing foreign aid (Elayah, 2016). Whereas the latter three are possible to adapt their work to, political situations can be more difficult to affect and handle, especially in countries whose political systems and agendas are not aligned with the public's.

1.1.2.1 Corruption and Fraud

"Corruption is much more likely to flourish where democratic foundations are weak and, as we have seen in many countries, where undemocratic and populist politicians can use it to their advantage."

- Delia Ferreira Rubio, Chair, Transparency International

As Rubio indicates, strong democratic foundations are incremental for a stable political system. According to Transparency International's Corruption Perceptions Index (CPI), corruption exists all over the world, however to substantially varying degrees (Transparency International, 2019). This index ranks 180 countries and territories by their perceived level of corruption in public sectors, scaling from zero to 100 – where the lower scores indicates high corruption. The highest scoring region, thereby the least perceived corrupt region, is Western Europe and the EU, whilst Sub-Saharan Africa is perceived as the most corrupt region (Transparency International, 2019). With certain exceptions, corruption correlates significantly to a country's wealth, and due to foreign aid's primary focus groups being developing countries their work is highly susceptible to corruption. Moreover, albeit some fluctuations and sporadic improvements, the perceived more corrupt countries and territories have experienced little change in their CPI scores in the past years (Transparency International, 2019).

As an effect of the levels of fraud and corruption in these countries, especially in those receiving humanitarian aid, questions have arisen regarding to which degree the aid is actually going to the people in need or whether aid organizations and people's donations and contributions are – in essence – funding corrupt leaders and systems. More importantly, fraudulent extraction of humanitarian aid by local governments could mean the difference of life and death (Transparency International, 2020). Transparency International further explains that the risk of corruption in developing countries are acute as money flows through unmonitored channels, meaning it is difficult to track whether the aid goes to its intended beneficiaries. This issue is even more prevalent in emergency situations, mainly due to time being of the essence and subsequently standards and anti-corruption measures being bypassed in order to quickly provide aid (Transparency International, 2020).

These concerns of foreign aid fraud are valid, according to former UN-servant Matthew Rycroft, who currently serves as Permanent Secretary at the Department for International Development (DfID) in the UK (Johnson, 2018). Rycroft further claims that people generally either believe that fraud problems are too big to fix or that

"*the whole thing is corrupt and money never ends up where it should*", validating the criticism (Johnson, 2018). Rycroft points, for instance, to DfID fraud cases quadrupling between 2010 and 2015. An investigation from 2017 claimed that nearly 40% of DfID's fraud cases between 2003 and 2016 involved NGOs, whilst 6.5% and 0.3% were accounted for by governments and radical groups respectively (Express, 2017).

In light of unveiling of corrupt regimes among other contributing factors, trust in the foreign aid sector is considered to be at an all-time low (Hunink, 2017), explored further in the following sub-chapter.

1.1.2.2 Trust and Transparency

As mentioned, general trust in humanitarian aid organizations is in decline. The reasoning for this could be increased awareness of corrupt regimes in benefitting countries. However, although the foreign aid industry is susceptible to external risks in the countries they operate in, there are several other factors which can further jeopardize the fulfilment of the UN 2030 SDGs. Such factors include scandals among various foreign aid institutions, as well as lack of transparency in these organizations.

One major scandal which has contributed negatively to public trust in aid organizations, is the Oxfam scandal in relation to their work in the aftermath of the earthquake in Haiti in 2010. Initially, it was uncovered that members of the organization had used NGO resources to access and pay for sexual services, which led to four people being sacked and three others resigning (BBC, 2019). However, a further investigation was later conducted, in which there was found evidence of staff abusing children as well as children being victims of sexual misconduct by an unnamed charity "boss" (BBC, 2019).

More generally, a major issue for trust is the assurance of the funds truly reach the beneficiaries and not ending up elsewhere (IISD, 2018). The abovementioned problem of corruption is one aspect of this, but there is also uncertainty regarding other costs being covered by funds intended to help the poor (Hunink, 2017). This issue has its origin in the lack of transparency in the organizations' funding supply chains, which consequently has resulted in more people no longer making donations as a general charity, but rather making "investments to which they want to see verifiable progress (IISD, 2018).

In relation to the UN 2030 SDGs, the International Aid Transparency Initiative (IATI) urges more transparency in the aid sector (Ingram, 2018). Ingram elaborates by stating that transparency is incremental to facilitate collaborations between different finance organizations, streamlining use of resources, and holding institutions accountable. The accountability issue is particularly prevalent, more specifically knowing who finances what, for what purpose and where, which will provide information on the investments' actual contribution to development (Ingram, 2018). Last, Ingram (2018) explains that transparency alone will not solve development challenges and fulfil the 2030 SDGs but substantiates its ability to improve decision-making and coordination and thereby hopefully the outcomes. The abovementioned external factors unveiled scandals and lack of

transparency are all contributing to mistrust, which subsequently has dampened the willingness to donate money.

1.1.3 The Bitcoin Hype

On October 31st, 2008 the concept of the cryptocurrency *Bitcoin* was introduced in the Bitcoin Whitepaper published by a person or persons using the pseudonym Satoshi Nakamoto (Nakamoto, 2008). Cryptocurrencies like Bitcoin differs from traditional fiat currencies as they are, traditionally, neither created nor controlled by countries (Tapscott & Tapscott, 2016). In the paper, Nakamoto introduced the idea behind the Bitcoin and the peer-to-peer system that have the potential to be an end-around to the banks and governments that have for centuries operated as the guardian of our financial systems (Casey & Vigna, 2018). In short, by taking use of this peer-to-peer version of electronic cash, it will enable online payments to be sent directly from one party to another without the need for a financial institution or third party (Crosby, Nachiappan, Pattanayak, Verma, & Kalyanaraman, 2016). Appendix 5 contains a detailed "walk through" of the Bitcoin Whitepaper, providing a valuable example that might help the reader towards a deeper understanding of the concept Bitcoin.

Following the introduction of Bitcoin, the general interest and hype increased significantly. The hype was partly due to its ability to solve the double-spending problem, a problem which had foiled many earlier attempts at implementing viable virtual currency platforms (Casey & Vigna, 2018). In short, this problem relates to the use of digital currencies as digital information can be reproduced and duplicated quite easily, making it possible to spend the same money twice (Frankenfield, Double-Spending, 2019). Furthermore, Bitcoin also represented the first successful implementation of the Distributed Ledger Technology (DLT) framework, believed by many to shape the future of distributed computing and a huge step in the direction of a more decentralized global system (Tapscott & Tapscott, 2016). The circumstances embossing the 2008-2009 global environment arguably also attracted the public's interest. The impact of the 2008 financial crisis was far-reaching and devastating for many people as they lost lifetimes of savings and investments. Conversely, some banks, investments firms and other financial institutions experienced great profit from these events, dramatically decreasing people's general confidence and trust in the financial markets (Sapienza & Zingales, 2012). Consequently, many began to actively look for new ways to safeguard their financial prosperity from the traditional markets. With Bitcoin promising a more secure market due to its decentralized structure and non-existing need for intermediaries, many became interested in the technology and started investing (Hackernoon, 2018).

The first real-world Bitcoin transaction took place in 2010 when a programmer bought two Papa John´s pizzas for a total amount of 10.000 Bitcoins (Edwards J. , 2019). Based on today´s Bitcoin price, which as of the 12th of February 2020 equals $10.365,70, the programmer paid $103 million for the two pizzas (eToro, n.d.). Later that year the first crypto exchange, Mt. Gox, was established in Tokyo (Frankenfield, Mt. Gox, 2020). When launched, Bitcoin was traded around $0,07 per coin. Despite hitting a milestone of $1 per Bitcoin in 2011, the

currency gained some negative attention as Mt. Gox experienced a series of hacks, exposing the currency´s vulnerability to significant price swings and the lack of regulations in the world of cryptocurrencies (Schulze, 2019). However, the hype and interest in Bitcoin continued rising with the price reaching $1.000 for the first time in November 2013 (CoinDesk, n.d.). Once again, Bitcoin's volatility became obvious as the price closed at around $700 that same year. In 2014, Mt. Gox, which at that time handled roughly 70 percent of all Bitcoin transactions, declared bankruptcy after hackers stole approximately half a billion USD worth of coins (Schulze, 2019). This proved to have significant effects on investors´ trust in the cryptocurrency market, reflecting the price fluctuating around approximately $300 from 2014 to 2017.

In early 2017, Bitcoin gained momentum as the price grew back up to $1.000. Once again the interest of investors was sparked, buying into what was characterized as a "safe-haven investment similar to gold" (Schulze, 2019). The global awareness of Bitcoin and cryptocurrencies was strengthened, and several new exchanges were created. From July to December 2017, the price increased from $2.000 to its peak at nearly $20.000 (CoinDesk, n.d.). In early 2018, the price dropped as many investors worried that the bubble was about to burst, making it close at around $4.000 at the end of the year. Several hedge funds, retail investors, traders and private investors experienced significant losses due to the burst, once again emphasizing the volatility of Bitcoin. As for Bitcoin's status in 2020, the price has once again exceeded the $10.000 price mark. In an interview with Forbes, John Iadeluca, founder and & CEO of multi-strategy fund Banz Capital, emphasizes the importance of this price mark:

> *"From a psychological level, the $10.000 Bitcoin price marks more headlines, more gossip, and more mainstream interest, which all plays into the "long" formulation of algorithms within cryptocurrency market."* (Bovaird, 2020)

Despite Bitcoin and cryptocurrencies gaining worldwide attention for years, many points to the underlying technology as being at least as disrupting. The decentralized control of cryptocurrencies is brought to life by distributed leger technology, which in the case of cryptocurrencies typically takes form as a *blockchain* (Tapscott & Tapscott, 2016).

1.1.3.1 Blockchain

Traditionally, we lack the possibility to reliably establish each other´s identities online or trust one another to transact and exchange money without the need of a third party like a bank or government (Tapscott & Tapscott, 2016). As these intermediaries process our transactions, they collect data and invade our privacy for their own commercial gain and security. Furthermore, more than 2.5 billion people are excluded from the global financial structure due to their cost structure (Tapscott & Tapscott, 2016). However, with the use of cryptocurrencies and blockchain technology, it is argued that this problem is about to be solved.

"In essence, the blockchain is a digital ledger that´s shared across a decentralized network of independent computers, which update and maintain it in a way that allows anyone to prove the record is complete and uncorrupted" (Casey & Vigna, 2018, p. 12).

This is achieved by using a special algorithm which is embedded into a common piece of software used by all the computers in the network. The uniqueness of this algorithm is its ability to consistently steer the computers towards a shared consensus, on what new data that should be added to the ledger, including all types of economic exchanges, claims of ownership and other valuable information (Casey & Vigna, 2018). Furthermore, each computer in the network is responsible for updating its own version of the ledger by following the unique consensus algorithm. One of blockchains' key attributes is that once the entries are included in the public ledger, special cryptographic protections make the entries virtually immutable. This results in something quite unique, as pointed out by Casey & Vigna (2018):

"A group of otherwise independent actors, each acting in pure self-interest, coming together to produce something for the good of all – an immutable record that everyone can trust and that´s not managed by a single, centralized intermediary (Casey & Vigna, 2018, p. 12)*."*

Another important feature is the ability to store a substantial variety of assets. If the asset can be recorded digitally, it can be written on a blockchain (Hern, 2016). Thus, it is by many seen as a technology that has the potential to disrupt several industries and revolutionize the way businesses operate today (Marr, 2018).

1.1.3.2 Blockchain disrupting industries

At the start of 2018, the word *blockchain* was predicted to be the buzzword of the year (Busby, 2018). One reason for this was people associating blockchain with Bitcoin, making the technology quickly gaining significant attention. An example is when the US-based soft drink firm Long Island Ice Tea Group changed their name to Long Blockchain Corporation, resulting in the company´s shares increasing by 432% in just one day (Neate, 2017). Later in 2018 a research for MediaPost´s Research Intelligencer concluded that *blockchain* was the most overrated buzzword of the year (Mandese, 2019). Nevertheless, despite being characterized as overrated, there are several real-life examples of how the technology will transform many of today´s industries and societies.

1.1.3.2.1 Financial Services

It is argued that blockchain technology has the abilities needed to drastically transform the world's second-oldest profession, financial services (Tapscott & Tapscott, 2016). As we know it today, the global financial services industry faces several problems as it is built on decades-old technology, often making it slow and unreliable. Furthermore, it excludes billions of people from having access to basic financial services as well as being centralized and monopolistic (Tapscott & Tapscott, 2016). Tapscott & Tapscott (2016) list six key reasons why blockchain technology will transform this industry.

First, Attestation; you do no longer have to rely on financial intermediaries to verify identities and establishing trust, enabling unknowns to do business with each other in a more secure way.

Second, Cost; blockchain technology has the ability to radically change the cost structure of banks, potentially eliminating an estimated $20 billion in back-office expenses without changing the "traditional" business model (Tapscott & Tapscott, 2016). As a result, more people in underserved communities will get access to financial services.

Third, Speed; In today´s traditional systems, remittances and stock trades could take up to two to three days to settle. In comparison, taking use of a system like the Bitcoin network, these operations can take an average of 10 minutes to settle.

Fourth, Risk Management; several forms of financial risk can be mitigated using blockchain technology. One of these risks are *counterparty risk*, which is the risk of the counterparty will default before settling a trade.

Fifth, Value Innovation: as the Bitcoin blockchain is open source, it facilitates innovation and experiments on new forms of blockchains suitable for handing other financial assets, physical or digital.

Sixth, Open Source; unlike the traditional financial services industry, blockchain technology can consistently innovate and improve due to its open source structure.

Mainly due to the hype of Bitcoin over the past decade, cryptocurrencies have become the most popular use case of blockchain technology. Yet, it is correspondingly characterized as the most controversial as it facilitates a multibillion-dollar global market of anonymous transactions without any form of governmental control (Crosby, Nachiappan, Pattanayak, Verma, & Kalyanaraman, 2016).

1.1.3.2.2 Supply Chain Management

Virtually every business or organization operate some form of supply chain. Furthermore, as these businesses are to a greater extent turning multinational, their supply chains are getting longer and more complex than ever before. This brings several new risks, as well as new demands from customers (Bird, 2016). As consumers are getting more aware of climate changes and demanding sustainable and ethical production of food and products, *transparency* in supply chains is of significant importance (Linich, 2014). Due to a general lack of such transparency in today´s businesses, supply chain management is an area that many believe will gain significant improvements from utilizing blockchain technology (Pilkington, 2016).

The use of blockchain technology in supply chains can be exemplified by the world´s largest diamond retailer, De Beers, who in May 2018 announced that they had been successful in tracking 100 high-value diamonds along the value chain using their new industry blockchain platform (De Beers Group, 2018). The diamond industry had struggled with associations with so called blood diamonds for many years, defined as diamonds mined under violent circumstances or in unsustainable conditions (Yafimava, 2019). De Beer´s new platform,

called Tracr™, would improve visibility and trust, as well as provide consumers with confidence that registered diamonds are natural and do not originate from areas associated with conflicts and unethical productions (De Beers Group, 2018).

1.1.3.2.3 Non-Governmental Organizations and the Foreign Aid Sector

United Nations´ World Food Programme (WFP) assists 86,7 million people in 83 countries each year, making WFP one of the world´s leading humanitarian organizations (World Food Programme, 2020). Their operations focus around delivering food assistance in emergencies, as well as helping communities improve nutrition and build resilience. With 5.600 trucks, 20 ships and 92 planes on the move every day, WFP have a complex and long supply chain. Furthermore, they are using cash transfers to provide aid, and in 2018 they transferred a total amount of 1.76 billion USD to people in 62 countries (World Food Programme, 2020). Due to the complexity and scale of their operations, and in order to make humanitarian assistance more efficient and efficient, the WFP launched a pilot project called Building Blocks in 2017 (World Food Programme, 2020). Powered by Ethereum, Building Blocks aims at expanding refugee´s choices regarding how they access and spend the cash that they receive by WFP. Furthermore, by putting their cash transfers on the Ethereum blockchain, they are aiming at making their cash transfers more efficient, secure and transparent. According to public information shared by the WFP, the program would save an expected amount of 150.000 USD per month, or 98%, in transaction fees when the project was scaled up to the whole Syrian refugee population in Jordan (Blockchain4Aid, 2018).

In order for people and refugees to receive aid and funds from a blockchain-based system, like the one used by WFP, a digital ID is required. However, according to data from The World Bank, there are around 2.4 billion people missing any form of recognized or legal identity (ID) (Dahan & Mohieldin, 2015).The Ireland-based fintech company AID:Tech aims at solving this problem, by providing refugees with a digital ID, thus enabling them to receive aid through the blockchain (AID:Tech, 2020). AID:Tech partnered up with the Irish Red Cross, and launched their pilot program in Lebanon, focusing on providing aid to Syrian refugees. By creating digital IDs for beneficiaries, AID:Tech provided refugees with access to new social and financial services, as well as making sure that the aid was sent to the right people. Furthermore, providing plastic cards with QR-codes equaling $20 each, refugees were able to buy whatever they needed at the local refugee camp store. These cards then get scanned by the shop keeper so the corresponding blockchain wallet address gets notified, and furthermore checks that there are sufficient funds on the card and verify the transaction. In the end, the donor receives an SMS with information on how their donation was spent (AID:Tech, 2020).

1.1.4 Accounting Processes

Throughout the thesis, the term *accounting processes* will occur on several occasions and furthermore be investigated in terms of to what extent these processes can be streamlined using blockchain technology. Thus, the term´s meaning in the context of the thesis must be explained. In short, the term relates to the processes

identified in the so-called *Accounting Cycle* (Edwards & Hermanson, 2010). The accounting cycle can be defined as "*a series of steps performed during the accounting period (some throughout the period and some at the end) to analyze, record, classify, summarize and report useful financial information for the purpose of preparing financial statements"* (Edwards & Hermanson, 2010, p. 76). The accounting cycle consists of eight steps reflecting all operations a business should carry out as a result of *business transactions*. Edwards & Hermanson (2010, p. 76) define business transactions as *"measurable events that affect the financial conditions of a business"*. The ultimate proof that a business transaction has occurred comes in the form of *source documents*, such as a sales ticket, check or receipt. The accounting cycle includes the following eight steps (Edwards & Hermanson, 2010, p. 77):

1. *Analyze transactions by examining source documents*
2. *Journalize transactions in the journal*
3. *Post journals entries to accounts in the ledger*
4. *Prepare a trial balance of the accounts and complete the work sheet*
5. *Prepare financial statements*
6. *Journalize and post adjusting entries*
7. *Journalize and post closing entries*
8. *Prepare a post-closing trial balance*

The first step involves identifying business transactions, which is necessary for transactions to be subsequently properly recorded on the company´s books.

In the second step, journal entries are made based on the identified transactions. Here, the double-entry accounting is important as each transaction should have a debit and a credit equal to each other (Edwards & Hermanson, 2010).

Once the journal entries are made, the third step includes posting the journal entries to accounts in the organization´s general ledger. In short, a general ledger consists of a detailed breakdown of all of the organization´s accounting activities by account (Tarver, 2019).

The fourth step includes preparing a trial balance. A trial balance provides a company´s unadjusted balances for every account.

Following the preparation of a trial balance, the fifth step includes preparing the organization´s financial statements. Here, it is important to check and ensure whether debits and credits are equal.

If adjustments to the entries is necessary, these are done and recorded as journal entries in the sixth step.

After potential adjustments are made, the entries and journal are closed in order for preparing the financial statements (Edwards & Hermanson, 2010). In most cases this includes preparing an income statement, balance sheet and a cash flow statement.

Finally, a post closing-trial balance is prepared, and the organization closes its books.

1.2 Purpose and Research Question

According to Andersen (2013), a research question should include the following two aspects: 1) a description of the problem that the researchers seek to question, investigate or solve, and 2) a number of sub-questions formulated with the aim of specifying the chosen field of research. Furthermore, an accurate and specific research question will help the researchers to navigate theoretical and methodological questions throughout the research.

When formulating the research question, there is especially one common pitfall that the researchers must avoid (Andersen, 2013). This pitfall lies in the development process of the research question, where it is important that the researchers carefully identifies a problem, rather than simply explaining a current situation. In other words, it is important that the topic of interest rises some critical questions, in which the researchers try to answer through data collection and analysis. Thus, Andersen (2013) encourages the researchers to consider three key questions; 1) what is the problem, 2) why is it a problem and 3) to whom is it a problem.

Based on the background provided on the foreign aid sector, accounting processes, and cryptocurrencies and blockchain technology, as well as Andersen's (2013) three key questions related to the research question, the following research question has been formulated:

How can NGOs take use of blockchain technology to increase trust in their business model and streamline financial processes?

In order to provide a specific and in-depth answer to the research question, the following sub-questions have been formulated:

1. *Which blockchain characteristics can be helpful for NGOs?*
2. *How can blockchain technology help streamline accounting processes?*
3. *How can SOS Children's Villages utilize blockchain technology to improve transaction processes?*

1.3 Delimitations

This sub-chapter will specify the scope of the thesis. The aim for this is to create a more concise thesis, to which this sub-chapter will provide sufficient reasoning and justification for the reader to understand the decided delimitations.

First, the foreign aid industry is large and varied, thus providing a "one-size-fits-all" conceptual design for all different types of actors in this sector is unlikely. Therefore, the thesis will be delimited to non-governmental organizations (NGOs), more specifically non-governmental development organizations – which will still be abbreviated to NGOs. Furthermore, to gain firsthand understanding of how an NGO operates, and the systems within such an organization, the thesis uses SOS Children's Villages as a case example for the conceptual design. Although this means that the design is more likely to be applicable for SOS, we aim to create a blueprint and ideas on how blockchain technology can be used on a sector-wide NGO basis.

Second, blockchain technology has many use cases, some of which were presented in Sub-Chapter 1.1.3.2. In the thesis, blockchain technology will be described thoroughly. However, the analysis will be delimited to mainly looking at its applications in 1) financial processes in NGOs, 2) the "supply chain" of SOS' funds, and 3) cryptocurrencies. In short, there are multiple potential applications of blockchain technology in the foreign aid sector that is not covered in the thesis.

As mentioned in Sub-Chapter 1.1.2.2, there is a lack of trust in the foreign aid sectors from the public as well as demand for more transparency. This notion has been claimed based on various reports and articles arguing this, and not on firsthand investigation of this phenomenon. Thus, the thesis is delimited by not having any primary data on the public's view about any parts of this research – which may have added an additional element to the thesis.

Furthermore, the research and the conceptual design will not include analyses of certain external factors, although these may be important for the conceptual design's feasibility. Such factors could be taxation rules, governmental regulations and laws, environmental issues, etc. Some of these aspects are subject for further research in Chapter 12.

Last, due to page restrictions cohering to the guidelines for writing a thesis, certain more detailed explanations and elaborations are referred to appendices. The instances where this occurs are highlighted in the relevant sections. Still, the information in this main document are still regarded sufficient to the validity of the thesis.

1.4 Thesis Structure

The thesis will follow the structure the researchers consider most appropriate through introducing themes and information in a logical order to enhance the understanding of the reader. More specifically, the structure is designed to provide in-depth knowledge making the reader eventually possess satisfactory knowledge to understand the researchers´ answer to the research question. Thus, the thesis consists of 12 chapters with the following purpose.

Chapter 2 will provide the reader with a literature review, consisting of a presentation of relevant literature used in the thesis. This will provide the reader with an overview of the existing literature in the research topic and potential gaps in the literature identified by the researchers. Chapter 3 consists of a step-by-step review of the thesis´ methodological choices, following Saunders' Research Onion (Saunders, Lewis, & Thornhill, 2019). Subsequently, Chapter 4, 5 and 6 will provide the reader with in-depth knowledge on three key aspects: 1) Social theory, 2) Non-Governmental Organizations, and 3) blockchain technology, respectively. Chapter 7 introduces the reader to the data collection done in the thesis, more specifically an introduction to the thesis´ interview participants. Following, the findings from the conducted interviews will be presented and analyzed in Chapter 8, creating the foundation for the conceptual design presented in Chapter 9. The proposed conceptual design will be designed based on relevant theory, SOS' business model and findings from interviews with industry experts. In Chapter 10, the researchers´ will discuss the feasibility of the conceptual design, as well as its strengths and weaknesses, and blockchain in accounting processes. Finally, Chapter 11 will present the reader with the researchers´ concluding remarks, before thoughts on a potential path for further research are presented in Chapter 12.

2. Literature Review

To provide a theoretical background of the thesis, multiple sources have been utilized to ensure that there are as few gaps as possible in its justification. This introduces the term validity, which according to Ettinger (2009), concerns whether the research captures what is intended, as well as accurately reporting its findings. In other words, ensuring a research' validity means ensuring that sufficient information about the subject is gathered and presented (Ettinger, 2009).

All primary and secondary data sampling for the thesis are introduced in Sub-Chapter 3.4. Supplementary, this chapter will provide further justification about certain literary works and theories which are presented in Chapters 4 and 6, regarding social theory and theory about blockchain and emerging technologies. Furthermore, these literary works' impact on the thesis' overall validity will be justified.

2.1 Social Theory

As NGOs operate with human needs in several underdeveloped countries, it is important to understand the context in which the thesis takes place. Thus, to understand societies and social requirements, three literary aspects, in which the last includes two theories, is used: 1) Social Business, 2) The Fortune at the Bottom of the Pyramid, and 3) Technological Determinism and Social Construction of Technology. These theories are presented in Chapter 4.

The first literary work introduces the term "Social Businesses", coined by Muhammad Yunus (Yunus, Moingeon, & Lehmann-Ortega, 2010). The article explains how businesses to a growing extent introduces humanitarian initiatives, and care increasingly about social profit, rather than solely monetary profits.

The second work, "The Fortune at the Bottom of the Pyramid", introduces the lowest tier of the consumer pyramid as a great common-cause business opportunity for multinational corporations, which can prove prosperous in humanitarian development (Prahalad & Hart, 2002). Using Prahalad & Hart (2002) to understand the business opportunities and how they can serve to decrease poverty is highly valid for the thesis, as the overall aim is to enhance the opportunity of lifting the least fortunate in the world – the bottom of the pyramid.

The third social theory in this theory involves the relation between society and technology. Kline (2015) describes the idea of Technological Determinism, whereas Bijker (2015) present a countering theory named Social Construction of Technology (SCOT). The two ideas are contrasting in explaining the relation between societal and technological development, which can be used to determine the environment around implementing new technologies in societies.

Altogether, the abovementioned social theories increase the thesis' validity as they comprise theories about society and the idea of social development, opportunities presenting common goals in improving societies and technological impact on society and social development. Thus, they are likely to help understand the social context in which emerging technologies can be implemented, which is of vital considerations for decision-making.

2.2 Distributed Ledgers and Blockchain Technology

As the thesis aims at introducing a conceptual design for SOS based on blockchain technology, a sufficient level of knowledge is required for both the reader and the researchers. Throughout the thesis, there are specifically three separate books that have all contributed to providing the necessary level of knowledge on DLT and blockchain technology. The first two are more focused towards providing knowledge on different use cases of blockchain technology, while the third book provides a greater understanding of the underlying technical aspect.

Written by Casey & Vigna (2018), "The Truth Machine – The Blockchain and the Future of Everything" provides insight on the authors view of the transformative potential of blockchain technology. First, it describes the hype and general interest following the introduction of the Bitcoin Whitepaper in 2008 and the initial release including the first Bitcoin transaction in early 2009. The authors aim to provide the reader with an understanding of how the technology has potential to disrupt industries and significantly change the way trust is obtained, and maintained, in activities that normally require intermediaries to provide trust and integrity.

"The Truth Machine" has been found relevant for the thesis due to its practical approach to explaining blockchain technology and some of its most famous use cases. Furthermore, focus on how the technology can disrupt the financial industry is seen as a key contributor to the thesis. Thus, it is considered as highly relevant and valuable, contributing to the overall validity of the thesis (Saunders, Lewis, & Thornhill, 2019).

Casey & Vigna (2018) illustrate one of the use cases of blockchain technology by taking the reader on a journey to the UN High Commission for Refugees´ Azraq camp near by Amman in Jordan. The camp functions as a home for more than 32.000 Syrian refugees which have fled from their homes due to war and violation of human rights in their home country. A number of these refugees do not have any form of ID, and the general lack of an infrastructure in the camp block their ability to take part in any form of financial activities, such as buying food and other necessities. Casey & Vigna (2018) illustrate how blockchain technology can help to provide and store digital identities for refugees, which again will provide them with the opportunity to take advantage of financial services by using cryptocurrencies for simple trade in everyday life. Thus, the authors illustrate how the technology can play a vital role in the life of "the unbanked", people that are for some reason excluded from the traditional financial systems (Casey & Vigna, 2018).

"Blockchain Revolution – How the Technology Behind Bitcoin is Changing Money, Business and the World" by Tapscott & Tapscott (2016) is also found as highly relevant for the thesis. Like "The Truth Machine", it tries to explain the potential of blockchain technology and its many use cases in a simple, yet thorough manner. Thus, it does not focus on the underlying technical aspects of the technology. Several of the technology´s use cases is described, ranging from healthcare records to online voting, and furthermore from insurance claims to artist royalty payments (Tapscott & Tapscott, 2016). Additionally, it discusses 10 of the general challenges and weaknesses of the technology that has been, and still is, limiting a universal implementation of the technology. Due to the wide range of use cases illustrated in the book, it is considered highly relevant for providing key knowledge both for the researcher and the readers of the thesis. Moreover, the authors´ view of the technology´s limitations were also valuable for creating a thorough understanding of the technology. Thus, it provides validity to the thesis as it contributes towards the necessary, yet general, understanding and knowledge of the technology and its many uses cases required in order to understand the concept and implications of the conceptual design developed later in the thesis (Saunders, Lewis, & Thornhill, 2019).

Last, "Blockchain Basics" written by Daniel Drescher (2017), has contributed to a great extent. Structured around 25 steps, it intends to provide the reader with thorough understanding and DLT and blockchain technology. The 25 steps cover a wide range of aspects related to blockchain technology such as why the blockchain is needed, planning the blockchain, hashing data, and limitations and how to overcome them. As the thesis aims at introducing a conceptual design based on blockchain technology, a thorough understanding of how the technology works, its use cases as well as its limitations are necessary. Therefore, Drescher´s (2017) work is found highly relevant and valuable, contributing towards the overall validity of the thesis (Saunders, Lewis, & Thornhill, 2019).

2.3 General Data Protection Regulation

With the aim of making Europe "fit for the digital age", the General Data Protection Regulation (GDPR) was enforced on May 25 2018 (Wolford, 2020). In short, the GDPR can be summarized as:

> *"The General Data Protection Regulation (GDPR) is the toughest privacy and security law in the world. Though it was drafted and passed by the European Union (EU), it imposes obligations onto organizations anywhere, so long as they target or collect data related to people in the EU. … The GDPR will levy harsh fines against those who violate its privacy and security standards, with penalties reaching into tens of millions of euros."* (GDPR, General Data Protection Regulation (GDPR), 2020).

Following the digital age, new technologies and services have facilitated the collection, processing and transferring of people´s personal data across borders and continents. Thus, the GDPR is designed so EU

citizens will get increased control over their personal data by simplifying and creating universal regulations for businesses and other organizations that collect personal data.

The GDPR applies to all businesses and organizations that *process personal data of EU citizens or residents*, or businesses that *offer goods or services to such people*, even if the business is not physically located in the EU (Wolford, 2020). Thus, businesses now have to ensure they are GDPR compliant, which means that they must ensure they operate within the carefully set boundaries of the GDPR when gathering and/or handling personal data (Wolford, 2020). Moreover, businesses are obliged to make sure the personal data they collect is not subject to misuse or handed over to any third party. Any form of mismanagement or disobedience will be followed by penalties. There are two tiers of penalties, in which the maximum penalty amounts to €20 million or 4% of the prosecuted business´ global revenue, whichever is the highest (Wolford, 2020).

In summary, the GDPR aims at providing a universal set of rules and guidelines for businesses that collect, process, store or transfer personal data of EU citizens or residents (GDPR, General Data Protection Regulation (GDPR), 2020). It includes numerous articles and recitals covering areas such as Territorial and Material Scope, Accountability, Privacy Notes, Consent, Individual´s Rights Breach Notifications, International Data Transfers and Sanctions (GDPR, General Data Protection Regulation (GDPR), 2020). One of the most important implications of the GDPR is individuals´ right to erasure, also known as *"the right to be forgotten"* (GDPR, Everything you need to know about the "Right to be forgotten", 2020). In short, this right implies that a data subject shall have the right to "*obtain from the controller the erasure of personal data concerning him or her without undue delay and the controller shall have the obligation to erase personal data without undue delay"* (GDPR, Everything you need to know about the "Right to be forgotten", 2020).

2.4 Literature Gap

So far, Chapter 2 has described literature relevant for the thesis. As described, literature on both the foreign aid sector, specifically NGOs and opportunities and threats in the sector, as well as on blockchain technology and its applications, is prevalent. Additionally, there is much existing literature relating blockchain to business cases such as financial services, supply chains, and audit, which will be used in the thesis.

When searching for articles and other existing literature to support the thesis, the researchers noticed a gap in the literature. A literature gap, or research gap, is described as an area that has not yet been explored or is only somewhat explored (NCU, 2020). Although both blockchain technology and NGOs are well written about, certain applications are less explored. More specifically, we were unable to find literature on how blockchain can streamline accounting processes. Additionally, although certain use cases of blockchain technology in foreign aid were accessible, existing literature on blockchain based ERP systems for NGOs was not discovered during the research.

Due to the scope of the thesis being undiscovered so far, this research is largely exploratory and will use existing literature to produce new concepts of how blockchain technology can be applied. Thus, the thesis will attempt to contribute to filling this literature gap, which according to Constanza-Robinson and Maxwell (2020) means that the thesis is a novel research contributing to the overall goals of science.

3. Methodology

Methodology involves making decisions regarding research philosophies, approaches to reasoning, strategies, procedures, and techniques cohering to the overall goal of a research (Saunders, Lewis, & Thornhill, 2019). As such, this chapter will present the methodological choices made for the thesis, using Saunders' Research Onion as framework.

3.1 Research Philosophy

Saunders, Lewis & Thornhill (2019) defines research philosophy as "*a system of believes and assumptions about the development of knowledge*." When conducting research, one develops knowledge in a particular field and throughout the research process, one is likely to make several assumptions. In the book "Sociological Paradigms and Organizational Analysis", Burrell & Morgan (1979) lists three types of such assumptions: 1) epistemological assumptions, 2) ontological assumptions, and 3) axiological assumptions.

3.1.1 Ontological, Epistemological, and Axiological Assumptions

In order to decide which research philosophy should constitute the basis for the methodological choices throughout the thesis, we need to distinguish them. One way to do this is to consider the differences in three critical assumptions that each of the philosophies make (Saunders, Lewis, & Thornhill, 2019).

First, ontology refers to assumptions about the nature of reality (Saunders, Lewis, & Thornhill, 2019, p. 127). In general, ontological assumptions are important as they shape the way which you see and study your research objects. For instance, in the context of business and management, these objects include organizations, management, individual´s working life and more.

Second, epistemology relates to our assumptions about knowledge, our thoughts on what constitutes acceptable, valid and legitimate knowledge and how we can communicate knowledge to others (Saunders, Lewis, & Thornhill, 2019, p. 127). As for a multidisciplinary context such as business and management, a broad epistemological approach means that different types of knowledge can be considered legitimate. Such types of knowledge might range from numerical data to textual and visual data, from facts to interpretations and more. However, it is of great importance to understand the consequences of different epistemological assumptions as they might have implications on the choice of research methods, as well as for the subsequent research findings (Saunders, Lewis, & Thornhill, 2019).

Third, axiology refers to the role of value and ethics within the research process (Saunders, Lewis, & Thornhill, 2019, p. 128). This include both our own values as researchers, and the values of our research participants and how we incorporate questions about all these values. It is important to remember that the role of our own values

plays an important role throughout the whole research process as they influence the credibility of our research results.

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3.1.2 Objectivism and Subjectivism

In addition to the types of assumptions the different research philosophies make, there are two types of opposing extremes within these assumptions (Saunders, Lewis, & Thornhill, 2019). First, objectivism is heavily colored by the assumptions of natural sciences, in that it argues that the social reality we research is external to us and others. Ontologically, objectivism embraces realism in that it considers social entities to be like physical entities of the natural world. Social entities are regarded as existing independently of how we think of them, how we label them or even of our awareness of them (Saunders, Lewis, & Thornhill, 2019). In terms of epistemology, objectivists seek to discover the truth about the social world. This is done through observable, measurable facts, in order to be able to draw law-like generalizations about the universal social reality (Saunders, Lewis, & Thornhill, 2019). Seen from an axiologically point of view, objectivists seek to keep their research free of values, as they believe that these values can bias their findings. This is done since they believe that social entities and social actors exist independently of each other. As a result, objectivists are focused on trying to remain detached from their own values and beliefs during the research process (Saunders, Lewis, & Thornhill, 2019).

Subjectivism incorporates assumptions of the arts and humanities, and by that subjectivists assert that social reality is made from the perceptions and consequent actions of people, also referred to as social actors (Saunders, Lewis, & Thornhill, 2019). In terms of ontology, subjectivism embraces nominalism, also called conventionalism. Nominalism, in general, includes considering that the order and structures of the social phenomena that we study are created by us as researchers and by other social actors, people.

3.1.3 Research Philosophy

Generally, there are five different research philosophies, namely positivism, critical realism, interpretivism, postmodernism and pragmatism (Saunders, Lewis, & Thornhill, 2019). Detailed explanations of the research philosophies can be found in Appendix 3, as the following paragraphs will explain the chosen philosophy, Interpretivism, in relation to its ontology, epistemology and axiology.

In terms of ontology, the nature of reality or being, Interpretivism´s view relates to a complex and rich nature of reality which is socially constructed through culture and language (Saunders, Lewis, & Thornhill, 2019).

Moreover, interpretivists assume that there are multiple meanings, interpretations and realities in relation to the question of what is assumed to be the nature of reality or being.

Interpretivism´s view on epistemology, the view on what constitutes acceptable knowledge, lies close to the view on knowledge adopted in the thesis. In interpretive research, theories and concepts are seen as too simplistic (Saunders, Lewis, & Thornhill, 2019), which can to some extent be seen as throughout the thesis. Since the introduction of Bitcoin in 2008, the knowledge and interest in blockchain technology have increased significantly. However, there is a lack of prior research on the topic investigated in the thesis – blockchain technology in NGOs' financial processes. Thus, the perceptions and interpretations of key people is imperative to gain sufficient knowledge on blockchain technology, cryptocurrencies and SOS' business model. Furthermore, Interpretivism acknowledges new understandings and worldviews as contribution to acceptable knowledge (Saunders, Lewis, & Thornhill, 2019). As blockchain technology has been characterized as being part of the fourth industrial revolution, one could argue that the technology is revolutionary, thus to some extent contributing to new understandings of how to do business in many industries (Pallock, 2018).

In terms of axiology, the role of the researchers´ values and ethics, Interpretivism suggests that researchers are part of what is researched, thus having a subjective approach (Saunders, Lewis, & Thornhill, 2019). Furthermore, the researchers´ interpretations are key to contribution. However, our intended axiology skews towards critical realism as we as researchers try to minimize bias and be as objective as possible. Typical methods used in the Interpretivism research philosophy are in-depth investigations and qualitative methods of analysis (Saunders, Lewis, & Thornhill, 2019). However, the thesis will not exclusively use qualitative methods, as quantitative methods for analyzing corruption and fraud in NGOs are adopted (Saunders, Lewis, & Thornhill, 2019). Hence, the typical methods used in Pragmatism, including mixed methods, are relevant for the thesis.

3.2 Approach to Theory Development

The second layer of Saunders' Research Onion refers to the "approach to theory development". Theory development is generally divided into two approaches: deductive and inductive (Saunders, Lewis, & Thornhill, 2019). The general perception is that an approach is deductive if the research origins in theories or hypotheses, which is subsequently investigated and falsified or verified. Conversely, an inductive approach starts with data collection to explore a phenomenon and subsequently build a theory (Saunders, Lewis, & Thornhill, 2019). However, it is important to note that no rigidity exist between these approaches, exemplified through the theory of abduction. Abduction is characterized similarly to the inductive approach, but with the distinction that generated theories are continuously tested through additional data collection, thereby using aspects also found in deductive approaches (Saunders, Lewis, & Thornhill, 2019).

Due to this paper's focus, blockchain technology in financial processes for NGOs, being within a relatively untested field of research, Saunders, Lewis, & Thornhill (2019) recommends an inductive approach to theory development (Saunders, Lewis, & Thornhill, 2019). However, the assessed approach to theory development in the thesis is, as argued to be advantageous in certain instances by Saunders, Lewis, & Thornhill (2019), a combination of inductive and abductive based on four characteristics illustrated below.

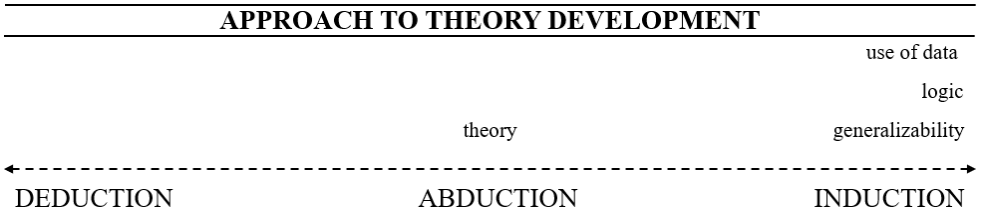

Figure 1: Approach to Theory Development based on the four characteristics

More specifically, as portrayed in Figure 1, the thesis adopts an abductive approach based on the theory-characteristic. This is due to the approach' structure of incorporating existing theory where appropriate, to build new or modifying existing theory (Saunders, Lewis, & Thornhill, 2019).

Next, the use of data is based on its purpose of exploring the phenomenon of blockchain, which in combination with identifying themes and patterns will produce a conceptual framework for how blockchain technology can be utilized in the foreign aid sector. Therefore, as well as the conceptual framework not being tested through subsequent data collection, the use of data has an inductive approach to theory development (Saunders, Lewis, & Thornhill, 2019).

Third, the thesis takes use of known premises to generate an untested conclusion, as the objective is to use knowledge from the foreign aid sector and blockchain technology to create a conceptual design. According to Saunders, Lewis, & Thornhill (2019), this indicates an inductive approach based on the logical characteristic.

Fourth, the thesis will generalize from the specific to the general, where the approach is to present facts and arguments which finally leads to a conclusion. Therefore, in terms of the generalizability characteristic, the thesis has an inductive approach to theory development.

In summary, the assessment of the thesis' approaches to theory development, explained more elaborately in Appendix 3, combines induction and abduction, thereby following the general methodological process and field of resembling an inductive approach more than a deductive. The inductive approach further allows alternative contextual qualitative explanations of what goes on and, in a way that is not possible in the rigid structure provided by a deductive and often quantitative approach (Saunders, Lewis, & Thornhill, 2019). Thus, in a primarily qualitatively based thesis where blockchain theory is combined with theory and interviews regarding the foreign aid industry and its stakeholders, the natural approach to theory development is induction (Saunders, Lewis, & Thornhill, 2019).

3.3 Research Design

The research design constitutes a general plan of how the research questions will be answered, as it contains clear objectives from the research questions, specifies the sources for data collection, how the data is collected and analyzed and discusses ethical constraints that may follow (Saunders, Lewis, & Thornhill, 2019). According to Saunders' Research Onion, the research design is made up of three steps; methodological choice, strategies, and time horizon, all of which contribute to create a coherence in the research design (Saunders, Lewis, & Thornhill, 2019). According to Saunders, Lewis, & Thornhill (2019), it is vital to have a clear research design with valid justification of the decisions made in the process. The justifications should be based on the objectives of the thesis and research question, be consistent with the research philosophy and provide coherence across the research design.

3.3.1 Methodological Choice

The first step of the research design is to determine the thesis' methodological choice (Saunders, Lewis, & Thornhill, 2019). In essence, methodological choice lies between using a qualitative, numerical, or quantitative, non-numerical method. The methodological choice is often correlated to research philosophy and the approach to theory development, as the different research designs often stem from these. However, as in the approach to theory development, research often consist of a combination of numeric and non-numeric methods. Such analyses may be due to the need for an interview or other non-numeric data collection to support or explain results and issues in the quantitative research (Saunders, Lewis, & Thornhill, 2019). Similarly, the research may need some numeric data to support non-numeric data or claims. This way, the two initial methodological choices may be described as the two extremes of a continuum, in which there are multiple combinations of choices and where practice is mixed. The complexity of the methodological choice and the continuum is illustrated in Figure 2.

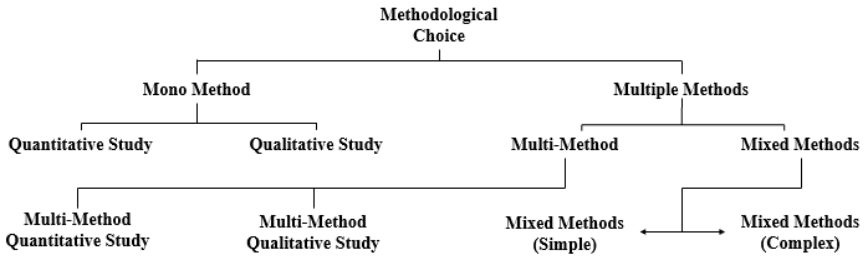

Figure 2: Methodological Choice Illustrated

Explained with further detail in Appendix 3, the methodological choice for the thesis follows the multiple methods branch of Figure 2, as different forms of research will be conducted, including semi-structured interviews and existing literature, thereby excluding a mono-method approach (Saunders, Lewis, & Thornhill, 2019).

The existing literature and interviews with blockchain experts and employees in the foreign aid sector constitute the most prevalent data collection of the thesis. However, primarily as support to the theoretical, qualitative analyses, some quantitative data will be collected. For instance, numerical data related to NGOs, corruption or other aspects where it may prove beneficial to the study will be collected. As such, the methodological choice follows the mixed methods branch visualized on Figure 2.

Mixed methods research comes in different varieties with varying complexities, which is concluded on the way the quantitative and qualitative methods are intertwined throughout the research (Saunders, Lewis, & Thornhill, 2019). Moreover, according to Creswell and Plano Clark (2011), mixed-method research is often either to a greater extent qualitative or quantitative, meaning one of the methods primarily run one of the methods, while the other operates supportively. This situation is called an embedded mixed methods research (Saunders, Lewis, & Thornhill, 2019). As the thesis is an exploratory study, rather than descriptive, qualitative research is prioritized with certain quantitative elements supporting specific findings. Thus, quantitative and qualitative data is collected separately with the aim of providing a richer and more comprehensive response to the research question (Saunders, Lewis, & Thornhill, 2019). Despite data being collected separately, it will be gathered in the same phase of the research to complement each other, e.g. for figures to support non-numerical observations.

Hence, the methodological choice in the thesis is a single-phase, simple mixed-method research design termed concurrent triangulation design.

3.3.2 Research Strategy

According to Saunders, Lewis and Thornhill (2019, p. 177), a research strategy can be defined as "*a plan of how a researcher will go about answering her or his research question*". Furthermore, Denzin and Lincoln (2011) argue that research strategy can be seen as the methodological link between the research philosophy and all of the subsequent choices related to collecting and analyzing data. In general, some research designs are often linked together with certain research philosophies as well as a research approach, such as deductive or inductive. However, as noted by Saunders, Lewis and Thornhill (2019), there are often open boundaries between all of these philosophies, strategies and approaches. Moreover, they argue that no research strategy should be considered as superior to any other. What they do note, however, is the importance of achieving a reasonable level of coherence throughout your research design, as this will enable you to answer your specific research questions and meet your objectives. Last, it is noted that the different research strategies are not mutually exclusive, meaning that it is possible to, for instance, combine them (Saunders, Lewis, & Thornhill, 2019).

According to Saunders, Lewis and Thornhill (2019), there are eight different research strategies worth considering, namely; Experiment, Survey, Archival and Documentary Research, Case Study, Ethnography, Action Research, Grounded Theory and Narrative Inquiry. Experiment and Survey are primarily, or

exclusively, linked to a quantitative research design (Saunders, Lewis, & Thornhill, 2019). Thus, they are not considered relevant for the thesis as both the chosen research philosophy the methodological choice points in the direction of mixed methods. The subsequent two, Archival and Documentary Research and Case Study, might involve quantitative or qualitative research, or even a design combining the two, called mixed methods. Finally, the remaining four are primarily, or exclusively, linked to a qualitative research design (Saunders, Lewis, & Thornhill, 2019).

In the thesis, the research strategy takes form as a case study. According to Yin (2014), a case study can be described as an in-depth inquiry into a topic or phenomenon analyzed in its real-life setting. Furthermore, the "case" in a case study may take form in several different ways, such as being a person, organization, a group of people, an event or a change process (Saunders, Lewis, & Thornhill, 2019). In the thesis, the case investigated is SOS Children's Villages. More specifically, the research focuses on investigating SOS' current system for transferring funds through each step in its supply chain from donors to end projects. Thus, we are interested in investigating SOS´ current system in its real-life setting, to assess how blockchain technology can be utilized to streamline their business model and increase transparency. To achieve the required in-depth insights into the case of interest, case studies often take use of quantitative or qualitative research methods and most often a mix of these two. As discussed in Sub-Chapter 3.3.1, the thesis will take use of such mixed methods.

Following the long and widespread use of case study as a research strategy, the approach has evolved into a wide variety of ways suited for different purposes (Saunders, Lewis, & Thornhill, 2019). For instance, both positivist and interpretivist researchers have adopted the strategy, each with a slightly different purpose. On one hand, positivist researchers have used case studies inductively in order to build theory and develop theoretical hypothesis and subsequently testing these hypotheses. On the other hand, interpretivist researchers put more effort into developing richly comprehensive and detailed descriptions and knowledge on the chosen case of the study (Saunders, Lewis, & Thornhill, 2019). Furthermore, some interpretivist researchers will try to work inductively and analyze data with the aim of identifying themes and patterns, and subsequently try to identify these patterns in existing literature. When identified, the researchers will try to refine, extend or generate theory based upon the findings (Saunders, Lewis, & Thornhill, 2019). As such, the thesis will follow the interpretivist researcher's approach to case studies.

Yin (2014) presents four types of case studies by distinguishing two dimensions. First, he presents single versus multiple, and holistic versus embedded case studies. A single case study focuses on what can be characterized as a critical, extreme or unique case (Saunders, Lewis, & Thornhill, 2019). Furthermore, a single case study can be used when the researchers intend to observe and analyze a problem that has not yet been researched to a great extent. A multiple case study incorporates multiple cases, and does so with the intention of trying to identify whether findings can be replicated across cases (Saunders, Lewis, & Thornhill, 2019). Additionally,

a holistic case study is one where the researchers focus on one unit of analysis, for instance a case study looking at the organization as a whole. Conversely, an embedded case study focuses on several units of analysis, for example if the researchers look at several different sub-units in the organization (Saunders, Lewis, & Thornhill, 2019).

In summary, the thesis can be characterized as a single, holistic case study. This can be argued based on the thesis focusing on one single case company, SOS. Furthermore, it can be argued that a literature gap exists on implementation and design of solutions based on blockchain technology for NGOs. Thus, the thesis aims to contribute with new knowledge on the chosen topic of interest. Additionally, as the analysis focuses on the entirety of SOS as an umbrella organization and not merely specific sub-divisions, the thesis characterizes as a holistic case study.

3.3.3 Time Horizon

When designing a research, it is important to clarify its time horizon (Saunders, Lewis, & Thornhill, 2019). This aspect considers whether the research will be a "snapshot" of a current situation – a cross-sectional time horizon – or a series of snapshots representing events over a longer period – a longitudinal time horizon. A longitudinal research may either be a research conducted over a substantial amount of time, or utilizing existing data for multiple years prior to the research, to reach a conclusion (Saunders, Lewis, & Thornhill, 2019). Contrarily, cross-sectional time horizons are often used to explain how factors are related in organizations. Thus, research with longitudinal time horizons are usually considered more definite and valid in concluding cause-and-effect relationships (Saunders, Lewis, & Thornhill, 2019). Both approaches to the time horizon are observational studies, meaning the researchers do not interfere with the study environment (IWH, 2015). Essentially, this means that the choice of time horizon will not be decisive in the final conclusions of the study.

The thesis will use interviews with a case company, SOS Children's Villages, as well as with blockchain experts, which in combination with existing literature will result in a conclusion and conceptual design. In other words, the research in the thesis will be primarily qualitative, analyzing the current picture and how various factors are related, and provide a potential improvement to it. However, this conceptual design will not be tested in practice and tracked over time to determine its effect. Therefore, it can be concluded that the thesis will follow a cross-sectional time horizon.

3.4 Techniques and Procedures

The sixth and innermost layer of Saunders' Research Onion concerns data collection and -analysis, which covers the thesis' techniques and procedures (Saunders, Lewis, & Thornhill, 2019). This is a complex process, which will determine both what kind of data is collected, and from which pool the data is collected – the latter of which is important to ensure the data collection's validity. Thus, the process of the research' techniques and

procedures include determining the data sample and which kinds of primary and secondary data is used in the research.

3.4.1 Data Sampling

When researching, it is of great importance to determine the pool of information data is to be collected from, as noted above. This is due to low feasibility of collecting and analyzing all potential data available (Saunders, Lewis, & Thornhill, 2019). Determining the sample of data will then allow the research to include only data from certain sources rather than all possible cases or elements. Moreover, data sampling is often done as a necessity of narrowing down the entire population to a more manageable size. However, as Saunders, Lewis, & Thornhill (2019) substantiates, it is important that the data sample does not jeopardize the validity and generalization of the research' outcome.

The data sampling relevant to the thesis is information regarding SOS. This is collected through interviews with employees at SOS CVI – the international office of SOS Children's Villages. Thus, the data sampling may include differing opinions and views from people in SOS' member associations, as well as donors. However, as the primary motive is to gain understanding of the transaction process and the organization's ERP system, SOS CVI's points of view are deemed to be representative for the organization and their general motives as a whole.

3.4.2 Primary Data

According to Hox & Boeije (2005), primary data is data collected for the specific research problem, using the procedures considered best suited. This data is collected directly by the researchers, however there are multiple ways of collecting primary data. Data collection methods falling under this category include observations, semi-structured, in-depth and group interviews, and questionnaires (Saunders, Lewis, & Thornhill, 2019).

For the thesis, primary data is collected through interviews, both with experts in blockchain technology, and with the internal audit-department of SOS CVI. Data collection is considered a research interview if it is a purposeful conversation between two or more people, where the interviewer asks questions and the interviewee responds (Saunders, Lewis, & Thornhill, 2019).

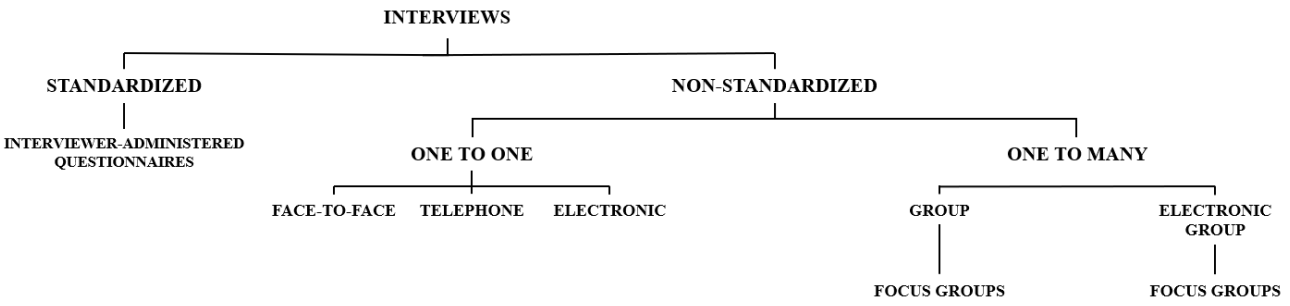

Figure 3: Standardized vs, Non-Standardized Interviews

As the interviews have been conducted one to one, and are not interviewer-administered questionnaires, the interview method is regarded as a non-standardized interview (Saunders, Lewis, & Thornhill, 2019). Furthermore, all interviews were of one individual, thereby defined as one to one interviews. Last, referring to Figure 3, one interview was face-to-face, one was over the phone and the rest were conducted over Skype, thereby being electronic one to one, non-standardized interviews. All interviews were recorded with consent and subsequently transcribed, thereby ensuring the discussions (Saunders, Lewis, & Thornhill, 2019).

The interviews in the thesis are primarily semi-structured, where a theme and some key questions are determined prior to the interviews. Following the characteristics from Saunders, Lewis, & Thornhill (2019), the questions vary from interview to interview, depending on new knowledge from the researchers as well as the interviewees' backgrounds, whilst covering similar themes. However, despite all interviews being intended as semi-structured, the interviewees were informed about the thesis' topic prior to the interviews. As such, some of the interviews draw more similarities to unstructured, or in-depth, interviews, where the interviewees have been allowed to talk freely about the topics (Saunders, Lewis, & Thornhill, 2019).

The blockchain-related interviews were conducted due to the technology still being at an early stage of adoption, thus acting as a supplement to existing theory. Thereby, these interviews support the research with multiple views and aspects of possible applications of blockchain. The interviews with SOS CVI, on the other hand, were conducted to provide a thorough explanation of SOS Children's Villages, their objectives and values, their point of view on industry issues and, most importantly, a thorough description of their current ERP system and the entire process of collecting and transferring funds to their beneficiaries. The latter point of this will form the basis of where blockchain technology may be implemented, and subsequently play a part in the thesis' conceptual design.

3.4.3 Secondary Data

Existing data and literature researched and further analyzed for some other purpose than the initial, is called secondary data (Saunders, Lewis, & Thornhill, 2019). Such data can include raw data and published summaries and analyses, and are typically used to provide additional or different knowledge, interpretations, or conclusions to existing theories (Bulmer, Sturgis, & Allum, 2009).

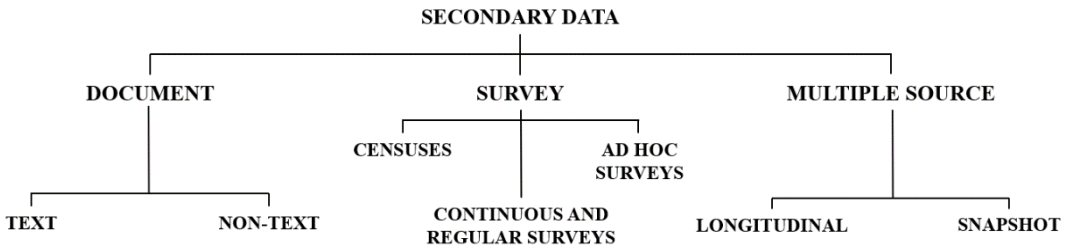

Figure 4: The Three Different Types of Secondary Data

Although secondary data is most common in explanatory studies, Saunders, Lewis, & Thornhill (2019) argues that it is perfectly applicable to exploratory- and case studies as well, which is the case in the thesis. The secondary data sources in the thesis relate primarily to blockchain technology, the foreign aid sector, and NGOs, and for methodology. This data is collected through a variety of sources where quantitative data, for instance about corruption which is reported regularly to follow development, is collected using continuous and regular surveys.

Moreover, much of the secondary data is provided through books, reports and journals, which are snapshot multiple sources. The information in these texts, being primarily theories and facts about something, relates to the snapshot distinction of this type. However, some of the information used in the thesis, for instance regarding the development of foreign aid, corruption, trust, and the history of blockchain technology, can be regarded as longitudinal multiple source secondary data.

Finally, certain instances of document secondary data will be presented in the thesis, for example text through articles in reliable, quality newspapers and magazines. Moreover, non-text document secondary data has been utilized to extend the researchers' knowledge about blockchain technology through a video course on the subject, facilitated by Princeton University.

3.5 Summary of Methodology

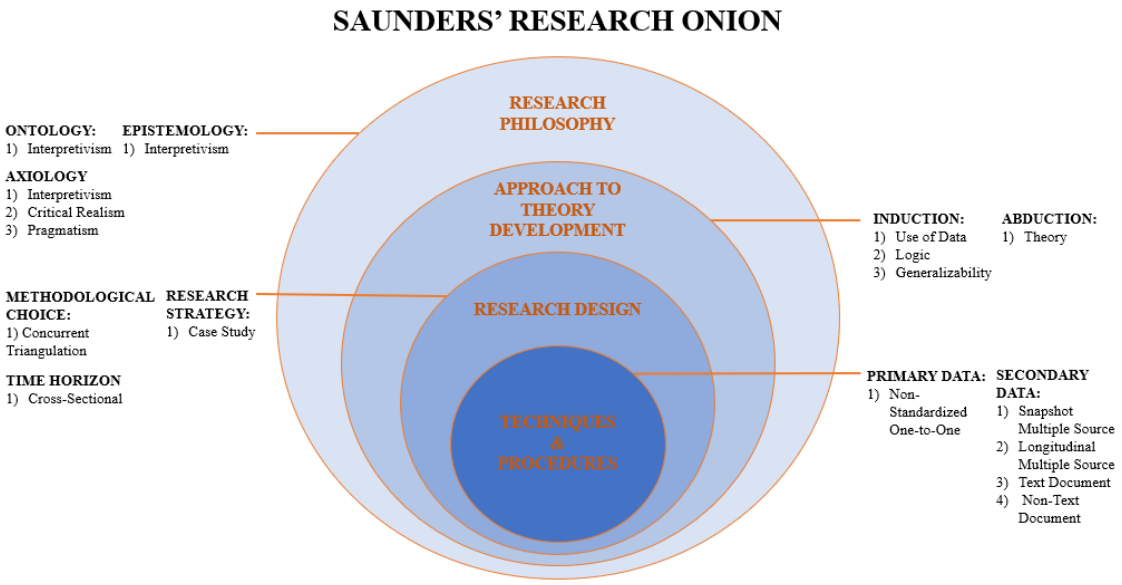

Figure 5: Summary of Methodological Choices, Based on Saunders' Research Onion

3.6 Data Preparation and Analysis

After each interview was conducted, they were subsequently transcribed as preparation for further analysis (Saunders, Lewis, & Thornhill, 2019). This analysis was done by taking use of a qualitative data analysis software called NVivo 12 (NVivo, 2020). By using NVivo 12, the researchers were able to code the interviews and create "nodes" which reflect specific and relevant findings from each interview. By analyzing the interviews in this manner, the researchers were able to identify key and common characteristic across the conducted interviews. The transcribed interviews were converted to PDF-files, imported to NVivo and subsequently carefully read separately twice by both researchers, without doing any coding or highlighting. We then read the interviews a second time and highlighted the most relevant findings in the interviews, as well as adding comments to each highlight describing what topic the highlighted sentences related to. Subsequently, based on the content from the interviews, the highlighted findings, and the related comments, as well as the topic for the interviews and the interview guides, 23 nodes were created in NVivo 12. The operation of highlighting the most relevant findings from the interviews resulted in 180 identifications. The distribution of the amount of identifications in the different nodes can be found in Appendix 7. These 23 nodes consist of 5 Top level nodes and 18 Sub-nodes with the following classifications:

Top Level Nodes	Sub Nodes	
SOS CVI	Supply Chain - Transaction Process	
	Trust, Transparency and pressure	
	Problems and Challenges	
	General	
	Income Sources	Double Spending
NGOs - Foreign Aid	Challenges	
Blockchain Technology	Blockchain and Distributed Ledger Technology	
	Strenghts	
	Weaknesses	
	Requirements for Implementation	
	Use Cases - NGOs	
	Use Cases in an Organization	
	Streamline Accounting processes	
Conceptual Design	Possibility 1) Shadow Transactions	
	Possibility 2) Use Cryptocurrencies or Stablecoins	
	Possibility 3) Consortium	
	Possibility 4) Change Business Model	
Traditional Banking Systems		

Figure 6: Top Level- and Sub Nodes in NVivo

3.7 Limitations and Weaknesses

We believe the methodological choices explained throughout this chapter ensures the thesis´ validity and reliability to the biggest extent possible. However, every choice will have certain limitations, and the most significant are likely related to the data sampling. More specifically, the primary data collected may be subject to bias.

The abovementioned interviewees include both blockchain experts and employees at SOS CVI. As such, we believe the interviewees provide the information necessary to ensure the validity of the thesis. However, there is a risk of interviewer- and interviewee bias. For one, interviewer bias may occur due to the interview structures generally being semi-structured, whereby the predetermined question are likely to cause biased answers (Saunders, Lewis, & Thornhill, 2019). Second, the semi-structured form may inflict interviewee bias, as the interviewees may not address topics outside the scope of the interview structure which could have been beneficial. This second bias is not going to be apparent in the in-depth interviews, which is relevant to the thesis' data collection (Saunders, Lewis, & Thornhill, 2019). However, there is a potential for interviewee bias in both structures regarding sensitive topics that the interview objects do not wish to detail.

We believe it could have been beneficial to conduct standardized interviewer-administered questionnaires about the public's views on NGOs and how they would feel about the intended improvements we suggest in the thesis. However, we believe this would only serve as complementary information to the assumption of lacking trust and the influence of transparency on trust and would thereby not be decisive for creating the conceptual design. Thus, such a questionnaire could be conducted at a later day to confirm or deny the assumptions from the thesis, and therefore increase the assumptions' reliability.

4. Social Theory

Before introducing NGOs and blockchain technology, it is beneficial to understand society and preliminary conditions for humanitarian organizations to exist, as well as the societal conditions in terms of adaptability of technological advancements. Thus, this chapter will introduce three aspects: 1) Social Businesses, 2) The Fortune at the Bottom of the Pyramid, and 3) Technological Determinism and Social Construction of Technology.

4.1 Social Business

As mentioned in Chapter 1, social businesses are contributors to foreign aid. The idea, formed by then professor and later Nobel-prize winner Muhammad Yunus, originated in the 1980s, as Yunus noticed that Bangladeshi people were trapped in poverty with no possibility of loaning money (Yunus, Moingeon, & Lehmann-Ortega, 2010). Yunus had discovered that banks refused giving out loans without collateral, which at the time was difficult for poor segments of the Bangladeshi society. Along with The Grameen Group, Grameen Bank was established to provide loans to people in poverty (Yunus, Moingeon, & Lehmann-Ortega, 2010). The success of Grameen Bank's initiative is tangible, resulting in 68% of families within the Grameen Bank system crossing the poverty line, as well as a 98.4% repayment rate and high profitability for the bank. According to Yunus, Moungeon, & Lehmann-Ortega (2010), The Grameen Bank system led to the emergence of the concept of social businesses.

The short definition of a social business is "*a self-sustaining company that sells goods or services and repays its owners' investments, but whose primary purpose is to serve society and improve the lot of the poor*" (Yunus, Moingeon, & Lehmann-Ortega, 2010, p. 309). In that sense, a social business is working for profit-maximizing, with investors being entitled to recover their investments, yet they are more cause-driven than profit-driven. Thus, investments in a social business offers investors an opportunity to leverage their business skills to contribute to a social problem. As such, Yunus, Moingeon, & Lehmann-Ortega (2010) explains that the businesses' surpluses are reinvested in the business and passed onto selected beneficiaries, rather than payed out as dividends to investors. In this regard, social businesses differs from non-governmental organizations (NGOs), most of which are obliged to raise funds rather than recovering costs from their operations and thereby not fulfilling the self-sustainability criterion (Yunus, Moingeon, & Lehmann-Ortega, 2010).

The conventional business model is built on three components: 1) a value proposition, which should identify their customers and what they value, 2) a value constellation, which proposes how the business' offer is delivered to the customers, and 3) a positive profit equation, which presents the financial revenues from the value proposition and the costs in the value constellation (Yunus, Moingeon, & Lehmann-Ortega, 2010). The social business model, however, includes a fourth component: 4) a social profit equation, which presents the

social and environmental profits the business' actions will produce. Additionally, the social business model substitutes "customers" with "stakeholders" in the value proposition, thereby altering the focus from customers to all stakeholders in the business – including the beneficiaries (Yunus, Moingeon, & Lehmann-Ortega, 2010).

Conclusively, Yunus, Moingeon, & Lehmann-Ortega (2010) argues that despite the social profit made by such businesses take longer to show tangible results than financial profit, humans' natural desire to help people as a success factor to social businesses. This is substantiated by the billions of dollars donated to various charitable causes yearly, both by private persons and companies through Corporate Social Responsibility (CSR) initiatives (Yunus, Moingeon, & Lehmann-Ortega, 2010). Thus, Yunus, Moingeo, & Lehmann-Ortega (2010) can be argued that developing social business initiatives within establish companies is favorable.

4.2 The Fortune at the Bottom of the Pyramid

A relevant literary work for the thesis is The Fortune at the Bottom of the Pyramid first introduced by Prahalad & Hart (2002). The article identifies low-income markets, the bottom tier of the consumer pyramid, as prosperous opportunities for wealthy corporations (Prahalad & Hart, 2002). The idea builds on the possibility to utilize the lack of modern infrastructure to develop environmentally sustainable technologies and products, whilst also help develop these countries and lifting people out of poverty, political instability, and terrorism. According to the authors, the bottom tier of the consumer pyramid constitutes two thirds of the world's population, and the demographic requires a completely new ways of thinking (Prahalad & Hart, 2002): *"In short, the poorest populations raise a prodigious new managerial challenge for the world's wealthiest companies: selling to the poor and helping them improve their lives by producing and distributing products and services in culturally sensitive, environmentally sustainable, and economically profitable ways."* (Prahalad & Hart, 2002, p. 1)

The abovementioned argument is based on the informal economies in these rural countries, where access to education and formality in terms of owning land, businesses and farms is limited (Prahalad & Hart, 2002). According to the authors, this opens the market for technological innovation, as it is possible to "leap-frog", i.e. skip steps, in technological advancement: Whereas the upper tiers of the consumer pyramid have worked for years to reach today's technological level, are content with it and can be sceptical of further development, the bottom of the pyramid is underdeveloped (Prahalad & Hart, 2002).

However, for the theory to be realized, Prahalad & Hart (2002) identifies six former assumptions obscuring the value at the bottom of the pyramid needing re-examination. These assumptions include prejudice about the market and companies, indicating lack of possible conformity (Prahalad & Hart, 2002). Thus, in order to successfully work with this market, the authors have identified four elements wherein all demands innovation in technology, business models and management processes, as well as willingness to cooperate. These four

elements are: 1) Creating buying power; 2) Shaping aspirations; 3) Improving access; and 4) Tailoring Local Solutions (Prahalad & Hart, 2002).

Combining the abovementioned elements is a difficult ask. However, through collaboration and thorough work, the potential of the theory is great. Indeed, Prahalad & Hart (2002) describes the effort as a common cause, where multinational corporations have a huge economically beneficial opportunity, whilst the potential in two-thirds of the world's population on the bottom of the consumer pyramid can be realized. Whereas traditional views on the subject divides these corporations and humanitarian aid, the authors describe a potential which can be realized through their cooperation with, for instance, NGOs (Prahalad & Hart, 2002). Collectively, Prahalad & Hart (2002) argues sharing prosperity with the less fortunate should be the loftiest global goal.

4.3 Technological Determinism & Social Construction of Technology

4.3.1 Technological Determinism

The term "Technological Determinism" refers to a controversial theory about the relationship between society and technology (Kline, 2015). Having connotations to Karl Marx, who iterated that "*(...) technology was an autonomous social force*", two meanings of the term has emerged: *"(1) the development of technology proceeds in an autonomous manner, determined by an internal logic independent of social influence; and (2) technological change determines social change in a prescribed manner."* (Kline, 2015, p. 109). Thus, the term and science behind technological determinism describes an idea that technology is a brute force in shaping societies.

The second meaning is grounded in claims that technology is out of control and can uncontrollably lead to changes in society, as well as being misused by powerful people (Kline, 2015). Nevertheless, criticizing the impact of technology on society is heavily debated. Therefore, in later years, the reality of technological determinism has been questioned. Consequently, the term "Social Construction of Technology" has emerged (Kline, 2015).

4.3.1 Social Construction of Technology

Social Construction of Technology, or SCOT, is a more constructive approach of studying science and technology (Bijker, 2015). According to Bijker (2015), SCOT can be used in two ways: 1) to study technical changes in society, and 2) the relation between society and technology – the latter of which refers to, and is a criticism of, technological determinism.

SCOT criticizes the technical aspect of technological determinism, arguing that it involves a poor research strategy as well as being politically weakening due to the mindset indicating that technology will inevitably

develop without any interventions (Bijker, 2015). In response, Bijker (2015) explains that SCOT suggests technological development is a result of social development. Thus, contrary to technological determinism's idea that technological development is inevitable, and that society develops as a result, the idea behind SCOT is that technological development is a result of social development.

5. Non-Governmental Organizations

Non-governmental development organizations, often just referred to as non-governmental organizations (NGOs), are governmentally independent organizations working to provide help to beneficiaries (Wieners, 2019). They are characterized by their work being "*(...) delivery of basic services to people in need, and organizing policy advocacy and public campaigns for change*" (Lewis & Kanji, 2009). Simultaneously, according to Lewis & Kanji (2009), NGOs are working actively with emergency response, building democracy, maintaining human rights, preserving cultures and conflict resolution, to name a few. Additionally, according to Wieners (2019), they are characterized with a not-for-profit structure, where all their cash-inflow being either reinvested in the organization or provided directly to the beneficiaries.

Referring back to Sub-Chapter 4.1, NGOs share certain similarities with social businesses. First, a social business is more cause-driven than profit-driven, which is of course the same for NGOs (Yunus, Moingeon, & Lehmann-Ortega, 2010). As such, a non-profit NGO dedicates all the funds they have raised to a social cause, whereas a social business uses the money they have earned through their business to further a cause (Tamara, n.d.). However, there are important distinctions between these two forms of charitable organizations. First of all, Tamara (n.d.) points out the way the organization attain funds, to which NGOs are funded through charitable crowdsourcing, whilst a social business operates like a business and use their profits for charitable causes. Second, investors in social businesses have the right to claim their investments back, an opportunity unprecedented in NGOs (Yunus, Moingeon, & Lehmann-Ortega, 2010). Thus, social businesses are still seeking to maximize financial profit, whereas NGOs only seek to maximize social businesses. Conclusively, as Atul Tandon argued in an interview with Forbes, the two forms share similarities, but also have distinctions making it difficult to determine the degree of which they can be categorized equally (Tandon, 2015). However, Tandon (2015) further explains that social businesses are gradually becoming more and more socially invested.

5.1 SOS Children's Villages – Company Presentation

In 1949, Hermann Gmeiner founded the first SOS Children's Village in Imst, Austria (SOS CVI, 2012). Gmeiner's mission was to help children who had lost their homes, security, and families to the Second World War. This organization, called Societas Socialis, has since grown to help children in 136 countries and territories, rebranded under the name SOS Children's Villages (SOS CVI, 2019). SOS Children's Villages is an independent non-governmental social development organization (abbreviated to NGO) who, whilst respecting religions and cultures, acts for children in countries and communities where they can contribute to making a difference (SOS CVI, 2012). Thereby, they are contributing to the 1989 United Nations Rights of the Child treaty – the most ratified human rights treaty in history, granting all children the same rights as adults as articulated in the Universal Declaration of Human Rights (SOS CVI, 2019). Additionally, their work is

aligned with the 2015 United Nation's Sustainable Development Goals, and is particularly contributing to SDG 1 (no poverty), 8 (decent work and economic growth), 10 (reduced inequalities), and 16 (peace, justice and strong institutions) (SOS CVI, 2019).

SOS Children's Villages is an umbrella organization structured as a federation. Among SOS' 136 member associations, seven are working exclusively with fundraising and supporting other member associations, whereas the remaining 129 all have programs of smaller or larger scale, of which 13 conduct both activities (SOS CVI, 2019). SOS are present in all the world's continents, with all member associations being led locally by staff that has vast knowledge and expertise about the environment to support children and families in each country. The fundraising and dual-activity countries, known as Participating and Supporting Associations (PSA), are typically industrialized, western countries, whereas the beneficiary countries are typically developing countries (SOS CVI, 2019).

Figure 7: SOS Member Associations and Their Tasks (SOS CVI, 2019)

5.1.1 The SOS Model

According to the "Who We Are" brochure (2012), SOS' vision of what they want for the world's children, is that they belong to a family and grow up with love, respect and security. The Children's Village concept, using a family approach to provide long-term care of orphaned or abandoned children, is based on four principles (SOS CVI, 2012):

First, each child has a caring parent – a mother. The SOS mother, being a child-care professional, runs the household with her children independently, and guide her children's development.

Second, the families consist of more children, creating the bond of brothers and sisters. In some countries, these are gender-segregated, whereas in others, girls and boys can live together. Together with the SOS mother, the ties in these families last a lifetime.

Third, each family create their own homes. The houses' routines and feelings are different in each family's home, thereby creating a sense of security and belonging. With this fundament, the children grow up together, and share responsibilities and life-events.

Fourth, every SOS family is a part of a community, where multiple SOS houses form the SOS Children's Village. The village forms a supportive environment where children can enjoy a happy childhood, and where families share experiences and help each other. Moreover, the village approach ensures that the children learn to participate actively in society.

Nevertheless, it is of great importance to note that SOS run various other programs alongside the children's villages, such as family strengthening programs, schools and kindergartens, and emergency response, who are all explained more detailed in Appendix 4 (SOS CVI, 2019). The primary common goals for all SOS' programs and services are to care for children, protecting their rights and keeping families together with a long-term perspective (SOS CVI, 2019). With 2.601 programs and 1.085.800 people reached in 2018, SOS aims to contribute to societies, youth especially, and work to fulfil their potential. Regardless of situation or type of program, their work and approaches are always child-centered and in the best interest of the child (SOS CVI, 2019).

5.2 Stakeholder Analysis

As the thesis researches a potential switch in operations for SOS Children's Villages as an organization, it is important to identify the stakeholders that may be affected of this change. According to the Department for International Development (1995), this is due to the make-or-break factor in identifying stakeholder interest and relationships, thereby assessing the project environment. Stakeholders are generally categorized in primary – stakeholders who are directly affected by the research or project, such as beneficiaries – and secondary – stakeholders that are intermediaries in the process, for instance, of delivering aid to primary stakeholders (DFID, 1995). Additionally, DFID (1995) argues the importance of assessing the project's impact on the stakeholders, and whether it may prove negatively or positively for them. As such, this sub-chapter will inform the reader about the primary and secondary stakeholders in the thesis, as well as who are regarded key stakeholders, i.e. most important and influential. More detailed descriptions about all stakeholders and their relevancy to the thesis will be available in Appendix 4.

The primary stakeholders in this research, and the most important stakeholders according to SOS, are the beneficiaries – the children, families, and communities that receive money and help (Accountable Now, 2018).

As previously presented, SOS have programs in 129 countries and territories on all continents, with more than 1 million beneficiaries reached in 2018. Although they are unlikely to be the most affected stakeholders with a blockchain implementation to SOS's transaction systems, it is vital to ensure that their interests are prioritized and not jeopardized with a new system.

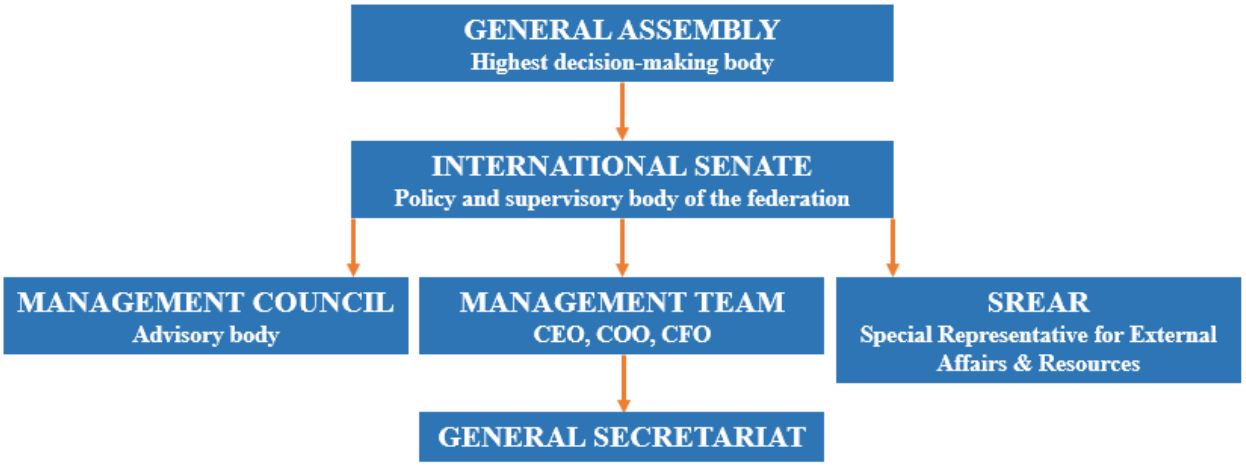

Figure 8: SOS Children's Villages Organizational Structure (SOS CVI, 2020)

The secondary stakeholders to this research, however, are many and varied. As SOS Children's Villages is an umbrella organization – a federation – there are multiple stakeholders internally in SOS. SOS CVI, the international office and the centrepiece of the organization, consists of multiple bodies, of which the hierarchy is presented in Figure 8. These bodies are the General Assembly, the International Senate, the Management Council, the Management Team, the Special Representative for External Affairs & Resources (SREAR) and the General Secretariat. Additionally, secondary stakeholders include all member associations, donors, governments and national institutions and other humanitarian organizations.

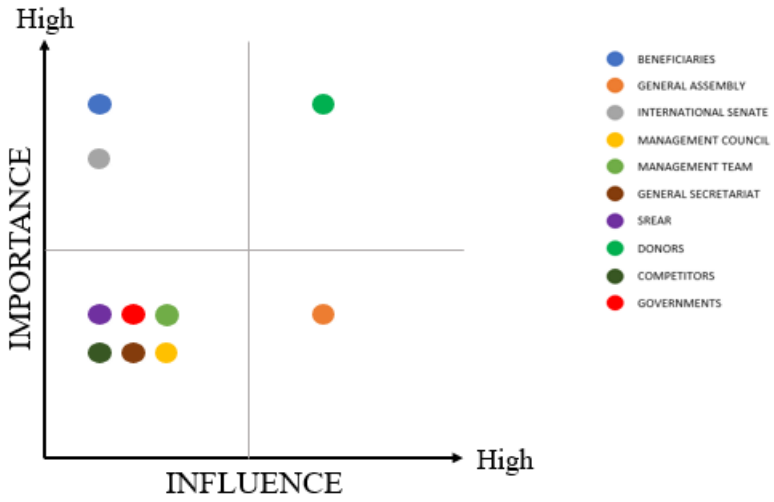

Figure 9: Stakeholder Analysis (positioning in each square is not defining)

The stakeholder analysis illustrated above and elaborated further in Appendix 4, indicates that the key stakeholders are 1) beneficiaries, 2) donors, and 3) General Assembly. The beneficiaries, despite low influence, are important for SOS work, and their interests must not be jeopardized throughout the project. The donors are SOS' main sources of income, and it is therefore important to align interests within SOS' work as well as transparency – as introduced in Chapter 1. Additionally, their importance regarding interests indicate that their influence is somewhat significant and must be considered. Last, the General Assembly must be considered, because their influence on ratifying new systems and processes are considered high.

5.2.1 SOS & Corruption

SOS' core values are *courage*, *commitment*, *trust*, and *accountability*, which guide their actions, decisions and relationships (SOS CVI, 2019). Their compliance and integrity in corruption prevention is prevalent, and they clearly recognize the reality of corruption. SOS annually compile and publish a Corruption Case Report, thereby complying to demand of transparency about such cases and issues in their work. The 2018 report unveiled 35 new cases reported, six more than in 2017, of which 16 had been confirmed, 8 not confirmed, and 11 yet to be investigated (SOS CVI, 2019). The corruption cases are scattered between SOS' different programs and services, with their care programs, namely Children's Villages, Youth Facilities, and Family Strengthening, accounting for 62%.

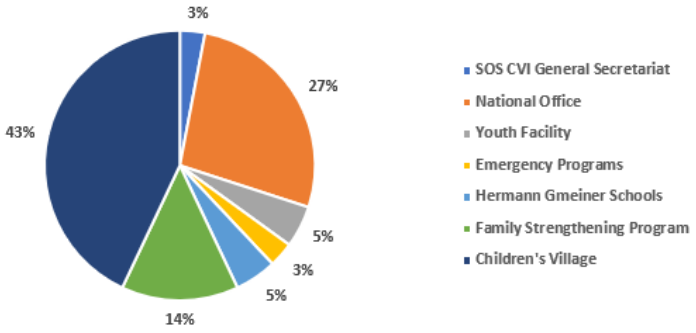

Figure 10: Distribution of Corruption Cases by Department (SOS CVI, 2019)

Moreover, SOS have an easily accessible portal where both children and adults can report suspicions of corruption. In fact, as the 2018 Corruption Case Report informs that 91% of the suspected corruption cases were reported through whistleblowers, it is viable to suggest such reporting mechanisms are efficient in SOS' fight to prevent and detect corruption (SOS CVI, 2019).

Furthermore, SOS have published three documents on their preventive actions towards corruption and fraud. These documents, namely Anti-Fraud and Anti-Corruption Guidelines, Company Code of Conduct, and Good Management and Accountability Quality standards, are all documents relating to how the organization and their employees should act, also in terms of fraudulent behavior (SOS CVI, 2020). The Code of Conduct is a code of how SOS should operate internally to conform with their core values and is integral to their integrity

and compliance. Externally, the Anti-Fraud and Anti-Corruption Guidelines outlines how SOS can approach potential incidents of corruption within the federation in regard to prevention and handling, whilst the Management and Accountability Quality Standards further supports their member associations with clear positions on their counter-corruption pillars: prevention, detection and response (SOS CVI, 2020).

All the actions and reports outlined above are part of SOS CVI's promises to "*foster transparency, corruption and awareness throughout the federation to enhance accountability and live up to the trust of our stakeholders*" (SOS CVI, 2020). This ambition is further substantiated by their membership in Accountable Now and Transparency International's Austrian Chapter, who are two major independent organizations promoting responsibility and transparency in civil society organizations (Transparency International, 2020; Accountable Now, 2020).

6. Blockchain and Emerging Technologies

This chapter will introduce distributed ledgers and blockchain technology. In fact, these two technologies can be characterized as *emerging technologies* (Winston & Strawn, 2020), which is further described in Appendix 5. The reader will get a thorough, technical introduction to blockchain technology and cryptocurrencies. The intention of this chapter is to provide sufficient knowledge on the technology and cryptocurrencies for the reader to easily understand the fundamental technical aspects in the proposed conceptual design introduced in Chapter 9.

6.1 Distributed Ledger Technology and the History of Blockchain

In general, distributed ledger technology (DLT) can be seen as an umbrella term that encompasses a variety of different structures, in which blockchain technology is one example. Despite having some dissimilarities, DLT and blockchain technology are both methods used for organizing transaction records in a shared, distributed database (Yun, 2018). Simply put, a distributed ledger is a database that is shared between multiple participants, also referred to as nodes, or across several locations (Belin, The Difference Between Blockchain & Distributed Ledger Technology, 2020). By contrast, a centralized ledger is typically a database that is stored at one single location, meaning that there is one sole point of failure.

One of the main arguments for using a distributed ledger lies in its decentralized structure, meaning it eliminates the need for a central authority or intermediary for processing, validating and authenticating transactions or other types of data exchanges (Belin, The Difference Between Blockchain & Distributed Ledger Technology, 2020). However, the implementer of the ledger has power to, in practice, dictate the structure, purpose and functioning of the network, it is arguably not fully decentralized (Majaski, 2019). Hence, it can be characterized as being technologically decentralized. Most distributed ledgers function in such a way that the records of transactions, or other exchanges, are stored on the ledger once consensus have been reached by all the parties, or nodes, involved in the ledger. The data is subsequently added into the ledger and furthermore timestamped and given a unique cryptographic signature (Belin, The Difference Between Blockchain & Distributed Ledger Technology, 2020). The fact that the files, or transactions, are timestamped and signed make the distributed ledger come with a verifiable and auditable history on all files added into the ledger.

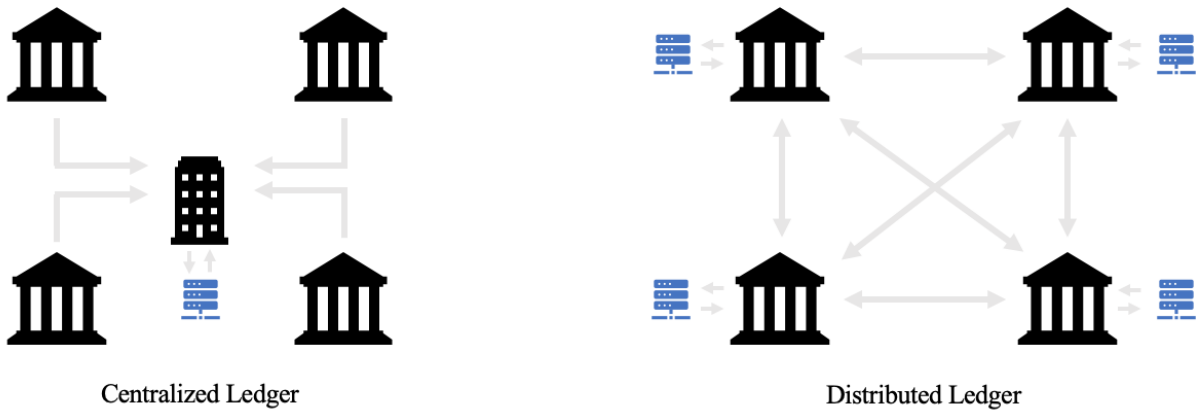

Figure 11 Centralized vs. Distributed Ledgers (Belin, 2020)

6.1.1 Distributed Ledger Technology versus Blockchain Technology

While blockchain is a type of distributed ledger, not all distributed ledgers are blockchains. This is one of the most prevalent reasons why many people find it difficult to separate the two technologies. However, there are certain unique features of the blockchain technology that is not always present in distributed ledgers.

One of the most unique features of blockchain technology is its structure – the blocks in the blockchain. These blocks consist of data, which in most cases is data on transactions that have been executed in the network and validated by the nodes (Drescher, 2017). Blockchains use specific consensus mechanisms in order to determine which transactions should be considered as valid and subsequently added as blocks. Additionally, all the transactions, or blocks, are timestamped. Finally, another specific characteristic is the use of cryptographic hash functions.

6.2 Why Blockchain Technology is Needed

In order to truly understand why blockchain technology is needed, it is important to understand the technology´s fundamental purpose; providing and maintaining trust and integrity in distributed and purely distributed peer-to-peer systems (Drescher, 2017).

6.2.1 Core Problems

In a purely distributed peer-to-peer system, one faces the problem of trying to organize and control a group of participants without the presence of a third party such as a central authority (Drescher, 2017). In such a system, trust and integrity in the network is significant. In the context of software systems, integrity can be defined as "*a nonfunctional aspect of a system to be safe, complete, consistent, correct, and free of corruption and errors"* (Drescher, 2017, p. 30). Furthermore, trust can be defined as "*the firm belief of humans in the reliability, truth, or ability of someone or something without evidence, proof, or investigation"* (Drescher, 2017, p. 30).

Drescher emphasizes that trust is given in advance, and that the level of trust in a network can change as it will either increase or decrease based on outcomes of interactions. In a peer-to-peer system, general trust in the system is important for participants to contribute, and also for new participants to join. Integrity is also important as it will help fulfill the expectations of the participants, as well as reinforcing the trust in the system (Drescher, 2017). A situation where the trust of the participants is not reinforced by the system due to a lack of integrity may cause the participants to abandon it, which in worst case can result in the system terminating. Therefore, the existence of a peer-to-peer system relies on the participants having trust in the system. Thus, the question that should be raised is how to achieve and maintain integrity in a purely distributed peer-to-peer system (Drescher, 2017).

There are several factors that come into play when trying to achieve and maintain integrity in a peer-to-peer system. Drescher (2017) points out two such factors as being 1) the participants´ knowledge on the number of nodes, or peers, in the network, and 2) the participants´ knowledge about the trustworthiness of the peers. Following this, the chances of achieving integrity in the systems will be higher if the participants in the network are aware of the number of nodes, as well as the nodes´ trustworthiness.

6.2.1.1 Integrity Threats

There are typically two specific integrity threats related to peer-to-peer systems (Drescher, 2017). First is the aspect of technical failures. The structure of a peer-to-peer system does, practically, consist of the individual computers of the system´s participants. When you have a system created by individual computers, one faces the risk, as with all hardware and software components, of failures and breakdowns. Second, one is faced with the problem of having malicious peers joining the system, creating a sense of untrustworthiness as such peers might have the intention of exploiting the system for their own purposes. Even though malicious peers are not, by definition, a technical problem for peer-to-peer systems, it can arguably be seen as the biggest threat as they pose a serious risk to the foundation of the peer-to-peer system; trust (Drescher, 2017). As soon as participants in the system start doubting their peers, they will abandon the system and stop providing computational power. If such untrustworthiness spreads across enough participants in the network, the system will eventually lack enough computational resources to run as intended.

6.2.1.2 Which Problems Should be Solved by the Blockchain?

As described above, the core problems related to purely distributed peer-to-peer systems lies within achieving and maintaining trust and integrity in the system and among the participants. In ideal conditions, this is not really a big problem. However, when dealing with a distributed system and facing challenging and difficult conditions, this can be a truly difficult task. This is exactly the problem that blockchain technology is designed to solve; how to achieve and maintain trust and integrity in a system that is additionally characterized by an unknown number of peers with a unknown level of reliability and trustworthiness (Drescher, 2017). This problem is actually widely known among computer scientists, and often referred to as the Byzantine general

problem (Lamport, Shostak, & Pease, 1982). In short, the Byzantine general problem relates to a situation where participants in a group, or network, have to rely on each other to agree on a single strategy to prevent complete failure, but where some of the participants are corrupt, providing false information, and are unreliable.

6.3 How the Blockchain Works

6.3.1 Centralized vs. Distributed Architecture

One of the fundamental decisions that must be made when implementing a system regards the system´s architecture (Drescher, 2017). A systems architecture concerns the way in which its components are organized and how they relate to each other. In general, it is most commonly distinguished between two major types of architectures; centralized and distributed (Tanenbaum & Van Steen, 2007).

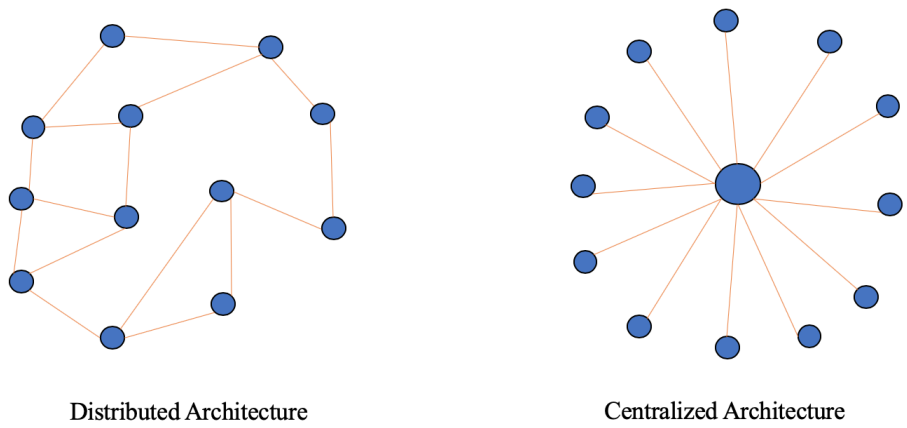

Figure 12: Distributed vs. Centralized Architecture

First, a centralized architecture is characterized by consisting of participants that are positioned around and linked with one central component (Drescher, 2017). It should be noted that in this structure, the different components are not directly connected with each other. However, they all share the same characteristic of being connected to the one central component. This means that it is the one central component that coordinates and controls all participants in the network. Another type of is a distributed architecture, which is characterized by consisting of participants that are connected to one another without the presence of a central, controlling component (Drescher, 2017). As seen from Figure 12, despite not being directly connected to each other, all participants are indirectly connected. The main advantages and disadvantages related to the two types are further explained in Appendix 5.

6.3.2 Distributed Peer-to-Peer Systems

A peer-to-peer network consists of individual computers, often referred to as nodes, and is a special form of a distributed system (Vu, Lupu, & Ooi, 2010). In a distributed peer-to-peer system, all the nodes on the network make their own individual computing power available to the other members of the network. Originally, as it is a distributed system, this is done without the coordination and control of a central component. Additionally, in a pure peer-to-peer system, all nodes perform the same tasks as well as taking on the role as both providers and consumers of resources and services in the network. However, there are also certain peer-to-peer systems that take use of some elements of centralization (Drescher, 2017). Such systems take advantage of having particular central nodes that facilitate interaction between peers or for the performance of look-ups or identification of new nodes.

6.3.3 Four Kinds of Blockchains

When designing a blockchain-system, there are several central "design-choices" that must be considered. These choices relate to two major conflicts of the blockchain, namely 1) Transparency vs. Privacy and 2) Security vs. Speed (Drescher, 2017). To understand these conflicts, we must review at their origins. The first conflict has roots in the operation of reading the data on the blockchain, leading to the choice of Public vs. Private blockchains. The second conflict originates from the operation of writing new data on the blockchain, relating to the choice of Permissionless vs. Permissioned blockchains (Drescher, 2017).

Writing Access	Reading Access and Creation of Transactions	
	Everyone	Restricted
Everyone	Public & Permissionless	Private & Permissionless
Restricted	Public & Permissioned	Private & Permissioned

Figure 13: Four Kinds of Blockchain

6.3.3.1 Public vs. Private

In order to decide on whether to adopt a public or private blockchain, the conflict of transparency vs. privacy should be addressed. The characteristics of openness and transparency are two of the key features and arguments of taking use of a blockchain-based system (Drescher, 2017). Additionally, these two characteristics are core concepts for the blockchain´s ability to verify ownership and solve the double-spending problem. The openness and transparency allow everyone to audit the transactions in the network, making it easier to uncover and prevent attempts at double-spending (Drescher, 2017). A public blockchain, which facilitates and emphasizes transparency, can be defined as a blockchain that: "*grants read access and the right to create new transactions to all users or nodes"* (Drescher, 2017, p. 215).

However, the feature of transparency comes at the cost of a lack in privacy. Privacy in a blockchain-based systems involves keeping key data such as transaction data, and information regarding accounts and amounts

transferred hidden from the public (Drescher, 2017). A private blockchain, one that limits the degree of transparency and openness in order to grant the participants´ a level of privacy, can be defined as one that: "*limit read access and the right to create new transactions to a preselected group of users or nodes"* (Drescher, 2017, p. 215).

6.3.3.2 Permissionless vs. Permissioned

It can be argued that the history of transaction data lies at the heart of the blockchain (Drescher, 2017). This transaction data is kept safe by storing it on an immutable append-only blockchain, which additionally requires the solution of a hash puzzle for a block to be added or altered (Drescher, 2017). As this operation is lengthy and resource-heavy, one faces the conflict of security vs. speed. Having such a lengthy and resource-heavy proof-of-work makes the blockchain secure, however at a cost of the system´s overall speed and scalability. This leads to the decisions regarding permissionless vs. permissioned blockchains, where a permissionless blockchain can be defined as a blockchain that "*grants write access to everyone. Every user or node can verify transactions and create and add new blocks to the blockchain-data-structure"* (Drescher, 2017, p. 216). Conversely, a permissioned blockchain can be defined as a blockchain that "*grants write access only to a limited group of preselected nodes or users that are identified as trustworthiness through an on-boarding process. As a result, only the group of nodes that have write access are allowed to verify transactions and take part in the distributed consensus procedure"* (Drescher, 2017, p. 216).

6.3.4 Hashing

In a distributed peer-to-peer system, there will be a high amount of transaction data that will have to be identified and compared to one another (Drescher, 2017). This should be done as quickly as possible and with ease, in order to detect attempts at double-spending. Thus, for this process to go as smooth and quick as possible, the transactions must be related to some kind of unique digital fingerprint. In a blockchain, these unique digital fingerprints are also known as hash functions (Drescher, 2017).

A hash function can be defined as "*a series of mathematical steps or algorithms that you can perform on some input data, resulting in a fingerprint, or digest, or simply, a hash"* (Lewis A. , 2018). In general, there are two types of hash functions, namely basic hash functions and cryptographic hash functions, where the latter is used in blockchains. Simply put, a hash function is a mathematical algorithm that transform a given input, text or numbers, into a unique output of a fixed length (Frankenfield, Hash, 2019). As all of the transactions are timestamped, connected with specific hash function that cannot be tampered with and additionally broadcasted to every node in the network, blockchains such as the Bitcoin blockchain are capable of preventing the double-spending problem (Tapscott & Tapscott, 2016). Further elaboration of hash functions and the difference between the two types can be found in Appendix 5.

6.3.5 Consensus mechanisms

Reaching consensus in a distributed system such as a blockchain will require a mechanism for the nodes to agree on collective decisions (Drescher, 2017). Additionally, the importance of implementing such mechanisms increases when considering the Byzantine problem, described in Sub-Chapter 6.2.1.2. Generally, there are two main types of consensus mechanisms, namely Proof of Work (PoW) and Proof of Stake (PoS). PoW is arguably most known for being part of the Bitcoin blockchain introduced by Satoshi Nakamoto in 2008 (Nakamoto, 2008). In a PoW-system, each node in the network is trying to calculate a hash value of the constantly changing block header (Zheng, Xie, Dai, Chen, & Wang, 2018). PoS is another consensus system which can be characterized as an energy-saving alternative to PoW, (Zheng, Xie, Dai, Chen, & Wang, 2018). In a PoS system, the nodes in the network are individually attributed mining power proportionally to the amount of coins held by each node. A more detailed and technical explanation of the two systems can be found in Appendix 5.

6.3.6 Identifying and Protecting User Accounts

As described earlier, a blockchain is a form of a distributed peer-to-peer system (Drescher, 2017). This means that everyone, in the case of a public and permissionless blockchain, can access, connect and contribute to the network. However, the system must be able to keep people away from the properties, except from their own accounts, stored on the different accounts connected to the blockchain. Simultaneously, the right to transfer an amount from one account to another is restricted to the one account that hands off the ownership of the coin (Drescher, 2017). This results in one of the challenges faced when operating a blockchain, more specifically how to protect the accounts of each participant in the network without limiting the open architecture, which is one of the main strengths and key characteristics of a distributed system. Blockchain conquers this is by treating every account on the blockchain like a mailbox, and by providing the participants with one public and one private key each. This implies that everyone on the blockchain can transfer properties to the mailbox, however it is only the owner of the account, or mailbox, that can access the property (Drescher, 2017). A public key is used in order to identify accounts in the networks, and a private key is used to access to actual account and its properties.

6.3.6.1 Zero Knowledge Proofs

Another feature working to provide anonymity and security for the user accounts, is the concept of zero knowledge proofs (ZKPs). In essence, ZKPs are mathematical methods used for proving something by providing a heap of information stimulating a sense that the prover has or knows the desired information, whilst keeping the underlying data secret (Newman, 2019). The purpose of this is to stimulate anonymity and security, for instance in transactions, interactions or sensitive agreements.

The concept of proving without revealing is complex. Thus, to provide a better understanding of its essence, we will use an example inspired by an article in Medium.com (Ray, 2019): Say a company claims they have a

software which can instantly discover Waldo from the famous Where's Waldo books. The provider does not want to reveal that it works without payment, but the user would like proof before purchasing the service. What the provider then wants to do, is to give enough information to convince the user that the service is legitimate, but without revealing where Waldo is. Thus, a solution could be to send a picture of Waldo on a set page, with everything around him being censored in black. They have thereby proven that they know where Waldo is without revealing his location. The essence of this example, provided by Ray (2019) at Medium.com, is also applicable to transactions, interactions or sensitive agreements situated on blockchains.

6.3.7 Key Attributes of Blockchain Technology

From the introduction to the different aspects of blockchain technology provided above, some key features can be highlighted. However, it is important to remember that some of these key features may also be present in DLT, as blockchain technology is a type of DLT. Furthermore, as described earlier, a public and a private blockchain do not share the exact same characteristics, and this is also the case for a permissioned and a permissionless blockchain.

First, blockchain technology has the ability to provide and maintain trust and integrity in distributed, and purely distributed, peer-to-peer systems (Drescher, 2017). Thus, the technology is able to deal with the mentioned Byzantine general problem (Lamport, Shostak, & Pease, 1982). By having a decentralized architecture with consensus mechanisms ensuring that every transaction, or data, added to the blockchain is verified and checked for double spending, the blockchain is able to build and maintain trust among its participants. Moreover, the characteristics of being decentralized and distributed makes the blockchain virtually hacker-proof, and it is widely known as being immutable due to the cryptographic hashes used to secure and identify transactions (Drescher, 2017). Second, with a public blockchain everyone can see and read the information stored on the blockchain, which provides a strong degree of transparency and traceability. Third, one can store a wide variety of assets on the blockchain such as cryptocurrencies, contracts, stocks, etc. This ability is one of the most important characteristics of the blockchain, as it is foreseen to disrupt many industries, and among these especially financial services (Tapscott & Tapscott, 2016). By being decentralized and distributed, and thereby not dependent on any form of intermediary, coupled with its ability to store and transfer digital assets, people all over the world are able to trade with one another without having to rely on third parties such as banks and other financial institutions. Thus, barriers to trade such as transactions costs, exchange rate fees and the time spent on financial transfers will decrease (Tapscott & Tapscott, 2016).

6.3.8 Limitations of Blockchain Technology

Despite its unique strengths and features, blockchain technology is not perfect and unquestionably has some limitations worth considering (Drescher, 2017). These weaknesses and limitations are some of the main reasons why the technology has yet to experience widespread commercial use as foreseen by many following the introduction of Bitcoin in 2008. The following weaknesses and limitations introduced are generally

applicable for a public, permissionless blockchain. Thus, it is important to remember that some limitations might not be relevant for other types of blockchain, i.e. private, permissioned blockchains.

First, there are certain technical weaknesses and limitations related to blockchains. As a distributed peer-to-peer network, the blockchain facilitate openness and transparency. The history of every transaction on the network is stored on the blockchain, and is necessary for every peer in the network to be able to clarify ownership and verify new transactions (Drescher, 2017). However, this openness and transparency causes a lack of privacy, which is often mentioned as a limiting factor for blockchain use cases requiring a higher degree of privacy. The concept of a having a public and a private key related to each account on the blockchain might cause problems. As soon as the private key of an account is lost, forgotten or stolen, either by mistake or by will, the security of that account is broken. Furthermore, there is no additional security measures that can protect the accounts if the private key is lost or stolen. Another limitation is that a blockchain system can be characterized by having limited scalability. This is due to the time-consuming and resource heavy consensus system, especially in Proof of Work (PoW) where miners must allocate significant time and resources in order to solve the hash puzzle. As a result, processing and construction of new blocks takes a significant amount of time, limiting the systems scalability and processing speed. Another weakness of the PoW is that it is rather expensive, making the whole blockchain incur significant costs.

As the PoW system favors miners with high computational power, the systems consequently bring a form of hidden centrality. The miners with the highest computing power will be most likely to solve the computational puzzle first, creating some form of centrality in the network despite the peer-to-peer network´s decentralized nature.

In addition to the technical limitations, there are some specific non-technical limitations that are worth considering (Drescher, 2017). First, there are still arguably a lack of legal acceptance surrounding the use of blockchain technology, especially when the technology is used for facilitating transactions of cryptocurrencies. As independent peers decide on and manage ownership of digital assets through a distributed consensus, many questions the legal consequences related to these transactions (Drescher, 2017). Second, despite the worldwide emergence of several use cases, there are still a lack of user acceptance of the blockchain technology. Many are wary about the openness and the lack of privacy of the technology, thus being reluctant to explore the possibilities that comes with the technology. However, one of the most important reasons for users´ lack of acceptance, is a general shortage in knowledge and education of the technology (Drescher, 2017). Undoubtedly, blockchain technology is complicated and requires a significant amount of time and research to truly understand how it works. Thus, many people do not have the knowledge required to understand how the technology works and how it can be used to improve and increase efficiency in their businesses (Nguyen, 2019). Additionally, due to the lack of general knowledge of the technology, many people that simply associate blockchain technology with the negative events of Bitcoin that we have seen since it was introduced in 2008.

6.4 Smart Contracts & Decentralized Applications

Smart contracts and decentralized applications (DApps) have emerged as expansions of blockchain technology (Antonopoulos & Wood, Mastering Ethereum, 2019). As applications built upon existing blockchain networks, most notably on Ethereum, they utilize aspects of the technology to make transactions secure, irreversible and trackable (CoinSwitch, 2018). The two share many similarities, especially on the Ethereum network, where there is no distinct difference between smart contracts and DApps (Coonrod, 2018). However, Coonrod (2018) argues that differentiating the two is important as blockchain technology is growing and maturing. He argues that the more complex a software system is, the more susceptible to risk it is (Coonrod, 2018). Because contracts and transactions can be worth millions of dollars, this sub-chapter will therefore explain and differentiate smart contracts and DApps regarding their abilities on blockchain networks. In Appendix 5, there will be a more detailed description of each.

6.4.1 The Difference

Referring back to Coonrod (2018), there is often no notable differences between a smart contract and DApps – but there *should* be. The distinction, which will be determining in this research' conceptual design, will thus be attempted presented in this sub-chapter.

Coonrod (2018) argues that smart contracts should be "*agreements between parties without the need for a third party*", written in a simple scripting language. He explains that this will not guarantee a flawless contract, but that it will reduce the contract's vulnerability. Meanwhile, DApps should be "*decentralized applications that do not execute on centralized machines*" (Coonrod, 2018). He urges the need for differentiating the two through the example of whenever a mistake happens in a traditional application, it usually crashes, and some work will be lost. On the other hand, if a mistake happens in a smart contract, vast amounts of money can be lost or stolen with no way of retrieval (Coonrod, 2018).

Coonrod (2018) uses RadJav Blockchain V2 as an example where smart contracts and DApps are distinguished. The V2 smart contracts uses a scripting language which does not allow for recursion, object-oriented programming, nested loops, among other features, to other smart contracts (Coonrod, 2018). Despite all these restrictions, it will still be possible to develop smart contracts satisfying the "easily verifiable" criterion.

The RadJay Blockchain V2 further enables a way for software where these features are needed to be developed (Coonrod, 2018). The DApps can be scripted in the same language, but with these restrictions unlocked, meaning that the application will not be restricted. This, creating a network with the same codes, but less security and harder verification and validation, is where Coonrod (2018) identifies the biggest difference between DApps and smart contracts.

Thus, based on Coonrod's (2018) explanation of the two phenomena, it can be interpreted that the difference between a smart contract and a DApp is their degree of leniency. Moreover, it is likely that a smart contract, with its high security and restrictions, is more suitable for vast transactions and for more restricted networks. Meanwhile, DApps appear more lenient and thus might be suitable for all public and in settings where privacy and security are less important than in smart contracts.

6.5 Cryptocurrencies

As the name suggests, a cryptocurrency is a cryptographic currency (Naranyan, Bonneau, Felten, & Miller, 2016). As Bitcoin was the first, and is the most prevalent today, people tend to think of Bitcoin when they hear the term "cryptocurrency". Perhaps the most notable difference between cryptocurrencies and fiat currencies, is that the entire cryptocurrency, situated on a blockchain, is dependent on a network and connectivity to work (Naranyan, Bonneau, Felten, & Miller, 2016). In this regard, cryptocurrencies operate in the same way as other online payment systems, such as PayPal. What cryptocurrencies do provide, similar to fiat currencies and cash transactions, and opposite to these other payment systems, is anonymity (Naranyan, Bonneau, Felten, & Miller, 2016). This feature is indeed what classifies the system as "cryptographic".

In general, what cryptocurrencies offer, is a digital-only currency placed on a blockchain, which offers secure and cryptographic payments, independent of third-party verification (Naranyan, Bonneau, Felten, & Miller, 2016). As noted, however, Li (2019) compares cryptocurrencies – Bitcoin in particular – to gold, as a store of value. Additionally, they are similar as the market gets bigger through mining, and that the asset is scarce (Li, 2019). Where they differentiate, however, is their volatility. As Nathan Reiff (2020) argues, gold is regarded a "strong safe-haven asset", meaning its scarcity and independency of other market prices holds its value quite stable. Contrary, Bitcoin is much more volatile, exemplified by the decrease in value from about $20.000 in the beginning of 2018 to $4.000 about a year later, which thence rinses it from a status as a "safe-haven" (Reiff, 2020). Thus, the categorization of cryptocurrencies, represented through Bitcoin, can be altered more to a volatile investment asset rather than a store of value. Moreover, this vast volatility makes cryptocurrencies less capable of being a regular currency, as pricing a product or service in BTC may induce conflicting prices from one moment to another.

6.5.1 Stablecoins

A stablecoin is a cryptocurrency created to mitigate the flaws of traditional currencies for daily transactional use (Sam, 2019). According to Sam (2019), an efficient cryptocurrency should have "*price stability, scalability, privacy, and decentralization*", criteria stablecoins are designed to satisfy. As such, the main advantages a stablecoin provides, are stability, cheaper and secure transactions, simplicity, regulations, and potential of implementing smart contracts (Sam, 2019).

There are multiple forms of stablecoins and different ways to keep the coin stable, i.e. what the coin can be pegged to, such as fiat currencies or other assets, or a bundle of both (Sam, 2019). Hence, stablecoins are centralized and requires some trust in a third-party to decide the asset pegging. Additionally, there are different use cases of stablecoins alongside for transactions, such as hedging against other currencies or cash flow losses (Sam, 2019). More on the considerations needed for evaluating stablecoins can be found in Appendix 5.

Last, it is important to note that although stablecoins cannot fully guarantee to hold their value, they are more likely to solidify profits than traditional, tradable cryptocurrencies (Sam, 2019).

7. Data Presentation

As presented in Chapter 3, the thesis follows a concurrent triangulation design, in which both primary and secondary data is collected. The secondary data is the blockchain- and NGO theory provided in the previous chapters, whereas the primary data collected through non-standardized one-to-one interviews, is what will be analyzed in Chapter 8. The primary data analysis thus consists of eight different non-standardized interviews.

As SOS Children's Villages is used as a case example to provide a conceptual design for implementation of blockchain technology to NGOs, two interviews with employees at SOS CVI have been conducted. These have been conducted to gain first-hand knowledge about the NGO environment, as well as how an NGO operate and the processes of raising and transferring fund. The information retrieved from these two interviews will be the basis for the conceptual design in Chapter 9.

Additionally, we have been in contact with six experts within blockchain technology to supplement existing secondary data on the subject and provide opinions of the technology's application. These interviewees work with digitalization, and especially blockchain technology, at various highly regarded companies within the consulting, banking, and cryptocurrency industries. The interviews are semi-structured, but the themes are similar for each interviewee, in order to gain different insights and perspectives on the same topics. Furthermore, this standardization removes certain bias, and provide higher reliability due to extensive data. The data from these interviews will be used as supplement to our interpretation of blockchain technology and solutions and is used to build the conceptual design intended to streamline and improve SOS CVI's current operations.

Table 1 shows the titles, companies, and sectors of the eight interviewees, as well as the language the interview was held in, its length, and place. The complete transcripts of each interview are available in Appendix 6.

Reference	Work Title	Company	Sector	Language	Length	Place
Interviwee#1	Head Internal Audit	SOS CVI	NGO - Foreign Aid	English	1h32m	Call, Skype
Interviwee#2	International Director - Internal Audit	SOS CVI	NGO - Foreign Aid	English	45m	Call, Skype
Interviwee#3	Manager		Professional Services	English	48m	Video call, Skype
Interviwee#4	CEO & Managing Director		Financial Services	Norwegian	54m	Call, Skype
Interviwee#5	Blockchain Specialist		Professional Services	Norwegian	46m	Call, Skype
Interviwee#6	Nordic Innovation Lead		Professional Services	Norwegian	54m	Call, Skype
Interviwee#7	Global Digital Innovation Manager		Professional Services	English	38m	Call, WhatsApp
Interviwee#8	Lead Blockchain Specialist		Financial Services	English	50m	Face to Face Office
SUM					**7h7m**	

Figure 14: Interviewees

8. Data Analysis

This chapter will present the most significant findings from the interviews with SOS CVI and the blockchain experts. As described in Sub-Chapter 3.6, the use of NVivo 12 made it possible to identify patterns and similarities, as well as differences, in the interviews. The following sub-chapters, in combination with the introduction to blockchain technology provided in Chapter 6, will create the foundation for the proposed conceptual design introduced in Chapter 9 and the subsequent discussion in Chapter 10.

8.1 Blockchain Technology

As emphasized in Chapter 6, two of the blockchain experts also stressed the importance of being aware of the difference, as well as the similarities, of distributed ledger and blockchain technology. One of these were Interviewee#3, who argued that there still consists some type of general misunderstanding of the blockchain technology. Due to the hype of blockchain technology, mainly caused by the public generally associating it with Bitcoin, there are many people that do not truly understand how the technology can be put to use, and most importantly in which cases blockchain technology can provide the greatest benefits. Interviewee#3 compered the question of whether to take use of blockchain technology, or a traditional distributed ledger, with typical questions asked when buying a new car:

> *"... It is kind of saying that "we all just need a car". Well I mean, for what purpose do you need that car? Should it go on the road or should it go on the dirt? How many people should it fit? Which needs does this technology actually try to solve?"* (Interviewee#3, 2020).

Furthermore, Interviewee#3 continued by emphasizing how the press and the media contributed to the hype of the technology by painting a picture of "*(...) a silver bullet that just kind of "does it all"*" (Interviewee#3, 2020).

Interviewee#3 also emphasized the importance of identifying whether three key requirements are fulfilled when considering implementing DLT or blockchain technology:

> *"1) there need to be an ecosystem – there need to be multiple actors, not only one. 2) there need to be low transparency, and 3) low trust."* (Interviewee#3, 2020)

The importance of not seeing blockchain technology as *"a silver bullet that just kind of "does it all""* (Interviewee#3, 2020) is also emphasized by Interviewee#6:

> *"Then we look at the challenges – can we use blockchain here? If yes, then nice, we might do it, but if we come to the conclusion of using it, then we always use it in combination with other technologies.*

> *Because blockchain is only a protocol, you can call it an intermediate layer, not some magic stand-alone solution in a corner that no-one really knows what is."* (Interviewee#6, 2020).

8.1.1 Organizational Use Cases

Through the analysis of the interviews, we were able to identify some similarities regarding in which part of an organization the experts believe that blockchain technology can add the most value and efficiencies. When Interviewee#3 were asked the question of where in an organization that blockchain technology can make a significant difference, the interviewee answered:

> *"In the transaction-heavy part. In finance, HR etc. Going back to the three criteria; in the parts where you have multiple actors, that goes outside the organization. (...) It needs to have some interaction with either your customers, vendors, suppliers. These kinds of ecosystem problems."* (Interviewee#3, 2020).

Blockchain technology being an efficient tool in finance and the transaction-heavy operations was also emphasized by Interviewee#4. When the interviewee was asked in which part of the organization blockchain technology can be used for optimizing operations, or as a cost-efficient tool, the interviewee answered "*Payments and transfers, without doubt*" (Interviewee#4, 2020). The interviewee furthermore emphasized that new trading infrastructures have been built due to the increased interest of cryptocurrencies and blockchain, lowering barriers to trade and use these technologies such as fees and trading expenses.

8.1.2 Limitations of Blockchain Technology

With the general hype of Bitcoin and the blockchain technology, it can be argued that there is a lack of sufficient theory on the limitations and weaknesses of the technology. Thus, to gain a deeper understanding of the technology and its ability to optimize the operations of NGOs, the interviewees were also asked on the topic of the technology´s limitations. When elaborating on one of the strengths of blockchain technology, the immutability, Interviewee#7 mentioned the technology´s ability to store basically any type of asset digitally on the blockchain. However, with this immutability a significant challenge follows, as "*if you store a lie, you are making a lie immutable"* (Interviewee#7, 2020).

> *"(...) even though the blockchain is called "the trustless machine", in reality you need to trust what goes on the blockchain."* (Interviewee#7, 2020).

Furthermore, Interviewee#7 emphasized that since you have this problem of actually "storing a lie" on the blockchain, there will still have to be some form of internal and external control to make sure that the people adding information to the blockchain isn´t behaving in a fraudulent behavior or are trying to maximize their own gain. Additionally, Interviewee#7 points out the limitation of scalability, especially when it comes to how many transactions that can be processed on the blockchain per second.

Just as Interviewee#7, Interviewee#8, also pointed out the problem of a blockchain being seen as a trustless machine, creating this kind of "false" illusion of not needing to have external and internal control, especially regarding public blockchains. A problem here is that everyone thinks that as a public blockchain is transparent, there is no need for trust as you can blindly trust everything that is on the blockchain. However, Interviewee#8 emphasized that, for example when NGOs take use of cryptocurrencies to transfer funds, there is still a need for external control and verification of the transactions to make sure that the transactions put on the blockchain are correct (Interviewee#8, 2020).

In other words, Interviewee#8 emphasizes that despite having a blockchain solution where an NGO can transfer funds using cryptocurrencies, you will still only be able to see that the money goes from point A to point B. What happens after the cryptocurrency is exchanged for regular fiat currency will not be visible on the blockchain, meaning you will still need some kind of control mechanisms. Thus, Interviewee#8 is skeptical about solely relying on, and having 100% trust in the blockchain alone. This skepticism of solely trusting the blockchain is also expressed by Interviewee#5, as two parties on the blockchain can agree separately to "fool the chain, creating a scheme where the two parties try to manipulate the data put on the blockchain.

> *"Also, it can look like someone has signed a transaction, but in reality, someone else gained access to their account."* (Interviewee#5, 2020).

As indicated by Interviewee#5, even though you have a blockchain solution, where you for example transfer funds using cryptocurrencies and smart contracts, you still face some problems in regard to having people outside of the blockchain that are fraudulent and untrustworthy. This aspect was also brought up by Interviewee#6:

> *"As long as there are humans and machines involved in the process, there is nothing that you can trust 100%. You can minimize risk, but you cannot be 100% risk-free. However, you can get a long way with this system, and you can definitely make a hype, but you cannot make something that will make you 100% risk-free of fraud only because of the fact that you take use of a blockchain."* (Interviewee#6, 2020).

Furthermore, Interviewee#4 mentioned some limitations not necessarily with the blockchain technology itself, but more related to the general public's knowledge of the technology as this is seen as quite low and people struggle to understand its true use cases. Additionally, Interviewee#4 mentioned that there are still some challenges related to the regulatory aspect of taking use of blockchains (Interviewee#4, 2020).

8.1.3 Streamline Accounting Processes

As described in Sub-Chapter 2.4, there is little existing literature on how blockchain will affect the accounting processes in organizations. Thus, in order to obtain greater knowledge on this topic, all of the blockchain experts were asked of whether they think of blockchain technology as a solution for streamlining accounting

processes in businesses, and specifically in organizations like NGOs. First, Interviewee#7 emphasized that having all transactions of funds on a public ledger will offer the possibility of making many operations relating to the accounting processes automatic, providing huge benefits. Furthermore, as the ledger is transparent, there will be easier for third parties to control and verify the transactions (Interviewee#7, 2020).

When asked about the potential difference and effects on the accounting process when having transactions on a blockchain using cryptocurrencies versus transactions using normal banking systems, Interviewee#6 responded:

> *"Well… It depends on how you design the system. On the one hand, you can couple the blockchain to your existing ERP system, and in that way tokenize the transactions received in the ERP system. Thus, transform these transactions to represent other assets."* (Interviewee#6, 2020).

Interviewee#5 elaborated on some thought of how blockchain technology can be used in accounting pointing out the aspect of "triple bookkeeping", meaning that in addition to the traditional double entry bookkeeping, you will also verify and store the transaction of the blockchain. (Interviewee#5, 2020). However, it was also emphasized that there have not yet been many real-life use cases of this type of bookkeeping.

From Interviewee#4, we received another, and slightly different, answer to whether blockchain technology can help organizations with the accounting processes:

> *"Blockchain technology might actually complicate this, in short term, because you will have people in different departments which will have to face new problems and questions on how to account for these new digital assets on the blockchain. There is no problem to have a cloud-based accounting system, in which the HQ has access to all its subsidiaries´ books etc. But there is no need for blockchain here. (…). Remember that in accounting, you would like to have the opportunity to alter/change the numbers. Like for instance if an accountant makes a wrong entry."* (Interviewee#4, 2020).

8.2 SOS Children's Villages

In Chapter 5, NGOs and their characteristics were explained along with a company presentation of the case example used for the thesis, SOS Children's Villages. The chapter included information available online, more specifically through reports and documents about SOS, their work and their values. Additionally, to gain insight to internal processes and firsthand experiences of SOS' operations, interviews with two senior employees at SOS CVI were conducted.

Interviewee#1 emphasized that SOS Children's Villages is a federation, pointing to the several legal bodies, and the subsequent organizational structure and democracy as such (Interviewee#1, 2020). Additionally,

Interviewee#1 explains that each member association have local offices working both operationally and financially, due to different local laws and regulations (Interviewee#1, 2020). They iterate further that this feature is unique to only a few organizations in the foreign aid sector, which gives them both opportunities and risks:

> *"We're not just collecting money and giving it to somebody else. So, we know who is there, we know what the people need, we also have knowledge about the context and about the respective countries and regions, what happens there on site, because we are there, and these are our own programs."* (Interviewee#1, 2020)

When asked about typical characteristics in the 136 countries, Interviewee#1 specified that they do not *"bear distinguished typical characteristics about the countries, there are just too many"* (Interviewee#1, 2020). Moreover, they substantiated that there are multiple differences within developing countries at the same continent, using South Africa and Eastern Africa as examples:

> *"So, although there are problems in South Africa, but there is infrastructure, there is a legal system so there is a certain structure and infrastructure that you can build upon. On the other hand, in Eastern Africa, there is no doubt about it, that if a country is literally destroyed by centuries of civil war, these are very difficult circumstances to operate in."* (Interviewee#1, 2020).

Following up on these countries, Interviewee#1 says that many of the countries resembling the ones in Eastern Africa have both weak financial institutions and unstable currencies. For instance, some countries can receive money in US Dollars, but cannot neither hold nor use US Dollars – which is an important issue in many countries (Interviewee#1, 2020).

SOS are trying to mitigate these issues by limiting the number of banks they cooperate with. According to Interviewee#2, SOS try to work with 10-20 globally (Interviewee#2, 2020). However, using international banks is not possible in all countries and territories of operation, according to Interviewee#2, who points to Iraq and Iran, where American banks are not allowed. Interviewee#2 further substantiates issues with using traditional banking systems to transfer funds:

> *"(...) and sometimes we are waiting desperately one or two weeks, thinking the money is gone, but then the banks have blocked the transfer for some reason. This could be due to an attack or that some additional information is needed."* (Interviewee#2, 2020)

Interviewee#2 proceeds by saying that this is a recurring problem in certain countries, and less recurring in others. Additionally, when the 10-20 main banking partners cannot operate in countries, or funds have to be sent to local banks, the transaction costs are normally higher and processing times may be higher (Interviewee#2, 2020). Moreover, Interviewee#2 explains that different banks have different requirements for

money transferring, primarily due to money laundering. Using U.S authorities as example, who may believe NGOs can be easily abused to transfer money from illegal sources into legal money somewhere (Interviewee#2, 2020). Thus, the banks are – along with the public, as explained – very much demanding more transparency as to where the money comes from and where it is spent.

Thus, it is clear that SOS CVI are facing certain limitations with the traditional banking systems, to which there is a need for easier transfer processes, which ideally may also have lower transaction costs.

8.2.1 Transaction Processes

Consisting of 136 countries and territories, the total process of raising and transferring funds is quite complex. As mentioned in Chapter 5, 116 of these only run programs, seven only raise funds, and 13 conduct both activities. The donations come from a number of different donors, ranging from sporadic donors to regular donors and sponsorships, as well as governmental donations.

Interviewee#2 explains that they have changed their systems and communication with banks to now having one shared treasury service at the headquarters in Austria (Interviewee#2, 2020). More specifically, they explain that the shared treasury service receives mostly Euros and US Dollars, as well as Nordic currencies. Moreover, in order to give SOS CVI more certainty regarding budgeting, the shared treasury service hedge 80% of the money, whilst 20% are free cash flow (Interviewee#2, 2020). The certainty gained from this is due to having a budget to the currency exchange rates, which thence makes it easier for the NAs and for SOS CVI's planning.

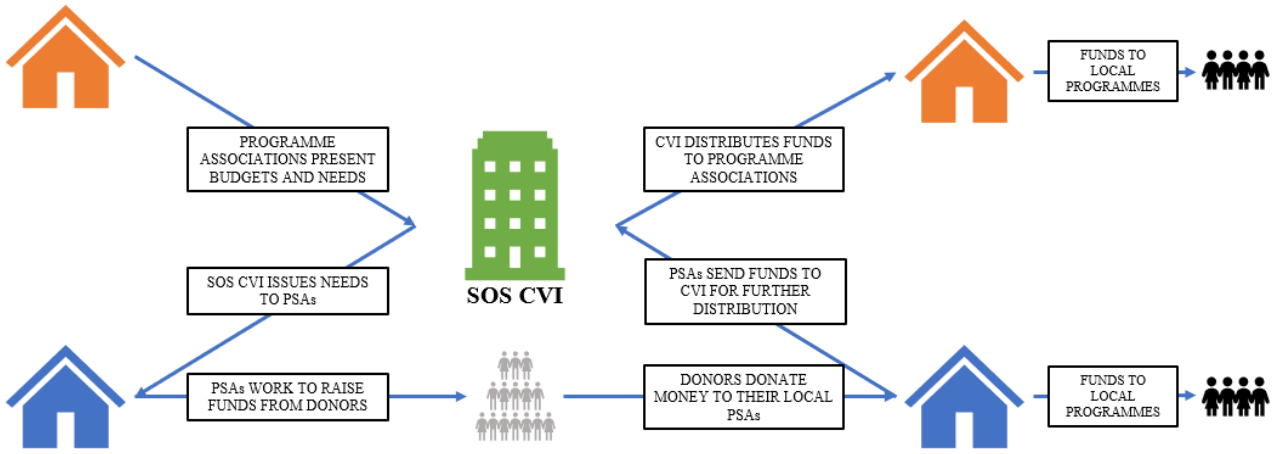

Figure 15: Transaction Timeline

Figure 15 presents a general and simplified picture of the transaction processes, as explained by Interviewee#2.

The first part of the process is that the NAs present a budget and cash needs for the coming year, which is checked and either disproved or approved. Then, these budgets are presented to the fund-raising countries, the

PSAs, who subsequently commit to supporting certain countries and projects for a given period (Interviewee#2, 2020).

Thence, the PSAs work to raise funds by attracting donors interested in supporting the countries and projects the PSAs are responsible for in the coming periods. This is seconded by Interviewee#1, who substantiates that the PSAs' funds are not collected in one pot and subsequently distributed to projects randomly. (Interviewee#1, 2020). In fact, there are strict procedures controlling that each PSA's raised funds are transferred to the countries they pledged to support:

> *"For example, before SOS Norway transfers money to a bank account, there are several control steps which makes sure that the money Norway passes onwards will be spent for purposes which is in line with the contractual agreement. (...) only if you have the necessary approval you can pass the money on."* (Interviewee#1, 2020)

The donations are sent to the donors' local PSAs, and can either be earmarked for specific purposes or people, or non-earmarked and thus more flexible (Interviewee#2, 2020). Interviewee#2 says they prefer flexible funds. However, they explain that the earmarked funds are a unique selling point for SOS, as their donors like having direct contact with the beneficiaries.

> *"This is why we have this sponsorship system: That you know which child you are sponsoring, and then you commit small amounts of money every month for that child. You can also donate some additional money which is then put into a savings box for this child, so that when the child is grown up, they will have better start for their life."* (Interviewee#2, 2020)

As the PSAs gather donations, these are transferred to the shared treasury centre at SOS CVI, typically on monthly or quarterly basis (Interviewee#2, 2020). However, Interviewee#2 explains that the fundraising countries that are also running programs in their country, being 13 of the 136 member associations, use locally raised funds to finance these. Other raised funds are then sent to SOS CVI with purpose of being transferred to the Program Associations.

> *"So, this is the circle from PSA to SOS International, SOS International to the NA. This is the normal procedure, and normally the system itself is quite secure: It has already been checked by auditors, both systems and control-checks."* (Interviewee#2, 2020)

8.2.1.1 Remarks to the Transaction System

This sub-chapter will cover certain other remarks to the transferring process, or audit trail, made by Interviewee#1 and Interviewee#2. These remarks are included to present certain aspects within SOS but secluded from the previous sub-chapter to keep the transaction process segregated and clear.

As mentioned, the money flows through the shared treasury centre at SOS CVI, before it is distributed to the receiving associations. Interviewee#2 explained that this process was quite effective, and later specified further that costs related to transactions are very low:

> *"So, it's quite good, maybe it's 1-2% - it should not be more. (...) So, this is quite good in some, but still we have really managed to find good banks who give us good conditions so that we, in our perspective, have a very cheap way to transfer money."* (Interviewee#2, 2020)

However, Interviewee#2 understands the interviewers' curiosity on the subject. Specifically, they explains that if one of the 10-20 main banking partners are not present in certain countries, there may be increased transaction costs and longer processes (Interviewee#2, 2020).

Interviewee#2 further says that SOS are working on developing a shared ERP system in which all countries will be using, thereby increasing the transparency and controllability of the audit trails (Interviewee#2, 2020). Transparency and controllability are also the reason why the funding passes through SOS CVI and the shared treasury centre before it is sent to the beneficiaries. Moreover, to ensure that the funds directed for specific purposes as issued in the budgeting round, Interviewee#2 explains that auditors are employed to control check this.

The biggest issue for SOS in terms of funding, Interviewee#2 argues, is equalizing needs with funding. Consisting of 136 countries and 110 associations requiring money, satisfying the needs in the PAs' budgets with the PSAs' funding is a lengthy and difficult process (Interviewee#2, 2020). This issue is increased by countries only wanting to fund certain countries, and conversely not fund others. An example of this made by Interviewee#2, is France, who are more inclined to fund countries in the western central parts of Africa and not South Africa:

> *"So, this is a real art. And we have a very complicated system, currently, behind it, and it takes us a lot of time to equalize the needs with the funding and funding available and possible."* (Interviewee#2, 2020)

8.2.2 Fraud, Trust, and Transparency

Additional to the risks portrayed regarding infrastructural challenges, SOS are aware of the risks relating to trust. Both Interviewee#1 and Interviewee#2 refer to the Oxfam scandal as an instance that damages NGOs' reputations to donors, and recognizes the aspects pointed out in Chapter 1. As explained in Chapter 5, SOS have guidelines and continuous reports regarding this problem, which is supported further by Interviewee#2, who also recognizes the issues of fraud and corruption:

> *"(...) we talk about incidents that have happened, for sure, and we do our best to remediate them. (...) I think, if you look at the Transparency International Corruption Index, we cannot just close our eyes*

> *and say that it won't affect us. We, of course, have external and internal risks, like fraud and corruption, which may happen somewhere."* (Interviewee#2, 2020)

However, Interviewee#1 is adamant that SOS still have the donors' trust, due to increased scrutinization of NGOs:

> *"So I would say, Yes, they still have trust. Yes, there have been incidents, but maybe as a general development, one could argue that we, but also other child-focused organizations, we are being held more and more accountable."* (Interviewee#1, 2020)

Thus, SOS are doing their part in ensuring that their work is honest. However, they still rely on trusting intermediaries, such as banks and governments. When asked about SOS' stance on this, Interviewee#1 replied:

> *"I have already told you about the difficulties with different political environments. Just to give you an idea: we are talking about hundreds of bank accounts, so yes of course does SOS trust their intermediaries. But given the different countries and locations we operate; we depend on a lot of providers."* (Interviewee#2, 2020)

As all interviewees were informed about the topic of the thesis being about blockchain application to NGOs, Interviewee#1 explained how the increased function of transparency would be beneficial, but not necessarily sufficient in eliminating fraud:

> *"But it is still only about the transaction, not necessarily what the money was used for or to whom. There are definitely frauds that can be committed, where there is not necessarily the means of the money transfer that is the most relevant part. (...) If the fraud is made well, the cheated money is built into the price."* (Interviewee#1, 2020)

This notion is further seconded Interviewee#2, who is excited about a completely transparent, digital system, but questions the feasibility at this point in time:

> *"What we have to ensure is that the confidence is there in that the money is spent properly, because, I think the only thing you see is that money is spent, maybe also for purposes like construction or for children's clothing, but you do not see the item at the last step. (...) That's the future; maybe in 10-15 years, currently I fear we are not there yet."* (Interviewee#2, 2020)

8.2.3 Accounting Processes

Conforming with the topic delimitation of the thesis, we were interested in gaining an understanding of the accounting processes in SOS. More specifically, we wanted to understand its ERP systems and whether they differ within the organization.

As mentioned, the first part of the financial year involves the program associations (PAs) issuing their cash flow needs for the coming year to SOS CVI and the PSAs (Interviewee#1, 2020). As the PSAs raise the funds matching these needs, and the PAs subsequently receiving what they asked for, however, it is clear that SOS CVI does not have access to all the PAs' records:

> *"I think for most of them, we have open access, but in some countries, it is a bit more difficult, e.g. in Syria, etc., they are not 100% connected to our system."* (Interviewee#2, 2020)

Interviewee#2 explains that they currently do not have a connected, share ERP system (Interviewee#2, 2020). This point was further proven by Interviewee#1:

> *"I repeatedly told you that SOS is not fully consolidated corporately, so we do not have an ERP system which close and reflects everything that the 136 countries are doing."* (Interviewee#1, 2020)

However, both Interviwee#1 and Interviewee#2 points out that SOS are currently working on setting up a shared ERP system, but that they are not there yet (Interviewee#1, 2020; Interviewee#2, 2020). Additionally, relating to the audit-part of the accounting processes, Interviewee#1 explains that there are controlling mechanisms in which criteria must be satisfied before funds can be transferred, which is a difficult task:

> *"Even though this sounds easy, it isn't. You have to separate this by country, you then have to basically verify the calculation steps per country, and only if you have the necessary approval you can pass the money on. However, the basis for the approval is reconciliation made on the accounting system. So, this is a multi-step process."* (Interviewee#1, 2020)

8.3 Conceptual Design

The analysis of the interviews in NVivo 12 helped us to identify four different blockchain-based solutions to how NGOs can increase transparency and trust, and additionally help streamline operations and accounting processes. It is important to note that none of the blockchain experts were informed of the other experts´ opinions, thus all of the scenarios have been mentioned solely on the experts´ own opinion and knowledge. Furthermore, some of the scenarios were mentioned by 2-3 of the experts, while others were mentioned by all 6 experts. The following four sub-chapters will present the different proposed scenarios based on quotes from blockchain experts.

8.3.1 Scenario 1 - Shadow Transactions

The first scenario of a conceptual design identified from the interviews is a blockchain solution in which the NGO can "shadow" the transactions of funds from donors to end projects. This type of blockchain solution was mentioned by two of the interviewees, without any of the two interviewees knowing what the other interview participants had proposed. Interviewee#7 elaborates how such a system could work by keep

involving the traditional banks for the transfers of funds, however there are some additional data stored on the blockchain. This data would contain identities of the persons involved in the transactions, the amount as well as purposes of the transactions (Interviewee#7, 2020).

> *"So, make this system very, very transparent, even though the money still flows through the traditional banking system."* (Interviewee#7, 2020).

Interviewee#7 emphasizes that this scenario would make the transactions much more transparent, and by taking use of smart contracts the NGO can be provided with sort of a status for whether they should send the next payments or not based on the degree of fulfilment of the requirements in the smart contracts (Interviewee#7, 2020).

> *"So, the blockchain can reveal through smart contracts, as a kind of an indicator that "ah, there is a red flag. This transaction should not go through."* (Interviewee#7, 2020).

When discussing some of the challenges of NGOs, involving their donors wanting to see where the money goes, when aid projects are completed and the fact that the money that they donate actually goes to the intended projects, Interviewee#7 adds:

> *"(...) you (the NGOs) have situations where you need to demonstrate that a certain project delivers certain results, so you could have a situation where you receive the money and the blockchain registers that you receive a transaction, "this money is of this amount, and they are meant for this project etc." Then on the blockchain itself, you can say the status of the project, "completed", "successful", "failed" etc. And then you could have a third-party organism (organization) that validate that the information that is put on the blockchain is true. So that you build a more trustable type of ecosystem, in this case."* (Interviewee#7, 2020).

The possibility of "shadowing" the transaction in the NGO was also brought up by Interviewee#8:

> *"In the other model, you would shadow where the money goes, when and so on. You would have to make all the people who are making up the current process, take part of that. Because they would sort of report what happened, they have to do it in a way that can be trusted and so on."* (Interviewee#8, 2020).

8.3.2 Scenario 2 - Use Cryptocurrencies or Stablecoins

Another possibility is to fully digitalize, or fully blockhain-ize the system. This scenario involves a more fundamental change than the previous one, as the entire business model will essentially be transferred onto the blockchain, with cryptocurrencies replacing fiat currencies in the internal processes (Interviewee#7, 2020). However, although this solution would mean that the transfers within SOS are in cryptocurrencies,

Interviewee#7 explains that banks will remain necessary, as local projects likely requires payments in local currencies (Interviewee#7, 2020).

One advantage of converting to cryptocurrency transactions is, according to Interviewee#8, omitting steps of the transactions:

> *"(...) you can change the actual flow of the money. You can change which steps they go through, when going from point A to point B. And the problem, you said, with the initial model is that there are some unnecessary steps. Well, necessary steps, but they are not really providing anything besides of the potential for getting lost along the way, etc."* (Interviewee#8, 2020)

Next, when asked about transaction costs, Interviewee#8 responded:

> *"Yeah, the more steps you have, obviously a larger slice of the overall pizza you are giving away to stuff that don't go to the actual purpose of the donations."* (Interviewee#8, 2020)

Interviewee#4 provides further explanations of the benefits of using cryptocurrencies, but recognizes that it is unlikely to solve the last mile problem, i.e. that the last stages of the audit trail will not be traceable (Interviewee#4, 2020). However, Interviewee#4 argues that this scenario maximizes transparency to the extent possible.

> *"You can trace the money and the business can make it more trace-friendly. (...) Then it will be easier for the organization to prove that "the money is at this place in the supply chain now". However, you will still have this "last mile problem" when the money is supposed to be exchanged for the desired currency and the money then goes dark. But this point (the exchange) you can put as close to the point desired."* (Interviewee#4, 2020)

Moreover, Interviewee#4 claims that using cryptocurrency transactions will have a controlling mechanism regarding funds being used to their actual purpose, thereby increasing the money stream's efficiency:

> *"In an inefficient and expensive system, this will not be possible as it might take three weeks to send the funds, and you risk that it gets stuck along the way, forcing you to do bigger bulk transactions. In a more efficient system, like the one in Bitcoin, you will be able to fine-tune the money stream, forcing results before sending additional funds."* (Interviewee#4, 2020)

In addition to fronting traditional cryptocurrencies as a solution, Interviewee#4 introduced stablecoins to this discussion. This proposal is seconded by Interviewee#7, who even proposes that SOS may operate similar to a bank.

> *"So, the way to implement a stablecoin itself, from a functional perspective, makes sense, because then you have everything moving to the blockchain. So, then you also save a lot of costs related to*

> *infrastructure that you need to maintain, or the banks that you pay, as well as all these problems with the fluctuations. SOS could become a kind of bank in that sense."* (Interviewee#7, 2020)

Interviewee#7 further argues that this solution may contribute to mitigate crime and corruption, as everyone can have their own e-wallets, and cash won't be flowing as it is now. They further support this solution with the fact that although most of these beneficiaries and their countries are poor, most people still own smartphones.

If SOS were to create a stablecoin, Interviewee#6 explains that the process is quite simple, yet not necessary, due to the vast amount of stablecoins already available:

> *"Technically, there is no problem setting up such a system. Then you'll need to find out which parties that are actually willing to accept the coin as a viable coin (currency). That is the most important question, because the transaction in itself is not that difficult. (...) That is not a problem, because is there one thing that we actually are not in need of today, is more stablecoins.* (Interviewee#6, 2020)

A stablecoin could be distributed by SOS Children's Villages and pegged to certain assets befitting the cause. Alternatively, as Interviewee#7 predicts, a stablecoin is likely be issued by the European Bank at some point, which may prove more trustworthy by the public:

> *"If you think about a European Central Bank that are issuing a stablecoin, then you can trust the stablecoin much more than a stablecoin issued by a private company. You need to trust that they actually have the funds in the bank, so that would be the situation."* (Interviewee#7, 2020)

In terms of functionality, Interviewee#5 explains that a stablecoin would work in the same way as a smart contract, but that there is still a way to go to create a fully functional platform:

> *"For an NGO, if it's crypto, it will be like a smart contract, only that instead of money flowing through that smart contract, it will be cryptocurrencies flowing through that smart contract. Now, what's important there, which is not in a private network, is regarding identities on both donors and receivers. However, there is currently emerging solutions to this, just that this platform in itself, e.g. Ethereum, hasn't got any stance on that."* (Interviewee#5, 2020)

However, Interviewee#5 argues that there are several regulations which must be complied to when working with money flows, which could be problematic if all donors are fully anonymous (Interviewee#5, 2020). This issue is supported by Interviewee#6, who explains that many projects have disregarded aspects of tax in such systems, which is especially important when there are large financial numbers involved:

> *"(...) if you trade one token from one wallet to another, it is classified as a taxable transaction. In other words, if you have a token, where you have transferred/exchanged from NOK to EUR to USD,*

> *then you have to take the exchange rate for those transactions to see whether there has been volatility to the UN Coin (used as stablecoin in this example).”* (Interviewee#6, 2020).

To substantiate this tax issue, Interviewee#6 points to the Libra Coin – Facebook’s recently launched stablecoin – and that it will be a failure, because they are disregarding taxes. Additionally, Interviewee#8 sees another aspect as to why stablecoins may not be a necessary solution for NGOs:

> *“(...) then it probably doesn’t matter if the underlying currency is stable or not, because that transaction will generally happen very fast, it’s not like the market is going to crash in the meantime. So, the stableness part of a stablecoin is a part that’s only relevant if you leave money in an account, right, and you don’t want the value of it to change.”* (Interviewee#8, 2020)

Conclusively, Interviewee#4 explains the necessary fundamentals to introduce cryptocurrencies to the system, more specifically to the beneficiary countries:

> *“What is needed is that the NGO has to figure out what is the viable currency for those in need (the locals). And what is the closest place in which there already exists liquidity between cryptocurrency and this local currency. Then, the NGO has to build the infrastructure for this exchange, which is close enough to the ones in need.”* (Interviewee#4, 2020)

8.3.3 Scenario 3 - Consortium

The third scenario identified regards a blockchain solution where NGOs come together to form a consortium. This scenario emerges from the fact that lack of transparency and trust in NGOs are more of an industry-wide problem, rather than only a company-specific problem. This was brought up by Interviewee#3, and it was argued that if the NGOs would come together, they would fulfill requirement 1) for a blockchain-case of having multiple actors, a network, thus they could all come together to develop a solution (Interviewee#3, 2020).

Interviewee#3 elaborates on the scenario by referring to a news article (Ottosen & Nielsen, 2019) in the Danish Newspaper DR about Danish pork being tracked on blockchain when shipped to China. The case here is that many of the Danish manufacturers of pork struggle with having their products being copied, so that the Chinese consumers are in danger of being served “fake” Danish pork. This problem has caused the Chinese consumers to pay more attention to the transparency of food being imported to China, as well as Danish manufactures having their brand associated with poor quality pork (Ottosen & Nielsen, 2019). Interviewee#3 continued to explain the scenario by referring to the article:

> *“So, they saw that the entire market, and the entire industry benefited from creating this joint platform, and it actually says “let´s be common around the infrastructure of the platform, because no single one, not even the largest player, would be trustworthy enough. However, if you come together as an industry, and then you can start applying game theory on that, I mean it would be very hard for one to*

> *cheat, because there would be this game where everyone benefits from all of them being together."* (Interviewee#3, 2020).

Interviewee#4 also mentioned the possibility of such a consortium, however they expressed more of a skepticism rather than optimism of such a structure. This was based on arguments that these types of projects quickly turn out to be rather creationistic, where the involved parties try to start a "super project" which can turn out to be too complicated (Interviewee#4, 2020).

Interviewee#4 continued by specifying why a consortium, or a joint blockchain-based solution would be difficult in practice:

> *"Well, some of the least management-friendly structure that you can have is a consortium, especially when it includes competitors. Then they are supposed to sit together and agree on how to innovate, that is really difficult to do…".* (Interviewee#4, 2020).

8.3.4 Scenario 4 - Change Business Model

The fourth and final scenario identified was one including a radical change to the business model of the NGOs. Interviewee#3 specifies that they do not have a thorough understanding of SOS CVI´s operating, or business, model. However, Interviewee#3 suggested a significant change to the business models of NGOs, thus not only changing the flow of the transactions of funds, but also by taking use of new technologies such as the blockchain technology. This was illustrated by seeing the NGO as a sort of a broker, identifying aid projects and making an online platform where donors could make direct donations in cryptocurrencies to these projects (Interviewee#3, 2020).

> *"That way the money never goes to SOS, right, it just goes straight to the receiver. Maybe they (SOS) will have to take some part of it out in order to manage their administrative cost. But that would be much less than it is today."* (Interviewee#3, 2020).

Interviewee#3 agrees that taking use of cryptocurrencies will increase transparency in the NGO, in the way that you will be able to trace where funds are sent, to whom they are sent and when they are received. However, Interviewee#3 argues that there are greater possibilities in the blockchain technology than only making NGOs´ transactions more transparent and effective:

> *"So, I think that we are actually talking more about sort of a business-mode change, more than a technological-challenge change. Which is interesting, and it is important to think that way when you are doing with these technologies."* (Interviewee#3, 2020).

8.4 Summary

Chapter 8 has presented the key findings from interviews with SOS CVI and the blockchain experts. Sub- 8.1 provided detailed first-hand experience with blockchain technology, its application as well as limitations, which will be used as primary information in the coming chapters. We noticed throughout the interviews that the experts had varying thoughts on blockchain technology, which only substantiates the insecurity and knowledge gaps at this moment.

Sub-Chapter 8.2 detailed the data from two interviews with SOS CVI. Their views on the aspects of trust, fraud, and transparency were described, providing additional information to the background information from Moreover, these two interviews provided sufficient information about SOS' funding supply chain and ERP system, making it possible to assess them, as well as investigating where blockchain technology is applicable and may increase efficiency.

Last, Sub-Chapter 8.3 presented four scenarios for blockchain technology in NGOs, as explained by the interviewees: 1) Shadow Transactions, 2) Cryptocurrencies or Stablecoins, 3) Consortium, and 4) Changing the Business Model. Here, as well, it is obvious that there are many strengths, yet also much insecurity and differing opinions about potential solutions, which in part is due to the lack of experiences of various uses cases.

These four scenarios and the data from Sub-Chapter 8.1 will, along with existing literature, be the basis for blockchain application in the conceptual design, in which it will be connected with the collected information about SOS and NGOs.

9. Conceptual Design

9.1 Identification of Blockchain Use Case in SOS

When identifying where and how improvements can be made in an organization, it is important to recognize the organization´s requirements. Throughout our interviews, there was a clear consensus that blockchain technology, at its current state, is most applicable in transaction heavy parts of an organization. Thus, we have identified that there are opportunities to streamline SOS' funding supply chain, as there are applications of blockchain that have track records of improving such processes (Interviewee#3, 2020).

In short, SOS' current involves donors donating to local SOS branches, known as PSAs, who then send the money to SOS CVI (Interviewee#2, 2020). Then, SOS CVI distributes the collected funding to the countries that the PSAs and fundraising countries are responsible for. In all, SOS Children's Villages consists 136 member associations, of which seven solely collect funds, 116 solely operate, and 13 do both (SOS CVI, 2019). All money transfers go through regular bank transactions, and SOS try limiting themselves to working with 10-20 banks (Interviewee#2, 2020).

Figure 16: Overview of SOS' Funding Supply Chain

Limiting the banks are, according to the SOS interviewees, intended to create strong bonds and thereby reduce transaction costs. However, this is not always possible, as certain banks are not present in various countries. Thus, along with regular transaction costs, further and higher costs occur when they have to operate with different banks – typically in the program associations. Additionally, the interviews revealed a pattern of issues where money is hard to trace, and the receiving associations notify the sending association that they have not received funds. Money can then be stuck for up to two weeks, and SOS are unable to trace the funds. Thus, it is proven that the current process through the correspondent banking systems are timely, opaque, and suboptimal.

Moreover, as informed previously in the thesis, donors seek more transparency in NGOs. Thus, there is a recognizable issue of lacking transparency in the current systems – a feature which is oftentimes mitigated or even eliminated through blockchains (Tapscott & Tapscott, 2016).

To successfully implement blockchain, Interviewee#3 detailed that there are three requirements to have an actual blockchain use case: 1) There needs to be an ecosystem with multiple actors, 2) there must be low transparency, and 3) there must be low trust (Interviewee#3, 2020). These three requirements are fulfilled in

this case, as 1) SOS´ ecosystems consists of 136 member associations, 2) there is no transparency in SOS' transaction system, leading to money getting lost, as well as 3) trust issues from donors, which is also inflicted through various scandals within the foreign aid sector.

For NGOs, it is important to recognize stakeholders when changing operations, specifically making sure that the change will at least make the situation as good for the beneficiaries, if not better. Additionally, we have identified four requirements which will be scrutinized when designing the blockchain system, aligning with SOS' current ERP system, values, and possibilities. These requirements are 1) increased transparency, which may increase trust, 2) increased traceability, 3) lower transaction costs, and 4) streamlined transactions.

Thus, this conceptual blockchain design will be directed at improving these aspects of SOS' – or similar NGOs' – funding supply chains, by addressing the issues of transparency, transaction costs and time, and traceability.

9.2 Assessment of Suggested Blockchain Scenarios

Following the analysis of the interviews with the blockchain experts, four distinct blockchain scenarios were identified. Each of the four scenarios were suggested by either some or all of the experts, and all the scenarios were proposed with the aim of increasing transparency, traceability and efficiency in NGOs. Despite all of the scenarios having certain similarities, some of them have the potential to cause a greater and more drastic impact on the NGOs operating model, thus being more challenging to implement than some of the others. In the following sub-chapters, each scenario will be discussed and evaluated. This evaluation will be based on an overall assessment of each scenario's strengths and weaknesses. The scenarios´ ability to fulfill SOS´ requirements, which have been identified in the previous sub-chapter, will be emphasized. Eventually, based on the assessment, one scenario will be chosen to function as the base for the conceptual design which will be presented and specified in Sub-Chapter 9.3.

9.2.1 Scenario 1 - Shadow Transactions

Scenario 1 was proposed by two of the blockchain experts with the aim of increasing transparency, traceability and efficiency in NGOs. More specifically, the scenario involves a blockchain solution with the ability to trace, or "shadow", each of the NGOs' financial transactions, all the way from donors to end projects. Thus, the transactions themselves will still go through the traditional banking system, however there will be stored records on the blockchain containing information on what the participants in the system will receive, the amount of the transfers, for what reason the participants have received money and eventually what the money has been spent on (Interviewee#7, 2020). Another application of this scenario is that the NGO can take use of smart contracts which can indicate, and provide, sort of a status for every transaction. Thus, the NGO can know whether the previous transaction was received on time and by the person that it was intended (Interviewee#7, 2020).

Last, the scenario´s ability to fulfill the requirements identified in Sub-Chapter 9.1 must be considered. First, as the blockchain will contain information on when funds are sent and received, the amount and the intended purpose, as well as information on the sender and receiver, the scenario will arguably fulfill requirement 1 on increased transparency. This improved transparency may affect the trust that donors have in SOS positively, however it will not completely solve the problem. Furthermore, this solution would increase the traceability of the funds as the information stored on the blockchain would create a kind of an audit trail for the transactions, thus fulfilling the second requirement. However, the fulfillment of the first and second requirement is based on an assumption that this information would be stored on a public blockchain. With the use of a private blockchain, it would not provide the same level of transparency.

However, as all of the financial transactions still will be handled by the traditional banking systems, this scenario does not fulfill the third and fourth requirement. This means that SOS will still face the same administrative costs, including transaction fees and exchange rates, as well as the problems related to lengthiness of transactions and funds getting "lost" along the supply chain.

9.2.2 Scenario 2 - Use Cryptocurrencies or Stablecoins

The second scenario identified through the interviews is one that involves taking use of cryptocurrencies or stablecoins in SOS´ supply chain. More specifically, it was suggested that SOS would take use of a cryptocurrency or a stablecoin to transfer funds from donors to end projects in its supply chain. However, there will still be a need for the traditional banking system as the cryptocurrency, most likely, has to be exchanged for local currency when it arrives in the origin country of the end projects (Interviewee#8, 2020). By doing this, SOS would omit a number of steps in the supply chain, as there is, potentially, solely a need for traditional banks to handle the transfers at the very beginning and end of the process. In other words, this scenario comes with the potential to actually change the traditional flow of the funds in the supply chain (Interviewee#8, 2020).

Just like in Scenario 1, this second scenario fulfils the first and second requirements. By taking use of cryptocurrency or a stablecoin to transfer the funds in SOS´ supply chain, and store key transaction data on the blockchain, the solution will provide SOS with a great level of transparency. As explained previously, this may affect the general trust positively. Additionally, when using a cryptocurrency or a stablecoin, the donors will also be able to see how much of the initial amount donated that is received by the end project. Similar to in Scenario 1, this level of transparency comes with the system as long as the blockchain is public and accessible to read for the donors. By storing all the transactions on the blockchain, this scenario will provide a public, distributed ledger which will work as an audit trail for the transactions. Thus, the second scenario will also be fulfilled.

When it comes to the third and fourth requirement regarding lower transaction costs and streamlining of transactions, this scenario also comes with the ability to fulfill these. When taking use of a cryptocurrency or

a stablecoin in the supply chain, SOS will have the ability to change the flow of the funds (Interviewee#8, 2020). This involves not depending on the traditional banking system for every transfer along the supply chain, and most probably only taking use of banks and other financial institutions at the very beginning and end of the process. As pointed out by Interviwee#8 (2020), the more steps you have along the supply chain, the more of the initial donation will get lost along the way in terms of transaction fees and other administrative costs. Additionally, as this scenario involves omitting some of the steps along the supply chain, it has the potential to streamline the transactions. By keeping a record of the key transaction data, there will always be an audit trail that states where the money is located along the supply chain. Furthermore, as the use of the traditional banking system is limited to the minimum, the chances of funds getting lost along the way are smaller.

9.2.3 Scenario 3 - Consortium

The third scenario proposed in the interviews, suggests several NGOs working together as a consortium and create a common blockchain platform for all to use. This scenario, as pointed out by Interviewee#3, was proposed due to SOS' problem being an industry-wide problem. As such, a consortium would bring economies of scale, where knowledge and resources could be shared (Interviewee#3, 2020).

Interviewee#3 substantiated this advantage through an example of the Danish pork industry and argued that game theory and cheating would be mitigated in such a scenario, because everyone would benefit from cooperation (Interviewee#3, 2020). However, Interviewee#4 brings up a valid point of skepticism, as although it could bring great benefits, the idea of competitors forming a consortium and agreeing on solutions is quite unrealistic (Interviewee#4, 2020).

Additionally, this scenario is different from the former two, as it only includes an idea of how SOS could build a system, not how the system could work. For that reason, scenario 3 is not really in the scope of the thesis nor its conceptual design, as it alone cannot fulfill any of the four criteria named in Sub-Chapter 9.1.

9.2.4 Scenario 4 - Change Business Model

The fourth and final scenario involves a more radical change to SOS' entire business model. Scenario 4 proposed a crowdfunding-like business model, where the NGO would act like a broker and administer of the crowdfunding website. This scenario would function by the beneficiaries publishing their needs on a website, or similar, and donors could pick what they would like to support (Interviewee#3, 2020). This way, the administrative costs of SOS would likely be reduced drastically.

The money would, as such, flow directly from donor to beneficiary, with some cut to SOS, satisfying criteria 3 and 4, as transaction costs would be eliminated and completed quickly (Interviewee#3, 2020). Interviewee#3 further suggests cryptocurrencies to this system, as the transparency and traceability would increase, satisfying criteria 1 and 2.

This scenario is likely to fulfill criteria 1 through 4, as described. However, as SOS consists of 136 member associations, this scenario would mean there is no security that all the nations receive all the funds they need – if any at all. Therefore, scenario 4 does not fulfill the shareholder criterion, and is consequently discarded. I should, however, be noted that Interviewee#3 had no knowledge of SOS' business model or systems when proposing this scenario. Furthermore, we recognize a possibility of using this scenario as a supplement to their business model, where crowdfunding in a control manner could help fund smaller projects. However, this will not be discussed further throughout the thesis.

9.3 The Conceptual Design

Where Sub-Chapter 9.1 confined where blockchain can be applied in NGOs and Sub-Chapter 9.2 discussed the four different scenarios of application approaches, this sub-chapter will explain how the conceptual design will work. We have identified that blockchain is applicable for transaction-heavy parts, focusing the conceptual design to NGOs' funding supply chains, whilst utilizing a fully blockchain-ized approach with cryptocurrencies. First, all underlying features of the systems and selections therein will be described in 8.3.1, before the blockchain blueprint and its layers will be visualized in 8.3.2.

The overall goal of the proposed conceptual design is to utilize the knowledge acquired throughout the process of this study through existing literature and interviews, to create a conceptual transaction system for NGOs. Having proved that the case fulfills the three requirements of a blockchain case – 1) There needs to be an ecosystem with multiple actors, 2) there must be low transparency, and 3) there must be low trust (Interviewee#3, 2020) – the system will therefore hope to fulfill the four requirements for NGOs, being 1) increased transparency, which may increase trust, 2) increased traceability, 3) lower transaction costs, and 4) streamlined transactions. At the same time, we believe the conceptual design will not jeopardize the development in the program associations.

The conceptual design will not be functional by itself, but it will serve as a blueprint for potential creations of prototypes for funding supply chains, specifically for NGOs. Although this design is based on particularly SOS' systems and processes, the concept is intended to be applicable to other NGOs with similarly structured systems and processes. Thus, the authors reserve the idea that this concept will address this delimitation and are aware that other solutions may be more appropriate for other scenarios.

Last, we would like to specify that the conceptual design solely looks at how donations are processed. As such, the conceptual design does not inflict any changes to the various types of donations, such as sponsorships, sporadic donations, etc. In this design, and presumably in the interest of the NGO's, these will remain.

9.3.1 Underlying Features of the Design

This sub-chapter will describe the underlying features of the conceptual design. These relate back to Sub-Chapter 6.3, where the different components making blockchain systems work were described. As such, this chapter will detail the chosen components such as platforms, privacy, and consensus, as well as the stakeholders and their role in this design.

9.3.1.1 Stakeholders in the Design

The stakeholders for the thesis were identified in Sub-Chapter 5.2, in which the General Assembly, donors, and beneficiaries had most interest and influence. For this sub-chapter, however, the focus will be on the stakeholders actively playing a part in the conceptual design. In short, the main participants are:

SOS Children's Villages International (SOS CVI), who will maintain their current operations, as well as administering and maintaining the system.

Fundraising associations (PSAs), who will work to collect funds in their countries and be responsible for certain beneficiary countries – as they are now. However, the funds raised will now be transferred via a cryptocurrency rather than fiat bank transfers.

Program Associations, who will receive funds in cryptocurrency, which will need to be exchanged to local currency for use. Otherwise, they will continue their operations as normal.

Donors, who will make a donation, and who can freely track their and others' donations. Their donations will be made in their local currencies, and then converted to the cryptocurrency. Hence, the donation process will not be more complicated.

Correspondent banks, whose task will no longer include from conducting the transfers across borders, but now rather sell the cryptocurrencies to the NGOs.

9.3.1.2 Platform

One of the most important decisions when developing the conceptual design relates to a consideration that can be characterized as a "make-or-buy" decision. More specifically, it involves the decision on whether the conceptual design should be developed from scratch, meaning that SOS will make their own blockchain platform, or whether they should take use of an existing one and build their solution on top of an already successful and well-developed platform. One example of such an existing platform could be the Ethereum platform, which is a global, open-source platform accessible anywhere in the world (Ethereum, 2020).

For the following conceptual design, our suggestion is to take use of an already existing and successful platform provider. This suggestion is based on several considerations of the pros and cons following the make-or-buy decision. First, as pointed out earlier, the lack of general, as well as thorough, knowledge of blockchain technology is one of the reasons why the technology yet hasn´t seen the widespread application as many

expected during the years of the Bitcoin hype. Additionally, building a blockchain platform from scratch requires much time and resources. Especially, the aspect of the required level of knowledge needed to build and design such a platform may be decisive to this decision. Second, operating its own blockchain platform would involve significant and continuous maintenance, which will require additional resources and knowledge. Thus, our suggestion would be that the conceptual design is built upon an already existing platform. This way, SOS would not have to acquire a substantial level of resources, specifically in terms of new staff, to operate and take use of the new system. In other words, the suggestion to buy or create the system upon an already existing platform is also based on the assumption that SOS do not, as of today, have the knowledge nor the resources required to build and operate their own system. Additionally, as SOS rely on donations to operate, to cover administrative costs etc., using donations to hire new staff and build an entirely new platform may not go well with their donors.

Despite the lack of a worldwide application of blockchain technology up to this point, there are many different providers of blockchain platforms. Many people might think that one platform provider may offer the same as another, once again this is a result of the general lack of knowledge of the technology. However, there are some specific providers that may suit particular purposes to a greater extent than others. Thus, there are some particular considerations that have to be made when deciding which blockchain platform that should create the base for the desired system; 1) kind of network, 2) language used, 3) popularity, 4) activity, 5) price and 6) consensus mechanism (Sharma, 2019).

9.3.1.3 Public Permissioned Blockchain

The blockchain in this conceptual design will have a public permissioned structure. The openness will secure maximum transparency, as the blockchain with the transactions will be visible globally. Meanwhile, the permission-based accessibility component means that only permissioned or verified users can operate, i.e. donate and transfer money, on the platform. The users are verified by the administers of the system, which in this instance will be the NGO.

We suggest the public platform, as one of the NGOs' main challenges is the lack of transparency. Thus, as the entire blockchain and transactions therein will be visible for anyone, this issue is properly mitigated. Moreover, the permission-based structure will provide more security, in that all transactions will be made by verified entities, rather than it being a "free market", such as in Bitcoin. This way, the transaction flow is controlled and less exposed to risks related to malicious nodes.

9.3.1.4 Consensus Mechanism

As presented in Sub-Chapter 6.3.5, the purpose of a consensus mechanism is to provide a way for all of the nodes in the network to agree on collective decisions (Drescher, 2017). Proof of Work and Proof of Stake, two of the arguably most used and known mechanics, were presented and explained. What should be noted regarding consensus mechanisms is that they usually come hand-in-hand with individual platforms, meaning

that they are interconnected. For instance, Proof of Work is the preferred consensus mechanism in the Bitcoin blockchain, and Proof of Stake is used in the Ethereum blockchain. As Sub-Chapter 9.3.1.2 did not conclude on one specific platform for the conceptual design to be implemented and developed, it is difficult to suggest which consensus mechanism that should be present in the conceptual design.

9.3.1.5 Currency

As the proposed conceptual design will take use of a cryptocurrency to facilitate the transactions of donations, there has to be made a decision on the preferred type of cryptocurrency that should be used. Chapter 6 provided a detailed introduction to cryptocurrencies, including stablecoins, and their suitability, as well as strengths and weaknesses in various uses. As stated by Sam (2019), a cryptocurrency should have "*price stability, scalability, privacy, and decentralization*". These characteristics, in addition to findings from the analysis of the interviews, will be considered when deciding on the most suitable cryptocurrency for the conceptual design (Sam, 2019).

The first cryptocurrency considered as applicable for the conceptual design will for most people be Bitcoin. The advantage of taking use of Bitcoin in this conceptual design would be its widespread application and to some extent acceptance. Thus, it would have been easier for SOS to find banks and other financial institutions that accepts Bitcoin for exchange in the desired local currency. However, as described in Sub-Chapter 6.5, cryptocurrencies are known for being very volatile. In the introduction to the thesis, the Bitcoin hype was introduced and the price of one Bitcoin was $10.365,70 at the 12th of February 2020. As of the 10th of April 2020, the price of one Bitcoin was $6.904,17 (eToro, n.d.), a decrease of more than 33% in barely over two months. One reason contributing to this decrease is the general unrest in the global financial markets following the Covid-19 pandemic. Some people argue that this volatility is vital to the general growth and interest of cryptocurrencies (Pollock, 2019). However, taking into consideration SOS´ operations, and their dependece on financial stability from the perspective of both donors and PAs we do not think that such a significant volatility is desierable. Additionally, as SOS also operates saving accounts for childeren in multiple countries sponsored by donors having the aspect of storing these savings in a currency with such a high level of volatility is not found favourable. Thus, in the conceptual design, we suggest using a stablecoin in order to avoid this volatility and yet having the characteristics of instant processing and a great level of privacy just as with normal cryptocurrencies. In this case, a stablecoin that is collateralized with a relatively stable asset like gold could help bringing the necessary stability and predictiveness of the coin. However, when choosing a stablecoin, the aspect of the stablecoin being accepted in all of SOS´ receiving countires has to be considered. In other words, the chosen stablecoin has to be one that can be accepted in all of SOS´ 136 operating countries.

9.3.1.6 GDPR Compliance

As the public permissioned system has full transparency into the blocks on the chain, it is important to maintain the anonymity of the actors on the chain. This importance is enforced by GDPR, which was further described

in Sub-Chapter 2.3. Thus, we will now present how the conceptual design complies with GDPR and maintains the end-user's anonymity and "right to be forgotten", whilst the organization will still have clarity on the donors' contributions. This is possible as the conceptual design consists of an on-chain, public part, and an off-chain, private part – which will be further described in Sub-Chapters 9.3.2.3 and 9.3.2.4.

On-chain, to ensure full anonymity and no traceability, each donation will solely be identified through a code. This unique code will be generated randomly, and will be completely independent from the donor, meaning that it is difficult to identify the donor through the code. This code will thus be the public key of the transaction and the end-user. The donor will, to be able to track their donation, also know their public key.

Off-chain, not accessible to the public but accessible for the NGO, is a repository of the real identities of the donors. This will, as such, be the private key of the transaction and the end-user, which combined with the public key will identify the code to which the donor is identified as. Thus, the NGO will have an off-chain mapping system of the codes (public keys) and the real identities (private keys).

For the end-user, when making a donation, they will sign an agreement for their information to be stored in the private database, and the unique code to be on the blockchain. As the public blockchain is immutable, the code cannot be deleted and will always remain on the chain. However, if the donor wants to retract their consent to be in the private database, they can, and the private key is deleted. If this option is waved, there will be no way to track the public key code to a real identity. Ensuring this option for the end-user and making the public key not traceable to a real identity, we believe the conceptual design will comply sufficiently with GDPR.

Additionally, we suggest that the public blockchain does not show the sum donated, but that it can still prove how much has gone to something other than the cause, and how much remains. This can be done through Zero Knowledge Proving (ZKP), which following its description in Sub-Chapter 6.3.6.1, would prove each donation's value throughout the transaction's audit trail without revealing the actual sums. The ZKP will be visible alongside the public key on the blockchain, whilst the donation in its actual value will be stored off-chain.

9.3.2 Conceptual Design

Having described the underlying features of the conceptual design, this sub-chapter will depict the design itself, and how it would work. The illustration of the design is divided into four parts. First, the timeline of a donation – the funding supply chain – and the changes from the current, is described. Second is the transaction process with the blockchain system, where the processes within a donation and the differences from the current process is described.

Next, the design consists of certain parts being public on the blockchain, and some remaining off-chain, i.e. not publicly accessible. Thus, third, the on-chain parts will be described, with the off-chain parts coming last.

Throughout this description of the conceptual design, we have generalized icons for each participant and important component of the blockchain system. These icons, which can be seen in Figure 17, are made to be recognizable and make the figures cleaner:

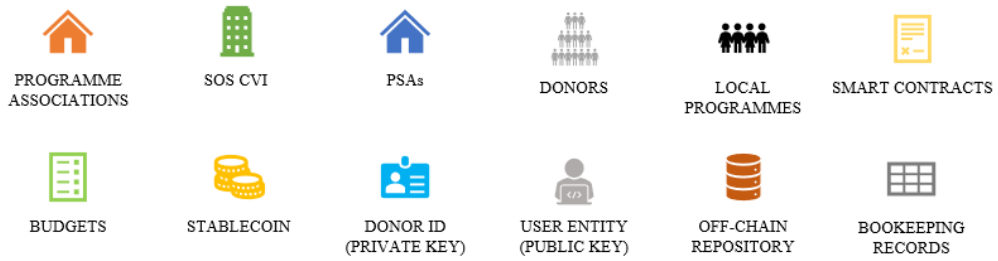

Figure 17: Illustrative icons for figures

9.3.2.1 Transaction Timeline

Sub-Chapter 8.2.1 and Figure 15 described and illustrated SOS´ total process of raising and transferring funds all the way from donors to the local programs. The process was described as complexed and lengthy with many different stakeholders involved such as donors, PAs, PSAs, SOS CVI, and several different financial institutions. Figure 15 illustrated a general and simplified overview of the transaction process with the aim of providing the reader with knowledge and insight in the process starting with the PAs introducing their budgets and needs, ending with the local programs receiving the funds.

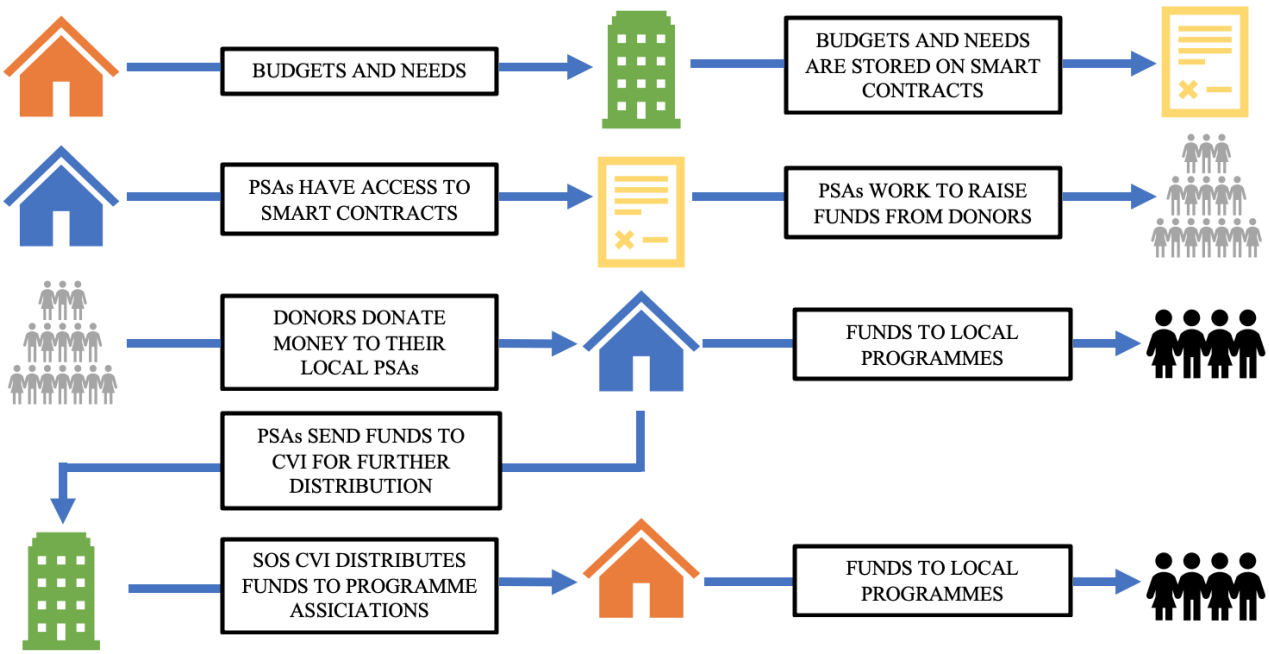

Figure 18: Transaction Timeline

Figure 18 illustrates the transaction timeline following the introduction of the conceptual design. Just as Figure 15, Figure 18 illustrates a general and simplified process in which the actual transactions of funds and the interactions with any financial institution are not visible. Thus, Figure 18 aims at providing a general overview of how the transaction timeline will change following the introduction of the conceptual design. As can be seen by comparing Figure 15 and 18, the only visible change is the introduction of smart contracts following the conceptual design.

The process starts with PAs presenting their budgets and needs to SOS, just as in the initial process. Following, SOS converts the budgets and needs into conditions that are turned into smart contracts and stored on the blockchain. These smart contracts will play a pivotal role later in the process. The PSAs, which have access to read the information on the smart contracts, are then informed of the needs of the PAs making it more transparent and easier to see for which purposes they are raising funds from donors.

Then, as donors donate funds to the PSAs, the process continues in two separate ways. One way involves the PSAs sending the funds directly to the local programs in the individual PSA´s country of origin, thus these funds are not distributed through SOS CVI. However, the other way involves a process in which the PSAs send the funds to SOS so that SOS can distribute the funds to the intended PAs. Then, the individual PA can send the funds to the each and one of the intended local programs. Once the local programs have received the funds, the smart contracts will come into action.

At the beginning of the process, SOS converted every PAs budget and needs into conditions in smart contracts. Thus, in order for the PAs to receive the next payment by SOS, they have to provide information verifying that the funds were used for the intended purposes listed in the smart contracts. If all the conditions are fulfilled, they will be eligible to receive the next payment. However, if there are some conditions that are not fulfilled, the smart contracts will function as an alarm system warning SOS that the PA, potentially, has not used the cash for the intended purposes. Thus, the PA will not receive the next payment and SOS can further investigate whether the deviance of the contract is due to practical issues or, in worst case, fraud and mismanagement of funds.

9.3.2.2 Transaction Process

By only comparing the transaction timelines illustrated in Figure 15 and 18, the introduction of the conceptual design does not seem to inflict any visible significant changes. However, the changes following the conceptual design truly appears when digging into the underlying processes supporting the transaction process. One of the underlying processes that are most significantly affected by the implementation of the conceptual design is the transaction process of the funds – the flow of cash.

Figure 19: Transaction Process

By taking use of a stablecoin to facilitate the transactions of funds all the way from donors to the local programs, SOS will be able to omit several steps in the transaction process. The steps that are now regarded as unnecessary are the ones that in the initial process were needed to transfer funds internally in SOS. These steps include all of the transactions after the first step which involves donors donating money to the PSAs. In the initial process, SOS had to depend on taking use of several different financial institutions in order to move the fund from donors all the way to the local programs. This process were described as lengthy and complicated, and SOS experienced situations in which they were not able to trace and locate the funds for one or two weeks (Interviewee#2, 2020). Furthermore, as the fund must be handled by several financial institutions along the way, as well as exchanged from one currency to another, significant administrative costs were involved in the process.

The conceptual design will be able to, significantly, transform the whole transaction process. The new process involves donors donating to their local PSA in their local currency, just as with the initial process. The significant change, however, takes place from this point and onwards. Having received the donations, each PSA will use an exchange in order to exchange to fiat currency into the chosen stablecoin for the conceptual design. By doing this, each transaction from this point and onward can take place, and will be stored, on SOS´ blockchain. As described earlier, taking use of such a stablecoin and a blockchain to process the transactions involves SOS not being depended on third parties, such as financial institutions, to transfer funds from donors to local programs. Thus, when the funds are sent from the PSAs, and further distributed by SOS CVI to the PAs, the stablecoin will then be exchanged back to the PA´s local fiat currency before the funds are delivered to the local programs. This means that the only need SOS has for intermediaries in the transaction process, are financial institutions who can convert fiat- to cryptocurrency at the start, and crypto- to fiat currency at the very end of the process.

9.3.2.3 On-Chain

As described, this conceptual design consists of a public blockchain. However, due to regulations such as GDPR and pseudonymity, described in detail in Sub-Chapter 9.3.1.6, certain parts will be off chain, i.e. not accessible to the public as it is not stored on the blockchain. These parts will be presented in the next sub-chapter, whilst this will present what will be on the blockchain – what will be visible for the public.

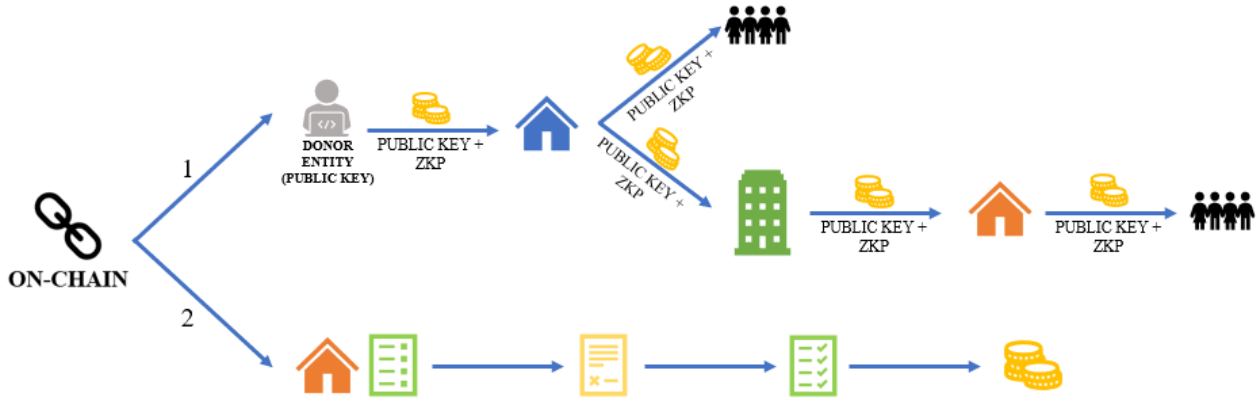

Figure 20: Illustration of the public blockchain

The on-chain part of this design consists of two parts: 1) The accessibility to see the transaction processes, and 2) the budgets, smart contracts, and fulfilments of the smart contracts.

The upper part of Figure 20, part 1, is the transparent supply chain of funds – the transfer processes. The idea here is to have full accessibility to the transaction process, where there is public access can see any unique donation's trail from the donor entity, through the local PSA, SOS CVI, the beneficiary PA, and finally to the program or project in that PA. Moreover, if the donor's local PSA runs their own programs, the funding allocated there, which does not pass through SOS CVI, will also be visible, and the user will be able to track both paths. Still, as mentioned in 9.3.1.6, the public accessibility will only see the hash of each donation, which will not include the donor's identity nor the actual sum donated, but a generated public key and a zero knowledge proof (ZKP) proving the value of the donation at each step. Thereby, the ZKP can show how much of the donation has gone to, for instance, administrative costs throughout the chain, and how much reaches the final destination.

The lower part, part 2, is the transparency in budgeting and actual costs. In Sub-Chapter 9.3.2.1, it was described that all the PAs' budgets are presented to SOS CVI and the fundraising countries, and that the budget is converted to conditions in a smart contract. We therefore suggest that this is made public, stimulating transparency in the NGO's plans and programs. Moreover, the fulfilment of conditions in the smart contract through spending of funds, and subsequently the next payments, are suggested to be on the public blockchain to further contribute to transparency, which – as discussed earlier – is regarded an important factor for trust.

9.3.2.4 Off-Chain

As described, there are areas that are vital to keep private, which therefore will not be made public on the blockchain. Taking inspiration from Faber, Michelet, Weidmann, Mukkamala, & Vatrapu (2019, p. 6860), we therefore suggest taking use of an off-chain repository storing this information.

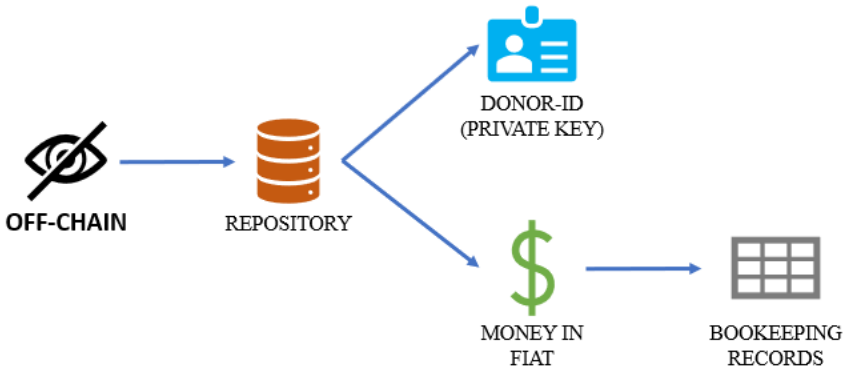

Figure 21: Illustration of the Off-Chain repository

With regards to GDPR, it would be incompliant to include the real identities of the donors on the public blockchain. This is due to the risk of this information being tampered with or misused by malicious people, hence why the on-chain part includes a public key with a generated code. Thus, tying the public keys to actual donor identities, the private keys, we suggest storing these and their connections to the donations and public keys in a highly secured database. As mentioned in Sub-Chapter 9.3.1.6, the donor will have the option of removing themselves from this off-chain repository, which will leave the public key as the sole identification of the donor.

Additionally, we have suggested using zero knowledge proof to prove the transaction process and the money flow. However, for SOS to be able to audit and have accounting books on their activities, it is important to have records containing the monetary sums. This will therefore also be kept and stored on the off-chain repository, inaccessible for the public. That said, the bookkeeping will be tightly knit to the blockchain regarding donations, funding, and spending. Additionally, in accordance with transparency, financial statements should still be presented in quarterly and annual reports.

This off-chain repository is important also for tax-purposes. As described by Interviewee#6, in Norway, you can get tax deductions if you choose to donate to charities and register it on your tax statements (Interviewee#6, 2020). This is likely to be an important incentive for donations, but if all donors are exclusively anonymous, how can you effectively prove your donation and reduce your taxes? This is where the off-chain repository tying public keys to identities pays off, as the government can have permission – albeit somewhat restricted – to see this repository. Thus, using an off-chain repository solves this tax issue without jeopardizing the anonymity feature on the blockchain.

9.4 Example Use Case

To simplify the previous sub-chapters about the components and processes of the conceptual design for the thesis, we will now present two use case examples. One use case will demonstrate how this conceptual design would work for the end-users, whereas the other will demonstrate how the conceptual design would work for the NGO itself. This way, we aim to summarize the aspects covered throughout this chapter and make it easier for the reader to envision the conceptual design.

9.4.1 End-User Perspective

From the end-users', being the donor, perspective, the donation process starts by consenting to having your personal information stored on the private off-chain database, and a public code representing your donation on the blockchain. Next, the donor will choose the desired type of donation, be that a sponsorship of one child or a regular donation, as well as the sum. Once the sum – one-time or periodical – has been chosen and paid, the payment is converted to the stablecoin, and the donation is automatically made public on the blockchain.

The donation will then flow through the donor's local PSA to SOS CVI and, if applicable, to the PSA's local programs. Next, the funds are transferred in accordance with smart contracts to PAs and finally to projects. The entire timeline will be accessible to the donor, who, when donating, would have been given the unique code, public key, at the time of donating. When accessing the blockchain, the donor will, as the rest of the public, see the unique code and the zero knowledge proof of that donation and how much is spent along the way. Additionally, as the smart contract the PAs need to fulfill to get payments, the end-user will have access to it, its fulfilment degree, and the flow of payments to the PA.

Last, conforming with GDPR, if the donor would like to retract their consent to have their personal information on the off-chain database, they can. Waving this option, the private key will be deleted from the off-chain repository, and the only identification of the donor's donation will be the unique code, which is public on the blockchain.

For the other type of end-user, being the general public, the perspective is somewhat different. They will have access to see the smart contracts, their degrees of fulfilment, and the flow of payments to the PAs, as well as the entire trail of each donation. However, they will only be able to see the public keys of the donation and their zero knowledge proves. As such, they can see how much of each donation reaches PAs, but they will have a hard time knowing who the donors would be.

9.4.2 NGO Perspective

As the end-user's perspective has just been illustrated, the new conceptual design will also be illustrated from SOS´ perspective. This is done through a simple walkthrough of the process illustrated in Figure 18, by using a case example involving SOS CVI, SOS Norway as PSA and SOS Malawi as PA.

From SOS´ perspective, the process starts out when they receive information on SOS Malawi´s budgets and needs for the upcoming period. Then, SOS transforms the information into conditions that are subsequently stored in smart contracts on the blockchain. SOS Norway, which is one of the PSAs responsible for collecting and donating money to SOS Malawi, has access to the blockchain and can then read the information in the smart contracts. Based on this information, SOS Norway reaches out to potential donors to raise the desired funds. As donors donate money to SOS Norway, the money is exchanged from fiat currency to a stablecoin. All of the funds are now stored on the blockchain, meaning that SOS will have real-time access to see how much money that have been donated to SOS Norway. Next, the funds are transferred to SOS CVI for further distribution. The use of a stablecoin facilitates high-paced and low-cost transactions and SOS will be able to trace the money.

When SOS CVI have received the funds from SOS Norway, they can further distribute the funds to SOS Malawi, who then uses an exchange to convert the stablecoins into the preferred currency in order to be able to finance their local programs. Next, SOS CVI are notified that the funds are removed from the blockchain and converted into fiat currency, thus receiving information on the amount that ended up in SOS Malawi compared to the amount distributed by SOS Norway and later on SOS CVI. For SOS Malawi to receive the next transfer of payments, they must fulfil the conditions in the smart contract. SOS Norway and SOS CVI will then be informed, through the smart contract, on whether SOS Malawi have fulfilled the conditions, thus getting eligible for receiving the next payment. However, if not all conditions are met, SOS will ask for additional information that can fulfill the requirements or prove the reason behind the lack of fulfilment.

10. Discussion

10.1 Social Theory

The first part of the discussion revolves around socially theoretical aspects, relating back to Chapter 4. Chapter 4 introduced Muhammad Yunus' Social Business, Prahalad and Hart's the Fortune at the Bottom of the Pyramid (BOP), as well as the countering theories about the relationship between technology and society; technological determinism and social construction of technology (SCOT). Thus, this sub-chapter will discuss the latter three's relevancy to the thesis and, as such, the conceptual design's implementability, specifically in developing countries.

As described in Sub-Chapter 4.2, underdeveloped markets are prosperous investment opportunities for multinational corporations whilst helping local communities – the common cause aspect. According to Yunus, Moingeon, & Lehmann-Ortega (2010), companies acting on this idea could be regarded as "social businesses". This theory conforms with Casey & Vigna (2018), who illustrate the impact technology can play on the "unbanked". Moreover, the common cause aspect conforms with UN's work to lift the societies at the bottom of the consumer pyramid through the Sustainable Development Goals (SDGs) – which also is the NGOs' primary aim (United Nations, 2020).

Nonetheless, as NGOs are not profit-maximizing organizations, but rather social organizations, the prosperity factor of being in these societies are irrelevant. That said, the conceptual design suggests that the blockchain system should be developed externally. With the NGOs' objective being to lift the bottom of the pyramid, and the conceptual design's purpose being streamlining a part of this, it is possible that the implementation of blockchain could prosper further technological development in these societies. As such, societies are likely to become markets for multinational corporations – a possibility which can incentivize corporations to work with NGOs.

The latter part of the previous argument about blockchain leading to a society where other technologies could be implemented, is similar to the idea in SCOT – stating more stable societies can prosper technological development. On the other hand, one could argue that social development in this instance would come as a result of technological development, similar to the idea of technological determinism. Regardless, neither are necessarily relevant for the objective in the thesis, as the proposal is aimed at streamlining the processes of funding underdeveloped countries rather than modernizing the societies themselves.

10.2 Opportunities

As the main objective of the thesis effectively is to improve SOS' current processes, this sub-chapter will discuss how the proposed conceptual design can contribute to doing so. More specifically, we will discuss how the conceptual design contributes to fulfill the four criteria identified in Sub-Chapter 9.1: 1) Increased transparency, which may increase trust, 2) increased traceability, 3) lower transaction costs, and 4) streamlined transactions.

First, a public blockchain will be completely transparent. Having the PAs' budgets and needs publicly accessible through the smart contract will further contribute to clearly improve the transparency issue. Although the actual sums in each donation are not visible on the blockchain, the ZKP will be sufficient in proving the value of the donation after each intermediary step. Having this publicly accessible is further increasing the process' transparency. As re-visited multiple times throughout the thesis, transparency is a determining factor to donors' trust. Thereby, we believe that the more transparent processes can contribute to increase donations as a result of raised trust. Additionally, we believe the implementations of smart contracts will be beneficial for SOS in other ways than just transparency. In Sub-Chapter 8.2.3, we detailed that there is a control mechanism regarding criteria for the PAs to receive money. However, the interviewees described this process as difficult. Thus, applying a smart contract to automatically approve or reject transactions will streamline this process for SOS.

Second, having each donation being immutable on the public blockchain will increase the traceability of the donation. The entire path of each donation is visible and cannot be tampered with, and it is possible to see the entirety of where the donation has been used, be it partly to administrative costs, or to specific projects in program associations. Although we assume the PSA will not distribute their collected donations to SOS CVI one-by-one, each stablecoin – or token – is traceable. Hence, evidence suggests that, even though stablecoins are distributed in batches, it would be possible for the donor to track the tokens they donated.

Third, the conceptual design decreases the transaction costs. As described in Sub-Chapter 9.1, the current system consists of four instances where financial intermediaries, i.e. banks, are involved. In the conceptual design, however, banks will only be involved twice; when converting fiat currencies to stablecoins in the beginning of the transaction process, and when converting stablecoins to fiat currencies at the end of it. Removing steps with third-party financial institutions, the transaction costs are immediately decreased. However, it must be noted that as long as the stablecoin is not accepted to purchase products and services in the receiving country, conversion costs will still have to be accounted for.

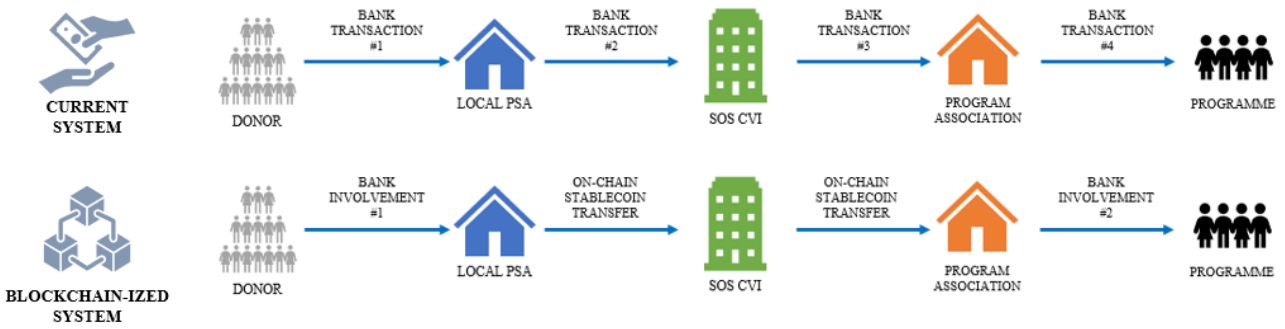

Figure 22: Comparison of the current and the proposed transaction systems

Fourth, the conceptual design effectively streamlines transactions as an effect of the aforementioned improvements. More specifically, removing steps in the transaction process will immediately make transactions go faster. As such, the issue where money is stuck or lost, as explained in Sub-Chapter 8.2, is eliminated by using a blockchain system.

Last, we believe SOS can reap similar benefits to Oxfam, who have experienced success with implementation of donations through DAI (Haig, 2019). Their pilot program, although different from the SOS model and our conceptual design, produced "unprecedented" transparency, which we believe to be achievable in this design as well. Moreover, the article states that Oxfam had similar issues with lengthy processes and slow monitoring and reporting, to which they found that using stablecoins in donations enabled "*(...) rapid analytics and automated transaction tracking*" (Haig, 2019). Consequently, Haig (2019) explains Oxfam were able to more rapidly assess their operations and issue process improvements.

10.3 Threats

Introducing a stablecoin to the proposed conceptual design can facilitate several improvements to the financial transactions. However, the design comes with certain limitations, as well as the possibility to negatively affect some of SOS´ stakeholders. There are many critics related to the implications following the use of such digital currencies, one being the Group of 20´s (G20) Financial Stability Board (Shevchenko, 2020). In short, the Financial Stability Board is an international body that on behalf of G20 *"monitors and makes recommendations about the global financial system"* (Financial Stability Board, 2020). On April 14th, 2020, they issued a comprehensive study on stablecoins, expressing concerns that stablecoins might pose a risk to the global financial stability:

> *"So-called "stablecoins", like other crypto-assets, have the potential to enhance the efficiency of the provision of financial services, but may also generate risks to financial stability, if they are adopted at a significant scale. While such financial stability risks are currently limited by the relatively small scale of these arrangements, this could change in the future."* (Financial Stability Board, 2020, p. 1).

As discussed earlier, and noted by Interviewee#4, there are regulatory challenges related to the use of cryptocurrencies. One aspect, arguably hindering the widespread application of such currencies is the absence of universal regulations, causing skepticism and negativity among businesses and others interested in the technology. Thus, many are concerned that businesses and people taking use of stablecoins will be able to play on differences between different countries´ jurisdictions, additionally emphasizing the importance of universal regulations. This is also noted in the study:

> *"They (stablecoins) have the potential to bring efficiencies to payments (including cross-border payments), and to promote financial inclusion. If widely adopted, however, a stablecoin could become systematically important in and across one or many jurisdictions, including as a payments infrastructure. Ensuring the appropriate regulatory approach within jurisdictions and internationally will therefore be important."* (Financial Stability Board, 2020, p. 1)

Furthermore, using a stablecoin might pose difficulties on some of the countries that SOS operates. As noted earlier, SOS operate in more than 136 countries, where some are characterized by instable infrastructure and financial systems. Here, the local banks and financial institutions rely on receiving transfers in regular fiat currency in order to have money reserves. However, by using a stablecoin, these banks and financial institutions will no longer have the benefits of receiving and storing money from SOS. This aspect was also pointed out by Interviewee#8:

> *"(...) funnily enough, these stablecoins, which we think of as exactly a stable alternative, they have the funny side-effect of de-stabilizing economies that are already not really stable, because they provide incentive for people to pull out their money and put it into stablecoins instead ..."* (Interviewee#8, 2020).

Moreover, there are difficulties related to using a stablecoin to operate the children's´ saving accounts consisting of funds sponsored by donors. Keeping and storing funds in a stablecoin with a long-term perspective for savings do not in practice come with valuable benefits such as interest rates. Furthermore, people could question SOS´ risk-awareness if they would allow valuable donations to be stored in high-risk placements such as a stablecoin in comparison to placing the funds in a fiat currency.

Furthermore, the conceptual design suggests using a stablecoin collateralized with a relatively stable asset like gold. This is due to gold being characterized as one of the more stable assets when considering volatility (Daltorio, 2020). However, it is worth noting that collaterazing the stablecoin with gold also comes with some potential difficulties. First and foremost, gold is a luxury good and most often associated with high wealth. Thus, if SOS were to use a stablecoin collateralized with gold, it could send the wrong signals to stakeholders.

As the conceptual design increases transparency and traceability in SOS´ business model, it will arguably make it easier to combat and detect fraud and mismanagement of funds. However, it is important to note that the

conceptual design is not something that should be seen as a form of a panacea to every problem faced by SOS and other NGOs. Despite blockchains being characterized as "the truth machine", one cannot be 100% sure that the people putting information on the blockchain do not have malicious intentions. This was summed up by Interviewee#6:

> *"As long as there are humans and machines involved in the process, there is nothing that you can trust 100%. You can minimize risk, but you cannot be 100% risk-free."* (Interviewee#6, 2020).

As pointed out by Interviewee#6, no technology can be trusted 100% as long as humans are involved in the process. The risk of fraud and mismanagement can to some extent be minimized, however it will still be present. Thus, in this case, it is important that SOS continues carrying out internal and external on-site control to ensure that information posted and stored on the blockchain is correct. Another aspect is that the budgets and needs of the different PAs might be overestimated. Thus, even if the PAs fulfill the requirements in the smart contracts, they may still have additional funds subject to mismanagement. This once again demonstrates the importance of internal and external control of the information put and stored on the blockchain, as the technology itself will never be able to turn any organization free of fraud and mismanagement.

Last, as long as the transaction process involves some kind of non-digital cash transfers, meaning that the cryptocurrency will be converted back into fiat currency, the transactions will not be 100% traceable and transparent. Thus, the last mile problem will still be present as the donors will not be able to trace their donations after it is exchanged for fiat currency. One potential solution to this problem could be using a mobile money service inspired by an existing service called M-Pesa. In short, M-Pesa is a financial service provider taking use of mobile money transfers (Vodafone, 2020). The service is accessible for anyone having access to a mobile phone, and it does not require access to a bank account. With M-Pesa, one can use mobile credit for purchases of goods and services, and it has been successfully implemented in several different countries. Among these is Kenya, where paying vendors with M-Pesa mobile credit have become the preferred form of payment. By taking use of a service like M-Pesa, all transfers and payments will stay digital on the mobile network. Thus, by connecting M-Pesa to the stablecoin provided to the local programs, donors will be able to view all transactions and expenditures related to the donated funds.

10.4 Accounting Processes

In addition to exploring whether blockchain technology can provide transparency, traceability, and trust in NGOs, how the technology can help streamlining accounting processes has been explored. The industry experts were asked on their opinions on the topic, and there has been attempts at identifying relevant literature and former research. However, it has proven challenging to identify thorough research on this topic. Several news articles, forums and reports point out the potential of the technology to be used in accounting exists,

however all of these are seemingly relatively superficial, failing to explain the technical aspects of how the technology can be applied in practice and provide efficiencies in this area. The following discussion will be based on the question of whether blockchain technology has the potential to help streamline some of the steps in the accounting cycle, first introduced in Sub-Chapter 1.1.4.

The analysis of the interviews with industry experts revealed some skepticism on the topic, somewhat emphasizing the lack of research and use cases in this area. On one hand, having the transactions in SOS stored on a public ledger provides the potential of making some tasks like verifying, tracing, and auditing the transactions more efficient. This is due to the fact that the ledger will continuously be up to date, meaning verification and other forms of control of the transactions can be executed on an ongoing basis, which will help spreading out the work done by both internal and external controllers. In other words, many of the tasks done by accountants today can be automated and arguably streamlined to a greater extent than they are as of today. Another aspect brought up regarding this topic is the technology's ability to provide something called triple bookkeeping or triple-entry accounting, adding another layer to the traditional double-entry bookkeeping used in accounting today (Interviewee#5, 2020). However, there is arguably a lack of consensus among researchers, as well a lack of thorough research, on the effects of this form of accounting. In short, triple-entry accounting can be defined as a process in which all of an organization´s accounting entries concerning outside parties are cryptographically sealed by a third entry on a blockchain (Tyra, 2014). This way, the third entry will function as both a receipt and a transaction. Thus, this entry provides proof that a transaction between two parties has occurred, in some way exceeding the evidence held by each of the two parties in the form of the traditional double entry process. As the entries are distributed and cryptographically sealed on the ledger, the blockchain, falsifying or destroying the entries are, in practice, impossible (Tyra, 2014).

On the other hand, despite providing some form of efficiencies, there are features pointing towards the technology's misalignment with accounting processes. One of blockchain technology´s main and most widely known strengths is its immutability. In practice, information stored on a blockchain is immutable, meaning it is not possible for anyone to alter or delete any of the data stored on the blockchain. In relation to accounting this can prove to be a somewhat challenging, or even undesirable, characteristic. This is because in accounting, there is usually a need for making changes and adjustments to the records, especially in the case of incorrect entries.

Based on the findings presented in the thesis, and the discussion above, we argue that blockchain technology can help streamline some of the steps in the accounting cycle. More specifically, it is evident that the technology can benefit the first three steps of the cycle. By using a blockchain to process and store transactions of funds, identifying and verifying transactions can be done on an ongoing basis as the blockchain is continuously updated as new transactions are added. This will help with adding the transactions to the journal, as they are all gathered on the blockchain, which makes it easier to identify and maintaining control over

transactions. However, it is important to note that these gains and efficiencies are most likely to be realized if all participants in the transaction process are connected to the same ERP system. This is somewhat the case brought by the conceptual design, as the blockchain is a public ledger shared across the PAs, SOS CVI and the PSAs, resulting in every internal transaction in SOS will be posted on the blockchain.

10.5 Feasibility

Alongside the threats of the conceptual design explained in Sub-Chapter 10.3, there are multiple factors determining the feasibility of implementing such a blockchain infrastructure. Some of these will be discussed in this sub-chapter, thereby informing the reader about what is needed for this conceptual design to be implemented.

One determining factor of feasibility is infrastructure and scalability. Throughout the interviews, we discovered that technical infrastructure and stable societies and political environments are necessary to implement this technology. As such, stable internet connectivity is pivotal to have a blockchain system in daily operations. Moreover, it would be beneficial if the stablecoins used in our design were viable coins. However, we recognize that this is, at least currently, not the case. Thus, safe and good ways of converting stablecoins into local fiat currencies is necessary for the design's feasibility, meaning stable financial institutions are important contributors. We recognize that most of the program associations are underdeveloped and do not necessarily fulfil these criteria. Therefore, we urge that the points in Prahalad & Hart (2002) regarding shared prosperity between multinational corporations and the bottom of the pyramid are ventured. This will, according to theory, result in more developed societies, which subsequently makes our conceptual design more feasible to scale and may consequently be beneficial for the corporations (Prahalad & Hart, 2002).

Subsequently, regulations regarding stablecoins in the various member associations, or the current lack thereof, must be considered in relation to feasibility. The thesis has been written with political aspects omitted from the delimitated scope, though we recognize this that needs to be considered when implementing such systems.

Furthermore, we need to consider the stakeholders' interests as important for the design's feasibility. Recognized in Sub-Chapter 5.2, the key stakeholders in the thesis are beneficiaries, donors, and the General Assembly. Whereas we have considered the beneficiaries and donors as important stakeholders throughout the thesis, the most influential for the thesis feasibility would be the General Assembly (GA). It will, ultimately, be the GA's decision whether such a fundamental system can and will be implemented into SOS Children's Villages.

Last, we would like to iterate that blockchain, specifically in the humanitarian aid sector, is new and untested. We assume further adoption and trials similar to the thesis will emerge in the future, which subsequently will reap benefits to create blockchain solutions in this sector.

11. Conclusion

The beginning of the thesis presented the UN's 2030 Global Development Goals (SDGs), which governments and various organizations work to fulfil, ultimately aiming to mitigate poverty. Among these organizations are non-governmental organizations (NGOs), who work independently of governments in building bridges between the public and governments, thereby contributing to fulfilment of the 2030 SDGs. However, NGOs are threatened by decreasing trust from donors, due to various scandals throughout the foreign aid sector. As such, low transparency and traceability, as well as fraud and mismanagement of funds, were identified as major issues for these organizations due to their dependence on donations.

Next, emerging technologies were introduced in relation to industries rapidly digitalizing for improved and more efficient procedures and processes. One of these, blockchain technology, was subsequently highlighted as a popular digital solution in digitalization. We explained the recent hype around the technology, which primarily stems from the rapidly increased interest in cryptocurrency, especially Bitcoin, as well as other current applications of blockchain.

Due to this digitalization and the hype around blockchain technology, we then introduced traditional accounting processes, detailed by the Accounting Cycle and its eight steps: 1) analyse transaction by examining source documents, 2) journalize transactions in the journal, 3) post journal entries in the ledger, 4) prepare a trial balance of the accounts and complete the work sheet, 4) prepare a trial balance of the accounts and complete the work sheet, 5) prepare financial statements, 6) journalize and post adjusting entries, 7) journalize and post closing entries, and 8) prepare a post closing trial balance (Edwards & Hermanson, 2010, p. 77). These steps, presenting the processes of traditional accounting, provided a background to the investigation of how blockchain could help streamline such processes.

Thus, the objective for the thesis was to investigate blockchain technology and to how its abilities could be utilized in NGOs and in digitalizing financial processes. More specifically, the research question was formulated as:

How can NGOs take use of blockchain technology to increase trust in their business model and streamline financial processes?

To provide a thorough and in-depth answer to the research question, three sub-questions were formulated:

1. *Which blockchain characteristics can be helpful for NGOs?*
2. *How can blockchain technology help streamline accounting processes?*
3. *How can SOS Children's Villages utilize blockchain technology to improve transaction processes?*

The following sub-chapters will summarize the thesis by chronologically answering the three sub-questions, conjuring a comprehensive answer to the research question.

11.1 Which Blockchain Characteristics Can be Helpful for NGOs?

Despite attracting global attention mostly due to the hype and introduction of Bitcoin in 2008 (Nakamoto, 2008), the underlying technical aspects of blockchain technology have been present for several years. Blockchain technology originates from distributed ledger technology, also known as DLT. In short, a distributed ledger is a database that is shared between multiple participants or across several locations (Belin, 2020). The opposite of a distributed ledger is a centralized ledger, a database that is stored at one single location, meaning that it is not shared between participants and across locations. One of the main arguments for using a distributed ledger is that the ledger is decentralized, omitting the need for a central authority or intermediary for the processing, validating and authentication of data exchanges (Belin, The Difference Between Blockchain & Distributed Ledger Technology, 2020). However, some might argue it is no fully decentralized, as there in practice has to be one party implementing the ledger, thereby having some authority and power over the structure and purpose of the ledger (Majaski, 2019). Most distributed ledgers function in such a way that the records of transactions, or other exchanges, are stored on the ledger once consensus have been reached by all nodes in the network. Then, the data is added into the ledger and furthermore timestamped and given a unique cryptographic signature (Belin, 2020). Here, one of the key characteristics of the DLT comes into action as the files, or transactions, are timestamped and signed make the ledger come with a verifiable and auditable history on all files added into the ledger.

One of the features making a distributed ledger a blockchain, and not just a distributed ledger, is its structure containing of blocks – the blocks in the blockchain. In most cases, these blocks consist of data on transactions that has been executed in the network and validated by the nodes (Drescher, 2017). All these blocks and transactions are timestamped as they are verified and added to the blockchain, providing a traceable and auditable chain of transactions. Thus, connected with specific hash functions that are basically tamperproof and distributed across the network, blockchains such as the Bitcoin blockchain are able to prevent the double-spending problem (Tapscott & Tapscott, 2016).

In addition to the abovementioned features, one of the main characteristics of blockchain technology is its ability to provide and maintain trust and integrity in distributed, and purely distributed, peer-to-peer systems (Drescher, 2017). By having a decentralized architecture with consensus mechanisms ensuring every transaction, or data, added to the blockchain is verified and checked for double spending, the blockchain can build and maintain trust among its participants. The characteristics of being decentralized and distributed makes it virtually hacker-proof, and it is widely known as being immutable due to the cryptographic hashes

used to secure and identify transactions (Drescher, 2017). Additionally, the public can see and read the information stored on the public blockchain, providing a strong degree of transparency and traceability.

Last, blockchain technology's ability to store a substantial variety of assets is arguably one of the most valuable characteristics for NGOs. If the asset can be recorded digitally, it can be written on a blockchain (Hern, 2016). This allows the use of cryptocurrencies, a digital currency that comes with the advantages of lowering administrative costs and significantly decreasing the time it takes to carry out cross border payments (Tapscott & Tapscott, 2016). Furthermore, the technology allows billions of people around the world to be included and have access to basic financial services. Additionally, businesses´ supply chains can become much more transparent, providing customers with the opportunity to read information on the blockchain regarding the origins, processing and handling of consumer goods such as food and groceries.

11.2 How Can Blockchain Technology Help Streamline Accounting Processes?

Based on the characteristics of blockchain technology and the findings in the thesis, it can be concluded that the technology has the required features to streamline accounting processes. More specifically, it has the potential to streamline the first three steps in the Accounting Cycle. By using a cryptocurrency to run, process and store transactions on a blockchain, one will have a distributed ledger that is constantly up to date with the latest business transactions. This provides the potential of making tasks, including verification, tracing, and auditing of business transactions more efficient as this can be done on an ongoing basis as soon as the transactions are added onto the blockchain. However, the true benefits of having the transactions on a blockchain are only realized when the different parts of the organization share and have access to the same ledger. In this case, the PAs, PSAs and SOS CVI should have access to the blockchain so that they can all identify and verify transactions on the constantly updated ledger. If they were all operating their separate blockchain and ERP-system, they would not gain the same advantages and efficiencies.

Furthermore, blockchain technology can help to facilitate what is often called triple-entry bookkeeping, where all of an organization´s accounting entries concerning outside parties are cryptographically sealed by a third entry on a blockchain, in addition to the traditionally double entry process done by all organizations today (Tyra, 2014). However, as the thesis suggests, there is a need for further research on this topic in order to fully understand how blockchain technology can facilitate this type of accounting.

Despite having potential to streamline certain tasks and operations, it is of great importance to critically review blockchain technology´s true fit with accounting processes. One of the technology´s key strengths is its ability to be tamperproof, as it is practically impossible to change or delete information put on the blockchain. However, in accounting, instances where there is a need to adjust certain numbers or entries might occur. For instance, this could be if one side of a transaction entered the wrong amount and paid either too much or too

little. Thus, if an organization uses a blockchain to identify and verify transactions that should be entered into the organization´s accounting journals, having one amount for the transaction on the blockchain and a different amount in the journals may cause difficulties. This emphasizes the question regarding blockchain's fit in relation to an organization´s accounting processes, as some might argue that there already is enough complexity related to these processes.

11.3 How Can SOS Children's Villages Utilize Blockchain Technology to Improve Transaction Processes?

Chapter 9 presented the conceptual design of a blockchain system we believe might present a solution to the third sub-question. More specifically, we believe the design can contribute to increasing donors' trust in NGOs through increased transparency and traceability, decrease transaction costs, and streamline transactions. As emphasized earlier, the conceptual design is based on SOS Children's Villages' current transaction system. Therefore, it is likely to be more suited to SOS than other NGOs. However, we believe it could be used as source of inspiration and blueprint for other NGOs considering implementing blockchain in their operations.

In creating the conceptual design, we have taken the key stakeholders, presented in Sub-Chapter 5.2, into careful consideration. The choices made in this creation has therefore been made to ensure the best interest of the donors, the beneficiaries, and the International Senate are preserved.

Out of four different scenarios of blockchain implementation, we decided on the scenario with full blockchain-ization of SOS' processes. This means that all transactions will be executed using a cryptocurrency, and all information is stored on the blockchain. As such, a donation will be converted into stablecoins, which will be traceable throughout the transaction process – mitigating the traceability issue. However, as stablecoins have yet to be considered a viable currency in most countries, they must be converted back to local fiat currencies in the beneficiary countries. This means that as soon as the conversion has happened, the traceability is gone, leaving a last-mile issue of tracking the funds. That said, the overall traceability throughout the rest of the transaction process has increased.

Converting fiat currencies to stablecoins, and vice versa, means that financial intermediaries are still required: In the beginning and end of the transaction process. This is a decrease from the five instances in the current system, to two in the proposed system, which indicates decreased transaction costs. Moreover, we believe the abovementioned measures contribute to streamlining SOS' current transaction processes in general.

We have suggested the blockchain being public, meaning all transactions are visible for anyone. Thus, the transparency issue – which is regarded as an important factor of trust – is solved. Nonetheless, to ensure the

security of the blockchain, the access is permissioned. Thereby, only verified nodes can enter, commit changes to, and write on the blockchain.

The conceptual design is suggested to be built on an existing platform, where the NGO chooses one whose abilities and consensus mechanisms are most fitting to their operations. Importantly, to ensure that the system complies with GDPR regarding the security of the entities on the blockchain, we suggested using unique ID codes and zero knowledge proves for each donation. Thus, it is intended that it would be impossible for malicious nodes to tie a donation to a real identity. The real identities and the actual values of the donations, however, will be stored in a mapping system on an off-chain repository. The donor can, at any time, retract their consent to their information being stored on this repository, which if triggered will remove any connection between a person and the ID code. Thus, we trust the conceptual design complies with GDPR.

As substantiated on several occasions throughout the thesis, blockchain technology cannot be regarded as a panacea. This is due to funds being converted to fiat currencies at the end of the supply chain, which introduces the last-mile problem where the final transactions are not recorded on the blockchain. Additionally, as long as there are humans involved, the risk of fraud and mismanagement of fund will exist. Therefore, there is still a need for strict internal and external control in order to verify and ensure all the information on the blockchain is correct and reflects the true reality on how donated funds are handled and processed.

12. Further Research

We have discovered that blockchain may indeed be beneficial for NGOs' transaction processes, which has been proven through currently ongoing, successful projects such as the mentioned Oxfam project. However, there are currently few projects fully resembling the specific requirements that SOS holds. To fully determine the feasibility of the conceptual design and its benefits, there are therefore multiple aspects requiring further research. This chapter will shed light on the relevant aspects we discovered to need further investigation.

For one, there is currently a lack of universal regulations on cryptocurrencies, and more specifically stablecoins. The marketplace for stablecoins is at this moment underexplored, and due to the rapid growth of the concept and emergence of different varieties, it is evident that there must be a broader, global understanding about its applications, which may result in both global and local regulations.

As well as governmental regulations, many societies in countries are run by tribes. As SOS are present in 136 countries, there will be even more than 136 social structures and rules to follow. As such, the possibility to cooperate with the tribal leaders will be vital, and the opportunities for cooperation in each society will differ. Thus, further research about, and discussion with tribal leaders must be conducted when considering changing current processes.

Moreover, the infrastructural feasibility of implementing stablecoins must be further researched and considered. More specifically, it must be investigated how stablecoins can be used as- or converted into viable currency in the program associations.

Finally, regarding blockchain and accounting processes, it is evident that a shared, distributed ledger will be beneficial for any multinational organization, such as SOS. As such, the first three steps of the accounting circle are arguably improved through blockchain technology. However, shared ERP systems can be obtained without blockchains, and we are yet to see evidence supporting that blockchains have clear advantages over other solutions. Thus, we recommend further research to gain more precise understanding about which digitalizing solutions will benefit accounting processes most efficiently.

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ECONOMICS & BUSINESS ADMINISTRATION

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MASTER'S THESIS

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BLOCKCHAIN IN FOREIGN AID

A comprehensive research about the applicability of blockchain technology to Non-Governmental Organizations' financial processes

APPENDICES

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Appendix 1 - 1. Introduction

1.1.2.2 Trust and Transparency

As mentioned, general trust in humanitarian aid organizations is in decline. The reasoning for this could be increased awareness of corrupt regimes in benefitting countries. However, although the foreign aid industry is susceptible to external risks in the countries they operate in, there are a number of other factors which can further jeopardize the fulfilment of the UN 2030 SDGs. Such factors include scandals among various foreign aid institutions, as well as lack of transparency in these organizations.

One major scandal which has contributed negatively to public trust in aid organizations, is the Oxfam scandal in relation to the devastating earthquake in Haiti in 2010. Oxfam is an NGO operating in more than 90 countries, aiming to end poverty and providing emergency aid (Oxfam, 2020). Initially, it was uncovered that members of the organization had used NGO resources to access and pay for sexual services, which led to four people being sacked and three others resigning (BBC, 2019). However, a further investigation was later conducted, in which there was found evidence of staff abusing children, as well as children being victims of sexual misconduct by an unnamed charity "boss" (BBC, 2019). The report found Oxfam thus "*failing to meet promises made*" under the terms of the Charities Act 2011 regarding safeguarding children and vulnerable adults (Gulland, 2019).

Additionally, press and unveiling of foreign aid's inefficiency in completing their intended goals are further contributing to distrust in the aid sector. As previously mentioned, foreign fraud concerns have been considered valid, but there has been further articles and findings about how money is spent, as well as the lack of sufficient progress. This issue has been emerging in recent years, as donors are no longer giving donations as a general charity, but rather making "investments" to which they want to see verifiable progress (IISD, 2018). It is therefore, due to an increase in third-party investigations about the aid sector's actual progress and use of funds, as well as mainstream media loudly vocalizing concerning results of these investigation, viable to notice a correlation between this and the distrust in today's society.

With a more general perspective, a major issue for trust is the assurance of the funds actually reaching the beneficiaries, and not ending up elsewhere. The mentioned problem of corruption is one aspect of this, but there is also uncertainty regarding other costs being covered by funds intended to help the poor (Hunink, 2017). This issue has its origin in the lack of transparency in the organizations' funding supply chains or audit trails. Moreover, as most aid organizations are funded solely through donations, thereby not being self-sustainable, administrative costs, wages, etc., are often funded through these organizations taking cuts from the donations (Wieners, 2019). Although this is not necessarily considered misuse of money, a completely transparent chain of transactions would ensure that diversion, abuse, or misallocation of funds elsewhere would not occur (Zwitter & Boisse-Despiaux, 2018). The allocation of donations' uses is usually published in the organizations' annual reports. However, such publications may still be flawed, and the public is still demanding a more transparent and unbiased supply chain

system, which accurately and consecutively portrays the organizations' costs (Hunink, 2017). Additionally, another argued benefit of complete transparency is that it could help decrease administrative costs due to the accessibility into the organizations' cost structures (Zwitter & Boisse-Despiaux, 2018).

Relating to the aforementioned UN SDGs, the International Aid Transparency Initiative (IATI) urges more transparency in the aid sector (Ingram, 2018). A statement from the 2016 High-Level Panel Report on Humanitarian Financing proclaims that "*The more we know about how money is channeled through the global humanitarian system, the better equipped we are to allocate resources and measure results."* (Ingram, 2018). Ingram (2018) elaborates by stating that transparency is incremental to facilitate collaborations between different finance organizations, streamlining use of resources, and holding institutions accountable. The accountability issue is particularly prevalent, more specifically knowing who finances what, for what purpose and where, which will provide information on the investments' actual contribution to development (Ingram, 2018). Lastly, Ingram (2018) explains that transparency alone will not solve development challenges and fulfil the 2030 SDGs, but substantiates its ability to improve decision-making and coordination, and thereby hopefully the outcomes. The abovementioned external factors, unveiled scandals and lack of transparency, are all contributing to mistrust, which subsequently has dampened the willingness to donate money.

Appendix 2 - 2. Literature Review

2.3 General Data Protection Regulation

In order to apply the GDPR, some key terms and definitions have to be mentioned:

- **Personal data:** *"personal data is any information that relates to an individual who can be directly or indirectly identified. Names and email addresses are obviously personal data. Location information, ethnicity, gender, biometric data, religious beliefs, web cookies, and political opinions can also be personal data. Pseudonymous data can also fall under the definition if it's relatively easy to ID someone from it"* (Wolford, 2020)
- **Data processing:** *"any action performed on data, whether automated or manual"* (Wolford, 2020).
- **Data subject:** *"the person whose data is processed"* (Wolford, 2020).
- **Data controller:** *"the person who decides why and how personal data will be processed"* (Wolford, 2020).
- **Data processor:** *"a third party that processes personal data on behalf of a data controller"* (Wolford, 2020).

Appendix 3 - 3. Methodology

3.1.3 Five major philosophies

Now that we have gained an understanding of how to difference between the different research philosophies, it is time to introduce them. The following sections will briefly introduce the five major research philosophies in business and management: positivism, critical realism, interpretivism, postmodernism and pragmatism (Saunders, Lewis, & Thornhill, 2019).

Positivism is related to the philosophical stance of the natural scientist and involves working with an observable social reality to produce law-like generalizations (Saunders, Lewis, & Thornhill, 2019). A positivistic/positivist (?) research philosophy promises unambiguous and accurate knowledge and, and its name refers to the importance of what is posited, in other words, what is "given". This label emphasizes the philosophy´s focus on strictly scientific empiricist method designed to yield pure data and facts due to the non-existing human interpretation or bias.

Critical realism is a research philosophy that focuses on explaining what we see and experience, more specifically, explaining the underlying structures of reality that shape what can be characterized as observable event (Saunders, Lewis, & Thornhill, 2019). Furthermore, there is also the more extreme version of critical realism, called direct realism. Contrasting critical realism, direct realism says that "what you see is what you get", meaning that what we see and experience can be perceived as an accurate portrait of the world.

In Interpretivism, you make a clear distinction between humans and physical phenomena because of the fact that humans create meaning (Saunders, Lewis, & Thornhill, 2019). Furthermore, Interpretivism argues that it is not logical to study human being and their social worlds in the same way as a physical phenomenon, thus emphasizing that social sciences research needs to be different from natural sciences research. In general, the main goal of interpretivist research is to create new, deeper understanding and interpretations of social worlds and contexts (Saunders, Lewis, & Thornhill, 2019). For business and management researchers, this includes looking at an organization through different perspectives, for example for different groups of people of divisions in an organization.

In Postmodernism, the focus lies on the role of language and power relations when trying to question accepted ways of thinking (Saunders, Lewis, & Thornhill, 2019). This is done in order to try give voice to alternative marginalized views. In their research, postmodernists try to expose and question the power relations that constitute dominant realities (Calás & Smirchich, 2019). They do this by trying to deconstruct, taking apart, realities, in order to search for instabilities within what is concerned as the realities´ widely accepted truths.

Pragmatism takes a different standpoint than the other four philosophies in that it emphasizes that concepts are only relevant where they support action (Keleman & Rumens, 2008). In pragmatist

research, you start out with a problem, and the aim is to contribute practical solutions that can contribute to future research (Saunders, Lewis, & Thornhill, 2019).

3.2 Approach to Theory Development

The second layer of Saunders' Research Onion is the "approach to theory development". Theoretical development is generally divided into two approaches: abductive and inductive (Saunders, Lewis, & Thornhill, 2019). The general perception is that an approach is deductive if the research origins in theories or hypotheses, which is then investigated and falsified or verified, whereas an inductive approach starts with data collection to explore a phenomenon and subsequently build a theory (Saunders, Lewis, & Thornhill, 2019). However, it is important to note that there is no rigidity between these approaches, which is exemplified through the theory of abduction. Abduction is characterized similarly to the inductive approach, but with the distinction that generated theories are continuously tested through additional data collection, thereby using aspects also found in deductive approaches (Saunders, Lewis, & Thornhill, 2019).

Due to this paper's focus being on a relatively untested field of research, Saunders, Lewis, & Thornhill (2019) recommends an inductive approach to theory development. This justification is based on that new topics are often debated and lacking existing literature – thereby indicating a vast emphasis of the research (Saunders, Lewis, & Thornhill, 2019). Alternatively, had the field of research been heavily documented, a deductive approach based on preliminary theories would have been the recommended approach. This could be the case for this thesis, due to quite extensive literature on blockchain technology and various use cases. On the other hand, because of blockchain technology in the context of foreign aid not being a much-researched area, an abductive approach may be the optimal approach based on the principle of theory (Saunders, Lewis, & Thornhill, 2019). This latter conclusion is substantiated by the approach' structure of incorporating existing theory where appropriate, to build new or modifying existing theory (Saunders, Lewis, & Thornhill, 2019).

On the other hand, from the "use of data" point of view, this thesis' theory development will have an inductive approach. Use of data addresses the purpose of data collection and how collected data is utilized in the research (Saunders, Lewis, & Thornhill, 2019). The initial assessment of an inductive approach on the use of data is based on its purpose of exploring the phenomenon of blockchain, which in combination with identifying themes and patterns will produce a conceptual framework for how blockchain technology can be utilized in the foreign aid sector. As the data collection in this paper is not used to evaluate hypotheses relating to existing theory, a deductive approach is excluded (Saunders, Lewis, & Thornhill, 2019). Moreover, because the use of data through a created conceptual framework is not tested through subsequent data collection, the notion of an abductive use of data is also excluded (Saunders, Lewis, & Thornhill, 2019).

This thesis will take use of known premises to generate an untested conclusion, as the objective is to use knowledge from the foreign aid sector and blockchain technology to create a conceptual design. This indicates, according to Saunders, Lewis, & Thornhill (2019), an inductive approach based on the logical characteristic. On the other hand, as the conclusion – the conceptual design – will be discussed in terms of feasibility and challenges in its implementation, thereby in theory being testable, it can be argued that the logical approach to theory development being abductive (Saunders, Lewis, & Thornhill, 2019). However, as this theoretical test of the conclusion will be based on already covered theories, not through a physical implementation and, as mentioned, no subsequent data collection, the approach is deemed to be inductive based on the logical characteristic.

In terms of the generalizability characteristic, which addresses the thesis' generalization from the general to the specific and vice-versa, this thesis approach to theory development can be regarded inductive (Saunders, Lewis, & Thornhill, 2019). This is because the thesis will generalize from the specific to the general, where the approach is to present facts and arguments which, in the end, leads to a conclusion, rather than the opposite, which would indicate a deductive approach (UMUC, 2011). As this generalizability approach is consistent throughout the thesis, the abductive approach in this regard is excluded (Saunders, Lewis, & Thornhill, 2019).

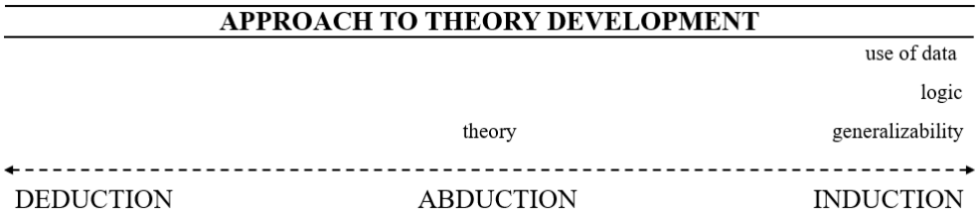


Figure 1: Approach to Theory Development based on the four characteristics

In summary, this thesis' approach to theory development is, as argued to be advantageous in certain instances by Saunders, Lewis, & Thornhill (2019), a combination of inductive and abductive based on the four characteristics. This is substantiated by the general methodological process and field of resembling an inductive approach more than a deductive; Followers of induction, and the approach's origin came as a criticism of the deductive approach, claiming the latter enabled cause-effect link between variables without understanding or considering the way humans interpreted their social world, as well as disregarding of the context in which the research takes place (Saunders, Lewis, & Thornhill, 2019). The inductive approach, according to Saunders, Lewis, & Thornhill (2019), further allows alternative contextual qualitative explanations of what goes on and, in a way that is not possible in the rigid structure provided by a deductive and often quantitative approach. Thus, in a qualitatively based thesis where blockchain theory is combined with theory and interviews regarding the foreign aid industry and its stakeholders, the natural approach to theory development is induction (Saunders, Lewis, & Thornhill, 2019).

3.3.1 Methodological Choice

The first step of the research design is to determine the thesis' methodological choice (Saunders, Lewis, & Thornhill, 2019). In essence, the methodological choice lies between using a qualitative, numerical, or quantitative, non-numerical method. The methodological choice is often correlated to research philosophy and the approach to theory development, as the different research designs often stem from these. However, as in the approach to theory development, research often consist of a combination of numeric and non-numeric methods. Such analyses may be due to the need for an interview or other non-numeric data collection to support or explain results and issues in the quantitative research (Saunders, Lewis, & Thornhill, 2019). Similarly, the research may need some numeric data to support non-numeric data or claims. This way, the two initial methodological choices may be described as the two extremes of a continuum, in which there are multiple combinations of choices and where practice is mixed.

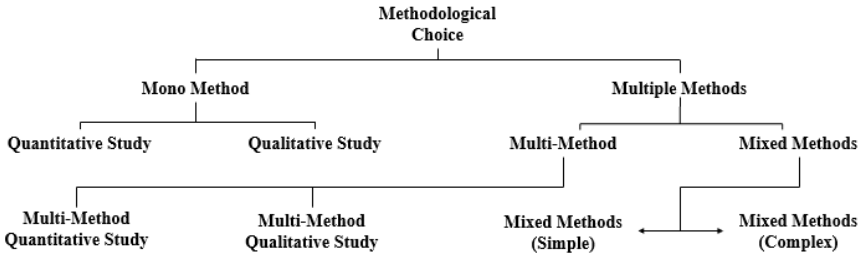


Figure 2: Methodological Choice Illustrated

Figure 2 illustrates the complexity of the methodological choice, in terms of the different choices available between the aforementioned ends of the continuum. As is evident, the complexity is prevalent in the multiple methods-branch, which extends further into different choices. In order to explain the methodological choices, this sub-chapter will explain the degrees of quantitative- and qualitative methods respectively, which in turn will be summarized to sufficiently provide an explanation of the decided methodological choice in this thesis.

3.3.1.1 Qualitative Methods

Qualitative research studies a variety of non-numerical data about participants' meanings and relationships therein, with the target of creating a conceptual framework, indicating an inductive approach to theory development (Saunders, Lewis, & Thornhill, 2019). The ambition for such theses is often to build theory which may enrichen the theoretical perspective that already exists in the literature. As this thesis will be taking use of existing knowledge of blockchain technology and foreign aid to create added value in the lacking literature on the combined subject, it is natural to use qualitative research methods in this process.

However, opposite to the mono method qualitative study-branch, this thesis and its conceptual design will not solely be based on existing literature, but also semi-structured interviews with blockchain

experts and employees in NGOs. Thus, the qualitative method research design used in this thesis is known as a multi-method qualitative study (Saunders, Lewis, & Thornhill, 2019).

3.3.1.2 Quantitative Methods

Quantitative research, often associated with a deductive approach to theory development, constitutes examining numerically measured variables, for instance collection of and analyses of a company's financial statements (Saunders, Lewis, & Thornhill, 2019). Such analyses often result in the creation of an experimental design to ensure their validity, rather than a conceptual design, as seen through qualitative research. Additionally, sources of quantitative data may be standardized questionnaires or other numerical data which may contribute to the research (Saunders, Lewis, & Thornhill, 2019).

The quantitative research design of this thesis will primarily be collection of quantitative data to support the theoretical, qualitative analysis. This includes collection of data regarding the foreign aid industry, corruption, and other aspects to which numerical data may exist and be beneficial for the study. Thus, as there will be only one method of quantitative data collection, the quantitative research design of this thesis will be a mono method quantitative study (Saunders, Lewis, & Thornhill, 2019).

3.3.1.3 Methodological Choice

Based on the two prior sub-chapters, this thesis' methodological choice follows the multiple methods branch of figure 2, as there will be conducted different forms of research, including semi-structured interviews and literature review, thereby excluding a mono-method approach. Next, it will follow the mixed-methods branch, as both qualitative and quantitative data collection will be conducted through the research (Saunders, Lewis, & Thornhill, 2019).

Mixed methods research comes in different varieties with different complexities, which is concluded on the way the quantitative and qualitative methods are intertwined throughout the research (Saunders, Lewis, & Thornhill, 2019). Moreover, according to Creswell and Plano Clark (2011), mixed-method research is often either more qualitative or more quantitative, meaning one of the methods primarily run one of the methods, while the other operates more supportively. This situation is called an embedded mixed methods research (Saunders, Lewis, & Thornhill, 2019). As this thesis is an exploratory study, rather than a descriptive study, qualitative research is prioritized, with certain quantitative elements supporting particular findings. Thus, the quantitative and qualitative data collection is collected separately with the aim of providing a richer and more comprehensive response to the research question, compared to a mono- or multi-method qualitative research design (Saunders, Lewis, & Thornhill, 2019). These data are collected separately, yet in the same phases of the research to complement each other, for instance figures on corruption to support non-numerical facts.

Thenceforth, the conclusive methodological choice in this thesis is, according to Saunders, Lewis, & Thornhill (2019), a single-phase, simple mixed-method research design termed concurrent triangulation design.

3.4 Techniques and Procedures

The sixth and innermost layer of Saunders' Research Onion concerns data collection and -analysis, which covers the thesis' techniques and procedures (Saunders, Lewis, & Thornhill, 2019). This is a complex process, which will determine both what kind of data is collected, and from which pool the data is collected – the latter of which is important to ensure the data collection's validity. Thus, the process of the research' techniques and procedures include determining the data sample, and which kinds of primary and secondary data is used in the research.

3.4.1 Data Sampling

When researching, it is important to determine the pool of information data is to be collected from, as noted above. This is due to low feasibility of collecting and analyze all potential data available (Saunders, Lewis, & Thornhill, 2019). Determining the sample of data will then allow the research to include only the data from certain sources, rather than all possible cases or elements. Data sampling is also often done as a necessity of narrowing down the entire population to a more manageable size. However, as Saunders, Lewis, & Thornhill (2019) substantiates, it is important that the data sample does not jeopardize the validity and generalization of the research' outcome.

The information regarding SOS' ERP systems are collected through interviews with people from SOS CVI – the international office of SOS Children's Villages. Thus, the interviews may differ from view in SOS' national offices, both in fundraising- and receiving countries, as well as donors. However, as the primary motive for those interviews is to gain an understanding of the transaction process and the organization's ERP system, SOS CVI's points of view are deemed to be representative for the organization and their general motives as a whole. Additionally, as this thesis is a case study of SOS Children's Villages, the issue of generalizability regarding other NGOs is not relevant (Saunders, Lewis, & Thornhill, 2019).

3.4.2 Primary Data

According to Hox & Boeije (2005), primary data is data collected for the specific research problem, using procedures that fit best. This data is collected directly by the researchers, however there are multiple ways of collecting primary data. Data collection methods falling under this category include observations, semi-structured, in-depth and group interviews, and questionnaires (Saunders, Lewis, & Thornhill, 2019).

For this thesis, the primary data collected will be through interviews, both with experts in blockchain technology, and with the internal audit-department of SOS CVI. Data collection is considered a research interview if it is a purposeful conversation between two or more people, where the interviewer as questions and the interviewee responds (Saunders, Lewis, & Thornhill, 2019). Such data collection often helps gathering valid and reliable data to the research questions and objectives and can cause changes in research question and research design. According to Saunders, Lewis, & Thornhill (2019), interviews

are generally categorized based on the interview's level of structure and standardization. All the interviews have been recorded and subsequently transcribed, thereby ensuing the discussion (Saunders, Lewis, & Thornhill, 2019).

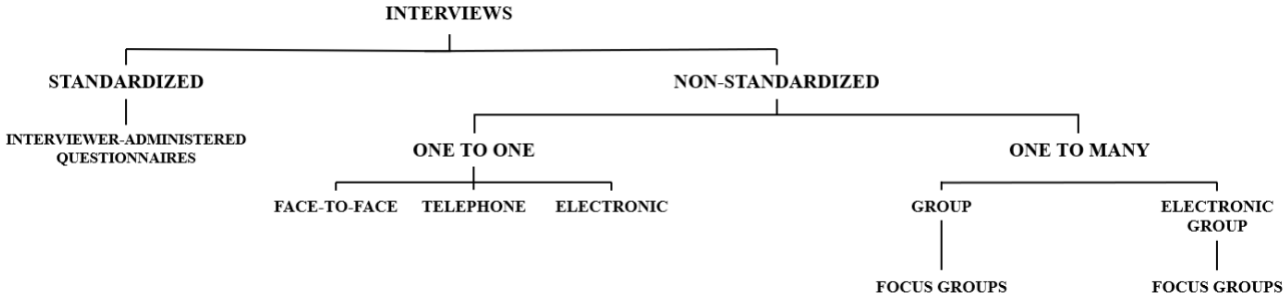


Figure 3: Standardized vs, Non-Standardized Interviews

As the interviews have been one to/on? one, and are not interviewer-administered questionnaires, the interview method is regarded as a non-standardized interview (Saunders, Lewis, & Thornhill, 2019). Furthermore, all interviews were of one individual, thereby being one to one interviews. Lastly, referring to figure 3, one interview was face-to-face and one was over the phone, whereas the rest were conducted over Skype, thereby being an electronic one to one, non-standardized interviews.

The blockchain-related interviews are conducted due to the technology still being new, and as a supplement to existing theory. Thereby, these interviews support the research with multiple views and aspects of possible applications of blockchain. The interviews with SOS CVI, on the other hand, are conducted to provide a thorough explanation of SOS Children's Villages, their objectives and values, their point of view on industry issues, and, most importantly, a thorough description of their current ERP system and the entire process of collecting and transferring funds to their beneficiaries. The latter point of this will be the basis for where blockchain technology may be implemented, and subsequently play a part in the thesis' conceptual design.

The interviews in this thesis are primarily conducted using a semi-structure method, where a theme and some key questions are determined prior to the interviews. Moreover, following the characteristics from Saunders, Lewis, & Thornhill (2019), the questions vary from interview to interview, depending on new knowledge from the researchers as well as the interviewees' backgrounds, whilst still covering similar themes. Additionally, the interview schedule for this interview contains some points about the purpose of both the thesis and the interview, thereby opening the discussion and allow for preparation prior to the interviews' starting (Saunders, Lewis, & Thornhill, 2019).

However, despite all interviews being intended as semi-structured, some of the interviews draw more similarities to unstructured, or in-depth, interviews. This is because the interviewees have been informed about the thesis' topic, and have subsequently provided a more monologue-esque presentation regarding the topic. Thus, the interviewees have been allowed to talk freely about events, behavior, and beliefs

about the area, but as they have allowed the interviewers to present their views and further questions, these in-depth interviews can be labelled as respondent interviews (Saunders, Lewis, & Thornhill, 2019).

3.4.3 Secondary Data

Existing data and literature that is being researched and further analyzed by researchers for some other purpose than the initial, is called secondary data (Saunders, Lewis, & Thornhill, 2019). Such data can include raw data and published summaries and analyses, and are typically used to provide additional or different knowledge, interpretations, or conclusions to existing theories (Bulmer, Sturgis, & Allum, 2009). Sources of secondary data are innumerable, ranging from reliable newspapers to governmental statistics and reports. In essence, secondary data is the term for all data not conducted by the researchers themselves (Saunders, Lewis, & Thornhill, 2019). Additionally, secondary data can, according to Saunders, Lewis, & Thornhill (2019), include both qualitative and quantitative data, and is usually used in both descriptive and explanatory studies.

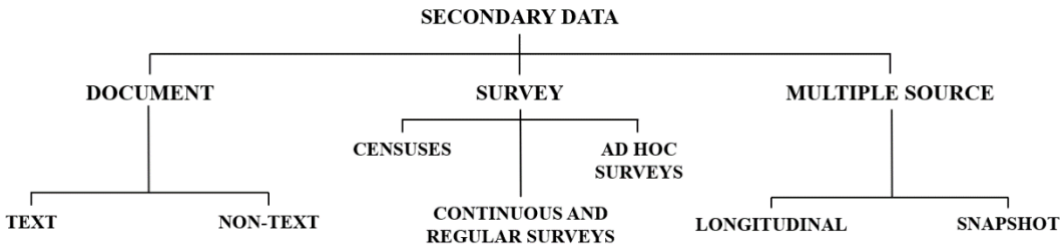


Figure 4: The Three Different Types of Secondary Data

Theory generally refers to three different types of secondary data: Document, survey, and multiple source (Saunders, Lewis, & Thornhill, 2019). As portrayed in figure 4, document secondary data is divided into text and non-text and is defined as data that endure physically and digitally as evidence, thereby allowing it to be transposed and reanalyzed for different purposes than initially intended. Examples of text data are, among others, magazines, organizations' databases, and blogs, whereas non-text data can be voice and video recordings, images, media accounts (Saunders, Lewis, & Thornhill, 2019).

Although secondary data is most common in explanatory studies, Saunders, Lewis, & Thornhill (2019) argues that it is perfectly applicable to exploratory- and case studies as well, which is the case in this thesis. The secondary data sources in this thesis relate primarily to blockchain technology, and the foreign aid sector and NGOs, but also for methodology. This data is collected through a variety of sources, where quantitative data, for instance about corruption, which is reported regularly to follow development, is collected through the use of continuous and regular surveys.

Additionally, much of the secondary data is provided through books, reports and journals, thereby using a snapshot multiple source. The information in these texts, being primarily theories and facts about

something, relates to the snapshot distinction of this type. However, some of the information used in this thesis, for instance regarding the development of foreign aid, corruption, trust, and the history of blockchain technology, can be regarded as longitudinal multiple source secondary data.

Finally, certain instances of document secondary data will be presented in this thesis, for instance text through articles in reliable, quality newspapers and magazines. Moreover, non-text document secondary data has been utilized to extend the researchers' knowledge about blockchain technology through a video course on the subject, facilitated by Princeton University.

Appendix 4 - 5. Non-Governmental Organizations

5.1.3 The SOS Model

However, over time, SOS' approach in helping children has changed, with other mechanism supplementing the Children's Villages. One of these is the Family Strengthening program, which intends to provide aid to and help stabilizing families with various difficulties, thereby minimizing the risk of these families being parted and the children having to move to foster homes (SOS CVI, 2019). Additionally, SOS are providing different services around the world, namely economic advisory, day-care centers, short-term care in special situations, helping youths prepare for higher education and jobs, and various actions to increase the possibility of self-reliance and sustainability for the children.

Furthermore, as SOS promote that every child has a right to education, they directly provide educational systems in their operating countries (SOS CVI, 2019). The schools and kindergartens in these systems are founded in partnership with local authorities and governments in areas lacking such facilities. By the publication of the 2018 annual report, SOS informs that 98 000 children have been reached through schools (SOS CVI, 2019).

Moreover, SOS provide emergency response to urgent needs of children and families during conflicts, natural disasters, and other similar occurrences (SOS CVI, 2019). In 2018, SOS responded to emergencies in 25 countries and territories, located in Africa, Asia, South America and Southern- and Eastern Europe. They substantiate the importance of urgent care for children and families during such times, where they may have experienced losses or dislocations, and the importance of ensuring safe and enjoyable conditions in such events (SOS CVI, 2019). SOS' way of operation in this regard is not to maximize efficiency quantitatively, but rather focus on supporting one child or one family at a time.

5.2 Stakeholder Analysis

As this thesis researches a potential switch in operations for SOS Children's Villages as organization, it is also important to identify the stakeholders that may be affected of this change. According to the Department for International Development (1995), this is due to the make-or-break factor in identifying stakeholder interest and relationships, thereby assessing the project environment. Stakeholders are generally categorized in primary – stakeholders who are directly affected by the research or project, such as beneficiaries – and secondary – stakeholders that are intermediaries in the process, for instance, of delivering aid to primary stakeholders (DFID, 1995). Additionally, DFID (1995) argues the importance of assessing the project's impact on the stakeholders, and whether it may prove negatively or positively for them. Due to the vast importance of positively identifying stakeholders and their interest, this sub-chapter will provide a full stakeholder analysis of SOS Children's Villages.

The primary stakeholders in this research, and the most important stakeholders according to SOS, are the beneficiaries – the children, families, and communities that receive money and help (Accountable Now, 2018). As previously presented, SOS have programmes in 129 countries and territories on all

continents, with more than 1 million people reached in 2018. Although they are unlikely to be the most affected stakeholders with a blockchain implementation to SOS's transaction systems, it is vitally important to ensure that their interests are prioritized and not jeopardized with a new system.

The secondary stakeholders to this research, however, are many and varied. As SOS Children's Villages is an umbrella organization – a federation – there are multiple stakeholders internally in SOS. The highest decision-making body in the organization is the General Assembly, which consists of representatives from all member associations as well as honorary members (SOS CVI, 2020). As the highest decision-making body, they have much power and influence in the organization, and all major decisions must receive a majority vote in the General Assembly to be ratified. That said, the General Assembly is not considered as important as, for example, the beneficiaries. However, they are important to this thesis due to the conceptual design likely having to be ratified by the General Assembly.

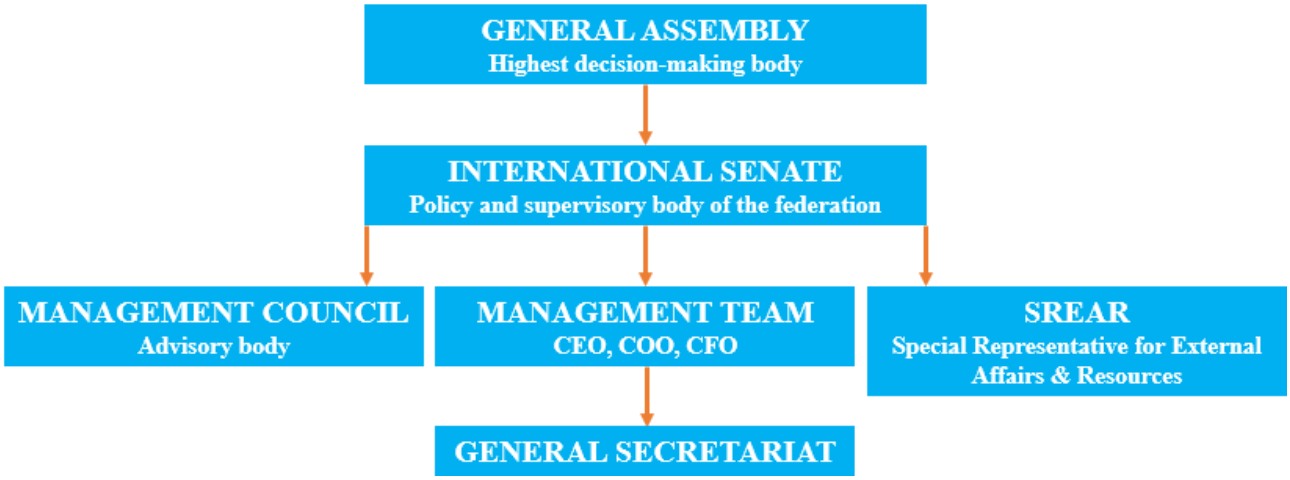


Figure 5: SOS Children's Villages Organizational Structure (SOS CVI, 2020)

The second body in SOS' governance structure is the International Senate, which consists of a president, vice-president, 20 board members from member associations, and a management team, is the Policy and supervisory body of SOS (SOS CVI, 2020). Next, SOS' advisory body is the Management Council (MC), the Management Team (MT) is the executive body with CEO, COO, and CFO, and the General Secretariat (GSC) comprises the International Offices in Austria and in the Regions (Accountable Now, 2018). The MC is an operational body, open to act within a mandate defined by the senate, the MT is responsible for day-to-day operation of the GSC, whilst the GSC is responsible for implementing strategic decisions taken by the General Assembly. It can be argued that the influence of these bodies is not as strong as the General Assembly, but they are all likely to be impacted to some degree by the conceptual design in this thesis. This notion is particular to the MT and GSC, who will directly be changing their ways of operations if a new system is implemented.

Additionally, the Special Representative for External Affairs & Resources (SREAR), mandated by the International Senate, is the body communicating with institutional and corporate donors and other

partners globally (SOS CVI, 2020). Thus, this body is likely to be impacted positively of this design, as they will communicate a new transaction system which may stimulate donors' interest of transparency and cost-efficiency.

Relating to the latter paragraph, donors are important secondary stakeholders. SOS Children's Villages is almost solely funded through donations, and in their 2018 Annual Report, SOS identify eight major types of donors, as well as "other income" (SOS CVI, 2019). Other income consists of Sporadic Donors, Sponsorship/Committed Giving, Major Donors, Foundations & Lotteries, Corporate Donors, Governmental Subsidies for Domestic Programmes, Institutional Funding, and Emergency Appeals. Being by far their most important sources of revenue, it is important for SOS to keep their donors satisfied. Thus, as the aim for this thesis is to provide a design for fund transactions that will increase transparency and reduce transfer related costs – both of which were identified in chapter 1 as current challenges relating to trust – the donors are likely to be positively impacted by this effort.

Moreover, secondary stakeholders may include other humanitarian organizations in partnership with SOS, such as The United Nations, and specifically the 2030 SDGs. Although they are not directly influential in this report, it is likely that if a more cost-effective and transparent transaction system attracts more donations, that certain SDGs can be impacted positively.

Other secondary stakeholders, which can be described as external stakeholders, are other NGOs and other donation-funded aid organizations. As this research and conceptual design will be SOS-focused, and other NGOs being subjects to the same issues as SOS, we assume that donors may wish to donate to a more transparent and cost-effective NGO instead of others. Thus, although their influence is non-existent in this research, other NGOs may experience a negative impact with an implementation of such a system in SOS. That said, there may be a longitudinal positive impact on these NGOs, as a positive implementation may cause their organization to adopt a similar system.

Last, governments and national institutions constellate other secondary stakeholders. These are institutions whom SOS work with or who support their activities in the program countries (Accountable Now, 2018). Thus, this stakeholder includes institutions in all 136 countries and territories within SOS operate. However, they are not particularly influential to this research, nor are they likely to be impacted substantially by it. Additionally, relationships to the governments, and aligning their interests with SOS, are hugely important.

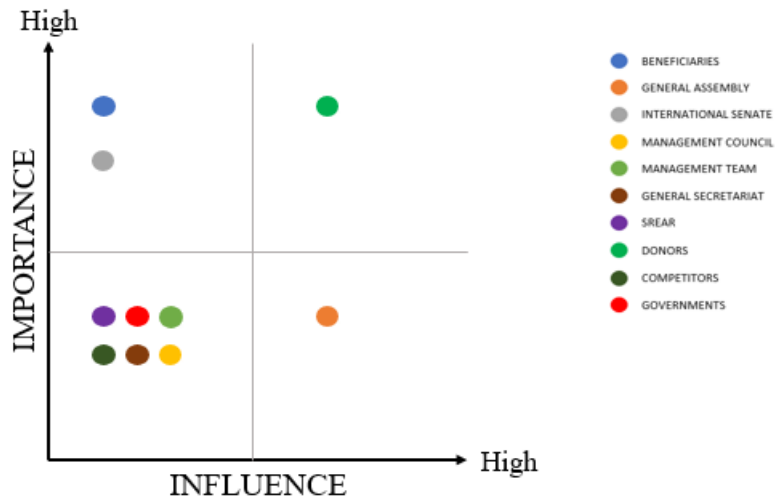


Figure 6: Stakeholder Analysis (positioning in each square is not defining)

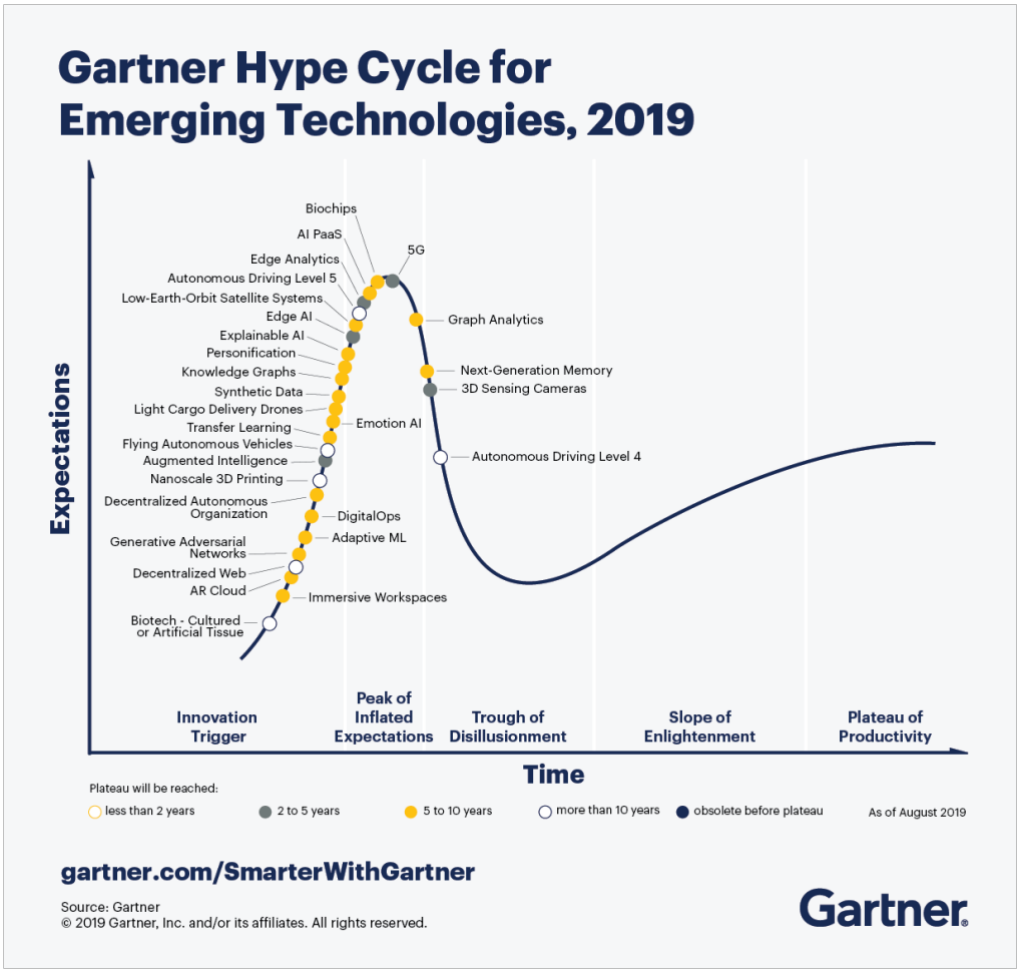
This stakeholder analysis indicates that the key stakeholders are 1) beneficiaries, 2) donors, and 3) General Assembly. The beneficiaries, despite low influence, are important for SOS work, and their interests must be aligned to the project. The donors are SOS' main sources of income, and it is therefore important to align interests within SOS' work as well as transparency – as introduced in chapter 1. Additionally, their importance in regard to interests indicate that their influence is somewhat large and must be considered. Last, the General Assembly, primarily through their interest, must be considered, because their influence on ratifying new systems and processes are considered high.

Appendix 5 - 6. Blockchain and Emerging Technologies

This chapter will introduce emerging technologies, including distributed ledger technology and blockchain technology. Furthermore, the reader will get a thorough introduction to blockchain technology and cryptocurrencies both in a practical and technical way. The intention of this chapter is to provide sufficient knowledge on blockchain technology and cryptocurrencies for the reader to easily understand the fundamental technical aspects in the proposed conceptual design introduced in Chapter 9.

6.1 Emerging Technologies

Despite the lack of a uniform definition of the term *emerging technology*, it is commonly used to describe technologies that are new or in continuous development (Winston & Strawn, 2020). Furthermore, it usually refers to technologies that are expected to be available within the next five to ten years and that create, or have the potential to create, substantial social or economic effects. Gartner Inc, also known as Gartner, is one of the world's leading research and advisory companies advising CEOs and executives on a variety of business functions ranging from customer service and support, supply chain and finance (Gartner, 2020). Despite its position as a leading advisory firm, Gartner are by many most known for providing best-class research and insight in a range of technologies. Each year, Gartner publishes a research known as the Gartner Hype Cycle, visualizing the maturity and adoption of emerging technologies and applications (Gartner, 2020). The Hype Cycle consists of five key phases which represents a technology´s life cycle, and a wide range of technologies are placed in one of these five phases based on Gartner´s research and believe for the future.



Another publication by Gartner is the *Gartner Top 10 Strategic Technology Trends for 2020* (Panetta, 2019). Here, Gartner presents technological trends that are structured around what they characterize as "people-centric smart spaces". In other words, they have considered how these technological trends will affect people, e.g. customers and employees, and the place that they live or operate in, e.g. home, office etc. (Panetta, 2019). David Cearley, Gartner Distinguished VP Analyst, emphasizes this by stating that "*These trends have a profound impact on people and the spaces they inhabit"* (Panetta, 2019). One of the trends listed by Gartner is Practical Blockchains, also referred to as Enterprise Blockchains. In the article, Gartner argue that a complete blockchain model includes five elements: 1) a shared and distributed ledger, 2) immutable and traceable ledger, 3) encryption, 4) tokenization and 5) distributed public consensus mechanism (Panetta, 2019). Practical blockchains, however, only include some elements of the complete blockchain. Furthermore, Gartner argues that blockchains will be fully scalable by 2023, considered by others as a rather bold and optimistic argument.

6.3 Distributed Ledger Technology and the History of Blockchain

When Bitcoin first was introduced in 2008 (Nakamoto, 2008), the buzz surrounding blockchain technology increased significantly. However, despite of being characterized as a "revolutionary" technology, the fundamentals of blockchain technology was not the first of its kind. Blockchain technology originates from distributed ledger technology, a concept with a rich and interesting past (Yun, 2018). The two concepts are often, and by many, concerned as identical, which in fact is not the case. What is important to remember is that not all distributed ledgers are blockchains, and it is vital to know the difference between the two concepts in order to truly understand which one that will provide the greatest benefits to a specific use case. Thus, this sub-chapter will provide an introduction to DLT and the history of blockchain technology.

Initially, the first trace of ideas related to blockchain technology dates back to 1990 when Haber and Stornetta (1990) published the paper *How to Time-Stamp a Digital Document*. In this paper, Haber and Stornetta propose a practical solution that will make it possible to certify, or timestamp, when a digital document is created or modified. Then, as early as in 1998, Nick Szabo (2005) proposed a new blockchain-based cryptocurrency called Bit Gold, one of the first attempts ever made at creating a decentralized cryptocurrency (Yun, 2018). However, Szabo´s Bit Gold was not able to overcome the double-spending problem of electronic transactions, which was one of the reasons that the project was never launched and implemented. A couple of years later, in 2002, Mazières and Shasha (2002) published the paper *Building Secure File Systems out of Byzantine Storage*. In the paper, Maziéres and Shasha study how blocks can be used to store data, arguably creating the framework for the blockchains that have been developed in recent years (Yun, 2018). One of these blockchains is the one facilitating the use of Bitcoin, introduced by Satoshi Nakamoto in 2008 (Nakamoto, 2008). Shortly after, the first block called the Bitcoin Genesis Block was mined and published on a public ledger in 2009 marking the very start of the Bitcoin blockchain.

There is no doubt that many people struggle to tell the difference between DLT and blockchain technology, and when adding Bitcoin into the equation a great deal of confusion occurs (Meola, 2020). In general, DLT can be seen as an umbrella term that encompasses a variety of different structures, in which blockchain technology is one example. Despite having some dissimilarities, DLT and blockchain technology are both methods used for organizing transaction records in a shared, distributed database (Yun, 2018). Simply put, a distributed ledger is a database that is shared between multiple participants, also referred to as nodes, or across several locations (Belin, 2020). By contrast, a centralized ledger, which is still used by many companies and organizations today, is typically a database that is stored at one single location, which also means that there is one sole point of failure.

One of the main arguments for using a distributed ledger is the fact that it is decentralized, meaning that it eliminates the need for a central authority or intermediary for processing, validating and authenticate

transactions or other types of data exchanges (Belin, 2020). However, as the one that implements the decentralized ledger, the implementer, has power to, in principle, dictate the structure, purpose and functioning of the network, it is arguably not fully decentralized (Majaski, 2019). So, a distributed ledger can be characterized as being technologically decentralized. Most distributed ledgers function in such a way that the records of transaction, or other exchanges, are stored on the ledger once consensus have been reached by all the parties, or nodes, involved in the ledger. Then, the data is subsequently added into the ledger and furthermore timestamped and given a unique cryptographic signature (Belin, 2020). The fact that the files, or transactions, are timestamped and signed make the distributed ledger come with a verifiable and auditable history on all files added into the ledger.

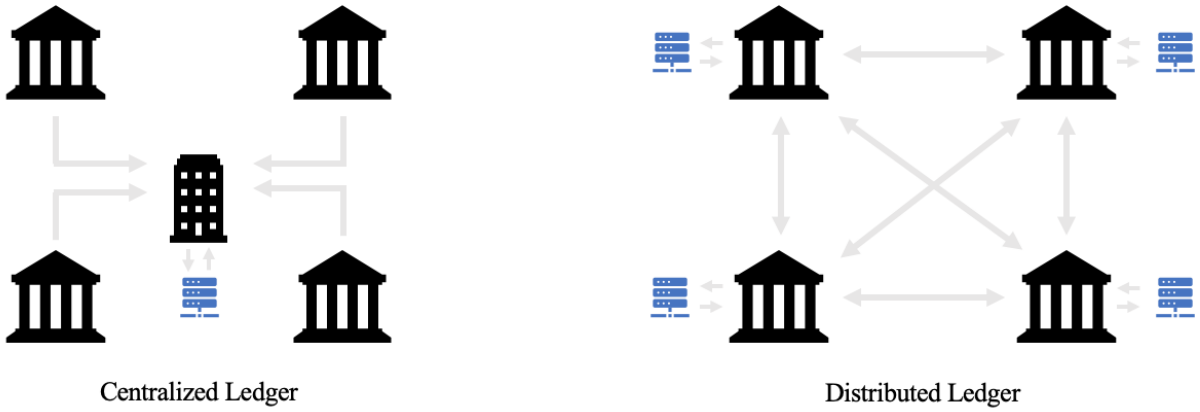


Figure 7 Centralized vs. Distributed Ledgers

6.3.1 Distributed Ledger Technology versus Blockchain Technology

Despite the fact that blockchain is a type of a distributed ledger, it isn´t always the case that every distributed ledger is a blockchain. This fact is exactly one of the reasons why many people find it difficult to separate the two technologies. However, there are some unique features of the blockchain technology that is not always present in distributed ledgers.

One of the most unique features of blockchain technology is its structure – the blocks in the blockchain. These blocks consists of data, which in most cases is data regarding transactions that has been executed in the network and validated by the nodes in the network (Drescher, 2017). Blockchains use specific consensus mechanisms in order to determine which transactions that should be considered as valid and subsequently added as blocks to the blockchain. Examples of such mechanisms are Proof of Work and Proof of Stake (Tapscott & Tapscott, 2016). Additionally, all the transactions, or blocks, are timestamped. Another specific characteristic of blockchains is the use of cryptographic hash functions. Simply put, a hash function is a mathematical algorithm that transform a given input, text or numbers, into a unique output of a fixed length (Frankenfield, Hash, 2019). As all of the transactions are being timestamped, connected with specific hash function that cannot be tampered with and additionally

broadcasted to every node in the network, blockchains such as the Bitcoin blockchain are capable of preventing the double-spending problem (Tapscott & Tapscott, 2016).

6.3.1 Bitcoin white paper

On the 31st of October 2008 a paper called *Bitcoin: A Peer-to-Peer Electronic Cash*, also known as the Bitcoin White Paper, was published by a person, or a group of persons, using the pseudonym of Satoshi Nakamoto (Nakamoto, 2008). In the introduction, Nakamoto uses the example of commerce on the Internet to point out weaknesses in the way electronic transactions are processed using traditional financial systems. In order for electronic trade and transactions to be processed, consumers have to rely on financial institutions working as trusted third parties. In most cases, Nakamoto argues that these systems work just fine, however they suffer from what is characterized as inherent weaknesses of this trust-based model (Nakamoto, 2008). Having these third parties to process transactions increases transaction costs, limiting the minimum practical transaction size and the ability to do frequent small-scale, casual, transactions. Another weakness lies in the fact that in the traditional financial systems, transactions can, in practice, be reversible. This increase the need for trust, and merchants must to a greater extent be aware of whom they are trading with and gather more information from their customers than would otherwise be the case (Nakamoto, 2008). Additionally, the fact that transactions can be reversible increases the possibilities of fraud. Furthermore, Nakamoto emphasizes that the transactions costs and payments uncertainties can be avoided when using physical currency, but that there is a lack of mechanisms that facilitate electronic payments without the use of a trusted intermediary such as a bank or other financial institutions (Nakamoto, 2008).

The paper proposes a solution to this problem by taking use of a peer-to-peer electronic payment system that is based on cryptographic proof instead of trust (Nakamoto, 2008). This system will allow any two parties to transact directly without the need for a trusted third party, and additionally make transactions impractical to reserve, protecting the participants in the transactions from fraud. Furthermore, the system proposes a solution to the double-spending problem, one of the biggest problems related to the realization of digital currencies. In short, the double-spending problem is the risk of a digital currency being spent twice, due to the fact that digital information can be reproduced quite easily by highly-skilled individuals with malicious intentions (Frankenfield, Double-Spending, 2019). This problem is solved by using a peer-to-peer distributed timestamp server which generates proof of the chronological order of all transactions in the network (Nakamoto, 2008).

In the paper, an electronic coin, or a Bitcoin, is defined as a chain of digital signatures (Nakamoto, 2008). A transaction is made in such a way that the owner of the coin digitally signs a hash of the coin´s previous transaction in addition to the public key of the next owner. All these signatures are then added to the end of the coin, the end of the chain of signatures, which means that the coin will always contain

data related to all previous transactions. Finally, a payee can then verify the signatures, thus verifying the coin´s chain of ownership (Nakamoto, 2008). However, this chain of signatures does not prevent the double-spending problem as the payee is not able to verify that one of the coins´ previous owners did not double-spend the coin. Instead of introducing a trusted intermediary, Nakamoto suggests that all transactions should be publicly announced so that every participant in the network can be aware of each transaction. Also, the system goes by the rule that in general it is only the earliest transaction, also in the case of a double-spending attempt, that counts. For this process to work, Nakamoto introduces a system that will help the participants in the network to agree upon a single history for the transactions for each coin, the order in which they were received (Nakamoto, 2008). This system is also known as a consensus mechanism, and the one used in Nakamoto´s Bitcoin is called Proof-of-Work (Tapscott & Tapscott, 2016)

The transaction process begins with a timestamp server timestamping a hash of a block of items, transactions (Nakamoto, 2008). This timestamped hash is subsequently published, thus proving for the participants in the network that the data in the block must have existed at the time of the transaction. Additionally, a secure and transparent chain is created as each timestamp includes the previous timestamp in its hash.

The consensus mechanism, proof-of-work, involves scanning for a value that when hashed begins with a number of zero bits (Nakamoto, 2008). Additionally, a nonce is incremented in each block. This nonce is the number that the bitcoin miners try to solve for, and it stays in the block until a value is found that gives the block´s hash the required zero bits (Frankenfield, Nonce, 2019). The uniqueness of this system is that once a miner has dedicated enough computing power to solve for the nonce, thus satisfying the proof-of-work, the block cannot be changed without redoing the work (Nakamoto, 2008). Furthermore, as earlier blocks are chained and earlier hashes are included in each block, the work to change one block would include redoing all the subsequent blocks. Proof-of-work also addresses another problem that occurs when there is no trusted third party to take charge in collective decisions, the problem of determining representation in majority decision making (Nakamoto, 2008). Proof-of-work is essentially based on one-CPU-one-vote, and the majority decision lies within the longest chain in the network. This is the case because the longest chain also has the greatest level of proof-of-work effort invested in it. In other words, this indicates that as long as the majority of CPU power is controlled by honest nodes, they will produce the one honest chain. This chain will then be the one that grows the fastest, and it will be able to outpace any competing chains (Nakamoto, 2008).

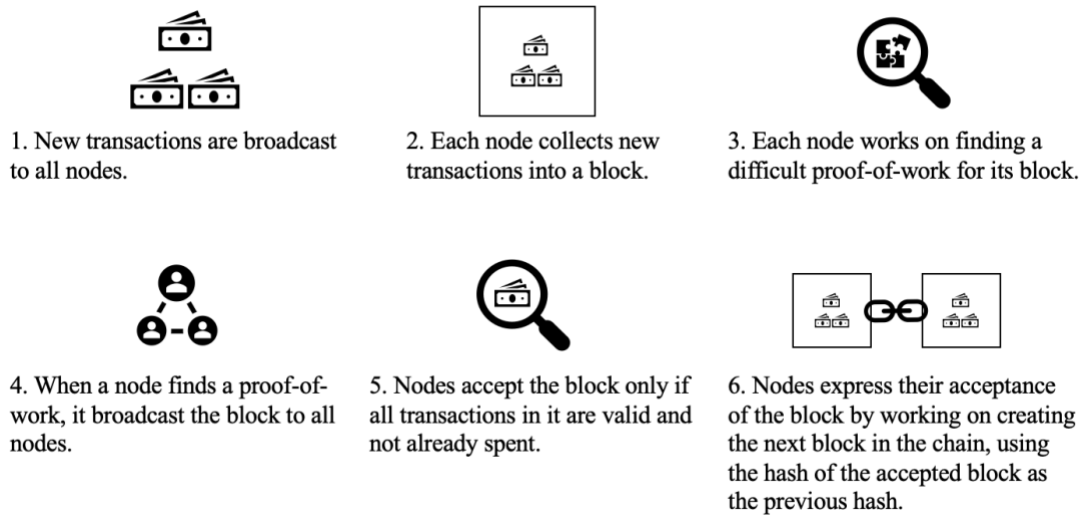


Figure 8 Captioncaptioncaptioncaption

Despite all of the transactions in the network are being publicly broadcast, the system is still able to provide the participants in the network with privacy. This is done by keeping the public keys in the network anonymous, so that the public is only eligible to see that someone is transferring an amount to someone else, however this information is not linking the transaction to anyone (Nakamoto, 2008).

6.4 Why blockchain technology is needed

Since the introduction of Bitcoin in 2008 (Nakamoto, 2008), blockchain technology has experienced a significant increase in interest among programmers, researchers, businesspeople and the general public. Following this interest, a wide variety of different use cases for the blockchain technology have been proposed, strengthening the general hype around the question of why the blockchain technology is needed. The most widespread ideas of such use cases concern the blockchain technology´s ability to disrupt industries such as financial services and the global financial system, supply chain management and foreign aid. However, in order to truly understand why blockchain technology is needed, first it is important to understand the technology´s fundamental purpose – to provide and maintain trust and integrity in distributed and purely distributed peer-to-peer systems (Drescher, 2017).

6.4.1 Core Problems

In a purely distributed peer-to-peer system, you have the problem of trying to organize and control a group of participants without the presence of a third party such as a central authority (Drescher, 2017). In such a system, trust and integrity in the network is of significant importance. In the context of software systems, integrity can be defined as "*a nonfunctional aspect of a system to be safe, complete, consistent, correct, and free of corruption and errors"* (Drescher, 2017, p. 30). Furthermore, trust can be defined as "*the firm belief of humans in the reliability, truth, or ability of someone or something without*

evidence, proof, or investigation" (Drescher, 2017, p. 30). Drescher emphasizes that trust is given in advance, and that the level of trust in a network can change as it will either increase or decrease based on outcomes of interactions. In a peer-to-peer system, the general trust in the system is important for participants to contribute to the system, and also for new participants to join the system. Integrity in the system is also important as it will help fulfill the expectations of the participants, as well as reinforcing the trust in the system (Drescher, 2017). A situation where the trust of the participants is not reinforced by the system due to a lack of integrity, may cause the participants to abandon it, which in the worst case can result in the system to terminate. Thus, the existence of a peer-to-peer system relies on the participants having trust in the system. Thus, the question that should be raised is how to achieve and maintain integrity in a purely distributed peer-to-peer system (Drescher, 2017).

There are several factors that come into play when trying to achieve and maintain integrity in a peer-to-peer system. Drescher (2017) points out two such factors as being (1) the participants´ knowledge on the number of nodes, or peers, in the network, and (2) the participants´ knowledge about the trustworthiness of the peers. Following this, the chances of achieving integrity in the systems will be higher if the participants in the network are aware of the number of nodes, as well as the nodes´ trustworthiness.

6.4.1.1 Integrity Threats

In general, there are typically two specific integrity threats related to peer-to-peer systems that you have to be aware of (Drescher, 2017). First, you have the aspect of technical failures. The structure of a peer-to-peer system does, practically, consist of the individual computers of the system´s participants. When you have a system created by individual computers, you face the risk, as with all hardware and software components of failures and breakdowns. Second, you face the problem of having malicious peers joining the system, creating a sense of untrustworthiness in the network as such peers might have the intention of exploiting the system for their own purposes. Even though malicious peers is not by definition a technical problem for peer-to-peer systems, it can arguably be seen as the biggest threat as they pose a serious threat to the foundation of the peer-to-peer system; trust (Drescher, 2017). The second the participants in the systems are having doubts in their peers, they will abandon the system and quit providing computational power to the system. If such an untrustworthiness spreads across enough participants in the network, the system will eventually lack enough computational resources to run as intended.

6.4.1.2 What Problem Should be Solved by the Blockchain?

As has been described in the section above, the core problems related to purely distributed peer-to-peer systems lies within achieving and maintaining trust and integrity in the system and among the participants. In ideal conditions, this is not really a big problem. However, when dealing with a distributed system, and when facing challenging and difficult conditions, this can be a truly difficult

task. This is exactly the problem that blockchain technology is proposed to solve; how to achieve and maintain trust and integrity in such a system that is additionally characterized by an unknown number of peers with a unknown level of reliability and trustworthiness (Drescher, 2017). This problem is actually widely known among computer scientists, and often referred to as the Byzantine general problem (Lamport, Shostak, & Pease, 1982). In short, the Byzantine general problem relates to a situation where participants in a group, or network, have to rely on each other to agree on a single strategy to prevent complete failure, but where some of the participants are corrupt, providing false information, and are unreliable.

6.5 How the Blockchain Works

6.5.1 Centralized vs. Distributed Architecture / Network

One of the fundamental decisions that have to be made when implementing a system regards the system´s architecture (Drescher, 2017). A systems architecture concerns the way in which its components are organized and how they are related to each other. In general, it is regularly distinguished between two major types of architectures; centralized and distributed (Tanenbaum & Van Steen, 2007).

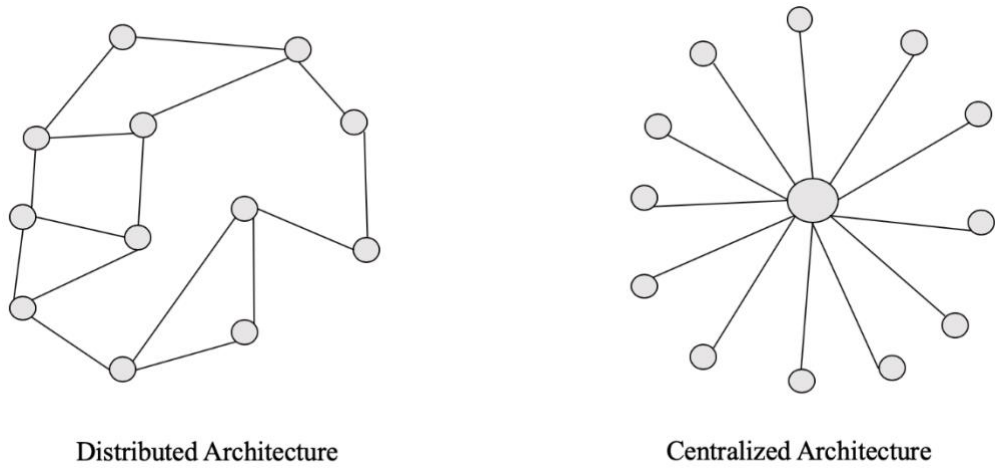


Figure 9: Distributed vs. Centralized Architecture

On the one hand, a centralized architecture is characterized by consisting of participants that are positioned around and linked with one central component (Drescher, 2017). It should be noted that in this structure, the different components are not directly connected with each other. However, they all share the same characteristic of being connected to the one central component. This means that it is the one central component that coordinates and controls all of the participants in the network. One of the consequences of structuring a system this way is that a failure of breakdown in the central component will cause the entire system to fail (Drescher, 2017).

On the other hand, a distributed architecture is characterized by consisting of participants that are connected to one another without the presence of a central, controlling, component (Drescher, 2017). As can be seen from figure XX, despite not being directly connected to each other, all of the participants

are at least connected indirectly. Compared to a system consisting of single computers, a distributed system comes with some distinct advantages (Drescher, 2017). First, a distributed system will have higher computing power as the collective power is the result of each participants´ computing contribution. Second, there is an aspect of cost reduction related to taking use of a distributed system. Despite the significant decrease in the price of mainstream computers, disk space and networking equipment, the initial cost of a distributed system surpasses the cost of individual computers. However, when it comes to creating, operating and maintaining e.g. a supercomputer, the cost is much higher than the cost of the same operations for a distributed system. Furthermore, as a distributed system does not rely on one single component, a distributed system is more reliable as it is able to continue to operate even though an individual participant, or computer, breaks down. In other words, a distributed system does not have a single point of failure (Drescher, 2017). Finally, one of the main advantages of a distributed system relates to scalability - its ability to grow naturally. As the overall computing power of a distributed network is the aggregated power of all participants in the network, the overall power can increase by adding more participants to the network (Drescher, 2017).

Despite of some distinct advantages, the architecture of a distributed system also comes with some disadvantages (Drescher, 2017). As there is no central component with the responsibility to control and coordinate the participants in the network, a distributed architecture has some coordination problem. Thus, the coordination of the network must be done by the participants, which costs both effort and computing power. In order to coordinate the participants in the network, they have to communicate with one another. Thus, a communication protocol for sending, receiving and processing messages is needed. However, such a protocol requires effort and computing power, thus taking some effort and computing power away from the network´s genuine computing task (Drescher, 2017). The communication protocol also brings some security issues into the equation. Some participants in the network might misuse the network in order to exploit the information that are being transferred between the participants, which again might cause some degree of untrustworthiness to spread in the network.

6.5.2 Distributed Peer-to-Peer Systems

A peer-to-peer (P2P) network consists of individual computers, often referred to as nodes, and is a special form of a distributed system (Vu, Lupu, & Ooi, 2010). In a distributed peer-to-peer system, all of the network´s nodes make their own individual computing power available to the other members of the network. Originally, as it is a distributed system, this is done without the coordination and control of a central component. Additionally, in a purely P2P system, all nodes perform the same tasks, as well as taking on the role as both providers and consumers of resources and services in the network. However, there are also some P2P systems that take use of some elements of centralization (Drescher, 2017). Such systems take advantage of having some central nodes that facilitate interaction between peers or for the performance of look-ups or identification of new nodes.

6.5.3 Four different kinds of blockchain

When designing a blockchain-system, there are several central "design-choices" that have to be considered. These choices relate to the two major conflicts of the blockchain, namely 1) Transparency vs. Privacy and 2) Security vs. Speed (Drescher, 2017). In order to understand these conflicts, we have to take a look at their origins. The first conflict has roots in the operation of reading the data on the blockchain, leading to the choice of Public vs. Private blockchains. The second conflict originates from the operation of writing new data on the blockchain, relating to the choice of Permissionless vs. Permissioned blockchains (Drescher, 2017).

Writing Access	Reading Access and Creation of Transactions	
	Everyone	Restricted
Everyone	Public & Permissionless	Private & Permissionless
Restricted	Public & Permissioned	Private & Permissioned

6.5.3.1 Public vs. Private

In order to decide on a public vs. private blockchain, the conflict of transparency vs. privacy must be considered. The characteristics of being open and transparent is two of the key features and arguments of taking use of a blockchain-based system (Drescher, 2017). Additionally, these two characteristics are core concepts for the blockchain´s ability to verify ownership and solve the double-spending problem. The openness and transparency allow everyone to audit the transactions in the network, making it easier to uncover and prevent attempts at double-spending (Drescher, 2017). A public blockchain, which facilitates and emphasizes transparency, can be defined as a blockchain that: "*grants read access and the right to create new transactions to all users or nodes"* (Drescher, 2017, p. 215).

However, the feature of transparency comes at the cost of a lack in privacy. Privacy in a blockchain-based systems involves keeping key data such as transaction data, and information regarding accounts and amounts being transferred are hidden from the public (Drescher, 2017). A private blockchain, one that limits the degree of transparency and openness in order to grant the participants´ a level of privacy, can be defined as one that: "*limit read access and the right to create new transactions to a preselected group of users or nodes"* (Drescher, 2017, p. 215).

6.5.3.2 Permissionless vs. Permissioned

It can be argued that the history of transaction data is what lies at the heart of the blockchain (Drescher, 2017). This transaction data is kept safe by storing it on an immutable append-only blockchain, which additionally requires the solution of a hash puzzle for a block to be added or altered (Drescher, 2017). As this operation is lengthy and resource-heavy, you face the conflict of security vs. speed. Having a such a lengthy and resource-heavy proof-of-work makes the blockchain secure, however at a cost of the system´s overall speed and scalability. This leads to the decisions regarding permissionless vs. permissioned blockchains, where a permissionless blockchain can be defines as a blockchain that

"*grants write access to everyone. Every user or node can verify transactions and create and add new blocks to the blockchain-data-structure"* (Drescher, 2017, p. 216). Conversely, a permissioned blockchain can be defined as a blockchain that "*grants write access only to a limited group of preselected nodes or users that are identified as trustworthiness through an on-boarding process. As a result, only the group of nodes that have write access are allowed to verify transactions and take part in the distributed consensus procedure"* (Drescher, 2017, p. 216).

6.5.4 Hashing

In a distributed P2P system, there will be a high amount of transaction data that will have to be identified and compared to one another (Drescher, 2017). This should be done as quickly as possible, and also with ease, in order to detect attempts at double-spending. Thus, for this process to go as smooth and quick as possible, the transactions have to be related to some kind of unique digital fingerprint. In a blockchain, these unique digital fingerprints are also known as hash functions (Drescher, 2017).

A hash function can be defined as "*a series of mathematical steps or algorithms that you can perform on some input data, resulting in a fingerprint, or digest, or simply, a hash"* (Lewis, 2018). In general, there are two types of hash functions, namely basic hash functions and cryptographic hash functions, where the latter is the one that is being used in blockchains. However, in order to understand how cryptographic hash functions work, first we have to understand the fundamental of basic hash functions.

In a hash function, some input in the form of text of numbers are converted to a unique or specific output. The input is often called a *preimage* or a *message*, and the output is often called *digest*, *hash value* or simply the *hash* (Lewis, 2018). A hash function can be characterized as being deterministic as the output is determined by the input. Antony Lewis (2018) uses the example of a really basic hash function that might say "Use the first character of the input". Then by having a hash that says "Hash("Hello world") you will get an output, a hash, of "H".

A cryptographic hash function, however, is more complicated than a basic hash function and it has some key characteristics that makes it suitable for cryptography and cryptocurrencies (Lewis, 2018). In general, these characteristics are summed up in five main properties (Drescher, 2017). First, a cryptographic hash function is able to calculate hashes quickly and from all kinds of data; Second, a cryptographic hash function, like a basic hash function, is deterministic. In addition to determine the output of the function based on the function´s input, every hash function will yield the identical hash values for identical input data; Third, a cryptographic hash function is *pseudorandom*, meaning that any changes in the input data will cause the output data to change unpredictably. Furthermore, this involves that it will not be possible to predict a hash output based on the input; Fourth, a cryptographic hash function is a *one-way function* as it is not possible to trace its input values based on its output values. In other words, it is impossible to recover the original input data based on a hash functions output value;

Lastly, cryptographic hash functions are *collision resistant* as they will not yield the same output data for distinct different pieces of input data. This characteristic is essential for cryptographic hash functions to function as digital fingerprints (Drescher, 2017).

6.5.5 Consensus mechanisms

As has been emphasized earlier, reaching consensus in a distributed system such as a blockchain will require a mechanism for the nodes to agree on collective decisions (Drescher, 2017). Additionally, the importance of having such a mechanism increases when considering the Byzantine problem, which was described when discussing the problems that should be solved by blockchain technology in section 5.5.1.2. In the following, two central consensus mechanisms will be presented.

6.5.5.1 Proof of Work

The proof-of-work (PoW) consensus system is arguably most known for being part of the Bitcoin blockchain introduced by Satoshi Nakamoto in 2008 (Nakamoto, 2008). In a PoW-system, each node in the network is trying to calculate a hash value of the constantly changing block header (Zheng, Xie, Dai, Chen, & Wang, 2018). The nodes keep calculating this value until they find a value that is equal to, or smaller than, a certain given value. When one of the nodes finally obtain the relevant value, all of the other nodes have to mutually confirm the correctness of the proposed value. Then, the transactions in the new block will be checked and validated in order to look for frauds. If there is nothing wrong with the transactions in the block, the block will be added to the chain and broadcasted to the network (Zheng, Xie, Dai, Chen, & Wang, 2018). This PoW process is also known as *mining*, and the nodes that try to calculate the relevant values are called *miners*. Since this mining process is quite time consuming and resource heavy, the miners need some form of incentive to put effort into the process. In the Bitcoin network, this incentive is created by issuing Bitcoins to the one minor that are able to solve the puzzle and calculate the relevant value (Nakamoto, 2008).

In a decentralized network, there are many nodes that work on solving the puzzle for the relevant value at the same time. This brings the possibility of having several valid blocks that might be generated simultaneously, which again can result in having sub-branches being created outside the original blockchain (Zheng, Xie, Dai, Chen, & Wang, 2018). However, in a PoW-system it is the longest chain that is considered as the authentic, valid, one. Furthermore, it is worth noting that a Bitcoin block is generated, in general, about every 10 minutes (Zheng, Xie, Dai, Chen, & Wang, 2018).

6.5.5.2 Proof of Stake

Proof-of-stake (PoS) is another consensus system, and compared to PoW, it can be characterized as an energy-saving alternative (Zheng, Xie, Dai, Chen, & Wang, 2018). In a PoS system, the nodes in the network are individually attributed mining power proportionally to the amount of coins held by each node. Thus, a miner in a PoS system is limited to mine only a percentage of the transactions, and this

percentage is equal to the node´s stake in the network – the percentage of the total amount of coins in the network owned by the node (Frankenfield, Proof of Stake (PoS), 2019). This implies that a miner owning 5% of the coins in the network is obliged to only mine 5% of the blocks. One of the key thoughts behind this system is that nodes with the highest amount of coins in the network, highest stake, will be more trustworthy and less likely to attack the network (Zheng, Xie, Dai, Chen, & Wang, 2018). PoS saves more energy and is more effective than PoW. However, it is worth noting that as the mining cost is nearly zero, PoS systems might be more susceptible for attackers trying to manipulate the network.

6.5.6 Identifying and Protecting User Accounts

As described earlier, a blockchain is a form of a distributed peer-to-peer system (Drescher, 2017). This means that everyone, in the case of a public and permissionless blockchain, can access, connect and contribute to the network. However, the system has to be able to keep people away from the properties, except from their own accounts, stored on the different accounts connected to the blockchain. At the same time, the right to transfer an amount from one account to another is restricted to only the one account that hands off the ownership of the coin (Drescher, 2017). This leads to one of the challenges faced when operating a blockchain, more specifically how to protect the accounts of each participants in the network without limiting the open architecture which is one of the main strengths, and key characteristics, of a distributed system. The way that the blockchain conquer this is by treating every account on the blockchain like a mailbox, and by providing the participants with one public and one private key each. This implies that everyone on the blockchain can transfer properties to the mailbox, however it is only the owner of the account, or mailbox, that can access the property (Drescher, 2017). A public key is used in order to identify accounts in the networks, and a private key is used to access to actual account and its properties.

6.5.6.1 Zero Knowledge Proofs

Another feature working to provide anonymity and security for the user accounts, is the concept of zero knowledge proofs (ZKPs). In essence, ZKPs are mathematical methods used for proving something by providing a heap of information stimulating a sense that the prover has or knows the desired information, whilst still keeping the underlying data secret (Newman, 2019). The purpose of this is to stimulate anonymity and security, for instance in transactions, interactions or sensitive agreements.

The concept of proving without revealing is complex. Thus, to provide a better understanding of its essence, we will use an example, inspired by an article in Medium.com (Ray, 2019): Say a company claims they have a software which can instantly discover Wally from the famous Where's Waldo books. The provider does not want to reveal that it works without payment, but the user would like proof before purchasing the service. What the provider then wants to do, is to give enough information to convince the user that the service is legitimate, but without revealing where Waldo is. Thus, a solution could be

to send a picture of Waldo on a set page, with everything around him being censored in black. They have thereby proven that they know where Waldo is, without revealing his location. The essence of this example, provided by Ray (2019) at Medium.com, is also applicable to transactions, interactions or sensitive agreements situated on blockchains.

6.5.7 Key Features/Strengths of the Blockchain Technology

From the introduction to the different aspects of blockchain technology that has been provided above, some key features can be highlighted. However, it is important to remember that some of these key features may also be present in DLT as blockchain technology is a type of DLT. Furthermore, as described earlier, a public and a private blockchain do not share the exact same characteristics, and this is also the case for a permissioned and a permissionless blockchain.

First, blockchain technology has the ability to provide and maintain trust and integrity in distributed, and purely distributed, peer-to-peer systems (Drescher, 2017). Thus, the technology is able to deal with the widely known Byzantine general problem. By having a decentralized architecture, with consensus mechanisms ensuring that every transaction, or data, added to the blockchain is verified and checked for double spending, the blockchain is able to build and maintain trust among its participants. The characteristics of being decentralized and distributed makes the blockchain almost hacker-proof, and additionally it is widely known as being immutable due to the cryptographic hashes that is used to secure and identify transactions. Second, with a public blockchain everyone is able to see and read the information that is stored on the blockchain, which provides a strong degree of transparency and traceability. Third, you are able to store a wide variety of assets on the blockchain such as cryptocurrencies, contracts, stocks, etc. This ability is one of the most important characteristics of the blockchain, as it is foreseen to disrupt many industries, and among these especially financial services. By being decentralized and distributed, and thereby not dependent on any form of intermediary, coupled with its ability to store and transfer digital assets, people all over the world are able to trade with one another without having to rely on third parties such as banks and other financial institutions. Thus, barriers to trade such as transactions costs, exchange rate fees and the time spent on financial transfers will decrease.

6.5.8 Limitations of the Blockchain Technology

Despite having some unique strengths and features, the blockchain technology is not perfect and it definitely has some limitations worth considering (Drescher, 2017). These weaknesses and limitations are some of the main reasons why the technology yet has not seen the widespread commercial use that some might had foreseen when it received extensive hype and interest following the introduction of Bitcoin in 2008. The following weaknesses and limitations are generally applicable for a public,

permissionless blockchain. Thus, it is important to remember that some limitations might not be relevant for other types of blockchain, as for example a private, permissioned one.

First, there are some technical weaknesses and limitations related to blockchains. As a distributed peer-to-peer network, the blockchain facilitate openness and transparency. The history of every transaction in the network is stored on the blockchain, and this is necessary in order for every peer in the network to be able to clarify ownership and verify new transactions (Drescher, 2017). However, this openness and transparency causes a lack of privacy, and the lack of privacy is often mentioned as a limiting factor for blockchain use cases that require a higher degree of privacy. The concept of a having a public and a private key related to each account on the blockchain might cause some problems. The second that the private key of an account is lost, forgotten or stolen, either by mistake or by will, the security of that account is broken. Furthermore, there is no additional security measures that can protect the accounts if the private key is lost or stolen. Another limitation is that a blockchain system can be characterized by having limited scalability. This is due to the time-consuming and resource heavy consensus system, especially in PoW, where the miners have to allocate significant time and resources in order to solve the hash puzzle. This again leads to the processing and construction of new blocks taking a significant amount of time, limiting the systems scalability and processing speed. Another weakness of the PoW is that it is quite expensive, making the whole blockchain incur significant costs.

As the PoW system favors miners with high computational power, the systems consequently bring a form of hidden centrality. The miners with the highest computing power will be most likely to solve the computational puzzle first, creating some form of centrality in the network despite the peer-to-peer network´s decentralized nature.

In addition to the technical limitations, there are some specific non-technical limitations that are worth considering (Drescher, 2017). First, there are still arguably a lack of legal acceptance surrounding the use of blockchain technology, especially when the technology is used for facilitating transactions of cryptocurrencies. As independent peers decide on and manage ownership of digital assets through a distributed consensus, many question the legal consequences related to these transactions (Drescher, 2017). Second, despite the worldwide emergence of several use cases, there are still a lack of user acceptance of the blockchain technology. Many are wary about the openness and the lack of privacy of the technology, thus being reluctant to explore the possibilities that comes with the technology. However, one of the main reasons, if not the most important one, for users´ lack of acceptance is a general shortage in knowledge and education of the technology (Drescher, 2017). There is no doubt that blockchain technology is complicated and it requires a significant amount of time and research to truly understand how it works. Thus, many people do not have the knowledge required to understand how the technology works and how it can be used to improve and increase efficiency in their businesses (Nguyen, 2019). Additionally, due to the lack of general knowledge of the technology, there are many people that

simply associate blockchain technology with the negative events of Bitcoin that we have seen since it was introduced in 2008.

6.6 Smart Contracts & Decentralized Applications

Smart contracts and decentralized applications (DApps) have emerged as expansions of the general purpose blockchain technology (Antonopoulos & Wood, Mastering Ethereum, 2019). As applications built upon existing blockchain networks, most notably on Ethereum, they utilize aspects of the technology to make transactions secure, irreversible and trackable (CoinSwitch, 2018). The two share many similarities, especially on the Ethereum network, where there is no distinct difference between smart contracts and DApps (Coonrod, 2018). However, Coonrod (2018) argues that differentiating the two is important as blockchain technology is growing and maturing. He argues that the more complex a software system is, the more susceptible to risk it is (Coonrod, 2018). Because contracts and transactions can be worth millions of dollars, this chapter will therefore explain both smart contracts and DApps, as well as their abilities on the blockchain network. This will later be subjected for analysis to the conceptual design.

6.6.1 Smart Contracts

According to Coonrod (2018), the idea of a smart contract is "*agreement between parties without the need for a third party*". The concept was coined by Nick Szabo in the 1990s in relation to a philosophical, rhetorical question about "security" (Satoshi Nakamoto Institute, 2020). Szabo explain that his idea derives from the fact that many contractual clauses are possible to embed in current hardware and software, and as such can make breaches of contracts more difficult – or expensive – for the breacher (Szabo, 1997). A smart contract uses legal principles, economic theories, and theories of reliable and secure protocols in combination with user interfaces to "*formalize and secure relationships over computer networks*" (Szabo, 1997).

In his first publication on the concept, Szabo describes smart contract as being a "*computerized transaction protocol that executes the terms of a contract*" (Szabo, 1994). By this, the smart contract ensures that every part of a contracts is respected. Smart contracts are, in essence, scripts stored on a blockchain network, which can execute contracts automatically, thereby eliminating the need for middlemen between parties in transactions (Christidis & Devetsikiotis, 2016). The script consists of coded rules to complete a transaction, for instance the amount of unit X needed to acquire one unit of Y. Then, a properly written smart contract should be able to either accept or reject a transaction, dependent on whether the transaction conforms with the criteria on the script (Christidis & Devetsikiotis, 2016). Furthermore, Christidis & Devetsikiotis (2016) explain that, as all transactions and interactions with a smart contract resides on the blockchain, every participant on the network can inspect the code and will all get a cryptographically trace of the contract's operations.

When explaining smart contracts, Szabo (1997) uses a vending machine as a descriptive example: The vending machine receives a coin from a person, the person registers their demand, and the machine computes which slot should dispense a soda bottle – and can in some instances additionally calculate change going back to the consumer. In this example, the vending machine is a contract with bearer, as anyone with coins can perform exchanges with the machine (Szabo, 1997). Moreover, the security mechanisms in the machine protects the coins and contents from potential breachers. This example visualizes a protocol guaranteeing that a product will be delivered following a payment, thereby showing that smart contracts is not just a system where nodes ensure and verify a transaction – which is a characteristic more like transactions of, for instance, Bitcoin (Szabo, 1994).

In relation to Bitcoin-style transactions, where distrustful parties can conduct transactions with each other, blockchain networks supporting smart contracts enables further trust between these parties through multi-step processes (Christidis & Devetsikiotis, 2016). The multi-step processes allow the transacting parties to "*(...) (a) inspect the code and identify its outcomes before deciding to engage with the contract, (b) have certainty of execution since the code is already deployed on a network that neither of them controls fully, and (c) have verifiability over the process since all the interactions are digitally signed*" (Christidis & Devetsikiotis, 2016, p. 2297). Consequently, given all possible outcomes are addressed and accounted for, the final outcome is indisputable, thereby mitigating the transaction-barrier between parties not trusting each other.

Szabo (1994) points to lower transaction costs as one of the primary benefits of smart contracts. Additionally, a smart contract should be using simple scripting language to ease code reviewing, -verification, and -validation, which will mitigate bugs and vulnerability (Coonrod, 2018). With a simple script, both the contractual terms and whether these have been respected will be easy for anyone to understand and confirm.

One example of a currently operating smart contract is Fizzy AXA – the French airline AXA's flight insurance (Medium, 2018). As long as a subscription fee is paid, and your airline details are in the app, Fizzy AXA will execute its smart contract based on parametric insurance. The insurance is triggered when a flight is more than two hours late, and the subscriber will then automatically receive compensation options (Medium, 2018). Once the subscriber has chosen their compensation, the money will be sent directly to their credit card.

The most important difference between a smart contract and simple coding, is that the smart contract lives on the blockchain, rather than on a regular server (Raval, 2016). This means that no third-party is required, and there is no need to trust a server owner. Therefore, as Raval (2016) says, a more formal way of phrasing smart contracts could be "*Cryptoeconomically secured execution of code*" (Raval, 2016, p. 7).

6.6.2 DApps

The term "application" is often perceived as a software application, and are available on all types of hardware devices, such as phones, TVs, computers, etc. According to Raval (2016), a software application defining a specific goal. Such applications can be offline, but there are also millions of online software applications, which mostly follow a centralized server-client model (Raval, 2016). Centralized applications have a central power whom all users depend on, such as Facebook, Amazon, Google, and most other mainstream services. Additionally, some applications are distributed, meaning the computation is spread across multiple nodes, rather than one as in centralized (Raval, 2016). Lastly, and the application form following the blockchain values, are decentralized applications – or DApps. "*Decentralized means no node is instructing any other node as to what to do*" (Raval, 2016, p. 4).

Decentralized systems can be both distributed and decentralized, as is the case for Bitcoin (Raval, 2016). Bitcoin is, according to Raval (2016), distributed due to its blockchain residing on multiple computers, and decentralized because the network will remain operative even if one node fails. However, the importance on distinguishing DApps as a system, originates in distributed systems also being compatible with centralized systems (Raval, 2016). He argues further that achieving decentralized consensus in software applications is the real innovation – and still an emerging field with much debate as to what DApps actually are.

DApps are usually open source (Raval, 2016). This is because in a closed-source DApp, the users will have to trust that the application is really decentralized. Therefore, according to Raval (2016), a closed-source DApp should raise red flags and consequently hinder the adoption of the application. The essence of the DApp and its decentralization is to create decentralized systems, and are currently especially prevalent in transaction and holding of funds (Raval, 2016). Thus, the most typical examples of DApps are currencies, or more specifically: cryptocurrencies – which will be presented further in chapter 6.8.

Thus, Bitcoin is a good example of an open-source DApp, as it is completely decentralized through its open-source system (Nakamoto, 2008). Blockchain's system enables complete transparency and every participating node are able to develop the blockchain (Raval, 2016). The nodes' work – mining and transaction-approving – is rewarded with coins. Consequently, Bitcoin is a profitable DApp with compensation schemes.

More generally, DApps have the feature of decentralized consensus (Raval, 2016). A peer-to-peer (P2P) network, where participating nodes are able to communicate, have been around for longer than the concept of blockchains. Such networks are known as Distributed Hash Tables (DHTs) and are great for storing decentralized data (Raval, 2016). However, what blockchain as a complement to DHTs give, are application-level elements such as usernames and high-scores, which every participant need to consent on in a decentralized way (Raval, 2016). Moreover, Raval (2016), explains that it is not important who actually owns each username, so long as the other participants agree who has it. The blockchain

technology's immutability therefore means no one can pretend to be someone they are not. According to Raval (2016), this feature can be enabled through the use of the aforementioned smart contracts.

However, according to Raval (2016), it is important to note that not all DApp codes are smart contracts. So, what are the differences between smart contracts and DApps?

6.6.3 The Difference

Referring back to Coonrod (2018), there is often no notable differences between a smart contract and DApps – but there *should* be. The distinction, which will be determining in this research' conceptual design, will thus be attempted presented in this sub-chapter.

Coonrod (2018) argues that smart contracts should be "*agreements between parties without the need for a third party*", written in a simple scripting language, as mentioned in sub-chapter 6.6.1. He explains that this will not guarantee a flawless contract, but that it will reduce the contract's vulnerability. Meanwhile, DApps should be "*decentralized applications that do not execute on centralized machines*" (Coonrod, 2018). He urges the need for differentiating the two through the example of whenever a mistake happens in a traditional application, it usually crashes, and some work will be lost. On the other hand, if a mistake happens in a smart contract, vast amounts of money can be lost or stolen with no way of retrieval (Coonrod, 2018).

Coonrod (2018) uses RadJav Blockchain V2 as an example where smart contracts and DApps are distinguished. The V2 smart contracts uses a scripting language which does not allow for recursion, object-oriented programming, nested loops, among other features, to other smart contracts (Coonrod, 2018). Despite all these restrictions, it will still be possible to develop smart contracts satisfying the "easily verifiable" criterion.

The RadJay Blockchain V2 further enables a way for software where these features are needed to be developed (Coonrod, 2018). The DApps can be scripted in the same language, but with these restrictions unlocked, meaning that the application will not be restricted. This, creating a network with the same codes, but less security and harder verification and validation, is where Coonrod (2018) identifies the biggest difference between DApps and smart contracts.

Thus, based on Coonrod's (2018) explanation of the two phenomena, it can be interpreted that the difference between a smart contract and a DApp is their degree of leniency. Moreover, it is likely that a smart contract, with its high security and restrictions, is more suitable for vast transactions and for more restricted networks. Meanwhile, DApps appear more lenient and thus might be suitable for all public and in settings where privacy and security are less important than in smart contracts.

6.7 Cryptocurrencies

As mentioned in the previous sub-chapter, the most prominent example of decentralized applications is cryptocurrency. Thus far, Bitcoin has been the example, and its features and structure has been explained

previously in chapter 6 along with an explanation of what blockchain technology enables compared to traditional systems. Following on the extreme hype on Bitcoin and the emergence of numerous other cryptocurrencies, it is important to understand exactly how these have become so prevalent today. Thus, this chapter will broaden the cryptocurrency horizon and provide an explanation of the groundbreaking currency system as a whole.

As the name suggests, a cryptocurrency is a cryptographic currency. As Bitcoin was the first, and is the most prevalent today, people tend to think of Bitcoin when they hear the term "cryptocurrency". Perhaps the most notable difference between cryptocurrencies and fiat currencies, is that the entire cryptocurrency, situated on a blockchain, is dependent on a network and connectivity to work (Naranyan, Bonneau, Felten, & Miller, 2016). In this regard, cryptocurrencies operate in the same way as other online payment systems, such as PayPal. What cryptocurrencies do provide, similar to fiat currencies and cash transactions, and opposite to these other payment systems, is anonymity (Naranyan, Bonneau, Felten, & Miller, 2016). This feature is indeed what classifies the system as "cryptographic".

Satoshi Nakamoto's Bitcoin white paper introduced Bitcoin as an electronic payment system which would counter the flaws of the traditional payment services (Nakamoto, 2008). And in the beginning, this was Bitcoin's primary use case, as exemplified through the pizza example in sub-chapter 1.2. However, many of these cryptocurrencies, and predominantly Bitcoin, are now viewed more as a store of value, similarly to gold (Li, 2019). Furthermore, it is likely that Bitcoin is the reason for the emergence of the numerous other cryptocurrencies on the market today. That said, the anonymity feature means that cryptocurrencies, and predominantly Bitcoin, are used as payment methods for people purchasing illegal goods and services of the dark web (Kumar & Rosenbach, 2019).

Previously, the technological structure of a Bitcoin has been presented. As Bitcoin was the first mainstream application of cryptocurrencies, and blockchain technology as a whole, its code has been used as a blueprint for many other software projects, and many coins are built on the Bitcoin blockchain (Antonopoulos, 2014). However, there are alternative cryptocurrencies – or coins – that have emerged which are not built on the Bitcoin blockchain (Antonopoulos, 2014). These are known as Alt Coins, and can have several different features, some like and some unlike Bitcoin. Their uses are also varying, where some are produced to work as a currency, whereas others are more similar to the Bitcoin as an investment (Antonopoulos, 2014).

In general, what cryptocurrencies offer, is a digital-only currency placed on a blockchain, which offers secure and cryptographic payments, independent of third-party verification (SOURCE). As noted, however, Li (2019) compares cryptocurrencies – Bitcoin in particular – to gold, as a store of value. Additionally, they are similar as the market gets bigger through mining, and that the asset is scarce (Li, 2019). Where they differentiate, however, is their volatility. As Nathan Reiff (2020) argues, gold is regarded a "strong safe-haven asset", meaning its scarcity and independency of other market prices holds

its value quite stable. Contrary, Bitcoin is much more volatile, exemplified by the decrease in value from about $20.000 USD in the beginning of 2018 to $4.000 USD about a year later, which thence rinses it from a status as a "safe-haven" (Reiff, 2020). Thus, the categorization of cryptocurrencies, represented through Bitcoin, can be altered more to a volatile investment asset rather than a store of value. Moreover, this vast volatility makes cryptocurrencies less capable of being a regular currency, as pricing a product or service in BTC may induce conflicting prices from one moment to another.

6.7.1 Stablecoins

In light of the high volatility of traditional cryptocurrencies, as explained above, these are not well suited for daily transactions and as a mainstream currency for daily use (Sam, 2019). According to Sam (2019), an efficient cryptocurrency should have "*price stability, scalability, privacy, and decentralization*" (Sam, 2019). She argues that additional features to a coin will help the coin satisfy these criteria – but it is not there yet. Thus, the idea of stablecoins was brought to light around 2012 (Sam, 2019).

A stablecoin is a digital currency backed by another or multiple other assets (Sam, 2019). Sam (2019) explains further that a stablecoin done correctly are "*simple concept, effortless to understand, easy integration points for partners, and ability for uncomplicated transactions*" (Sam, 2019). However, as is the main idea for the stablecoin-concept, it is important to maintain the coin's value stable. Simply put, stablecoins are cryptocurrencies "pegged" to fiat currencies or other assets, such as gold, to remain stable (McIntosh, 2019). According to Sam (2019), the goals stablecoins aim to accomplish are: 1) create stability among cryptocurrency trading pairs, 2) diversify portfolios in case of market instability, 3) being used for daily transactions as a direct substitute to fiat currencies, 4) aid the mainstream adoption of cryptocurrencies, 5) form a new financial ecosystem, 6) improve investment predictions countering the volatility of traditional cryptocurrencies, and 7) protect those plagued by hyperinflation through a global stable currency (Sam, 2019).

By May 2019, there were 54 stablecoins identified, comprising 2.7% of all current cryptocurrencies – an increase from 1% in 2018 (McIntosh, 2019). Among these, 17% are held stable by algorithms, whereas 83% are stabilized by asset-pegging. Pegging can be done in a number of ways. For instance, Tether, or USDT, is pegged with a one to one ratio with the US Dollar (Sam, 2019). This solution is satisfying for a cryptographic money transfer system internally in the US but will be susceptible for many of the same disadvantages of a fiat currency if the system is aimed to be global. Thus, another solution is to peg the stablecoin to another asset, such as gold, or a bundle of different currencies and/or assets (Sam, 2019).

Additionally, stablecoins can be created for one specific purpose or organization, which McIntosh describes as "in-house stablecoins" (McIntosh, 2019). This aspect is introduced by Stan Stalnaker, Founding Director of Hub Culture, who referred to mainstream companies, such as Nike and Facebook,

potentially benefitting of building in-house stablecoin ecosystems (McIntosh, 2019). Moreover, a stablecoin is especially useful for international companies where money is transferred from country A to country B, C, and/or D regularly (McIntosh, 2019). This is because the lack of a third-party makes the transaction happen quicker and without external verification, as well as the lower transaction costs.

The main advantages a stablecoin provides, are stability, cheaper and secure transactions, simplicity, regulations, and potential of implementing smart contracts (Sam, 2019). However, stablecoins are centralized and requires some trust in a third-party who decides the asset-pegging. Additionally, Sam (2019) points to a potential issue of redeemability, as the currency likely has to be redeemed to be used to buy actual goods. The key factors one need to make when evaluating stablecoins are: 1) auditability, 2) collateralization – the collateral, or asset, behind the stablecoin, 3) methods in case of system failure and user protection, 4) growth in terms of the ecosystem's stability, 5) maintenance and running cost of the system, 6) the entity to which the coin is pegged, 7) redeemability, 8) stability methods, risks and guarantees, and 9) the system's transparency (Sam, 2019).

Summarized, a stablecoin is a cryptocurrency created to mitigate the flaws of traditional currencies for daily transactional use. There are multiple forms of stablecoins and different ways to keep the coin stable. Additionally, there are different use cases of stablecoins alongside for transactions, such as hedging against other currencies or cash flow losses (Sam, 2019). Lastly, it is important to note that although stablecoins cannot fully guarantee to hold their value, they are more likely to solidify profits than traditional, tradable cryptocurrencies (Sam, 2019).

Appendix 6 - Transcribed Interviews

Interview 1

- Interviewee#1 – Head Internal Audit
- Sector: NGO – Foreign Aid
- Date: 29.01.2020
- Length: 1h32m
- Place: Call, Skype

MW: "Just as an introductory note from my side. I will, as I said, reply to your questions to the extent possible. Obviously, you guys will have a chance to also speak to Ruediger (Birkental journ.anm) who is at SOS Children's Villages International (CVI) – the international director for the internal audit function, who obviously have a vast experience in the (…) interfaces into the accounting world. Ruediger is in charge of accounting, so he's a certified public accountant according to German law, and he's been a professional for 30+ years. So, whatever is very hardcore finance and accounting related, on the interface with new technologies, he definitely is the man. But now you've got me first!"

EG: "Yes, and we're very happy about that as well!"

MW: "Thank you very much! So, my title and position is I am the Head of Internal Audit at SOS Children's Villages International. But before I start with information boring you off: What do you know about us, from Bente (Lier) or from others?"

EG: "What we know is that you are a multinational company with offices all over the world. You are getting donations from, well, the public and from companies and funds, etc., which you send to different project nations who use it to establish initiatives like children's villages, and also the family (strengthening) programs, etc., to help people in difficulties, particularly in third-world countries, but also in some other first-world countries as well."

MW: "Yes, we are a child-focused organization indeed. Let me comment on the "Multinational company": So, the organization (…) it is an international non-governmental organization (NGO), and also the fairest description of it would be: federation – federation in the sense that, you know, we do have legal bodies. We do have a president, vice-president, senate, management council, management team, CEO, CFO, COO. The federation means that there are so-called participating and supporting organizations, essentially collecting money. On the other hand (…) we have program activities in many countries. But you don't have to imagine this as a multinational enterprise with a Chief Executive on top and basically everybody reporting to that structure. A federation is more like a supernational organization with a lot of stakeholders, so there is a lot of complexity also in the structure. If somebody at a certain stage says "A", there are also other people who have a saying before a decision is made. There are advantages and limitations to a certain extent, but I'd like you to have this concept of a federation in mind in what I'm going to tell you about the organization and the distributed accounting activities."

"The Head of Internal Audit is one of only two internal audit people who really work at the General Secretariat of SOS CVI – which is the umbrella organization. The General Secretariat is located in Austria and tries to hold that umbrella over all the member associations, be that one collecting money (PSA – Participating and Supporting Organization) or a country where there are more program activity. They probably do not have that possibility to collect a lot of

money, but that's where the money is spent. There are some central functions, mainly support service for the member organizations, but this is not a "real corporate headquarters" which takes the decisions for everything – we have a very decentralized structure, (...) so the functions are very well distributed across "regions". A region consists of many countries, and there are also international directors for specific regions, who are very senior decision makers. There are also finance responsible people in the regions and on the national level, because in the accounting but also in the program-world, there are a lot of national laws and regulations to consider."

"(...) So speaking about the Internal Audit function is obviously distributed: We're talking about teams of approximately 10 people across the regions, but there's only two of us in the international office in Austria. The other members of the team are spread across the globe in the regions – we have at least one per region, and there are also national internal auditors in the respective – or in some countries, it's actually not many. There is no direct reporting line to a certain centralized function, but they all report to the national management which, as you can see, is obviously not 100% independent there."

"What we provide is internal audit work, but not in a strict, financial sense, because we have our books audited in the form of statutory audits by external auditors. We try to do that for each of our member associations, also for centrally. But the internal audit function provides services mainly following what we call a cross-functional internal audit approach. By cross-functional, I would like you to see that this is not about finance, but we also audit program aspects, we also include supporting functions – that's where we deploy specialist also from different areas – but we're not a mere financial audit and assurance department."

On "Purpose of SOS Children's Villages":

MW: "(...) I told you that we are a child-focused organization. (...) When I try to answer, "what is the purpose of SOS Children's Villages", I start with "What do we do?". We have the Children's Village in our name. (...) Children's Villages, they are 10-15 houses with 8 or more children per house. (...) There is no typical format, but that's a very common format on how a Children's Village is run. When we say, "We give children a loving home", which definitely is one, if not the purpose, this is one of the key pillars and a very historic one. However, I also want to point out that that's not the only thing we do: We also try to strengthen families to make families stronger, meaning that in a Children's Village, you very often find children who do not have any parents at all anymore, and other relatives as well. In the region where you were (South-east Africa), there is HIV, AIDS, which killed generations of people, so there might be children who really do not have any relatives anymore. But there are also children in need of care, where there is still maybe one parent – or another relative – or the generation of the grandparent is still alive. But this family background cannot, you know, fully care for the child, so there are additional needs. So, we try to strengthen families to the extent possible. This is something we try also outside the villages."

"(...) Family strengthening programs are always child-centred, child-focused, and it serves the purpose of providing a loving home to every child. (..) Let me just add to those two pillars, The Children's Villages and Family Strengthening programs, which are obviously two of the main activity streams: We operate the programs ourselves: We're not just collecting money and giving it to somebody else. So, we know who is there, we know what the people need, we also have knowledge about the context and about the respective countries and regions, what happens there on site, because we are there, and these are our own programs. (...) This also gives us a little bit more exposure and also a couple of more risk we have to take care of."

"Alongside Children's Villages and Family Strengthening, we promote children's rights. We have a word for that: "Advocacy", which is also sending out representatives into the bodies where at an international and supernational people think about what children's rights are, how they can be put into legal framework and obviously organization like ours advocate into those processes."

"And finally, this is another main activity – obviously there are also very special activities in one or the other country – but protecting children in emergencies. That may be a national disaster, a war situation, or other really, really severe situations where we try to protect children in such emergency situations by, for example, provide child secure spots or places in a camp or near a camp in areas where there are no liveable conditions for those children."

(...)

On "main income sources":

MW: "If we now think of one "leg" where the money comes in, and obviously there's also one "leg" where the money is being spent for programs. (...) This is an international NGO, this is not the "corporate-world", so we do not a fast (something) here this January. So, what I'm going to provide you with here is basically figures from 2018."

"(...) So, we are looking at a total revenue of €1.2bn. This is, really everything coming in. So, if we speak about what we refer to as "sporadic donors" – basically somebody is prepared to give, not in connection with a sponsorship or a regular donation, this is roughly €300m."

"(...) Do you just want the different sources, or are you interested in figures?"

EG: "I think, mainly what we are looking for is not necessarily the figures, but sort of just where or who donates, like where does the money come into the…"

MW: "OK, I will leave you alone with the figures. (...) But answering your question, there are sporadic donors who I already told you about. We then have something which we refer to as sponsorships or committed giving. If somebody wants to give to SOS and does not do a one-off donation, as I just described, you can sponsor a child. (...) They (the child) just lives in the village, but they have sponsors, maybe on the Northern Hemisphere, and basically, those people who give, they also receive specific information back, e.g. the child, once it goes to school, writes a letter and shares information about "I'm going to school now, and I'm interested in this and that and want to be a mechanic or a pilot" (...). Those children, they also tell something about them, and that is, I would say, a more intense relationship for the donor."

"We then have major donors. So, these are parties, e.g. wealthy people, sometimes even organizations, who give at a larger scale – a lot of money by a few. There is also some money from foundations and lotteries. Other sources income is corporate donors – corporates who took the decision to collect money themselves and give that to us, trusting us with that money so that we can bring that money into our programs where it's needed. Obviously, these are on a contractual basis, so they also have their saying there."

"We now come to a completely different source, which is: There are governmental subsidies for domestic programs in the respective countries. I have to admit that I do not know the current situation in Malawi, but certainly in that region and elsewhere, governments, for example, give money to SOS, for SOS to provide care for certain children, because the government

themselves. Maybe the location is remote, maybe a certain care is not available. So, the government subsidies are also a source of income."

"We have institutional funding; we also have to mention that. So, not only the EU, but that also definitely a source and comparable – that's why I say supernational organizations. There is also money coming in from emergency appeals – but that's only on a smaller scale."

"There is also "other income". If you look at the figures, but "other income" really is now sort of the remainder of everything else. You have the merchandise, for example: A certain member association operates a program and produces something and sells that in a specific country. If money comes in, then this money is obviously also income for the respective members associations. So, that is also income for the organization."

"When we go back to the Family Strengthening program (...). Normally, the organization also has the possibility to support income-generating activities. (...) This obviously comes in different flavours and colours, but the basic concept is that the organization provides the caregiver in the Family Strengthening context, or also to youth, so they have something based on which they can attempt to produce their income. So, this is all on the path for children and youth to find their way into self-reliance and they can really take care of themselves, which makes them independent, which is also – closes the loop back to the purpose."

AS: "Just one question, to make sure we got it right. If, for example, SOS Norway generates funding and sends that to you at SOS International to further distribute to developing countries: The funding that goes from Norway to you, is that regarded as your income?"

MW: "(...) We obviously, in the figures I told you about, the KR, € or $ is only counted once. So, the categories I gave you now is mapped about where it comes from. You're very right in saying that money collected in Norway finds its way into a bank account from where it is then transported onwards to program locations – we'll come to that. But it's only counted once as an income. So, for example, if a donor in Norway, a private individual, gives, then yes; that would be included in what I told you in probably "sporadic donors". However, if an organization like NORAD (Norwegian Agency for Development Cooperation) provides funds, there are other administrative ways, but also the $ to €, or whatever currency, is only counted once. So, it will not be Norway-income once, and then passed onwards and noted again as income."

On "in which countries does SOS operate?":

MW: "So now we have talked about- in which countries does SOS operate? And you are asking for typical characteristics. So, the standard wording I have to provide you is obviously: SOS operates in 136 countries and territories. Why do we say that? Because not all of those territories are sovereign states, but basically it is 136 countries. Of those are 47 in Africa, 22 in the Americas, 32 in Asia and Oceania, and 35 in Europe – the wider Europe, not just EU. We already talked about this structure under the umbrella organization, the PSIs, so mainly bringing money in, and locations in, a lot of them in the Southern Hemisphere, where the program locations are, which spend more than they earn. I have to add at this stage: You have to bear in mind that even though, and I heard one of you saying it earlier, there are also program activities, roughly said, on the Northern Hemisphere. So, we also operate programs in the countries "where we are". Often that is forgotten. For example, the first ever Children's Village is located in Imst, in Tyrolia, in Austria. Very near from the headquarters today. This

is the first location ever opened at the time, by Hermann Gmeiner, the founder of the organization, himself. So, there is program activity also in those countries where the money is collected – not all of it goes to Malawi and other developing countries in Africa. This is also interesting for Norway, I think, in Austria there is even, on a small scale, street-work program activity and so on."

What are the typical characteristics of such countries?

MW: "Well, when you operate in 136 countries and territories, I do not bear distinguished typical characteristics about the countries, there are just too many. But, let me maybe add a comment on how it is to do business in developing countries."

"Obviously in Africa, close to where you (Erlend) were in Malawi, there is really decent infrastructure. A couple of weeks ago, when I was in South Africa, I was drinking water from the tap. So, although there are problems in South Africa, but there is infrastructure, there is a legal system so there is a certain structure and infrastructure you can build upon. On the other hand, in Eastern Africa, there is no doubt about it, that if a country is literally destroyed by centuries of civil war, these are very difficult circumstances to operate in. We still speak about the money and where the money comes from and where it goes to: Not all of those countries have stable banking systems. Not all of those countries have stable currencies. So, there are associated risks when running programs in those countries that you have to consider. A $ or a € which goes to the Southern Hemisphere in a country – let's keep it in Africa – may be received, but it's not certain in all of those countries that an association is allowed to hold dollars and make payments in dollars. So, this is really relevant, and this is really important. But, again, this is not typical characteristics in all of these countries, so this has to be really distinguished. But as a rule of thumb, and if we look at Africa, there are many countries there where there are unstable situations and where there is a series of risks. Let me just pick one (country) out, and not commenting on their operations. But if you look at a country like Sierra Leone, where you have three if not more generations which have been exposed to severe civil war situations. Stability has a completely different meaning than for us in central, northern or western Europe. So, typical characteristics vary between very stable banking and currency systems to situations where you're not really sure what happens to the dollar you send in."

EG: "And also, which is part of our main focus in this thesis, is also the security that the money which is sent there goes to the programs as well. There are, particularly in developing countries, many risks related to corruption and money not necessarily being spent where they are sent to be spent."

MW: "Yes, that's obviously a vast topic. Yes, we have to be very clear about that. There are enhanced risks in the field of fraud and corruption-matters in such countries. We will speak about bank accounts, etc., as we go. I'd also like to add one feature, which might probably not be that obvious, but very near that program in South Africa, I saw by Nedbank – a major banking player there – they have their ATMs, and you can have Bitcoin from them! But if you operate programs like we do, for children in need, there are certain needs. If you have your asset, or your money, stored – excuse my French now, but – if you have your valuables stored in a blockchain, but you're on the ground and you have to feed children, it's not so sure that in the countries we have just been talking about, that you will find vendors and sources for food and other things you need where you can actually pay when your money is electronic only. I'm very well aware that money transferring is big in Africa already, but if you operate a program, not every transaction can be made via two wallets from a smart phone. This is something we

must keep in our minds. (…) There are certain facts about the spending of the running cost in a program environment, which does not fit into brand new technology only."

Started
44:50

M: Then you asked me do you feel that your donors have trust in SOS? And the pressure from donors and the general public to keep administrative costs as low as possible.

E: As background; when we have been doing research and multiple reports say that in general, people are having less trust in NGOs and in that they money not necessarily go to where they are supposed to. That is the background for the question.

M: Yes, that is very understandable. And I mean, incidents like we have seen at Oxfam obviously not help for the reputation of NGOs. I am certainty not troughing all the NGOs into one bucket, but these kinds of reputational incidents definitely has an impact on donors in particular and consequently also into the recipients of the money. So I would say, Yes, they still have trust. Yes there have been incidents, but maybe as a general development, one could argue that we, but also others child focused organizations, we are being held more and more accountable. We have to answer to questions like where does the money go, did you make sure that this and this did/didn´t happen, did you put adequate safeguards in place in order to protect the assets as well as the running costs money for the operations and so on and so forth. So yes, there is that development.

Keeping administrative costs as low as possible, well this is sort of a general concept. Donors wants the money spent in the programme in the purpose for which he/she makes their donations for. There is also the element of, was the donation spent for the purpose in the programme. Not only the pressure "as low as possible", but also "was it really spent for the purpose meant to be".

Imagine that working in an NGO is like being exposed to the pressure when you have a cost-cutting in a corporate organization. So if I fly, even long distance, it is always economy class. If you ask my CEO, when he flies to Sierra Leone, he sits on economy class.

I can not speak for finance, for the shared treasury services for example. Does SOS trust their intermediaries, e.g. banks governments etc.? I have already told you about the difficulties with different political environments. Just to give you an idea; we are talking about hundreds of bank accounts, so yes ofc does SOS trust their intermediaries. But given the different countries and locations we operate, we depend on a lot of providers. I go back to the region where Malawi is, and actually to a country almost there. You are not free to choose among a big variety of banks that are available on Wall Street, but the programme location uses a bank which is available there, on site. So, not sure if this is an intermediary, but it is definitely a bank. There is not much competition in certain of our programme locations. This is certainly also something that is not really obvious. What I also like to add in that context, this is certainty not blockchain, but there are obviously internal controls built into our systems. There are for example separate and dedicated bank accounts for certain purposes, which facilitate or adds to some transparency. But, there is no doubt about that this does not reflect the degree of transparency, not the same audit trail as the blockchain provides.

Does that cover your question?

A: Yes it really does, thank you. The background for the question was that, as Erlend mentioned, that we have read many articles on the pressure on NGOs to keep administrative costs low.

(…)

M: It is a fact that, even bank charges, if you operate a lot of bank accounts and you have to deal with different banks etc. Yes, there is a share, but honestly I can't tall you how much of a donated dollar of EUR that is spent for banking infrastructure and transaction fees.

M: So, can you describe the transfer process from donors (e.g. from Norway) all the way to the ones in need in the developing countries? I´ll try to explain it from a high level. Let´s say that SOS Norway collect money from donors. I already mentioned NORAD, these funds are collected and the transfer process looks something like that; the Norwegian organization collects the money at some stage, the shared treasury services, which then administrates the process for the money to end up in the programme intended. There is two things I would like to separate. The money is transferred via bank accounts, and the money is booked into our accounting system. I repeatedly told you that SOS is not fully consolidated corporately, so we do not have an ERP system which close and reflects everything that the 136 countries are doing. We are working on implementing a new ERP-system which covers more, but we are not there yet.

From the shared treasury services, money is passed onwards to programme countries. Specific programmes, for example if you have a programme that shall receive NORAD´s (?) funds, this comes with a lot of requirements. NORAD is very strict about that. We have safeguards in place there for dedicated bank accounts etc. (…) This specific programme activity can only spend from such bank accounts.

(…)

How long does it take before funding are transferred from e.g. SOS Norway to the projects in developing countries? Technically, the usual time for passing the money onwards is the usual time for bank transfers to be executed. But that is just the money flow. Obviously, these transactions have to be booked as well. I keep coming back to the structure, as this is a federation not a corporate organization. So if you want to transfer money onward, it takes certain level of clearance. Believe me, before Norway passes money onwards, they are going to make sure that the propriate approvals have been attained. So there is a technical side of passing money onwards via bank accounts. So there is nothing special about the time spent for the transfer, just usual time when transfers are made with bank accounts. Approvals and administrative processes also take some time. I´m not sure how the technology for transferring money around would change the manual leg in the transfer process and decision making process. (…)

E: When SOS Norway have collected money, and they are passing that onwards, are they responsible for some regions and some countries? Do the money that SOS Norway have collected only goes onward to some specific countries?

M: Not all of the PSA (Participating and Supporting Associations), does not give to all the SOS countries. I have already mentioned the dedicated bank accounts, where the money is really earmarked, by the donor or institutional giver, so that the money have to go to specific projects. So, all the funding is not just going into one single pot, and then distributed to the projects randomly. (…) For example, before SOS Norway transfers money to a bank account, there are several control steps which makes sure that the money Norway passes onwards will be spent for purposes which is in line with the contractual agreement. Even though this sounds easy, it isn´t. You have to separate this by country, you then have to basically verify the calculation steps per country , and only if you have the necessary approval you can pass the money on. However, the basis for the approval is reconciliation made on the accounting system. So, this is a multi-step process.

(…) There are a lot of processes in the background. As I told you, we are planning to implement a new ERP-system which in the end will make many of these steps much easier. But, we are not there yet.

M: You then ask me what percentage of funding remains after each transfer. Honestly; I don´t know. This does not necessarily mean that someone in the SOS don´t know, but I here and now don't know. This is maybe something that people in our finance function can answer. If we run certain analysis in our finance department, we can find the answer.

Banks have their commissions and fees, but I don't know right now.

(…)

M: Are unaccounted funds noticed? I´m not sure, if thinkable instances of fraud would necessarily be detected right away with other technology. There is no doubt that the blockchain technology application will provide you with an transparency audit trail. But still, the transaction is then forever stored in a decentralized accounting system, so you can externally verify and check transactions. But it is still only about the transaction, not necessarily what the money was used for or to whom. There are definitely frauds that can be committed, where there is not necessarily the means of the money transfer that is the most relevant part. If you were to commit a fraud, you would probably not actually use the money transfer to take money away. You would probably think about whether you can kick back some money, or can I have some back from a business partner. I am aware of that the blockchain technology can provide an audit trail, but only about the transaction itself right?

E: Yes

M: So if the business partners do their work and act with due diligence, they have better means to identify fraud than the actual money transaction itself.

(…) If the fraud is made well, the cheated money is built into the price. And the transaction, whether it takes place via a standard bank account or via more advanced blockchain technology, it still shows the transaction between two parties. We have to manage out expectations when it comes to fraud detection when we use new cutting-edge technology. Because, I have my doubts that the blockchain technology will "prevent" all fraud only by pushing a button.

(...) yes, unaccounted funds are noticed. Noticing a fraud will probably be noticed by the victim, by the party losing the money. We have certain knowledge about the bank transfer, and probably the victim notices that something is missing. I'm not sure what new technology will be able to notice. But I do not doubt that there are still fraud out there that go undetected. And I think that is the reality. Obviously, there are fraud detection. Once we are there when we can analyze mass data in order to find patterns in large number of transactions, maybe that is a distinguishable new feature. Maybe we will be able to notice fraud from the analyses of mass data. Honestly, for the time being, in the context we are speaking of fraud now, we do not have neither the capabilities, means, nor the tools to, and not even the data cubes where we can run analyses to identify these kinds of patterns.

(...) When you ask me "how are they registered", we obviously have to follow procedures and have to get out books done. Because they will be audited at the end of the year.

(...) The most common way fraud is identified is through tip. So somebody, telling somebody else "look at that. This was a fraud". A piece of information provided by one natural person to another. So, If SOS, or any other organization receives a tip we obviously investigate. If there is information indicating a fraud, it will definitely be followed up on.

Interview 2

- Interviewee#2 – International Director - Internal Audit
- Sector: NGO – Foreign Aid
- Date: 06.02.2020
- Length: 45m
- Place: Call, Skype

EG: So we can just start off with you talking a little bit about yourself and your position in SOS.

RB: *So, my name is Rudiger Birkental, I am the international director for internal audit of SOS CVI in Innsbruck. So I am more or less leading the internal audit department of SOS on a world-wide basis. Before, I have worked, well, 30 years with different big four audit companies; EY, Anderson, Deloitte, KPMG. I was partner doing forensic investigation, doing internal audit, doing a lot of consulting stuff and also external audit. And then, at some point in time, I said: "Well, now it's time to do something different", and then I joined SOS to establish and improve our internal audit function all over the globe. That's a bit in a nutshell what I am doing. As such, yes, I have some insight in what SOS is doing, but especially maybe also regarding the flow of funds. So, for sure if there is something that is confidential, then I will not tell you that, but I think for the normal stuff I can for sure explain to you what the processes look like and so on so that you get a good picture of how we are currently doing it.*

EG: Yes, that's perfect.

RB: *OK. I think your first question is about my perspective on the general trust in NGOs. OK, so, I think Oxfam hit the NGOs quite badly. There was quite a big scandal in Germany about 10 years ago with UNICEF. So, trust is a big issue, and if you lose trust, you will not attract any NGOs any longer, especially the NGOs when the NGOs are in the spotlight. This is something that we really take care of, which is why we enhanced our compliance function, where we have a colleague and an international director who are heading the integrity, compliance and legal department with 5 people. So, at least we are doing our best to ensure that we have a robust framework regarding anti-fraud and anti-corruption, which we also have a guideline for, a code-of-conduct. So, we have separate means to ensure that our people act in accordance to what we think that they should act like.*

So, yes, we are actively working on that (trust): We are publishing, for example, our compliance report - a short one integrated in our annual report - and we talk about incidents that have happened, for sure, and we do our best to remediate them. Of course, I think we are working in 135 countries, and most of them are read (?). I think, if you look at the Transparency International Corruption Index, we cannot just close our eyes and say that it won't affect us. We, of course, have external and internal risks, like fraud and corruption, which may happen somewhere. That's also what we include in our internal audit procedures: To look at that actively and also look how, let's say, awareness is raised in our organization; do the people know about our policies and procedures? Is there a conflict of interest? Are the national and international directors talking about it? These are also what we are talking about, and we also highly encourage our colleagues all around the world to do that.

So, if you maybe look at our website, or if you don't find something, for example our code-of-conduct or anti-fraud and -corruption, we also have something like "good management and accountability standards", where we also frame a bit around how we think our people should act. If you need something like that, either ask Bente or me, and then we can for sure send you the stuff. The stuff is not hidden or secret.

EG: Yes, we found some documents, like the code-of-conduct.

RB: *If you miss something, either a corruption guide or examples of good measurement of accountability standards, just let us know. That's not a secret.*

EG: We will let you know - thank you very much!

RB: Now, looking at our banks - the intermediaries, bank governments, and so on.

EG: Yes, so in short terms, we want to gain an understanding of the SOS current ERP system, before we go into the more detailed stuff. Can you give a short explanation of it?

RB: *We have an old system which is from an accounting side, and lot of the old, programmed software-stuff, and we also have a very good banking system. We have changed our way of communication with banks from, let's say, a single point of contact or one-to-one contact, to a more or less shared treasure service. What we now have is that, for example, our colleagues in the GSEs, they collect all the money that will be transferred to the NAs (National Associations) - to the members from associations - and they everything about that: they convert currencies into other currencies, and do hedging to ensure that we have the best conditions, the banks, and also to ensure that they follow the same processes and that we do not lose money somewhere.*

We have tried to really reduce our banks. Our banking connection especially. You can imagine a banking system in Uganda or Angola, they have far too many banks. They have historically grown banks, so we have tried to reduce our number of banks. So, we are really trying to work with 10-20 globally acting banks. Even less than more, who also can, let's say, ensure that we have their presence in the different countries, and this really makes our lives much easier. The idea, as well, is to say, as we are not, the GSEs are something like an intermediary, something like a holding function. And we are not a bank, so what has been done is that now there is every year a budget round of the NAs, the member associations who need money. This budget then shows a cash flow need for the next year, and this is then discussed between all the funding PSAs, who more or less give a commitment. You can imagine that sometimes this is like a layering-up something, so say that PSA 8 or PSA 10 are interested in funding something in Uganda. So, everyone are giving their own commitment for the next year This will also mean that then they are obliged to send money to our shared treasury centre, that is a little portion - a down-payment - before next year starts. Then, sometimes on a monthly or quarterly basis, our shared treasury centre then transfer the money to the national organization. Given that we have many countries with local currencies, if possible, our shared treasury centre is also doing hedging (80% hedging, 20% free-float). This gives, on one hand, more certainty regarding budgeting, because then you have a budget to the currency exchange rate, which makes it easier for our NAs, and also for us planning things. On the other hand, you might also lose some opportunities if the currency goes down. But we try (with this) to make things as budgetable and planable as possible to ensure that we have a sound base for sending the cash to the NAs the next year.

The main currencies that our shared treasury centre is receiving is mostly Euro, some USD, and also nordic currencies.

But, it is a bit of a complex mix. You can imagine that, if you look at a spreadsheet structure, it means that you have some incoming currencies, which are mostly hedged (80%), and then you must ensure that the cash needed in the NAs goes to the NAs via secured channels and in smaller instalments, but ensured that it is sent to the right bank accounts - the local bank accounts - with reliable banks.

AS: We can now move on to the questions regarding the "funding time-line". So, what we would like to try here is to understand how the funding goes from a private donor, e.g. *me*, and then - as we have understood it: It goes from me to SOS Norway, who transfers it to SOS International, who distributes it to, for example, Malawi. Of course, you don't have to mention certain steps if they are confidential, but if you can take us through the process, from the very beginning to the developing projects, and all the different steps and transactions that are in that process.

RB: *If we start from the "Cash-collection side". This is done in e.g. SOS Norway, and it can be donors with a regular sponsorship, maybe they sponsor a child in Malawi and send a small amount of money every month, or there are also one-off donators. So, the art (?) starts in Norway to ensure that, for example, if they want to fund Malawi, that they attract donors who have interest in funding malawi, for either direct sponsorship of children or also by sponsoring the NAs. Moreover, if you have something called an "earmarked fund", e.g. a donor wants to fund Uganda, you cannot use that money to fund Malawi. So, what NGOs always like is to have money that is not earmarked, because it gives you more flexibility. However, especially the unique selling-point for SOS is that we also own the projects, and our donors like to have direct contact with the beneficiaries. This is why we have this sponsorship system: That you know which child you are sponsoring, and then you commit small amounts of money every month for that child. You can also donate some additional money which is then put into a saving box for this child, so that when the child is grown up, they have a better start for their life. So: The money collected in SOS Norway, they have to know if the money is earmarked. If the money is earmarked for, for example, Malawi, then the money has to be used to fund Malawi. These projects can be of different types and sizes. For example, we have children's villages, we have use facilities, we even still have some hospitals, some schools and some kindergartens. And these institutions need money, and the need of money is framed, because the needs or frames that the NAs send to SOS International, where it is checked for whether it is reasonable. Then, this cash need is communicated to the PSAs. They then think: "OK, we can fund, for example, Malawi, with one million". So, some of the money is earmarked - so it should only be given to, for example, if it's for the child, then - it is very difficult; Because if it is for the child, then the fund has to go to the children's village, to the house where the child lives, and also to the mother that is running this house. So this is a very specific purpose, and that is what the NAs have to ensure internally, that they (the frames) are very strictly followed. However, if you don't have that strict earmarking, then it's easier, and the money can be used for other projects like kindergarten or the school or whatever.*

And then, as I mentioned, SOS International does not have any free cash. The funding PSAs sent 20-30% at the latest by the end of last year or beginning of this year, to the shared treasury centre. This is then used always to facilitate some periods in between, because normally SOS Norway do not send money on a monthly basis, sometimes they only send it on a quarterly basis, due to it depending on the "cash-needs". The STS (shared treasury service/centre) then send new appeals to SOS Norway so that they get fresh, new money in Norwegian currency, and normally on a monthly basis, this money is then sent via trusted banks to the bank account in Malawi.

So, this is the circle from PSA to SOS International, SOS International to the NA. This is the normal procedure, and normally the system itself is quite secure; it has already been checked by auditors, both systems and control-checks. But, if you think from a blockchain perspective, having total information flow, you have money coming from Norway, and this money is then converted into local currency, and is then sent via the banking system of SOS International to the benefitting organization.

Do you also need to understand how the money is spent on-site?

EG: Yes, would be great.

RB: OK, so let's use Malawi as example. Malawi may have some projects which only allows to use some earmarked money. So, this earmarked money is normally transferred from the STS to the so-called "earmarked bank accounts", so that only expenses paid out of that bank account can be tracked back, and only the money that has been sent in can be used for that purpose. This is what we normally also audit, to ensure that there is a clear flow of funds, which we can also show to our donors; Because you can imagine we also have some external donors, e.g. NORAD, who funds very specific projects, and really want us to ensure that these are being done. And then there is a "normal" bank account, where the money is sent for the NAs' needs for operations, for example like salaries, etc.

NGOs will also have so-called "tied money giving accounts". These are account where, for example if a donor wants to give the child something extra, for Christmas or whatever, then this money is transferred into a separate bank account, which is then 100% funded by cash on the asset side to ensure that, when the child at some point in time leaves our care, they will get something extra to start their business or what they'd like to do. So this is 100% backed with bank transfers only spent when the child is grown up.

AS: OK. I have some follow-up questions for you, if that is OK? Firstly, you mentioned the "saving box" for the children. Where are those kept? Is it in banks in, for example, Malawi, or is it at SOS International?

RB: *It's kept in banks in Malawi. This is also then something that is discussed with the donor. If we can, we try to keep it in "hot currencies", being USD, but sometimes in some countries you are not allowed to do that, and you have to convert it into local currency. We then, for sure, hope that we get some interest on it. So, it's more of a savings account for the beneficiaries, like if your grandparents would like to donate you something, they can give you a savings account, and then it can be separately kept and gain interest over time.*

AS: Thank you. You also mentioned the frequency of the transfers of funding. For instance, you said it was on a monthly or quarterly basis, is that correct?

RB: *Yes.*

AS: But, if there is an instance that makes, for example SOS Malawi, in urgent need for funding, e.g. if there has been a natural disaster or something like that. Is it then possible to send money on a more frequent basis?

RB: *Yes, it would be possible, but normally it would mean that there would have to be an appeal first. Because money is only sent if there is an appeal and the PSAs have agreed to fund it separately. You talked about these types of crisis, for example we had this flood in Tanzania and in other regions. If this happens, then it starts with a funding appeal, and then extra money is channelled to them. But we also have more procedures than that, so it cannot be unauthorized payment without the acknowledgement of the PSAs.*

AS: Thank you. One last question to this; You said that the bank accounts for some of the children were earmarked for special expenses, etc., and that these accounts were audited so that you can show your donors where the money is going. Are these accounts audited in the SOS country, or is it audited by you at SOS International?

RB: *It's audited annually, because all of our associations need to go through the external audit process, meaning the financial statements are audited and tied money gift accounts are audited. These are also, you can imagine, audited by internal audits. When we are there, on-site, we also look at it to ensure that everything is OK.*

AS: OK, thank you.

RB: *This is the normal process. Maybe, if you would like to understand a bit more regarding, let's say, spending, then the NA just has its normal processes. There are accounting systems behind, and also checks and balances to ensure that money is spent for the purposes intended. This is then done in local currency. And, for sure, if they exceed budgets, there are some questions from us, the HQs, the GSC/GSEs to understand where the money was extra spent, if there would be some savings next month, so that we ensure that the NAs can do whatever they need, but also to ensure that the money is not only wasted.*

EG: So, the local countries have their own books where they keep their records. Do you have open access to that, or do you get them once a year?

RB: *I think for most of them, we have open access, but in some countries it is a bit more difficult, e.g. in Syria, etc., they are not 100% connected to our system. But, I think 90-95% of them have (inaudible), and we are currently converting to these new system from Microsoft. So, our current project is to only have one unique ERP system, and hopefully get all the countries to use it.*

EG: OK. And when you are transferring funding, what percentage of the funding remains after a transfer? I.e. what goes to administrative costs, exchange rates, transfer fees, etc.?

RB: *It's very low (the percentage lost during transactions). I think, compared to what we had before, I think we are saving every year approximately a few millions by centralizing this all into one SDS (?) and one shared treasury centre, talking with few banks. This money is then, for sure, either given back to the funding PSAs so they can use it for additional funding for different purposes, or sometimes it's also given to some of the NAs who have some extra investments, or something like that. So, it's quite good, maybe it's 1-2% - it should not be more. It's very, very low compared to others. You can imagine, sometimes it is difficult to convert into local currencies and get the money to the countries, like Syria and Venezuela and so on. So, this is quite good in some, but still we have really managed to find good banks who give us good conditions so that we, in our perspective, have a very cheap way to transfer money.*

EG: That's good.

AS: So, you have told us about these different kinds of funds; Some of them are earmarked, etc. But, for those funds that are not earmarked for specific projects, is there a system that can track these funds throughout the entire supply-chain?

RB: *In the end you'll see, for example let's go back to Norway. Norway has earmarked funds for, let's say a few million, that they just use for Malawi. And then they have non-earmarked funds that they would like to use for, let's say, Angola for example.Then they take this money, they more or less commit to fund Angola for the next year, for example. They take this money, and this money is then, as a normal procedure, they have to pay the 20% in advance to enable our shared treasury centre to run the whole system, and then it is called off every two-three months, for example. Then, Norway pay what is committed to SOS International, and then from SOS International, it channels to Angola. So, it's the same method. In the end, you know, SOS have, for example, recorded one million to Angola in maybe 10 installments of 100 000, who see the cash in from Norway to the International office. The international office then out at some point in time. Maybe the amounts are a bit different or the frequency is a bit different, but in the end the million is vented out to Angola during year 2020. So, it really is a 1-to-1 match of what has been committed to fund, and what is funded. There's only a very small portion that could be used to equalize, because at some point in time in the budgeting there is something difficult, and sometimes PSAs also commit to say "OK, we also commit maybe 1-2-3% of what we are giving to SOS International to be used for other programs in other countries.*

EG: So, when a country like Malawi or Angola is asking for money, do they state different projects that they have planned to do, or to commit to, and what the money is supposed to go to?

RB: *It's both. If it is a specific project that is specifically funded, then they normally have separate calls for these projects, because they might follow a different interval of when they really need the money. But, if you have the normal instances, when the village needs tools which always require money to run and to have the beneficiaries to survive, then this is normally done on a monthly basis. So there are normal frequencies and there are extra projects which do not fall into the normal procedures. And, there are still somewhere that some PSAs still do not participate in our shared treasury centre. Those smaller amounts are also channelled not via our STS, but directly channeled from the PSA to the NA and to the*

specific project. But, we try to, let's say, enhance the reach of the STS so that at some point we have that 98% of everything is channelled through the same, which from an economic point of view it makes more sense.

EG: But then, say if there is earmarked funding, do you have any systems to track and check that the money is spent at what it is earmarked for?

RB: *Yes, so for example if you have specific projects, let's say you have a specific accounting project, which shows that this object is bought for this purpose, and is also accounted for, you can do that in NVision, you can do that by setting up some kind of project codes, in the new system you can even set up cost centres or whatever. You can also, because sometimes these projects go for more than one year, you don't only want to see the year-by-year development, but also the beginning-to-end development. So, hopefully, with the new system it will be better. But, we have specific accounting for that, and we also track the cash out and cash in for these operations or these, let's say, projects.*

AS: So, we have now spoken about the process where funding goes from the donors to the developing projects and the earmarked projects, etc. Are there any steps in this process where you are looking for changes so that they could be done in more effective ways?

RB: *I think, what is really time-consuming now on our side is matching of needs and funds. It's quite a painful process, because, as you know, we have 135 countries and 110 organizations or associations who require money. So, on one hand you have the need and the budget, and on the other hand you have the PSAs who are funding it. And the art is really to fill that up with earmarked money, with money that is free for the country, with money that is totally free and so on, and to ensure that all the needs are funded by the PSAs - especially some PSAs do not want to fund specific countries due to history. For example, France want to go more into the western central parts of Africa, like Algeria, and they do not want to be in countries like South Africa. So, this is a real art. And we have a very complicated system, currently, behind it, and it takes us a lot of time to equalize the needs with the funding and funding available and possible.*

The payments themselves, the money, is called off, and the money is received. This is more or less done on a normal, well-controlled, and, I think, a very efficient basis. For sure, when you look at the NAs, you have to ensure that if there is earmarked funding, they only use use it for these purposes. This is done by external and internal auditors, and we also have colleagues in the regional offices who are looking at the finances and the accounting of each member association. So, this is also normally done, for sure, if you want to do tricks you do tricks, but this is normally also very well controlled. But, the most part, that really costs a lot of money, that I want to mention to you, is to equalize cash-needs from the NAs with funding peculiarities that our PSAs have.

EG: That was a very good explanation. I have one more question: In regard of the transparency towards donors, of course you have to report for the earmarked funds that the money goes where it is supposed to. But, say that there were to be a blockchain introduced to your system, it will makes almost everything transparent. So, are there any information in the different transactions that are completely confidential and that couldn't be broadcasted to the public on this system?

RB: *Well, let me think about it. No, earmarked, I think is not confidential. If it's only used internally and also for the donor, it should not be a problem. I think if it is published on a website or that anyone could look at it, then no, there shouldn't be any problem, I think. If, at some time, we would be able to do so, it would also give our donors more confidence. So, if they give us 100 or 1000 Euros, then they will see where the money is channelled through and what it is spent on: Perfect!*

What we have to ensure is that the confidence is there in that the money is spent properly, because, I think the only thing you see is that money is spent, maybe also for purposes like construction or for children's clothing, but you do not see the item at the last step, meaning how the negotiations between

the organizations and the supply has been made, if they followed our procedures, e.g. that you have three bids, that you have a procurement committee and so on. So, you would only be able to see it if everything was 100% transparent, so also our internal processes would be 100% transparent and would also follow something like a process model and all the data would be kept.

That's the future; maybe in 10-15 years, currently I fear we are not there yet. However, I would say: Great! You may have a unique selling point. If not, then others will do it as well - and then we would have to follow anyway. And, doing that would mean that you would have full transparency of the money flow. You may also see what kind of money is used for exchange rate and for admin costs, and so on, and what you spend in the end. What it means when you have 100%, I would say, homogeneous IT system - that all the computers are following a specific logic and sequence, so for example that you don't have a break between money coming in. Maybe you have something like a pot, and then the money from International is then used to transfer it to somebody. It would mean some effort from our side as well, especially that some information is given with all the transfer initiations that are done by the banks. Sometimes the banks are sending money to corresponding banks, and sometimes do it even directly, but even indirectly. For example, due to the U.S. banks are not allowed in some countries, so you cannot use U.S. banks in countries like Iran and Iraq. I hope that all the other banks also have the same set of data, so you can really follow up.

But if that is all possible, then fine! It would be good for us, and sometime we are waiting desperately one or two weeks, thinking that the money is gone, but then the banks have blocked the transfer for some reason. This could be due to an attack or that some additional information is needed. It's not even easy to transfer money from one country to another. So, whenever we have more transparency about that, and we can follow where the money is currently blocked, and then speed that up, then perfect!

AS: OK. So, I have one more question for you, and please correct me if I'm wrong. You mentioned that in your current transactions, you are collaborating with 10-15 banks, is that right?

RB: *Yes, maybe even a bit more, but we really try to nail it down to a few.*

AS: OK, so if I understand it correctly, SOS Malawi has to use a local bank in Malawi to get out their money. Using Malawi as an example; If it is not possible to cooperate with one of your 10-15 banks in Malawi, if there is just a local bank available there, is that an issue for you?

RB: *Mostly not. It may cost a bit more money, because it is not done via one of them, but normally, for example if we take one of the larger banks that we normally use, and then they would try to transfer the money to this local bank. It may also mean some higher charges for our colleagues, because this local banks normally have higher charges than if you have a world-wide contract. But, it's possible! Yes, it may take longer, and it may be less transparent, because maybe just at the interface, the money might get stuck somewhere. And the requirements from the local banks are different from the sending bank, and then, sometimes, this communication takes a while. To clear it up, sometimes they want to make sure that the money is coming from a "clean" account, especially due to money laundering. Also, now the NGOs are much closer looked at, especially by the U.S. authorities, because they think that maybe NGOs can easily be abused to transfer, I would say, money that comes from illegal sources, and convert it into (il)legal money somewhere. So that's why, especially banks are also now having much stricter requirements to understand where the money comes from and where it is spent.*

AS: You mentioned that the money sometimes can get stuck on these transfers, due to some administrative work, or something - does this happen often?

RB: *It depends. In some countries, yes, it is a permanent problem. Especially in a country where normally U.S. banks don't want to do any business due to bans or whatever. Sometimes it can just happen unexpectedly. In maybe 5% of the cases, and these sometimes are the cases where the country is in urgent cash-need. Our countries also have some kind of financial reserve, and we really encourage*

everybody to have at least one month of cash reserves so they can survive without any more external funds coming in. But, these countries are normally a bit more short on cash and desperately need it, and then, maybe after one week, our shared treasury centre gets information from the NA saying: "Hey, we didn't get the money. What's up?". And then the banks need to work and investigate and find where the money got stuck.

AS: And how long does this process normally take?

RB: *Well, sometimes it takes up to two weeks. But that's unfortunately something that has to do with our banking system: As long as they are not harmonized, as long as they are not transparent, whatever their interfaces are, there are always some problems. And, whenever it comes to difficult countries, where especially the state is trying to control the inflow of USD, because they urgently need this kind of money for other purposes, this is always an issue. There are many countries like this, for example Zimbabwe, who are currently very short on foreign currencies, so we really need to find ways to deal with that.*

AS: Thank you. Actually, that was all of our questions for you! Is there anything you would like to add?

RB: *What I can only add: Good luck to you, and if you have other further questions, then just let me know.*

Interview 3

- Interviewee#3 – Manager
- Sector: Professional Services
- Date: 05.02.2020
- Length: 48m
- Place: Video Call, Skype

AS: We have written down some questions, so if you can start out by telling us about yourself and your background, and how you got interested in the blockchain technology?

JS: *So, I am also from CBS as you might know I have my bachelor and master degree in Business Administration and Information systems, and I Have been working with Deloitte since 2011 while I was studying, and then in 2016 I went to TDC that owns YouSee and many other brands. There I was first a strategy consultant and then I was heading up to the robotic process automation unit, building up an organization for around 40 people there, and then I returned to Deloitte in 2018, starting the journey towards becoming an industrial PHDs. And my research area is blockchain technology´s impact on accounting. So I am a part of CBS´ department of accounting, and I am a part of the Deloitte global blockchain team, situated in Copenhagen, but right now I am on a four month exchange in the US. On Friday I am going to the Deloitte New York office in Manhattan and I am affiliated with Rockhurst Business School, they have the best accounting information systems facility in the world. So right now it is pretty exciting to be me as well.*

But I think that the blockchain technology has got a lot of attention and with, I mean, I think it has a merit that it has got so much attention. I think where we are right now, if we take a look at the Gartner Hype Cycle curve, we are deffinitely in the "Trough of Disillusionment". Because people think that the applications of cryptocurrency has the same impact when you try to rule it out in the business world, and also I don't know if you read our point of views from Deloitte. Hopefully next week we will come out with a new point of view, I think actually spot on what you are writing about. The entire operational finance kind of space. Taking the entire value chain of how transactions are actually managed reconciled, settled and all that. (...).

Two things that we need to start with; first lest try to call it DLT (distributed ledger technology) and not blockchain. I know, we also call it blockchain, because there is a certain hype around it still. However, I think in order to educate the market and educate ourselves, we need to talk about DLT-systems and then we can later on specify what type of DLT. It kind of saying that we all just need a "car". Well, I mean, for what purpose do you need that car? Should it go on the road or should it go in the dirt. How many people should it fit? Which needs does this technology actually try to solve. And I think in the press it is kind of a silver bullet that just kind of "does it all". But there is big differences between the Bitcoin protocol vs. what you guys want to have with increased transparency in NGOs. Their characteristics are simply very, very different. (...).

EG: So going a bit back to the basics, what general advantages and strengths does blockchain and DLT-systems provide?

JS: I think, to answer that question, it is a good idea to start out by the requirements for a use case to be eligible for a DLT-system. So if you look at problems, more kind of holistic, I usually start with a slide; so on one hand side you have problems that are organizational-focused. And on the other hand side you have problems that are ecosystem-focused.

Lets start with the organizational-side. Here you tend to use technology that are very centralized because you need to be and have the total control over that. That could be ERP-systems, machine

learning, algorithms, etc. Compared to that you have governance systems that are also very centralised. (...).

However, on the ecosystem side you need to apply another mindset and another type of technology. You need to apply network technology. That is why the Internet is such a great invention for doing commerce online or network-wide solutions. And then on the governance side you also need to apply another set of governance rules and that is why we see so many consoldier, I think you should also look up Deloitte´s latest Global Survey and point of view on Consolture. You need to be conscious around saying that blockchain can solve the transparency problem. Because I say that there are three things that needs to be present in order justify why DLT is the right tool in the toolbox. 1) There needs to be an ecosystem - there needs to be multiple actors. So not only one. 2) there needs to be low transparency. And 3) low trust. So certainly you have low transparency, and you have low trust. The question is do you have an ecosystem? And you might have, so that is fine. I mean, the money that goes in to the NGO need to be distributed to parties in the ecosystem, and in that case you can argue that there is an ecosystem. However, there are also the possibilities to use, IBM call them "Trust anchors". I think actually that is a way from getting from a centralized to a less centralized model, and then over time maybe to an entire decentralized model. I think we need to consider what happened with the Bitcoin protocol; they went from a totally centralized to a total decentralized model in just one go. But with businesses, those radical changes almost never happen. I have never seen it, to be honest. There needs to be some intermediate step, to kind of paint a picture saying "this is the vision". But also from an economic standpoint, you know the term "sunk cost", and the investment in the infrastructure that companies have, and also the investment in the skill, in the capabilities that their employees have, it is simply just too much to go from zero to hero in just one go. So I think that you should definitely explore the possibilities for trust anchors, and I think the most mature trust anchor you would find right now is a platform called "Hadera". They have just launched, last week, called the "Hadera consensus service", and they have also announced a partnership with IBM and the hyperledger fabric platform. So they have actually combined, and I think that combination is quite strong. Because then you begin to also get the business blockchains, which we also talk about at Deloitte, because then you would get the true decentralization and ordering of the transactions from the trust anchors, however you still control who sees what and who participate in the ecosystem. So it is kind of a hybrid between a less centralized and the entire decentralized setup.

AS: I just have to ask; you mentioned these three requirements, low trust, low transparency and a network with multiple actors. Is that like a framework you at Deloitte use if you are to advise a customer on the implementation of DLT and blockchain?

JS: Sure.

EG: Let's say you want to implement such a system for an NGO, which has many offices in developing countries in Africa, for instance, what type of general infrastructure is necessary for being able to introduce such a system?

JS: Internet. I think that's it. But of course you will run into the Orakle (?) problem, do you know what that is?

AS: No we don´t.

JS: So the Oracle problem in blockchain is how to get data from the off-chain on to the chain. There is an inherent problem in that. I mean it is how to link the physical. It has two dimensions, it is typically the problem of connecting the physical world with the virtual world. How do you really make sure that the physical assets is actually represented on the chain. That is a classical problem and it is still there, it is very relevant to try to solve that. There are things that are being developed right now in terms of secure IOT devices, but again, I think also with the Control part of your education it is definitely a thing where you have to provide audit or at least assurance for that this physical thing is actually there and not just on the ledger. So that is one problem and we typically call that the Orakle (?) problem.

And the other part is that how do we get some non-physical asset or calculation from outside the DLT into the DLT, and that you trust that calculation or whatever information is actually true. Because normally you would use the network to verify transactions, but there are things that you need to have from the outside. For example that could be currency fluctuations, weather forecasts or other things that need to be frequently updated.

AS: In which part of an organization do you think that DLT can streamline operations?

JS: In the transactions-heavy part. That will be in finance, HR etc. Going back to the three criteria; in the parts where you have multiple actors, that goes outside of the organization. I think that is pretty important. It needs to have some interaction with either your customers, vendors, suppliers. These kinds of ecosystems problems.

Actually, the phrasing of the question, I think you should try to broadend it up. So I would suggest to SOS that they say "Ok, so this problem is an industry-wide problem. It is not only SOS, it is a problem for all NGOs that accepts payments and wants to distributed that wealth to foreign countries. So I would actually argue that NGOs they need to come together, because then you will actually have that network, right. And so, right now we are helping. There is a news article on DR where you can find that blockchain technology can help pig production. Meat going to China. What we have actually done there, is that we have put all the meat producing companies together in the same room and, I mean as with the NGO, they all have the problem around traceability. The chinese consumers are so focused on traceability and transparency on where the meat has been, at which temperature it has been stored, what grain the pig has eaten etc. All these kind information that we take for granted. We trust that whenever we go to the supermarket, things are well and ok. However, that is not the case in other places. So if you can provide that information the the consumer, it definitely provides certain behavior and also decisions to buy. So they saw that the entire market, and the entire industry benefited from creating this joint platform, and it actually says "let's be common around the infrastructure of the platform, because no single one, not even the largest player, would be trustworthy enough. However, if you come together as an industry, and then you can start applying game theory on that, I mean then it would be very hard for one to cheat. They would benefit more from all of them being together. And I think that is the same paradigme here in the NGO space. And I think that agreeing on the infrastructure, and then competing on the client-facing parts, the value proposition, that is fine. That is all individual and normally, but let's agree on the infrastructures, structures alike.

So, they kind of saw that the entire market and the entire industry actually benefits from creating this joint platform, and it actually provides - it actually says: "Okey, let's be common around the infrastructure of the platform", because no single one, not even the largest player would be trustworthy enough. However, if you come together as an industry, and you can apply game theory to that, then it would be very hard for one to cheat, because there would be this game where everyone benefits from all of them being together. I think that it is the same paradigm in the NGO space, and I think that agreeing on the infrastructure and then competing on the client-facing part, so the interfacing and the branding-side of it - that's fine. But, let's agree on the infrastructure and standards.

EG: Following that question, in what part of an organization can the blockchain or the DLT be used as a cost-efficient tool?

JS: *So that's kind of the same answer, right: In the transaction-heavy areas.*

AS: Talking about SOS International, they are characterized by many different transactions. They get money transactions from Norway transferred over to SOS International, who then transfers the money to regional offices in developing countries, who then transfers it over and eventually to the final recipient being the projects. They are using bank transfers for this, but if

these transfers were put on a DLT-system, do you think this will provide advantages in terms of the auditing processes?

JS: *It would provide, I would argue, a lot of benefits. I think, also from the Deloitte paper, there is a section about "corporate-coin", which kinds of answers that problem. What happens when you move money, even internally from branch to branch, of course you are exposed to risks and delay in cash flow. So, if you are moving money from Norway to a branch in Brazil, it is a hassle.*

(...)

It is also a dilemma that we sometimes forget (...) We just assume that everything works very well and digitally. Sure, in many countries it does, but in other countries, especially in the NGO-space, you are in rural areas where there might not be things. So, for me to be saying "You just need internet" - that might even be a stretch.

(...)

I think the African continent has evolved immensely in the past years, and they have kind of leapfrogged one or two technology generations due to the introduction of the internet through their mobile phones. So, it may not be the case that they don't have internet, but there are certain things that you need to be aware of when proposing these types of solutions. Also, from a cultural point of view: In the western part of the world, we like everything to be controlled and standardized because we see the benefit. However, it is not certain that people who have not been brought up with the standardization sees this kind of control as a good thing. So, there is also a cultural aspect to implementing new technology. (...)

There are two terms that you should consider: On the one hand, you can draw a continuum going from the one hand called SCOT (Social Construction Of Technology (?)), and then on the other hand it is called technological determinism. The SCOT is where the social context points to and affects how we developed technology and, in this case, an information system. On the other side, we have technological determinism, which is where the technology was just kind of put in there, and it changed the way that we do things. The two classical examples here are: The SCOT is the bike: The bike was first developed weirdly: It had a large wheel on the front and a small wheel at the back, and it was very impractical. Then, over time, it developed into the bike as we know it today. (...) On the other hand, there is a famous article around technological determinism, where an architect in the New York area, who was a racist. He created bridges that were fairly low, meaning that only cars could go from Brooklyn and New Jersey into Manhattan. So what do you think was the result of that?

AS: Well, since you said he was a racist, and not many coloured people had cars.

JS: *Exactly, so they were taking the bus, and the bus couldn't go under the roof of the bridge.*

So, you have these two ends of the continuum where blockchain is definitely somewhere in between. The dimensions here are actually quite important for the sake of your thesis, because if you want to provide a bit more abstraction level to your thesis and making sure that it is not just a consultancy report (...) make sure that you also provide that type of perspective on "what does technology, and what does information systems actually provide? So, there is a term called the socio-technological system, and it is certainly within that area that you are right now.

AS: Do you have anything you want to add on what parts of the business model that can be transformed by using such technology?

JS: *The reason why I this space was that I think that DLT systems are certainly more technologically deterministic than a social construction of technology, meaning that the technology provides opportunities for organizations to do things differently than they have done before. And I think the, kind*

of, essential part of this is that the boundaries of the organizations get blurry with the introduction of trustless computing or increased trust. I believe that's the cornerstone of what DLT actually does. So, for the organizations to get their head around that, it's actually quite a hard change. I have also, before I started my PhD, I also taught the class in change management, and from that angle this is definitely a transformative change, because it requires organizations to be able to manage partners which are also their competitors, in a new way. This is a discipline that they all suck at, to be honest. So, also from my Deloitte experience, and from the global network, we see that even though there are these large consortiums, it is still just damn difficult for the organizations to actually participate, as well as opening up and trusting each other. So I think that dimension is the most interesting, and the most difficult one.

AS: We haven't really thought about the aspect of change management for our thesis, at least not thus far. Do you think that it's an aspect that can provide value to our thesis?

JS: *I mean, if you go with the stance that you suggest that SOS should form a consortium together with, let's say, Red Cross, Save the Children, etc., then there needs to be a consideration around change management. How does that affect the finance organizations in the different organizations? How would it be perceived by the public? There are many thoughts there where the human aspect is easily forgotten as we get so excited about the technological pieces.*

(...)

There is another paper (provided in a chat): "What does blockchain actually do?" This paper stated that 35% of the U.S. economy in 2010 was used on trust-creating parties, meaning auditors, lawyers, etc. Thus, 35% of the entire U.S. economy could, if done right, be swapped with blockchain. They also ask: "Why do we need all these third-parties that provide trust into a transaction?"

EG: This interview gave us a lot of information, so we are very grateful that you took the time from your settling in to help us.

AS: Good luck on your research in the U.S.

JS: *Thank you, and good luck with your thesis.*

Interview 4

- Interviewee#4 – CEO & Managing Director
- Sector: Financial Services
- Date: 04.02.2020
- Length: 54m
- Place: Call, Skype

Introduction to our master thesis, the topic of interests and our background (...).

TB: Do you plan to investigate how use of blockchain and cryptocurrency can change how the last mile problem will be in the future, or how an NGO itself can be a part of changing the way it is doing its business? I mean, if they take use of a cryptocurrency today, they will still face the last mile problem. However, in the future you may see that cryptocurrencies are more stable and it may be taken use of in many countries, a stable coin, a bitcoin or others, which can be transformed to mobile credit (mobile money) or other credit, then we will have another possible solution.

So, is the focus what the NGO can do, or how the ecosystem that the NGO is part of will change?

AS: we think that we will go in the direction of how the ecosystem will change, following this new technology. We had a talk with one from Deloitte yesterday (Jonas), which also talked about how NGO might come together in the ecosystem so that they can see how they all can alter the way they are doing their business by using this new technology. However, we are still in the early phase of pointing out which direction we would like to go. What we are supposed to end up with is a conceptual design for how SOS can take use of a blockchain in the way they are doing their business. This will focus more on the structure of the system, rather than the technical aspect.

TB: Then you will focus more on the aspect of transparency, rather than incentives, bonus systems etc.?

AS: Yes, we would like to see whether the design can create this needed transparency. Additionally, we are both into accounting so we would like to see whether the technology also can contribute towards streamlining accounting processes within the NGO. "Streamlining accounting processes".

TB: Exactly, the question of time is essential here. I would image that for NGO there are a lot of money that are "tied up" related to transfers and different intermediaries etc. Tied up on their travel towards the end goal. I think that the effect of losing up this money and decrease the time aspect of transfers would be significant.

AS: Then you have got a quick introduction to our thesis and have some thoughts of where we would like to go.

So, can you start out by telling us a bit about yourself and your background, and also how you got interested in the blockchain technology?

TB: I am an economist (samfunnsøkonom), and got aware of Bitcoin in 2013 as I was a student in London. At that time I had a couple of professors which raised the question of "What is money?" and different approaches to the question. And the field related to this question is really interesting, so first i was quite sceptic to Bitcoin. However, I was interested enough to think "what if I take all these different theories about money, and try to use them on Bitcoin". Following this, I did my master thesis on Bitcoin in 2013/14 and I saw that this (Bitcoin) was much bigger than phenomenon than I had ever imagined. I spent a lot of time trying to understand the technical aspect of Bitcoin, especially on the structure of the phenomenon. Not necessarily the language (code etc.), but more about how the system of Bitcoin

worked. Consensus system, and the technology, which actually originates to the 80s. I wanted to look at which problems can be solved by Bitcoin, which has not been solved today by other technologies.

I think that I have been quite lucky, because when I first got aware of Bitcoin it was not the "hype" that we have seen the past 4-5 years. This caused me to do some research by myselves, like Can Academy on YouTube. Thus, I gained a thorough understanding from the very start. (...). I started working more and more with blockchain and cryptocurrencies as a consultant/advisor, speaker etc. in 2016/17 in Menon (?) Economics. Since 2018 I have worked with Arcane Crypto and are building up that business. We are a company that used fintech to build on open blockchains, and cryptocurrency as payments.

(...)

My interest in the blockchain and cryptocurrency also originates in the "banked vs. unbanked problem". For all of those which are excluded from todays´ current systems, which opportunities do they have as a result of this new technology.

EG: By looking at the blockchain technology, without relating it to any specific use cases, what main strengths would you like to highlight?

TB: What is important to understand is that this (blockchain) is not only a technology. It is also a network, meaning that a blockchain technology is not necessarily something that you should install on your server and then you get the value. It can be compared with TCP IP, the technology behind the Internet, it is an important question whether you install this as an internal network (intranett) or as an open network, looking at the uses. It is a lot more things to do on the Internet than on the internal network, even though it is the same technology.

Thus, I would say that the most interesting aspect of the blockchain technology is ... First of all it is an open infrastructure for handling of value, which also is global. The fact that it is open means that anyone can build upon the technology, it is open source. Anyone can further develop the technology, and the fact that it is global means that anyone in the world can use it in the way they desire. Then, in the open blockchains, you have the ability to e.g. store data in such a way that you can prove that something has existed in any form at a given time, thus securing other systems e.g. books (regnskap) that you are doing yourself. Thus, you can at a later point in time prove that you have data (the books) that has not been altered. This aspect is not something that lies specifically within the blockchain technology, but in the possibility to store data and infrastructure that other businesses can't manage.

However, possibly the most important aspect, because of its powerness, is the possibility to transfer digital values. Not only abstract values, but simply put money. The possibility to erase boundaries and make it programmable is extremely powerful. Combined with the work that are being done concerning what is called "decentralized ID", especially Microsoft, and the standards that are being developed in the Web 3 Consortium, you can solve many of the problems problems that are said should be solved by the blockchain. Because in most of the cases, it is a "E-ID" problem, you don´t really need to blockchain for anything other than store the ID, and then you can do the signing of the data outside the blockchain.

So, my point is that; if you install a blockchain on a server at IBM, you actually don´t have anything new.

EG: How "mature" is the technology? How far has it come? And how is the general knowledge of the technology?

TB: The general knowledge of the technology is quite low. Many have heard of it, however few understand how it can be used and what it is and what it actually isn't. However, this is changing at a rapid pace. Both the maturity of the technology, as well as the knowledge of it. You have some few first-movers, which shows how it can be used, and suddenly you have others that want to do the same. Then

the show goes on. There was a significant hype in 2015, at the same time the price of bitcoin and cryptocurrencies were not that high, sometimes decreasing. Big consortiums which were supposed to use blockchain for everything and solved every problem got a lot of attention, then people have realised that this actually is not that easy and quick fix. Some of the problems that were tried to be solved were more about coordination rather than technology. So, people learn quickly, but the general knowledge and understanding is till quite low.

EG: How is the demand for such (blockchain) solutions?

TB: The demand is definitely there. On one hand, the demand is driven by the hype that is still around the blockchain technology. The hype is about a universal solution that will solve all of our problems, thus the demand is really high. Blockchain and DLT are still buzz words, which may really benefit your organization, like if you can say that you have a blockchain system. On the other hand, there are highly relevant problems that can be solved by this technology, by reasonable implementation. If you show that you can solve problems, there of course are people who are willing to pay for these solutions.

EG: Do you have any examples of which implementation of blockchain technology has been successful?

TB: If you take the R3 (?) Consortium, which develops Corga (?), here it ended up with many of the big banks backing out of the project. They came with some news about live prototypes etc. but they haven't really figured it all out yet.

Regarding successful implementation, you have the example of BitGive. A project that take use of the transparency in the Bitcoin blockchain to trace transactions from the very beginning to the end. You also have SunExchange which take use of the blockchain as a value "carrier" for countries in which "ordinary" payment systems do not function perfectly.

AS: You mentioned these banks that dropped out of the consortium (R3), why did they do so?

TB: Well, some of the least management-friendly structure that you can have is a consortium, especially when it includes competitors. Then they are supposed to sit together and agree on how to innovate, that is a really difficult thing to do. (...).

EG: Speaking of, the one we interviewed yesterday (Jonas) from Deloitte, suggested that the NGOs might benefit from constructing a consortium for innovation on blockchain in foreign aid, do you think that this can be difficult? Maybe not a realistic solution?

TB: I am quite sceptical about such a solution, yes. It happens from time to time that you can get value from such structures, however the problem is that it quickly turns into something quite creationist. You try, top down, to change all the parts of your organization at once, then something goes wrong and the project fails. (...). They should absolutely try to cooperate about possible solutions, but rather than starting a "super project", they should look at what is out there, what is being used and how can we take use of those solutions.

Especially for organizations that take money into organization, and then transfer the money out again to a lot of different locations, preferably with transparency along the way, a cryptocurrency or a stable coin can be a great opportunity. (...). Thus you can gather all the money at the main office, then sending it out to various locations. The problem then is that you would have to find someone at the end locations which can exchange the money (crypto) to the desired currency. The specific of such a solution will vary from destination to destination, but there are projects that have been successful doing this. I think it is in the Philippines, where almost every other store can take cryptocurrency as payment.

So rather than making their own cryptocurrency or "super" blockchain solution, I think it is more likely and important to take use of open source systems, which is already being used and developed by others, thus also become a part of the development, rather than thinking that you put all these NGOs together in a room and expect that they will come up with a solution.

AS: What basic infrastructure is necessary in order to implement a blockchain-based system?
TB: Before answering that question, it is important to know what you would like to use the blockchain for. Let us say that you would like to trace an ecologic fruit. The problem is that regardless of how safe the blockchain is, you will not be able to solve the problem of the fact that whoever that is adding the data to the blockchain can lie. If the farmer saying that this fruit is ecologic lies, it doesn't help that this data follows the fruit all the way along the blockchain. If the truck says that "it was only 4 degrees, not any more, in the container, if the censor if bugged or something like that, if they tweak the data, it doesn't help that the data is stored on a blockchain. In the very end, if you scan the connected QR-code it will not help if you can´t know exactly if the QR code isn't lying. That will not be solved by the blockchain.

EG: So you will need to have people along the supply chain that can verify these instances anyway.

TB: Yes. However, the aspect that I find really interesting is that you are able to, especially in terms of the transfer of financial assets, where you can have more transparency, by doing the transactions on the Bitcoin. Then you can trace the money and the business can make it more trace-friendly. The same is the case for stable coins and open networks, e.g. USDT (?) a USD-backup stable coin which can be transferred on the Ethereum network. Then it will be easier for the organization to prove that "the money is at this place in the supply chain now". However, you will still have this "last mile problem" when the money (crypto) is supposed to be exchanged for the desired currency as the money then goes "dark". But this point (the exchange) you can put as close to the point desired. An example of this is SunExchange. (...). The blockchain technology makes it possible to get rid of a lot of the intermediaries along the supply chain, and transfer more trust to the end point. However, you still have the aspect that someone needs to verify data along the way.

AS: You mention "trust" many times, which is a common word used to describe the technology. So, if you picture a business like SOS, which have several subsidiaries, how can blockchain help increase trust in such organizations?

TB: If I got the structure (of SOS) correct; it (money) goes into the organizations by a lot of sources, and then the money goes from the organizations to a lot of sources.

AS: Yes.

TB: So, in Norway you would most likely have trust in the organization (SOS Norway), but you can be sceptical about how much of the money (what percentage) actually reach the end project at the very end. How much has gone to high salaries, bonus, transfer fees, exchange rates, administrative costs etc. The level of trust may be varying due to such factors. If you give 100 NOK, how much comes though in the end. Until now, you have been forced to trust whatever percentage given by the NGO because there has been a lack of opportunity to monitor this. However, if the organizations commit to the use of a blockchain as an infrastructure for the transactions of value (money), then it can be public for everyone where this money goes until they reach a point of exchange (from crypto to fiat, e.g.). Then it will be easier for an organization to be effective to do these transfers in an efficient and transparent way. Furthermore, it will make it more difficult for those organizations that are not that efficient, because they will get competition from those that are (efficient). Internal in the organizations there are also possibilities for value creation, as whenever you are able to to faster payments and transfers, without high fees, you can give more on a frequent basis rather than just "all or nothing" payments.

Thus, from the perspective of those building a Children's village, they will know their balance (disponiblet). Let's say they receive money every week, for the weekly/monthly payments, instead of

receive for the whole project in one payment. Thus, they know that they (the receiving part) will have to prove progression to the sending organization, in order to receive additional money. In an inefficient and expensive payment system, this will not be possible as it might take three weeks to send the funds, and you risk that it gets stuck along the way, forcing you to do bigger bulk transactions. In a more efficient system, like the one in Bitcoin, you will be able to fine-tune the money stream, forcing results before sending additional funds.

AS: This leads us to our next question; in which part of an organization can blockchain or DLT-systems be cost-efficient?

TB: Payments and transfers, without doubt. What is interesting here is that, technically, this has been possible with cryptocurrencies and stable coins for a long time. However, the problem has been that goin from fiat currency to cryptocurrency is way too expensive and inefficient. The volatility has been too high, and so has the fees etc. Over the past years, there has been built trading infrastructure, because of peoples´ demand to trade cryptocurrencies, and the result is that the fees go from high percentages (e.g. 10%?) to (0,01 and 0,0001%). The expenses for going fiat-crypto-fiat has gone from high to really low in quite a short time.

The other problem for cryptocurrencies such as Bitcoin has been scaling. However, solutions such as the lightning (?), which also is experiencing significant growth, are solving the technical scaling problem. So, in the coming years, you will see a significant growth in the use of cryptocurrency as a payment structure, where you originally want to transfer one fiat currency to another, but where you today will have several problems in doing this, due to geography etc.

EG: On the accounting specific, do you think that blockchain can help with the accounting and registering of transactions for organizations?

TB: Well, not really. There are many things that can be more efficient with accounting systems. For instance, integrate them with platforms where these tasks are done automatically, but there is not any need for a blockchain in order to do this. Blockchain technology might actually complicate this, in short term, because you will have people in different departments which will have to face new problems and questions on how to account for these new digital assets on the blockchain. (...) This is not a technology for the accounting service. It is a lot to get from digitalization. There is no problem to have an cloud-based accounting system, in which the HQ has access to all its subsidiaries books etc. Google Cloud etc. But there is no need for a blockchain here. You can even have the cryptography which will secure that only the right persons have access to the right aspects etc. (...). Distributed databases have existed for a long time. Remember, in auditing you would like to have the opportunity to alter/change the numbers. Like for instance if an accountant makes a wrong entry.

AS: We have spoken a lot of blockchain in NGOs and aid, but do you have any thought on the use of crypto donations in NGOs? Do you have any thoughts on the feasibility of such systems?

TB: Yes, and exactly that (crypto donations) is something that I find really interesting. The combination of people having smartphones, with camera and access to Internet, even in the projects countries (developing countries). Let's say that an aid NGO sets up a local crypto exchange, and a local platform where locals can pitch their ideas and projects and what they need money for. A system in which they (the locals) can write and post pictures about their projects and the NGO facilitate for the platform and the exchange, but they (the NGO) lets donors donate directly to the ones i need. Of course, you still have the issue of corruption etc., however, that direct person-to-person, across countries and continents, have never before been possible. Not it is, and I can send a bitcoin to anyone anywhere in the world, and they can receive that money instantly. In comparison to an exchange of any other currency (other than crypt) which is a claim on another person, I can not send that directly to a person in South Africa. Because I have an account in DNB (Norwegian bank), but the person in South Africa hasn´t, which means you have to go through (korrenspondendsbanksystemet), which is a chain of banks trusting each other. With

bitcoin and stablecoins, decentralized such as e.g. Die, but also centralized such as USDT, it is possible to transfer directly to the one in need for money to buy a shovel etc.

Aid organizations that facilitate such transfers will build infrastructures and support projects like this, combined with reporting to avoid fraud, can be really interesting.

AS: What is necessary in order to implement/set up such a crypto exchange? If SOS for instance, would like to build such an exchange? For example, Malawi, one of the poorest countries in the world, how challenging would it be to be successful with such a system?

TB: What is needed is that the NGO has to figure out what is the "gangbar" (viable) currency for those in need (the locals). And what is the closest place in which there already exists liquidity between crypto currency and this local currency. Then the NGO has to build the infrastructure for this exchange, which is close enough to the ones in need. So, it would vary from country to country. For instance, in South America there is many crypto exchanges, so the distance to these will be quite low, thus there is less things that the NGO will have to facilitate.

If you look at what SunExchange do, which is really interesting, and also Abra (?), a project in the Philippines. You would need different solutions for the different locations, but in general is to set up a crypto exchange and also a platform for the project to be distributed (marketed) to the ones that will donat. The interesting thing about SunExchange is that you can look at how they choose their projects, how they receive funds, because there is no doubt that SunExchange is an intermediate, but they make it possible for me, as a micro investor, to invest in solar panels on that specific location etc. Here there are some really exciting possibilities, because then the money can transfer directly from the Norwegian family to the child in the SOS Children's Villages.

EG: Apart from the technical challenges, is there any other challenges with such a solution? Regulatory challenges, for instance?

TB: The main challenge is knowledge. Regulatory challenges are present as well, uncertainty etc. There is no doubt that there are challenges, but these are possibly to solve. We are able to transfer money today, in a relatively ok efficient way, but there has to be a way to do this in a much more efficient way.

Regulatory, it is becoming much clearer how people can operate and innovate with such solutions. But then again, the main challenge is knowledge and understanding of the technology and the aspects that come with such solutions. And for NGOs, it might be a problem that there can be a lack of enough people from finance, accounting, economics, cash flows etc. among those people which are actually the most dedicated about doing the right thing. Thus you might end up in a situation which those that are most eager to help, don't really know how it will function financially.

Of course it is up to you how you want to structure your thesis, but I think that focusing on how cash flows and transfer of money globally will be transformed by blockchain technology can be really interesting. That is because I think that is the part where it has the strongest potential, short term. Because, when it comes to put data (information etc.) you will almost always have to trust that "yes, these guys were building that new school", and when you have to trust these guys to put the correct information on the blockchain anyway, there is not necessarily that this may provide the greatest value.

And I think that Save the Children, and the UN have began to accept crypto donations, UNICEF accepts donations in Die, a stable coin, decentralized. And I know other aid projects also accept Die. But again, the most hierarchical multinational organizations with inefficient and expensive cash flows (transactions) suddenly can transform they way they are doing their business, becoming a lot more decentralized.

Do some research on the aspects of cash flows and blockchain. An alternative would be incentive systems etc, using a token for doing good things, green bonds etc. But I really think that it is the aspect of cash flows that will be the most interesting and have the greatest impact, at least for the next five years.

Thank you!

Interview 5

- Interviewee#5 – Blockchain Specialist
- Sector: Professional Services
- Date: 07.02.2020
- Length: 46m
- Place: Call, Skype

Short introduction to ourselves, our background, the topic of our master thesis and the role of SOS International.

(...)

Starts at 4:55

NK: That is really interesting, and also a quite specific case. Alibaba has launched a similar project last autumn, a "charity chain", where they handle several millions (money) using their new platform. We (BDO) have got specific requests from our customers, especially customers that are into aid, on how blockchain an effectivize the finance department in organizations. Many of these organizations have significant overhead, as they have to, almost manually, trace and make sure that their transactions go through along the chain. And specifically for the donors, they have to know where the money ended up and what percentage of the money got lost along the way, administrative costs, fees, exchange rates etc. And the percentage that was given to the NGO, what was that percentage used for by the NGO.

I can show you an example, if you want. It is an example that I use for NGOs etc. (...)

AS: Our supervisor wants us to come with some kind of conceptual design for how a blockchain structure can be for SOS International. He is not expecting us to go deep into all of the technical aspects, but more on the structure and design aspects of such a design.

NK: What is important to think about when designing such a structure is the difference between public and private solutions (blockchains). And how mature these systems are. Maybe in the short term, it will be significantly easier to come up with such a solution with a private blockchain, rather than a public. More specifically, Hyperledger of R3. However, in the long term, this is a bit of speculation, but I vision that these public solutions can be more likely. So, I think that over the next 5 years I find it difficult to vision other than private blockchain solutions for these use cases. So if you are interested in the architecture of transactions, I would have started out by doing some research on the Hyperledger Fabric, as they have come the longest way as of now. I'll send you the link. If I were you, I would have done some research on the basics of the Hyperledger Fabric. (...). Then you will gain an understanding of the different transactions in the chain, and you can vision where you will put SOS, the donors, end projects etc. However, you will ofc face several questions regarding consensus mechanisms, whom will have access to which parts of the chain, what aspects that should be centralized vs. decentralized etc. This system is not a plug-and-play solution, but I think that it will add great value if you do some research on that (Hyperledger Fabric). Especially take a look at "key concepts". (...). Additionally, I would recommend you to try to get in touch with someone from IBM.

The questions of whom should have access to the platform, which parts should be public vs. private, centralized vs. decentralized etc. is typical questions that you will face if you want to design such a system. And if the platform should be designed for a specific case, here SOS, you can look at the example of Alibaba. Here, Alibaba designed a huge system that several NGOs could join, and then you won't face all of these (abovementioned) questions. Then you could recommend that SOS take use of such a "plug-and-play" platform designed and implemented by a third party (here Alibaba). This would be a much easier solutions for you, however it would be important that you include a section where you

discuss Alibaba´s incentives to design such a system, what data does Alibaba get through this system, expenses for SOS by joining such a system, data security for donors by using a third party´s (Alibaba) platform. I do not say that such a solution does not make sense, I just emphasize that you would need to discuss the questions, and potential problems, by taking use of such a third party. What does Alibaba control, and what will SOS be able to control.

Also, have you heard about WeTrade by Nordea? They take use of Hyperledger, not for aid, but for trade among small and medium sized European businesses by using smart contracts to effectivize the trade. There are big banks involved in this project and that has designed this platform. Then you can ask what their (the banks´) incentives, what do they gain from this etc. Which is a quite different use case, but rather an example of a case that has gone live. Maybe you can get in touch with someone from Nordea in Copenhagen, thus gaining some knowledge on how the system works, who has access to which parts etc. the impact this system has on data security for donors and the customers of Nordea etc. Then you will get an easier way to your target instead of designing a whole Hyperledger for SOS, which will be quite complicated. It could be better for you to do some research on systems that have already gone live, and see what role SOS will have in such a system, pros and cons of being part of such a system etc.

I can now show you the example in the PowerPoint if you want.

EG: Perfect!

NK: (...) If you set the slides in presentation mode we can go through the slides together. This is like a general case that I use to explain the logic of how blockchain and smart contracts can be used in aid.

So the thought here is that an NGO issues a smart contract on a blockchain network, here we do not give that much attention to whether the blockchain is private or public, in this case it doesn't really matter. By the way, are you familiar with smart contracts?

AS: To some degree, yes. We know how they can be used and and they work.

NK: Simply put, they are codes. But they are codes that can be put on the blockchain, so then they are called smart contracts. They can present simple business transactions etc. which is not unique, actually. This can also be done on ordinary databases today, however the problem becomes real if you have two parts which are binded to a contract, how should you store the code. However, if you use a blockchain you agree with the other participant what is stored on the blockchain, so then you can also store the code there.

So if SOS issues a product contract saying "We want to collect money which should be sent to a country experiencing environmental crisis etc. And we would like to collect XXX NOK by xx.xx.xxx and the funds are meant for Project X." Whether the project X is a private person or a business doesn't really matter that much. "Furthermore, SOS takes use of supplier X and Y to send food and water".

If you go to the next slide you´ll see the African boy, and the two suppliers X and Y, and the payment from donors. Then, the contract gets "filled up" with money, which is money that SOS does not control, but the contract is stored on the blockchain, so it is issued by the SOS. However, the SOS is not the one that controls the contract, so everyone has to follow the rules and principles that are stated within the contract, no one can alter these. Unless all involved parties agree to change the rules. So the money is locked up into the contract, like an "escrow" (?), and then on a specific date some amount is supposed to go to the water supplier. Before this transaction happens, SOS can say "we would like to do a transaction to the water supplier on this address" so they have to ask the donors if that is OK. Then the donors can, before the transaction happens, verify whether the address stated by SOS is real and that it is really the water supplier that owns the address. Then you will see a green light (on the ppt.) as the transaction has been verified by the donors. You do not necessarily need to have this exact logic, you

can also just have pure transparency, in which the donors can see where the money is transferred etc. This example is more about designing smart contracts, and incentives for implementation of blockchain solutions. It is cost efficient, high transparency etc. but you'll also get the ability to offer complete new products, like the one we have talked about here. Thus, you can provide the donors with a great level of control using the smart contract, if that is desired by the donors and the NGO. Whether or not this is desired will be decided by the market, when the technology becomes mature enough.

So, let's say that the transaction is approved, which causes the contract to transfer money to the supplier, which again sends money to Project X. Then the project can sign with their own keys/address on whether they have received the water from supplier X as agreed by the smart contract.
Then SOS also would like to pay the food supplier (supplier Y), but then there is a mismatch in the system etc. which causes wrong address for the supplier, which does not match the criteria of the initial agreement in the smart contract. Then the donors can stop the transaction before it happens, the money then get locked up in the smart contract.

Let's say that it only was water (supplier x) that was included in the smart contract. The transactions went well, and the donors are satisfied with the end result. Then a small percentage in the smart contract works as SOS´ cut-off, which is then transferred to SOS. Then it is really transparent what percentage SOS gets in the very end. And especially the fact that SOS does not get their percentage until the product has been delivered to Project X. This percentage (the cut-off) can be decided on beforehand in the smart contract, so that the donors are aware of this from the very start. Let's say it is 2,5%, then SOS is not able to get a higher percentage than the one agreed upon. This makes the system really reliable and predictable, because the donors know that the code (inside the smart contract) cannot be changed, and you can see along the way and in the very end that all of the transactions went well. (...).

Of course, this system is not pure magic. For instance, the address that signs the transactions might be the wrong address etc. Is it really the people behind Project X that uses the Project X´s address to sign, or is it someone with fraudulent intentions? This problem will not get solved by the blockchain, but rather by internal audit and control procedures, IT-audit, security etc. So there is definitely still some risk in doing these transactions, but given that the input on the blockchain is correct, and that the parties that sign the transactions actually is whom they intend to be, such a system provides a significant upgrade compared with how these transactions are done today. And this is the true value of such a system. The control systems around this solution have to be in place, because there can obviously still occur bugs etc. Code-bug (?) in a smart contract is a known phenomenon, especially in the Ethereum system. But then again, compared to today´s system, this can be a significant upgrade. That can be the key takeaway in your conclusion of your thesis. "Of course there are still great risks, and aspects of the process that can go wrong, but with the right control procedures in place, and with the right structure, you will get a significant upgrade on today´s systems. Both in terms of transparency and "audit" (etterkontroll) of the transactions, cost efficiency due to the fact that you don't need the same level of (etterkontroll) as earlier, and that the smart contracts can automatize many of the steps needed in these transactions. And the fact that you can offer "complete" new contracts to the donors, in which the donors themselves have a greater level of control." Vision that you have 1000 donors, thus there are 1000 receivings in the smart contract, so that you (as a donors) can directly control your own transaction, all the way to the end. Instead of sending one huge lump sum, there can be 1000 individual transactions that can be traced all the way. Then if SOS would like to take some of the receivings from the smart contract and transfer them to the end project or suppliers, you (as a donor) will have to verify the transaction and make sure that the party that SOS would like to transfer money actually is the one that is supposed to receive your money.

Of course there are several questions related to this, what is the consensus mechanism, how do the nodes operate etc. If I were you, I would have talked with your supervisor to make sure that you are familiar with what level he requires you to enter into (on a technical basis). If you are not to go into the technical aspects, but only the business case of this, then the solution I presented might be enough.

NK: Do you have any questions?

AS: That was a very good introduction to how smart contracts can be used. We have thought about that, but have not really investigated such solutions yet. However, this gave us great value, Niklas.

NK: So, as I said, spar with your professor whether he's interested in a business/strategic report or actual architecture. You have probably read about the technology's maturity, Gartner (?), McKinsey and others have many articles on blockchain's maturity - so it's still immature, but the maturity of the technology overall is expected to come around 2025-2030. Until then, we'll see increasingly different implementations. Finansavisen this monday had 4-5 pages in the paper about different use-cases in Norway; Fishing, sustainability, etc. So this was interesting for our part, as we work with Norwegian customers, because we've seen a lot internationally until now - of course there is a way to go with our clients' partners here at BDO - but now as there are exceedingly more Norwegian examples and in Norwegian newspapers, then our Norwegian customers also start asking us questions. So, therefore there is a demand that we can be a relevant sparring partner for our customers, and eventually think whether we can deliver solutions in terms of helping create smart contracts, etc. which has a big connection with accounting. We work much with accounting, and an interesting quote in the article (...) This is a bit more aimed towards accounting, but it gives the essence (...) "Why is this relevant to accounting?" But blockchain is an accounting-technology, as it is a distributed ledger, right?

Additionally, it could be good to remember, if you're to write something about architecture and such. Also, an understanding of how clients generally could implement this - NGOs, for example, should every NGO create their own blockchain-platform. Most likely not, maybe? Maybe they'd like to try that out in the medium-term, but on longer-term, and this might be a bit "fluffy", because it's difficult to concretely vision how that could be, but you might vision that clients join a platform in the same way that you connect to the internet today. So that might be a good angle on your thesis, that you discuss a bit on the end, if you build an enterprise-blockchain now with a closed-blockchain to concretize and show to cases that are live today. But, also discuss by the end of the thesis the longer-term vision, this is network-technology with many similarities to the internet, and blockchain platforms don't have the limitation, so if you have transaction privacy without high power-demand and with high transaction processing, then it will be much better to use open blockchain solutions. This way, you don't have to think about the problems regarding accessibility, identities, etc. So, if you look at the suppliers from the SOS-case I showed you - can they change suppliers, or should they have new suppliers. Then, with a closed-solution, there would be a lot of administrative work in approving these suppliers - this is not an issue in the same way if you use an open solution.

(...)

So you can see on the picture that this is a new type of accounting technology. You got double bookkeeping in the 14-15th century, Excel in the 70s, 80s, early 90s, and now the DLT, which is a natural prolonging of this. So you can see the quotes from Finansavisen: "The first useful area of use is, unsurprisingly, transactions in every form". So, brought to a head, we work with accounting and auditing, and accounting book transactions, and auditing audit transactions.

AS: So we have this aspect of how blockchain and DLT can streamline transactions and accounting in, for example, such organizations like SOS. Do you have any thoughts about this? Of course, they have several transactions crossing borders, different currencies, etc. The money goes through SOS International and then out to all these different countries.

NK: Absolutely, and then you are more relating to finance, for example looking at how banks and financial institutions use blockchain, because they use lots of money on exactly this, sending money back and forth, and capital is frozen during these processes, and they might not be coordinated meaning you have to go up afterwards to see if all parties agree. So, this is somewhat of the same concept, at least in

terms of the money - the capital. However, directly regarding the accounting system, this will be internally at the company, but there has been talk about accounting systems implementing blockchain or blockchain solutions, so that we have what's called "triple bookkeeping" - meaning that when you sign off on the debit-side in your system, I sign off on my credit-side, so that this is matching. There has been some talk about this in theory, but I have not seen any concrete examples of this, other than that I know Zapp (?) has been in the media internationally talking about this. However, this is not as concrete as the aid-example I provided, where you have the transactions, whilst the accounting later e.g. for SOS… They are interconnected in the way that they become more effective due to the parties being on the same wavelength. However, if you think one step further in, at the accounting system, how debit and credit are booked and how this is done with the other party, whether this is integrated - I have not seen that accounting systems have reached this level yet. It's likely to be a natural next step, but it is hard for me to concretize, as I have little experience within accounting systems. So, I would suggest Googling this more (...), but as far as I have heard so far, this is still more on a theoretical basis.

AS: We have read quite a few articles, and most of them are saying a bit on how it can be done, but there are very few saying how it can actually be done. There are still very few case-examples online anywhere.

NK: No, and the thought there is that it is easier to envision that a lot of commerce and transactions happen at a blockchain platform, and that data is integrated into an accounting system, so you know that the data you get into your books are correct and approved by other parties, in comparison to that the accounting system should be integrated directly. It's a bit tricky, but I won't say that it won't happen, because this changes in such a great pace. But, based on what we have seen on concrete cases, then it is more like what I showed regarding transactions going over the platform, and subsequently you collect the data into the accounting system.

AS: And also, regarding trust, that blockchain can help increasing trust amongst parties, is well known. And as we have this case with SOS and NGOs, who have many different steps in their processes before the donation reaches its target. How do you think blockchain can increase trust, both internally in SOS, but also - we have been talking a bit about it already?

NK: Well, you could see that on the first powerpoint-example I gave you, on the lowest level, the blockchain network and the architecture there, that it is programmed correctly. When the platform is programmed correctly it won't be anything people think about, really, because you know that you, as the end-user, just use the software or application, and don't even think/consider that you are using blockchain. So, that will be the end-product for the end-user that blockchain technology facilitates high trust towards the transactions because you have easy access into the transaction flow and which parties that are involved in the supply chain have confirmed continuously that they approve what is happening. And as I've said, this doesn't eliminate risk of, for example, two parties agree separately that they want to "fool" the chain and create a scheme where they two approve, although it's not correct. Also, it can look like someone has signed a transaction, but in reality someone else gained access to their account. So these types of things, you still need auditors, IT-auditors, internal audit, but in a completely new way, system-wise and completely different improvement-level compared to how it is today.

But how can you have trust in the blockchain itself, this trust is built on the lowest level of the blockchain network. Here, there are big differences between open- and closed networks. For open, there is mining or verification of transaction of cryptocurrency, in which you can send data in such a crypto-donation, but it is the cryptocurrency that is confirmed, like account X had 1 Ethereum and sent it to account B - that is what this network does. However in a private network, there is only the involved parties in the transaction that approves. So this is a more architectural question, like: Should the donor see every payment continuously? Should the water-supplier see transactions with the food-supplier, are they related or have anything to do with each other? Maybe not? What if, for example, SOS want to give an extra discount to the water-supplier and not to the food-supplier? These types of questions, regarding data accessibility, and in Fabric, this is something called "Channels" - I recommend that you, if you

are to research/use Fabric, then a quick way to determine this is through Channels. Read about that, as that is an important field regarding data-security, etc., in such a platform. So, maybe the donor should have access to every channel, and maybe the water-supplier should only have access to their channel. So, SOS and the donor have access to everything, and then they create and send respective smart contracts to the water-supplier and the food-supplier. These types of questions are more regarding architecture, and you should research this, and also talk with your professor about which technical level he wants you to be at.

In closed/private networks, Fabric, it is then about consensus mechanisms, and RAFT is then the standard, so you don't have to read KAFKA and Solo (?) in documentation.

AS: That's very good, Niklas. We have also read about crypto-donations emerging, and I believe it was UNICEF who are now accepting crypto-donations. Do you have any thoughts regarding implementation of this into aid, specifically for SOS, how this can change aid?

NK: It will be much of the same, in that you swap out the lowest level with an open blockchain network. For an NGO, if it's crypto, it will be like a smart contract, only that instead of money flowing through that smart contract, it will be cryptocurrencies flowing through the smart contract. Now, what's important there, which is not in a private network, is regarding identities on both donors and receivers. However, there is currently emerging solutions to this, just that this platform in itself, e.g. Ethereum, hasn't got any stance on that. But what other third-party solutions, YouPat (?), Civic, identifies parties' crypto accounts, for instance due to white-washing, AML and other financial regulations, which such companies/organizations must comply to. Therefore, it could be problematic if all donors were anonymous, for example. So, this is just a little bit different type of question, but crypto is exciting, and crypto is emerging, so it's also maturing very quickly. Additionally, in practice for SOS, where it should be in their value chain, then you have to look down at the lowest line regarding how the blockchain network will look.

(...)

So, you can think about your app, if you wish to donate and SOS publish in their app: "Here is a new fundraiser". Then you will just send money/donations into that account, and then this account will actually be a smart contract, although this is irrelevant for the user, and then you will get a summary by the end, saying "here have the transaction gone, to these people, and this cut-off went to SOS". Then the obvious difference from today is that the documentation is not published by SOS, but through the blockchain platform, which is not operated by SOS, whereas today you would just get a message from SOS, and you'll think "Yes, OK, I just have to trust that this is correct". I don't know if you even get such a summary as a donor, but that is at least a very simple improvement for the end-user, as you don't have to blindly trust the one company that the data you receive is correct.

AS: Do you think that such use of crypto-donations, e.g. in NGOs, are further away than just using blockchain and regular smart contracts with regular fiat currency?

NK: It depends. If you think about the Alibaba case, where an organization can use an already created platform, then I believe this is much more adjacent than crypto. However, if the organizations have to build their own platforms, then crypto is likely to be more adjacent, because you don't have to use the infrastructure, which is a bit "heavy" for organizations to create themselves. However if it's like "the internet is the internet", meaning that there is a platform ready to be used and you just plug-and-play, then that is a much easier way towards the goal. It's really only the biggest companies in the world that are currently working on creating their own platforms for their own use - Walmart, Equinor, etc. - it's at that level. Therefore it is more likely that companies like IBM, Alibaba create solutions for private enterprise, almost like a cloud, just blockchain, that you and your ecosystem can use, or open blockchains and the crypto-world. One of those two routes, it is difficult to estimate. In the beginning it's likely to be more enterprise-blockchain because they are safer and data-secure, but on longer-term

it will be more network effects and open blockchain networks that will be used. Moreover, there will be some interoperability between these platforms, meaning that they can speak with each other, you can share data between platforms because they have the same standard - such as the internet which has the same TCPIP. There are many different internet networks, it's just that you can speak together through TCPIP.

AS: That's very good, Niklas. We have pretty much gone through all of our questions. So we've gained a lot of great input and good discussion aspects that we can include in our thesis.

EG: Yes, as well as other aspects where we can do more research, which we are grateful for.

NK: That's good to hear, and I wish you the best of luck.

Interview 6

- Interviewee#6 – Nordic Innovation Lead
- Sector: Professional Services
- Date: 14.02.2020
- Length: 54m
- Place: Call, Skype

We started by talking about ourselves and our educational background, as well as the topic of our master thesis.

We then explained the ERP system of SOS CVI, and how funds are transferred from donor to beneficiaries.

(...)

AS: If you can start out by talking a little about yourself, your position at EY, and how you became interested in blockchain?

MJ: I have a background from both tech, economics, and a master in European Law, so I have quite a varied background. I started working in the real-estate business before I started in a law firm, and worked with developing some tools due to some new regulations. So, in my first year, I was pretty much just coding and testing these tools in Excel and wrote macro-scripts. Then, I worked as a traditional lawyer, but mostly within the segment of digital tax-authorities in new reporting forms. And in regards to this, I work mostly with our IT-Advisory, technical consultants on clear ERP-system updates, etc. So, I have always been in this cross-segment, and also been in the IT-association e-Fora (?) for a long time, and really enjoy the tech-environment. I have, for a long time, been in the expert team on e.g. Artificial Intelligence, meaning you get exposed to many new emerging things. So, I have been working in the law-firm to serve both internally and externally all our business fields, e.g. International tax, national tax, regular law etc., from a tech-house's perspective. So, I have quite a "free role" in EY, where I basically do what suits me best, as long as it's digital, because I sell projects not only within one category and field, but can more identify things emerging in, like, 3-5 years and how we should develop products and platforms based on this, whilst at the same time living in the now, and deliver on this. And this is where I started as early as in 2015, because I realized that we, as a law-firm, have to understand both how smart-contracts works, how blockchain works, and especially in regard to auditing, which then, naturally, is that we will get customers who gets into this technology, and we have to know how to handle it. So, we work with this from many angles and perspectives, we're not just sitting with technical development as such, but we have an approach where we don't do blockchain-solutions, we do process-development/upgrades. Then we look at the challenges - can we use blockchain here? If yes, then nice, we might do it, but if we come to the conclusion of using it, then we always use it in combination with other technologies. Because blockchain is only a protocol, you can call it an intermediate layer, not some magic stand-alone solution in a corner that no-one really knows what is. So you have underlying databases, and then you have a protocol-layer, then a user interface, and so on - very easily described. And this is what many people misunderstand in its entirety - they think that you can put everything onto a blockchain, and everything should be controlled by the blockchain, but in reality, the stupidest thing you can do is to put data on a blockchain, you should never do this. The blockchain should verify data, but you should never put data in itself on a blockchain, because then you have a high risk, both in terms of GDPR, data breach elements, etc.

So, we're primarily working in the way that we meet customers in the segment, and then you might say: "Yes, we are working with a solution, I have a company in Norway, but it's a holding company in UK, and then I have some IT developed in Bangalore and in Argentina. Where is it best for me, tax-wise, to place myself?" And this is our "milk and bread"-tasks, that's the sort of solutions we deliver. However,

when you say: "Ah, by the way, we're working with blockchain", at that point we become more sceptical. We have gone in and say: "We know this market very well, and we know what we can deliver by help of our traditional services, but then we'll say that, normally, position A would be the best tax-wise, but there you will never get bank account or an accountant, as it looks right now, so you have to go to position B. This is the type of advisory we start out with, then we speak with the customer, and then we go into deeper detail about your industry, so then they understand that we speak the same language, and they might understand that: "OK, can we help you there? Do you want a technical solution?" rather than many other consultants who are out there selling thin air, saying "Hey there, do you want a blockchain solution?". This has especially been a case within the aid sector. And, the aid sector has been a hype from the get-go. A massive hype. Everything else, like every consultant who has been out there and doesn't know/understand the technology or how to apply it, says that "All accountants, consultants, lawyers, etc. will be replaced by an algorithm and a smart-contract. The smart contract will expire and we will be able to conduct safe payments. Everybody knows this, and every refugee can just remember this entire extra-decimal code they have, and brings this with them in the back of their heads. This is no problem, right? Write it on your butt and go across the border!" This entire thing is brought to a head, it's idiocy, and everyone has been sitting, nodding, saying that this is fantastic! But we are not there today.

(...) In this part, Jones spoke about a previous task he had had, where he was asked to give his verdict on the use of blockchain in aid. This part has not been transcribed, but it is basically an example of how little most people know about the technology, and that people just want it because of the hype, not really knowing what they actually need.

MJ: So, the debate and talk about blockchain there, has been so very far away, and you have then moved towards rather having the volunteers, such as Innsamlingsrådet", they look at, as you said in the introduction: Where is the money going internally in the organization? That could be a challenge. And, there you'll have a completely different verification element, where you can apply a middle layer with a blockchain, just like you write the details somewhere, so that you'll know who has been in the system and eventually who has been fiddling with it.

Here, I can give you an example of a project we've done in a "Smart City", in Wien, Austria. There, we have done a Smart City project, where we have, as a start, that there are many different elements to this project, but as a start you'd like to have some blockchain. And, when they want a blockchain we said that, of course you'll get some hype from us, we'd love to do this. Thus, we took 300-ish databases from the public, and put them on a blockchain-structure on the public Ethereum blockchain. So then, they might think that: "Public data, that's not good. You can see all of the government's data. But, here we use the zero-knowledge proof, or Nightfall (?) solution, which our system is called, which in essence means that we take that document, which is in a normal database, which then through a helping organization, or in this instance: a public government, can update and change - because you have to update and change! It's a bit stupid if you are in Wien and have a place of living there. Then, the government writes "in stone" on the blockchain that you live there. Well, then you have to live in Wien for the rest of your life - welcome! So, you have to be able to update this, which led to us basically tearing off a corner on that paper - visually thinking - and then it's that little corner that is placed on the blockchain, and then the database can be updated, but if you're updating one sign (number/letter), then this little piece of paper will no longer fit digitally, and you can say that someone has been tampering with the document. And you get no other warning than that it has been tampered with, you won't see what it is. Then we take, at the same time, at the government's login, there is a double verification by the way that we have a blockchain that is registering the internal transactions of who has logged in. So, you can't go in and delete the log by itself, like you're able to on a regular database, in order to hide your tracks. Yes, you can trace back in the normal database as well, but it's definitely more difficult. So, this is then the double verification, so that in one blockchain, there's nothing more than what is called "shit (?) in, shit out"; If you don't know any of the information on the blockchain's source, then you should be very sceptical to that. Because just the fact that it is on a blockchain, that gives zero security in itself. However, if you go in and do a double verification like this, and put in a place a middle layer, then you can get a few nice votation functions, where you eventually, which you

will get, necessarily, micro-payments, that you get to actually use it in practice, a smart contract which can execute (?), where you can say that: "These funds are only to be used for this area or by that person, etc.". Then you're starting to see a realistic purpose. So, this is pretty much the next step on how you can do this. We know that we will get there, we're completely certain about that, but it won't be tomorrow or next year - this part will take longer.

And what can you do today? Well, you can get a better overview by - we have created a platform called EY Blockchain Intercompany, which involves commerce between companies, and this could be used between companies regardless of whether they are in a consortium or not. The reason why it is set up in a consortium PT (pro tem) is just that it is a value transaction, and also because of uncertainty in various restrictions, then we don't want to trigger something in tax authorities in country A, B and C, who have different classifications, etc. which would put us into deep shit. So we have tried doing this in the U.S. We did a project together with Microsoft, and it didn't help that we came together to the U.S. Government, they just reply with: "Shut it down, it's (inaudible) security". And then we're in the shit.

So, what we do there, is using smart contracts to unlock sale documents, which confirms the ownership, against a token representing a payment which was unlocked in the smart contract. Then, you know that neither buyer nor seller can say that "No, I don't want to pay you" or "No, I don't want to give you ownership of this". And then, we have a tracking token which goes between the transport, which follows the eco-terms, like "When was the product delivered?" "Well, it was delivered now" - then you can respond with "OK, received" or "Dispute", then it's locked. However, when you say OK, then the algorithm will automatically send an ownership token to the new owner, and the payment directly to the seller, and by this way, you save insane amounts of work internally in the back-office handling, that you don't have to reconcile toll-declaration documents where you have to pay in 30-40 days - "Have we gotten the money" "No not yet", etc. Matching that to the document. "Yes we have received the document, but we haven't received the payment - then you can't place that in the complete-folder, then I'll have to put this to the left instead. This is the reality today, you spend crazy amounts of time on such things. So this part could be applied directly into the aid sector as well, to verify different parties.

But, then it's also down to what you're supposed to verify, regarding whether it's collection, if you're using different sensors towards cheating node, or if it's to be used for other types of verifications, or if you're on the clean - like you have been talking about - the money goes into one account, but where does the money actually go? Then you could, for instance, apply a - call it a middleware - layer, which can track this, given that you can support it with the correct APIs towards banks, etc. Or if you share it further through a token structure, which follows this internally in a system, so you can actually confirm. But then again, there, it goes down to a relationship about trust, meaning that you cannot just create your own bitcoin. It's very easy to create a ERC-20 token in Ethereum, which is the easiest form of digital token you can create in 15 minutes. Many people do this, especially within verifying sustainability and this green element, which says that:
"This token verifies that this is a green product from somewhere."
"Yeah, but you have created this yourself, isn't that right?"
"Yes, and it is green"
"Yes, because you say it's green"
Etc.

(...)

So what we have done on our projects with real-estate companies in Norway who wishes to confirm that there is a sustainable element in it all, is that we have created a unique token (721?), which is a so-called non-(something), and this is connected to information from third-party verifiers with third-party databases, so that you have someone going in who you have to report to, and then you have another which is of a slightly lower degree, to which you only have to report to, etc. So, then you have at least 2-3 different third-parties who are directly connected into a token, which you can send a link to, and

check by yourself and your own database. And, then you have a completely different credibility, compared to if only the helping organization created their own currency.
(...)

AS: That is really interesting. As I mentioned, we have read a lot of research and articles on blockchain in NGOs, and in aid. And the part you mention here about people believing that blockchain will be the magical solution to all their problems (also in aid), we have also seen that. However, as you also say, even though these transactions are put and stored on a blockchain, the people putting this information on the blockchain can still have fraudulent intentions. Then you have the problem that you have a lie on the immutable blockchain, which you can not erase. You have to verify that the data put on the blockchain actually is true, and reflects the true value etc. So we are aware of the problem that the blockchain, alone, is a unique solution to these problems.

You mentioned, when you told us about the example with UD (should not be quoted on the UD example), how they could have used this solution in aid. And we have also talked with several different person now, and feel that we gain more knowledge on this case each day. We have still a lot to learn, but that is one of the most interesting things about being able to discuss this thesis with experts such as yourself. And you mentioned the possibility to create a stablecoin, in order to get the transactions online, and also in order to reduce the intermediaries and transaction fees etc. Do you have any thoughts on the feasibility of implementing/designing such a system in our cas with SOS?

MJ: Technically, there is no problem setting up such a system. Then you´ll need to find out which parties that are actually willing to accept the coin as a viable coin (currency). That is the most important question, because the transaction in itself is not that difficult. If you then take use of Bitcoin, USDC (?) or an E-kronor, about to be launched in Sweden, which people trust, is actually completely irrelevant. As long as there is not only one country involved, but several, you will always have the need to exchange between several currencies, e.g. from local currency to USD. Or EUR to USD. That is not a problem, because is there one thing that we actually are not in need of today, is more stablecoins. For example you have the Tether (USD Stablecoin) that is trading at 70-80 cent, then you understand that there is something missing, as it is supposed to be traded at a 1:1 to the USD. If is a bit difficult to have a stablecoin constant at a 1:1 the e.g. the USD, despite that is supposed to always be the case. This is because you have some "idiots" out there trading, and some algorithms, which makes the coin trading at 1,04 or 0,95. It is stable, in the sense that it is not a 10000% price drop/increase, like Bitcoin, but you still do not have a 1:1 to the USD at any time. And another aspect that you have to include is that, for politicians, it is really easy to make exceptions for themselves, especially if there is some kind of tax-benefit included. So an aspect that a lot of people forget is that in many "institutions" today, including in Norway, if you trade one token, from one wallet to another, it is classified as a taxable transaction. In other word, if you have a token, where you have transferred/exchanged from NOK to EUR to USD, then you have to take the exchange rate for those transactions to see whether there has been some volatility/changes to those transactions, compered to whether there has been volatility to the UN coin (used as stablecoin in this example). If it (FN coin) always trade at 1USD, you will not have a problem, but if it trades at 0,97 one day and 0,3 the other, you have a problem. One case is if your transfer is supposed to finance i banana in the developing country, but if it is an amount of 40 million NOK, or whatever, you have a taxable aspect which is of quite significance, which can be taken use of by some creative people. Maybe some in africa will say that "here you theres hould be a tax on aid funds etc." Then you have a double taxable transaction, which people haven't thought about. As for th technical aspect of this, if your system transfers the money from one wallet to the other, to a third, and a fourth, but neither the receiver or sender is abel to see, however the systems accepts the transactions, they you have a lot of data to handle. That is the same case why I, in an interview with Finansavisen, stated that the Libra coin (facebook´s cryptocurrency), the project will not be a failure. This was because they (Facebook) haven´t thought about the tax aspect of this. (...).

Technically, it is easy and feasible to set up a solution as the one the UN are considering, with a UN Token. However, that is best if you are only looking for the ability to trace where the money is sent. Then you can say that you, in the different steps in the supply chain, minimize 1-3 steps, which do not take up a big percentage of the funding along its way to the end projects. However, can you know for certain that the person collecting the assets funded by the donors actually will use the assets that he gets in an ethically and correct way? No. If you additionally want to safeguard against this, you will need sensor technology to verify and trace the asset, and that is a whole need platform, which might not be that suitable in all the SOS countries. So you will never be able to secure the whole supply chain. (...)

You will need a system where you think of a bigger ecosystem that can take part in the verification, not only being reliable or trusting one single party. Because we do indeed see that there are untrusty parties within these organizations (the NGOs). Thus, you will to a certain extent be able to minimize some of the corruption and fraud, but not all of it. As long as there are humans and machines involved in the process, there is nothing that you can trust 100%. You can minimize risk, but you can not be 100% risk-free. However, you can get a long way with this system, and you can definitely make a hype, but you can not make something that will make you 100% risk-free of fraud only because of the fact that you take use of a blockchain.

EG: What might be positive for SOS, compared to some of the other NGOs delivering aid, is that they are present in the countries in which they send funding. And those persons that receive the money are SOS employees. Of course, they can do whatever they want with this money, but you can argue that this is like a safety for SOS.

MJ: Of course, and then it comes to how you design the structure. Because the thought here is that the donors, when they donate money, actually would like it to be so that they money they donate goes directly to the enr project or developing countries. Then the "smart" consultant would say that "With blockchain you can do this peer-to-peer, and then it would be simple and secure. Then the SOS will provide the donors with a QR-code, so that the money from the donors can be sent directly to wallets, that you will have to trust." But if that is the case, why would the NGO put all this effort into collecting donations? Because their business model is actually based on being an intermediary, taking a percentage of the donations! So when that is their business model, we come to the question of "Do the NGOs really want it to be in that way that donors can donate directly? That is quite an important question in this case. Because if they want this business model to continue on, they could rather send all the tokens to their own (SOS´) wallet, and then transfer them to the developing countries, and taking a cut of the donations. Then you are sent back to the same business model as earlier, because there are no one that do this 100% for free. There are some that are paid, getting their salary etc. But if you build a structure in which you don't need all these salaries, offices etc. and only focus on transfering money on the most cost-efficient way, going 100% digital etc. that would be a totally different business model and structure, meaning that these funds can be used on a totally different way. So there is not actually a yes or no answer here, there is more about a macro/micro perspective to the whole picture.

AS: Yes, and you have some really interesting thoughts on that perspective, thank you. And we were also wondering about if you have any thoughts on the audit process. Lets that that if you are about to do all of these transactions via, let´s say a stable coin, how would be the audit process, audtitng the processes on the blockchain, compared to the adutit process of the transactions in the way they are doing it today. Do you have any thoughts?

MJ: Well. It depends on how you design the system. On the one hand, you can couple the blockchain to your existing ERP system, and in that way tokenize the transactions received in the ERP system. Thus transform these transactions to represent other assets. In an ideal world, you would go from 100% analog to 100% digital. But that would not be the case in the real world. You need to do a reality check, you cannot just go from analog to digital in one day. Like when Norwegian block exchange says that "Now you can buy on our block exchange, so now Norwegian will sell all of their tickets via cryptocurrency. By doing this we have estimated that we will save 2 mrd. NOK, thus or deficit of 2 mrd.

NOK is covered.". No that, will not be the case that all of your customers suddenly will be able to pay for tickets using cryptocurrency. However, they could have the aim that 1 million of their customers will use this solution during 1 year, and that could be a more realistic solution. But, in our world, in my opinion, you will have to do some delimitations; "yes it could be possible in an ideal world, given this an that". But and ideal world doesn't exist. So you have to consider what percentage of the (Norwegian´s) customers would have used this system, and that is a question that you have to consider. Furthermore, what is the cost-benefit here, versus transparency etc. You have to be realistic about the project. So that you don´t end up with "in theory, it is possible". Because in theory it is possible, but not necessarily in reality.

So in terms of the audit, there is no challenge to do this. We have our own EY Blockchain Analyzer. Given that you don't design your own coin privacy structure, and making these solutions at private systems etc. Because you also have the question of "are you sure that every single donor, one that maybe donates quite a significant amount, would like to, theoretically, traceable and stored on the blockchain?". Not necessarily, maybe. In Norway you get deductions if you donate to charities, then you have to register this in your tax statement etc. Then you have another layer that will have to be verified. A different case is if you donate from your own wallet, you have to be identified and signed etc., then the media etc. can see who is giving to who. Then you are in need of a whole different safety structure. A thing that you should bear in mind is that the world, as it is today, is not ready for this, because you have to consider the complexity of the donor process here in this case. But the transactions, are quite simple, if you would like to add some transparency. However, then again it is the question of what can this (transparency) be able to measure, well it can measure whether a token is on the blockchain, but you still need someone to verify where to money come from. I imagine that, in the lacuh of such a project, the flow will be that e.g. NOK gets in to the system, and then the challenge will be that you will need to have an exchange or these tokens (NOK gets transformed to tokens, and then tokens gets exchanged to local currency etc). This is not a free infrastructure, they will still need to take a percentage in order to finance this infrastructure. So there are many aspects in this big picture, that at first glance might seem pretty easy to do, but that in reality will be really complicated.

However, if you say that all exchange platforms in Norway are required to trade BistandsNOK (a imaginal token for the purpose of this interview), which will be of free exchange (no transaction fees) from NOK to BistandsNOK and that the government pays these expenses as subsidies, or something, then you are looking at an infrastrucutre, which theoretically can be totally free. But I think that his is quite far from where we are today.

AS: As a last question, you just mentioned some of it, actually. But as we mentioned, we are supposed to come up with a conceptual design for how we think that a blockchain system for SOS can be. Of course you can say that "in the short term they should do this, however in the long term they should do that". Of course we don't expect you to provide us with the final result, but do you have any thoughts on what what could be our solution? What is the reality/feasilbility of our case and the solution?

MG: Then you would need to really investigate in the structure of the industry and the NGOs. Delimited to a specific type of NGO, and not a high level picture of all NGOs. Because they are really different in the way they work etc. how people donate. I can´t say that there is like one specific structure that is better than the others here, so personally, I would have delimited to one specific organization, which might be a bit more streamlined. Then I would have said "given this firm-specific supply chain, we can see that in this specific area there is possible to implement this technology (blockchain)". Draw a picture of the case and the organization. Where will you meet challenges etc. And maybe taken a step-by-step analysis of the challenge; possible with a blockchain or not? Yes or no. If we implement the blockchain, we can get rid of step 2 and 3 etc. and this might cause cost savings of XX% or whatever.

AS: Absolutely. That is also what has been the aim of our interviews with SOS International, to gain an understanding of their processes and business mode, so that we can identify where the blockchain technology can be utilized.

(...)

The end

Interview 7

- Interviewee#7 – Global Digital Innovation Manager
- Sector: Professional Services
- Date: 13.02.2020
- Length: 38m
- Place: Call, WhatsApp

Started out the interview by telling a bit about ourselves, our background and the topic of our master thesis.

Provided a short introduction to the topic, NGOs and what we believe the blockchain can be used to. The process of the transfer of funding etc.

(...)

AS: If we use an example, for instance SOS Norway, just so that you can get an understanding of our thesis. If you donate money to SOS Norway, that money is transferred to SOS International, which then again transfers the money to the receiving country, the country in need, for example SOS Malawi. Then again, the money is transferred in Malawi from SOS Malawi to the different projects. So, the case here is that there are several different transactions of funds, money. SOS International take use of 10-20 different banks to do these transactions, and sometimes the money gets lost along the way, and they are not able to trace the money for two weeks, additionally they don´t know for sure why the transfers were stopped. Most of the time, they reveice the money in the very end, however they are not able to trace them along the supply chain. So, their system is quite complex with a lot of different transactions, bank accounts etc. So in our thesis, we would like to "investigate" whether the blockchain technology can be utilized in order to effective/streamline this process, and also increase the transparency in order to increase general trust in NGOs like SOS.

GM: When you talked to SOS, did you speak about blockchain as well?

AS: Well, we did not, actually. Because we just wanted to gain an understanding of how their business model worked, how they transferred money etc.

GM: But like, are they willing to change? Because here we could act in two ways: 1) we move everything to the blockchain, also the transactions themselves. 2) The other way is that the transactions stay in the traditional model (bank transfers etc.), but we record, through some traceability record, the transactions on the blockchain. And we could think of a system where.. If you want to do a transaction via the normal bank, first you need to be authorized to do the transaction, also on the blockchain platform. So the blockchain platform will be able to add identities for all the actors that are involved in these transactions, and a record of what the actors receive, in terms of money, of what reasons they receive money, for what reason they have spent it, so forth. So, make this system very, very transparent, even though the money still flows through the traditional banking system.

So we have this two type of approaches. If you imagine two axis, it could be "semi decentralized" and "fully decentralized" or "semi blockchain" or "fully blockchain". So the first approach would be a "fully blockchain" solution, which means that, you are transferring coins on the blockchain, Bitcoin, Ethereum or whatever. This need to then be plugged in, anyway, with the banking system because the local projects would need local money (currency) anyway. We are not in a phase where Bitcoin or Ethereum is used worldwide for this type of projects, yet.

The other solution (2) could be that we rely on the traditional system, but we put on top this blockchain layer to grant more transparency, and you could think of smart contracts that are able to give you a sort of status, sort of score, or greenlight whenever you want to make a new transaction for certain actors. I don't know what is going to be your suggestion, but maybe they want to trace all these things. Maybe they send money twice, not necessarily the same money, like two buckets of money that are meant to go to the same organization. But, you will do this only if you are sure that everything was OK from the previous situations (transactions). So the blockchain can reveal through smart contracts, as a kind of an indicator that "Ah, there is a red flag. This transaction should not go through."

(...)

On top of that, what I can tell you is that we (DNV GL) are doing this, we are building new services based on blockchain, which we call digital assurance. We are doing several approaches, but the one I can tell you about is about supply chain type of assurance. Here the goal is to ensure that certain activities, certain elements are in place in our production process, that could be made of many nodes, suppliers. And the idea is to use the blockchain as the backbone of this digital supply chain, so enable them to interface with the blockchain to have this record of transaction that are data type of transaction. So you store data to a blockchain that are related to a particular product, production process and so on in order to grant transparency to these processes and products.

The additional service that we provide is to verify the information that goes on the blockchain. Because you can store everything on the blockchain, and then that information becomes immutable. However, if you store a lie, you are making a lie immutable. Therefore, even though the blockchain is called the trustless machine, in reality you need to trust what goes on the blockchain. So you can think of the blockchain as a trustless machine, IF the asset that you are referring to on the blockchain is native to that blockchain, a native digital asset to that blockchain. So for Bitcoin, don´t need a third party in order to do a transaction, because everything is native to that blockchain. But when it comes to put information on the blockchain, information that are not native to the blockchain, then you need to be sure that information actually is accurate. So, what the service that we do, is to verify through, either traditional auditing approaches, or data drive type of approaches, you can think of sensors, IoT or other types, to verify certain information. So that you can put a layer, and element of trust, in that information. And this could be an element, also in this case, because you have situations where you need to demonstrate that a certain project delivers certain results, so you could have a situation where you receive the money and the blockchain registers that you receive a transaction, "this money is of this amount, and they are meant for this project etc". Then on the blockchain itself, you can say the status of the project, "completed", "successful", "failed" etc. And then you could have a third party organism (organization) that validate that the information that is put on the blockchain is true. So that you build a more trustable type of ecosystem, in this case. So I think of this as very relevant for your case.

AS: Yes, and we have also talked about the fact that if these transactions are put on the blockchain, as you are saying, you would still need some form of internal of external control or other parties verifying that the information put on to the blockchain actually is true. You will only get to see the transaction, so if the person that are putting the transactions on the blockchain is corrupt or fraudulent, that will not actually be noticed on the blockchain.

GM: Yes, if you have some type of validator that can add to this (...). In this specific case, even though you are not completely getting rid of the issue of corruption and fraud, you are adding some system that will, to a greater degree than the way it is done today, prevent such fraudulent behavior. Because, it becomes more transparent on the blockchain, and another party validates will add, with its own digital signature, a validation of certain elements. This becomes transparent on a shared type of platform, so in the case of corruption where the validator is also corrupt, you limit a lot of the incentive, in a sense, to be corrupted. Because it is much easier to expose certain behaviors.

AS: Of course, as SOS is operating in more than 136 countries, they are exposed to a lot of different currencies and banking systems, which might be not particularly stable. When they are operating in Norway, Denmark and Sweden, they have stable banking systems and currencies, but for instance in Africa, that is not always the case. So, what do you think of the possibility of taking use of stablecoin for these transactions?

GM: Yes, definitely. So this would be the kind of step 2 (or 1? The one where you put all the transaction on the blockchain), where SOS puts their transactions on the blockchain. And a stablecoin could be one of the solutions. And then you could use a stablecoin that are already existing, and I suppose that the European Bank will issue at a certain point a stablecoin. I know, because I am working with the San Marino state, that they want to issue a stablecoin, which has a different purpose than a "normal" stablecoin, as it is meant for investments for investment in innovation type of projects that they are building. So you could refer to those, and these are at the moment pegged to the US dollar.

If you think about a European Central bank that are issuing a stable coin, then you can trust the stable coin much more than a stable coin issued by a private company. You need to trust that they actually have the funds in the bank, so that would be the situation.

Or, in the same way, SOS could create their own stablecoin, and they could choose how to peg it. They could peg it just to one currency, or to a basket of currencies, like the Libra concept, who wanted to relate one Libra to a basket of currencies and other commodities including gold, if I'm not mistaken. So, the way to implement a stablecoin itself, from a functional perspective, makes sense, because then you have everything moving to the blockchain. So, then you also save a lot of costs related to the infrastructure that you need to maintain, or the banks that you pay, as well as all these problems with the fluctuations. SOS could become a kind of bank in that sense. Then also, the projects, maybe they don't need at this point to run a local currency. Maybe they don't need to exchange to local money. Maybe they can pay their suppliers (...) in this stablecoin currency, and SOS takes the responsibility to exchange this stablecoin in the local- or the USD at the time it is requested. This will also fight a lot of criminality and other types of corruption when it comes to, you know, in these third-world countries, even the banks could be nasty, or this remittance situation, like Western Union. Actually, in these countries, people maybe don't have access to a bank account. So, you actually give them a sort of bank account, because then all their money is in their "wallets" on their smartphones, or even on normal phone. And, nowadays, in Africa, for instance, mobile phones are very much widespread, right? So, it's not really a barrier that. So, you can also think to target this type of situation. So, very interesting, yes.

AS: So, if SOS are about to launch their own stablecoin, can that be run on the Hyperledger Fabric system, or does it mean that they have to create their own network?

GM: I'm not sure if it can be run on the Hyperledger, because the Hyperledger doesn't support, from my knowledge so far, these types of applications, it doesn't support coins. So, you should go through another type of blockchain. Of course, Ethereum will be one, but, for instance, we work with another one, vChain, and some peculiarities that are interesting for many applications. For example transaction fees are very low, and there is a governance mechanism, there is not consumption of energy like Bitcoin. This governance mechanism is very important, because when you run a totally decentralized blockchain like Ethereum and Bitcoin, you don't have control over the evolution of the network, what happens to the protocols, etc. While if you move to, for instance, vChain, it runs a different type of consensus mechanism called Proof of Authority. Then, all the nodes that are validators of transactions, but most importantly they are KYC (Know Your Customer) and AML (Anti-Money-Laundering) process to be validated by the vChain foundation. The vChain foundation, at that point, allows you to be an authority node, so validator (...) And then, this committee of this foundation is able to also request updates to the protocol - you never know, there might be security issues or any type of issues - scalability and so on. Scalability, security - I think on vChain we don't have any security issues, but you never know. But scalability, for sure, certain parameters, because you know, one of the problems of blockchain is scalability in terms of how many transactions can this blockchain operate per section. And vChain has,

with this model, Proof of Authority, can reach many transactions per second, and if in the future there will be any needs to increase the throughput, then the committee can request an update of the protocol. So, this is important when looking ahead, which platform to choose.

AS: And vChain, is that a public or private platform?

GM: It's public permissioned. So, it's public in the sense that anyone can read the blockchain and write on the blockchain. It's permissioned in the sense that only those designated nodes can validate transactions. So, only these 101 authority nodes, so Proof of Authority, authority nodes, while in Bitcoin and Ethereum we are in Proof of Work. Ethereum are trying to move to Proof of Stake. I don't know how much you know about this, if you want me to explain.

AS: Yeah we know a bit.

GM: OK. And basically, these are the main three protocols: PoW, PoS and PoA, which the vChain are nowadays around.

AS: And, for an NGO like SOS, we are unsure of their knowledge of this technology. Like many other organizations, they know about it, but knowledge is not there. Do you think that, maybe in the short-term, it would be easier for them to use a private blockchain, but then in the long-term, change into a public one?

GM: I'm sceptical about the private blockchain, because then you start losing on transparency, and potentially also integrity, because you don't know what happens in a private blockchain. One, you don't need to store the raw data. Actually, you won't store the raw data. You just store the digital signatures of those raw data, you can store some smaller raw data. So you keep the private information, but you still guarantee the immutability and the transparency. So, this is my take on private and public blockchain. But, I mean, if they're interested to talk. As I've said we are also working with San Marino state, and we bring vChain in DNV GL.

(...)

And the business of DNV GL is really to provide trust. So, this trust is historically been provided through certification activities, but to us the word becomes more and more digital. You need to bring at least results, if not more, of these certification activities, on a digital substrate (??) for the stakeholder to be able to access this information in a transparent and trustable way. So, we are using blockchain, practically we are using blockchain to transform all of our business, and we are moving all of it to the blockchain. And, we are part of the (inaudible) committee also for vChain.

So, we are working with municipalities in Italy, also in Oslo, we talk to the municipality actually with the Italian government as well, and other industry associations. We are talking to big players in dataspace. So, what I want to say, is if you trust DNV GL, and DNV GL is considered a trusted partner, then you can also trust vChain, because we are working together. So, if they are interested in exploring more, we could have a meeting together with SOS, also just for information and to get a better understanding of their possibilities. I could bring in, depending on the meeting and the staff, but I could bring in the CEO of vChain and our digital director in DNV GL, so I bring in important, so to say, people, and have a discussion.

AS: We will let them know, thank you. And, like we said, the transactions that SOS are doing today, are through normal bank transfers. If we take these transactions over to a blockchain, for instance vChain…

GM: You could build a separate coin, I would do that in this instance, to be honest - the SOS Stablecoin. Or use the digital asset of vChain. And also this is very peculiar. So, vChain has two tokens. That's why

the fees can be considered kind of stable. Because, you have the primary token that, depending if you stock a primary token, you get the yield of the secondary token. The secondary token is the one used to pay for the transactions. So, if you know the size of your business, the amount of transactions that you need to make during a year, you say "OK, I need to buy this much of the primary token. This will guarantee me a yield of this much of the secondary token, so I can pay for the transactions that are needed for my business" - without having to go on exchanges and buy the secondary token on exchanges, and therefore being subjected to fluctuations of the secondary token. Because, you know how much you need to stack of the primary token to generate enough of the secondary to support the amount of transactions that are needed for your business. So, this is one of the mechanisms.

The other mechanism is that the foundation can ask, so as I've said, there is a yield, if I keep a primary, I get X amount of the secondary per month, per year, per block. The foundation can ask, through voting, the authorities to upgrade the protocol, so that in the end the yield can change, so I can generate more of the secondary compared to the amount of the primary (?). This will lower the price of the secondary, because you create more supply. But, most probably, it will also increase the value of the primary, because it's your primary asset. So, this will keep a balance in the end, from a transaction cost perspective.

AS: Do you have any thoughts on how the audit process will change when you do transactions on the blockchain and via Stablecoins, compared to general bank transactions?

GM: You mean from an accounting perspective?

AS: Yes, from an accounting perspective. We know you're not an accountant, but do you have any thoughts?

GM: Yeah. Once you have all these transactions on a public ledger, then obviously you can make many of these checks automatic, and so of course the benefit will be huge there. Now, I'm not from this industry, so I can't expand (?) too much on this, but it's clear to me that if I have a ledger of transactions, that can be audited, so a ledger that is auditable by a third-party in a transparent way, then I can automate a lot of this accounting and auditing process. And, yes, whereas it's not possible to make it automatic, you can still rely on the fact that whatever accountant will put their digital signature on an outcome of an accounting or auditing activity. So, also from, again, an accounting perspective, accounting accountant, it has a value from an anti-corruption perspective.

AS: That was really good! You've added a lot of value to our thesis and given us some new directions that we want to figure out as well.

GM: Fantastic! Let me know if you need anything, if you have any doubt or questions.

END

Interview 8

- Interviewee#8 – Lead Blockchain Specialist
- Sector: Financial Services
- Date: 18.02.2020
- Length: 50m
- Place: Face to Face Office

Started out the interview by telling Mads about our background, the topic of our thesis and our interest in the subject of blockchain technology. And some information on SOS CVI´s business model, the "funding supply chain" etc.

5:00

AS: However, they (SOS CVI) are still experiencing problems. For instance, they told us that sometimes the funds might get lost along the way, it might be gone for like two weeks.

MC: Yeah right, in the corresponding banking system?

AS: Yes, and they are not able to trace them, and they are not able to know why the transactions have stopped. Usually, in most cases, they get their money in the very end. But, it is a complicated structure and process for all of these transactions.

MC: And I guess that particular problem is not one that is so specific for your use case, because this is an underlying problem with the corresponding banking work. And certainly a problem that many people have looked towards the blockchain, as a potential solution. So I mean, you could go that route. But I mean, this is not the only problem you are looking at. You also have the transparency problem, tracing where money goes etc. that is a separate problem.

AS: Yes, for sure. So as I said, we have done two separate interviews with SOS CVI, and then we have also conducted some five interviews with blockchain specialists, in order to figure out the path of our thesis, etc. And in the very end, we are supposed to come up with some sort of conceptual design for SOS CVI, like a blockchain solution. And how that can be implemented, what should be private/public, what system they should use e.g. Hyperledger Fabric, should they use cryptocurrency in all of their transactions, or should they use a stablecoin, or should it only be data containing information...

MD: So like shadowing the transactions, and each step etc.?

AS: Yes. So we have a lot of questions that we have to figure out, in order to design this system.

MC: Yeah, and it sounds like you have a pretty good understanding already of the sort of questions you need to ask. You obviously have some sort of hypothesis on how you are going to solve this, right?

AS: Well, as for now, we have not come that far yet. On how we would like to design our system.

MC: Hopefully that will change many times along the way.

AS: Yes, for sure. When we have had all of these interviews, we have got several different tips for our design. Someone has told us "oh, you should use a public blockchain for all of the data. That would be great." Then another one told us "No, ofc you can not put everything on the blockchain, because that is not possible, and people don't always want their information on the blockchain."

EG: In general, someone tells us that this (one suggestion) is really good, but then another one say "that´s impossible".

MC: Yeah, that sounds like blockchain.

EG: Yes, and we think that reflects the picture, as there are still so much unknown.

AS: But for sure, we have gained a lot of knowledge through these interviews, and we are gaining more and more knowledge on the blockchain for each day. But of course we are not experts here, just interested in the field.

MC: I gain more knowledge on the blockchain everyday, and I am supposed to be an expert. This is the way this field works. But what I can say is that we, the experts in the field, certainly know more than what we did three years ago. Especially in financial services, where we were almost totally ignorant of what we could be able to do with this technology, and we have come to some kinds of realisations to that right now.

Well, where to start?

AS: We have some questions for you. So, if you think of blockchain technology and cryptocurrency, e.g. bitcoin. For you, as a financial services institution, if you think of the initial thought of the bitcoin and blockchain, they actually want to exclude such financial services, intermediaries.

MC: True.

AS: But, if you think of the traditional way that transactions are done today, like SOS CVI. Do you have any thoughts on challenges in the way they are doing their transactions today?

MC: The current banking systems?

EG: Yes.

MC: You have already mentioned some of them, I mean the corresponding banking system obviously has some limitations, right. Essentially, it is built on a process that was invented hundreds of years ago, and we kept building on top of it, repeating the same steps, but adding new technologies to it. If we were to start over today, and to it all from scratch, it would have looked very different. So obviously, it has its problems. But you have a problem that is not very easy to fix, because it is so ingrained and it takes so many different stakeholders to agree to actually do something about it. (...). So that is certainly a problem.

I mean, to your initial point that this was made to make banks redundant. I think it is quite clear by now that is not going to happen. The traditional financial systems still have its place, right. And that is because, funnily enough, for some of the reasons that you mentioned before, that money can get lost in the existing system, things take time etc. But, someone will actually take that time and find out what happened, where the money went and give that back to you. For something like public cryptocurrencies, especially for the early ones, if you somehow send that money to the wrong address, that will also get lost, you will never see that money again no matter what you do, right. So, that by itself is enough of an argument that public cryptocurrency, as it is today, will not completely replace the role we (financial services institutions) will have in the industry, because a lot of people will simply not be willing to take that risk upon themselves, they would rather let the banks take that risk on their behalf, like the traditional system. But that is a problem, that public blockchain systems generally have to deal with, when they function in that was as originally envisioned, like Bitcoin and so on. How do you deal with a

system where there is no one who is really accountable, ultimately, for making sure that "shit don´t go wrong".

AS: And that might also be the case when you have seen all of these huge cryptocurrency exchanges that have been hacked, and millions, if not billions of dollars in cryptocurrency have been lost, and you can not be able to get them back.

MC: Yes. At least, you can not be able to (get the money back), based on the technology, but sometimes you can you money back based on the custodian, because a crypto exchange is really like a kind of bank, when you look at it in practice. So when you have your money in an exchange, they are holding it in custody, just like a bank would. And actually, most exchanges now a days will make sure that you are ensured, some how. But then again, we are back at something similar to a traditional banking system. But if you go back to the initial idea of the technology, there is no middlemen, we don't have to depend on custodians to hold our money, for us. Then you have the problem. And it is clear that we already now, it didn't take more than a few years before we introduced that idea, before we started to develop systems going back to the custodian solution, right. So, that goes to show that we will never, or at least, it will take a different approach to get rid of these centralized middlemen. But yeah, otherwise you are absolutely right.

AS: Do you have any thoughts on, let say, if organizations like SOS CVI put all of their transactions on the blockchain, in the form of either a cryptocurrency or a stablecoin, how will their business-model change, and do you think it will effect the way donors have trust in these organizations?

MC: That is a really complex question. That depends entirely on what it is they do, exactly. But I would say that, what is my initial impression, is that there is certainly is some possibilities here. So you mention specifically that they would actually do their transactions, using blockchain, you mention yourself that is not necessarily, the way this would work. You could actually just "shadow" their existing transaction in their existing system. That is something that I can see as an actual use case. You simply have some kind of decentralized auditing, essentially, on what is going on, where do the money go, if you can get that set up to function, as intended. I don´t know how that would work, but you know, things are possible. I could see that really work, and I could see that such a system is something that donors etc. would be really interested in.

As regard actually doing the transactions themselves, now we are talking about putting a whole lot of money through an entirely new infrastructure, instead of using an old one. That is a totally different story, with a totally different system, and potentially different participants. In the other model, you would shadow where the money goes, when and so on. You would have to make all the people who are making up the current process, take part of that. Because they would sort of have to report what happened, they have to do it in a way that can be trusted and so on. But in this other system (with crypto transactions), you know, you can change the actual flow of the money. You can change which steps they go through, when going from point A to point B. And the problem, you said, with the initial model (SOS CVI´s system) is that there are some unnecessary steps. Well, necessary steps, but they are not really providing anything besides of the potential for getting lost along the way, etc.

EG: And also different transaction costs etc.

MC: Yeah, the more steps you have, obviously a larger slice of the overall pizza you are giving away to stuff that don't go to the actual purpose of the donations. So that is where the second option (crypto transactions) certainly is more interesting, in that sense. That you can change something more fundamentally than you can the other way. The other one is simply a model to increase trust and transparency, right, which is good enough. But it will take a lot of people to colaborate etc. so it will not be easy. But the other one, changing the flow of funds and so on, in some case that can be easier. Because it requires less parties, in a sense.

I mean, I don´t know how their (SOS CVI) processes work, but someone receives some money and that needs to go somewhere, and we need to ensure that it actually does. I mean, that could be probably quite simple, you wouldn't necessarily have to make your own system for it. I would probably just use some kind of existing asset, that has proven to be successful out there, it just have to have certain types of properties. You need to track where the money goes, and you want to make that part of it public, we are talking about the ability to trace certain individuals´ money to see whether they are used for the right purpose, right. So, I would probably find any of the existing infrastructures out there, and build a new application on top.

That doesn´t mean that you will get rid of the connections to the banks, you still need to have a ramp on to that new infrastrucutre. You need to, unless people have cryptocurrency already - which I expect most people don´t - you still need an unwrap to that new infrastrucutre. You need to convert that currency to cryptocurrency etc. So that needs to be built into it, and that would probably make more sense to do through a bank, somehow. That is what the exchanges do today, they have some kind of relation to a bank, which can handle that for them.

EG: One thing that I would like to add to that is that, as you said, most people don´t necessarily have cryptocurrencies now. I think I was a graph that i saw just earlier today, stating that the highest percentage of people giving to charities are age 55 or above.

MC: Yeah.

EG: And you can say that it is the demographic below that are most likely to have cryptocurrencies.

MC: Definitely. If people have cryptocurrencies, they are still probably below 30 right. So I agree. The other thing would be much simpler, but I mean all this is interesting. I mean, I don´t understand SOS CVI´s operating model, but if you did this you should actually not just rethink their transaction flow, you should rethink their operating model. Because they don´t have to coordinate it in the same way as they have used to, they can coordinate it differently. Why not skip the middlemen, in a sense, right. They could perhaps act as some sort of broker, right. Let´s say "here are some useful purposes that you can donate money to." List them on the website of whatever, and then you (the donors) can just pick it. That way, the money never even goes to SOS right, it just goes straight to the receiver, right. Maybe they will have to take some part of it out in order to manage their administrative costs, right. But that would be much less than it is today. But what I am saying is that, in terms of the transaction part of it, that is simply what every cryptocurrency does today, track where the money is going, make sure that the receiver is publicly known, so that you can verify that the transaction got sent to the right receiver etc. So anyone can verify that, and you don't have to make the sender public, right. The actual part that is very different, is what you build on top of that, to soft of fit that into their operating model. So I think that we are actually talking more about sort of a business model-change, more than a technological challenge change. Which is interesting, and it is important to think that way when you are doing with these technologies. Because what people tend to think is that what is going on today, and then just taking new technology and still doing the same stuff. Which is not very useful when it comes down to it, because this is a technology that, when it comes down to it, fundamentally changes how things can be done, in like an overall system.

EG: The way, just briefly, SOS CVI is doing it now is that they have offices with local people working administratively, and they are building these children's villages, that people are living in and also supporting families locally in those counties. And each year they (the receiving countries or counties) send budgets to the International office, with what they are going to need money for to build, or to provide people with schools etc.

MC: Do they actually build the schools themselves, or do they give the money to someone who builds the schools for them?

EG: Locally, we are pretty sure that they hire some people to build it for them down there.

MC: That would make the most sense. So the administration cost of it is also like making sure that it actually happens, right.

EG: Yeah, that is one of the main tasks, and a big part of it. That they have people that they trust, that work there and that make sure that the money are sent where they should etc. It is not the sort of NGO or charity where you just send money. That is what makes SOS a bit different, because of their presence in all of these countries as well.

MC: Yeah, fair enough. That makes sense. In any case, the sending money part is still a fundamental aspect of your problem here. So at least you can say that the money came from here and that it ended up in that country etc. (...).
(Start: 27:15)

EG: Some of the other people we've talked to have said that you're going to need some people or some sort of system that, because anywhere there is people, stuff can happen, and regardless if it's verified, it might still not be true. So, you got to have some other security to check that it's actually true.

MC: You're not going to have a truly decentralized system where you can actually check that there is a correspondence to reality. That's a fundamental problem of public blockchain, that… You come from this idea that it's transparent and there's no need for trust, because everything is true, etc. But it's one thing that only applies if the actual asset that you are using, or that you are transacting here, stays within the blockchain itself. And what we're doing here, is that we're talking about actual real-world things, right? So, you can see that a transaction happens, but you have to verify that that thing actually happened in real life as well, and that it happened because of that transaction. That is one of the problems you're never gonna get rid of. You need to, like you said, have some people who need to carry out that verification. And, no matter how smart your technical solution are, you can never be 100% certain that those people aren't corrupt, in a sense. So, in general, I think it will be very hard to solve that problem with a blockchain, in spite of all the hype about the trust and all that stuff. And, there is also the question of if that is the biggest problem? Perhaps you should rather solve; If you made a much more efficient transaction system, you might solve some of that problem incidentally, right, because you will have fewer steps, meaning fewer places where it can go wrong. So, excuse me, but this is not the kind of problem that we are personally working with at Danske Bank. So, you can imagine, as a bank, we are basically looking at this technology from a permissioned perspective. We are not actually dealing with stuff like cryptocurrencies - at least currently. We're rather looking at how the technology can be used as, basically, a shared database backbone for an industry, for instance, which is very different kinds of use cases from what you're looking at. So, bare with me, if I'm not an expert in what you're writing about.

AS: It's, like you were saying, because there are so many people saying blockchain is the "magical solution", and even though you can see that the money goes from the donor to the end project, that is the only thing that can be traced from the blockchain. From the end point, even if you're doing it with cryptocurrencies, somehow you have to exchange it into local currencies, and that is not a part of the blockchain, right? So, you still need to have some internal or external control. But, it can work as a sort of incentive to decrease the level of fraud and corruption, because it has some form of control there, that is different from the way they are doing it today. But, of course, it is not this solution to all these problems.

MC: No, but I guess you're right that you could argue that you get some degree of auditability over, at least, parts of the process, that you didn't have before. So, it solves part of the problem. But, it's an interesting discussion about all that, and really it's kind of weird to me that many people are still not

seeing, kind of, the counter-arguments to this. So, if you're looking into the supply chain, there's blockchains as well, you know, the idea that the blockchain tracks some traded good all the way from harvestation of corn until they're made into popcorn. They say "Oh, it's not a problem to track the relation between reality and the ledger, because we just put censores in those trucks and in the corn fields, or whatever".

EG: Yes, because everything can still just be tampered with.

MC: Yes, that too, right. And also it's like, there's so much work you need to do before that even works, right. I think we still have some work to do with that one.

AS: Yes, but it's interesting, because our, even though we are supposed to come up with a conceptual design… as we said, we are not going into that technical aspects, not that much anyways, but of course we have our discussion. So, the discussion in our thesis will be on the feasibility and all the other problems and questions that will come up if you implement such a system, such as the ones we are discussing here. You'll still need internal control, and you'll still need people there in the developing countries, verifying that this money is spent on these projects, because we cannot just state in our thesis that "Oh, blockchain will be the solution, and SOS will have no fraud".

MC: Definitely. I mean, what you can say, if you're gonna use it for that, to sort of track which transactions happened and, then you can definitely make a system that you cannot "cook" the books, right. Or you can say that "these are the actual transactions that were recorded". Then, what you have left to do, is to make sure to govern the rest of it. So, you need to spend a lot of resources verifying people, that they're actually doing what you're supposed to do and not pocketing the money, which is similar to today. But yeah, you will definitely have solved some problem. And, it probably wouldn't mean that, I mean, you probably still would need as many people as you have today, doing this, right. At least that's what my initial impression is, that's why I find that the other idea in solving the transaction problem interesting too, because that's, I mean again, a general problem, it's not just something that relates to your case. But, it could be interesting in the perspective of your case, like the entire correspondent banking problem of moving money from one place to the other. I think there could definitely be some interesting things to look at there too. Also, it's important to know that it's another problem you solve; it's not the problem of accountability or transparency, it's the problem of efficiency, making sure money don't get lost, making sure it gets there fast and doesn't cost a lot. That is something I definitely think you can use the technology to solve. But, it's important to make it clear that that's two very separate problems, and you would go about them in two very separate ways. It's not something you sort of build one solution to to be a "be-all end-all" solution.

AS: Do you have any experience with using stablecoins?

MC: Using?

AS: Well, not using, but do you have any thoughts on the …

MC: I have plenty of thoughts on them, for sure. So…

AS: If you're thinking of our thesis here, where you have SOS who, of course with cryptocurrencies you have the volatility aspect of it. But, if you're using a stablecoin you are less exposed to…

EG: You're locked to some sort of other currencies, etc.

MC: For the one problem you have, it's not really relevant, because if you just want transparency for the transactions, you don't even need cryptocurrencies, you'll just need a sort of tracking system. So,

for the other one, it depends. It depends on whether you want to have money around in that system, right. So, in general, if you just have a transaction system, (...) I just want to make sure the money gets there, but then it's the question of if they convert that money into the local currency in a local account, they probably need to do that eventually anyways - then it probably doesn't matter if the underlying currency is stable or not, because that transaction will generally happen very fast, it's not like the market is going to crash in the meantime. So, the stableness part of a stablecoin is a part that's only relevant if you leave money in account, right, and you don't want the value of it to change. So, if that's not the case, you probably don't need to consider it as much. I mean, there might be fluctuations, like there is with normal currencies too. So, I wouldn't consider that so much. Saying that, I think stablecoins is something that we definitely need, but for another reason than what you're looking at.

AS: Why?

MC: Well, you're looking at transactions, and stablecoins are fundamentally about solving the problem of volatility, right. Volatility is not related to transactions, it's related to the, sort of, storing of the value, right. So, in that sense, I wouldn't personally think it's all that relevant to you. It might be if, for instance, people need to have money in an account somewhere, which they can regularly pay from to other guys, then it might be better to have it in some kind of stablecoin. Again, I would say, there's no particular reason, I think, that they should want to build their own infrastructure around this. That seems awfully complicated, given that there is already hundreds of frameworks out there that does what you want them to do, stablecoin or not.

EG: And, of course, I don't necessarily think that the donors want them to use the money they give to help people, to build a new system. Because most of the organizations are solely reliant on donations to work, they're not self-sustainable, so they don't have much money lying around, so you probably shouldn't use the donation money for that.

MC: You shouldn't do that, no, unless there for some reason would be great pay-offs to doing so, way down the line. But, I don't think so, I think you should leave that to the private companies who are good at that anyways, or leave that to the governments to go together one day and say "let's build something together". That is a very real possibility that, let's say, the banks of Europe in a few years come together and say "How about we build a common UN stablecoin", for instance, that would act as a common good, working as a common payment system going across borders. At that point, it's pretty obvious that something like charity organizations will adopt these and say "Adios!" to the old correspondent banking systems, right. It doesn't require them, if you ask me, to invent the.. You know to go and do something that everyone else failed to make a proper solution for right now. That would be sort of "forcing" a solution, when all they need to do is actually being a little patient, and let someone else do it for them.

AS: But, for instance, SOS CVI told us that some people have a sponsorship program, where you donate to one specific child, and then they provide some sort of savings account for when they get older. So, if you think of that aspect, it could be better to use a stablecoin, maybe. Because, that is money that can be stored for maybe 15 years.

MC: Yeah, you could. The alternative to that would probably to use a normal bank account like you do today. And now they have relations with, you said, 20 different banks to do that. So, this is a judgement call you have to make, whether it's better for us, simply to govern that ourselves, or do we want to have all of this money in some stablecoin account instead. And then, who is governing that? Who's in control of that? Is that something we control ourselves, or are we dependent on, let's say, they just use something that already exists? Let's say we put this money into an account on Dai, for instance (...) What if that ecosystem breaks down in the meantime? It's certainly not as safe, currently, as having it in a bank somewhere.

AS: But, you still have, because, well, they operate in 136 countries, so they will be exposed to a variety of different banking systems, etc. But they'll still have, if we use Malawi as an example,

one of the countries that is sponsored by SOS Norway, let's say the banking system there crashed, or something like that. Then, you still have the risk of the savings getting lost. So, there definitely is a trade-off that we have to discuss here.

CM: It is interesting, but you got to also ask yourselves "Is that a development that a charity organization even wants to support?" Don't you think they would rather want to support the local economies by having money locked up in savings account. That would have a stabilizing effect, right. Whereas, funnily enough, these stablecoins, which we think of as exactly a stable alternative, they have the funny side-effect of de-stabilizing economies that are already not really stable, because they provide incentive for people to pull out their money and put it into stablecoins instead, right, like they've been doing with the USD for hundreds of years now. And that's interesting, and I don't know if, like, ideologically that is something that those kinds of organizations should support. But, that is more of a political question, and philosophical almost, than a technical one. And, you have to really get into the macro-economic effects of this, which I assume is a bit outside of the scope.

(...)

To me, those questions are almost the most interesting parts of these things.

AS: Well, you have actually covered a lot of our questions here. But, as you might understand from our conversation here, we are still trying to find out where we'd like to go with our thesis, and this conceptual design. That is why we also have these interviews, because - we have some knowledge, but of course there are so many questions that we will face along the way, and whether SOS should use an existing system, like you mentioned, or they should create their own - well, we have definitely concluded that they should use an existing one instead of creating their own.

MC: I mean, don't take my word for it…

EG: No, but from our standpoint as well, that is the most realistic, or smartest option as well.

MC: It definitely has been some sort of tendency, I think, especially when the hype first started around blockchain and DLC, that everyone wanted to get in on it, right, and build their own systems. So, everyone tried to reinvent the wheel. And, basically all of them made the same mistakes too, looking at the wrong (...). It's not the technical parts that are the problem here, you can use what's already there. The challenging part is the rest of it; how do you embed it in an organizational context that makes sense? How do you make all of the different actors that need to be part of it for it to make sense, actually to be part of it? How do you broker that relationship and create that collaboration between potentially thousands of different parties? Those are the real challenges you need to deal with, it's not what parts of your infrastructure that needs to be public or private, or Hyperledger instead of Ethereum, or whatever, right. That's secondary; You need to solve the fundamental problems first. So, anyways, I'm ranting, but it seems like you're taking the right approach, if you ask me.
(...)
If you thought that you had a clear idea from the start, then you probably wouldn't be right anyways. With these types of problems, you need to change all the way until the end, with your scope, your perspectives, and your possible solutions - that's how it should be. So, just keep on doing that.

AS: And, if you just, when you think of NGOs that provide foreign aid, what fundamental problems come to your mind? For NGOs, like SOS, that provide foreign aid, you mentioned that we have to think of the fundamental problems that they are facing.

CM: Well, the fundamental challenges related to introducing new technologies such as blockchain, and what I mean by that is that, just because you have new technology, that doesn't make all of your existing challenges go away. So, if you just put in the new technology and substitute it with what you did before, but you don't change the process around it, you're not going to change any of the problems either.

That's why I said that if you still let them use their correspondent model, making money go step-by-step, so down the same pipeline, then you're not going to solve any problems. What you need to solve is that. You say "Well, now you have possibilities here, you can do things in a new way". And then, what kind of challenges arises because of that. When you create new ways of doing things in big ecosystems like this, which involves many stakeholders, not just in the organizations, but all those external third-parties they are interacting with, you're going to have a big challenge. Just like in general, when we are building DLT or blockchain systems, we're creating network effects, right, we are creating a network. There needs to be a network of nodes that are participants that are providing something to this network, and you need all of those to be there. You don't just build a network yourself, as an organization, and hope everyone else comes and joins afterwards, right. You need to broker that relationship from the start, because otherwise your solution doesn't make any sense. Then you might as well create just a traditional database, right, which is how banks operate right now. You don't want a decentralized system if you have no one to share it with, that doesn't make any sense. And that challenge is often unaddressed when you look at all the people coming up with blockchain proposals that can solve all their transparency problems, and so on. It's the same problem as we discussed earlier; You need to actually go to those people who you are trying to make transparent, in a sense, and have them agree to participate in this system and make all their stuff transparent. And, how are you going to do that? That problem doesn't solve itself. It requires you to go out there and doing something that you didn't do before. So, that is the challenge you need to solve, it's not to consider which frameworks and which of the cryptocurrencies or stablecoins, or whatever you want to use for it, because that part is straight-forward enough, how you're going to make it real, in a sense. My view, that I generally like to take, because of this entire discourse around blockchain has been too little around sort of the execution part of this progress, and how we can make reality of it.

AS: Yeah, that was really good. Thank you.

Appendix 7 - NVivo12 Output

SOS CVI

Supply Chain – Transaction Processes

Files\\Interviews\\Interviewee#1 290120 - § 5 references coded [5.69% Coverage]

Reference 1 - 1.49% Coverage

M: So, can you describe the transfer process from donors (e.g. from Norway) all the way to the ones in need in the developing countries? I´ll try to explain it from a high level. Let´s say that SOS Norway collect money from donors. I already mentioned NORAD, these funds are collected and the transfer process looks something like that; the Norwegian organization collects the money at some stage, the shared treasury services, which then administrates the process for the money to end up in the programme intended. There is two things I would like to separate. The money is transferred via bank accounts, and the money is booked into our accounting system. I repeatedly told you that SOS is not fully consolidated corporately, so we do not have an ERP system which close and reflects everything that the 136 countries are doing. We are working on implementing a new ERP-system which covers more, but we are not there yet.

Reference 2 - 0.64% Coverage

From the shared treasury services, money is passed onwards to programme countries. Specific programmes, for example if you have a programme that shall receive NORAD´s (?) funds, this comes with a lot of requirements. NORAD is very strict about that. We have safeguards in place there for dedicated bank accounts etc. (…) This specific programme activity can only spend from such bank accounts.

Reference 3 - 0.99% Coverage

How long does it take before funding are transferred from e.g. SOS Norway to the projects in developing countries? Technically, the usual time for passing the money onwards is the usual time for bank transfers to be executed. But that is just the money flow. Obviously, these transactions have to be booked as well. I keep coming back to the structure, as this is a federation not a corporate organization. So if you want to transfer money onward, it takes certain level of clearance. Believe me, before Norway passes money onwards, they are going to make sure that the propriate approvals have been attained.

Reference 4 - 0.66% Coverage

So there is a technical side of passing money onwards via bank accounts. So there is nothing special about the time spent for the transfer, just usual time when transfers are made with bank accounts. Approvals and administrative processes also take some time. I´m not sure how the technology for transferring money around would change the manual leg in the transfer process and decision making process. (…)

Reference 5 - 1.91% Coverage

E: When SOS Norway have collected money, and they are passing that onwards, are they responsible for some regions and some countries? Do the money that SOS Norway have collected only goes onward to some specific countries?
M: Not all of the PSA (Participating and Supporting Associations), does not give to all the SOS countries. I have already mentioned the dedicated bank accounts, where the money is really earmarked, by the donor or institutional giver, so that the money have to go to specific

projects. So, all the funding is not just going into one single pot, and then distributed to the projects randomly. (…) For example, before SOS Norway transfers money to a bank account, there are several control steps which makes sure that the money Norway passes onwards will be spent for purposes which is in line with the contractual agreement. Even though this sounds easy, it isn´t. You have to separate this by country, you then have to basically verify the calculation steps per country , and only if you have the necessary approval you can pass the money on. However, the basis for the approval is reconciliation made on the accounting system. So, this is a multi-step process.

Files\\Interviews\\Interviewee#2 060220 - § 22 references coded [32.49% Coverage]

Reference 1 - 1.24% Coverage

RB: We have an old system which is from an accounting side, and lot of the old, programmed software-stuff, and we also have a very good banking system. We have changed our way of communication with banks from, let's say, a single point of contact or one-to-one contact, to a more or less shared treasure service. What we now have is that, for example, our colleagues in the GSEs, they collect all the money that will be transferred to the NAs (National Associations) - to the members from associations - and they everything about that: they convert currencies into other currencies, and do hedging to ensure that we have the best conditions, the banks, and also to ensure that they follow the same processes and that we do not lose money somewhere.

Reference 2 - 0.98% Coverage

We have tried to really reduce our banks. Our banking connection especially. You can imagine a banking system in Uganda or Angola, they have far too many banks. They have historically grown banks, so we have tried to reduce our number of banks. So, we are really trying to work with 10-20 globally acting banks. Even less than more, who also can, let's say, ensure that we have their presence in the different countries, and this really makes our lives much easier. The idea, as well, is to say, as we are not, the GSEs are something like an intermediary, something like a holding function.

Reference 3 - 1.08% Coverage

And we are not a bank, so what has been done is that now there is every year a budget round of the NAs, the member associations who need money. This budget then shows a cash flow need for the next year, and this is then discussed between all the funding PSAs, who more or less give a commitment. You can imagine that sometimes this is like a layering-up something, so say that PSA 8 or PSA 10 are interested in funding something in Uganda. So, everyone are giving their own commitment for the next year This will also mean that then they are obliged to send money to our shared treasury centre, that is a little portion - a down-payment - before next year starts.

Reference 4 - 1.19% Coverage

Then, sometimes on a monthly or quarterly basis, our shared treasury centre then transfer the money to the national organization. Given that we have many countries with local currencies, if possible, our shared treasury centre is also doing hedging (80% hedging, 20% free-float). This gives, on one hand, more certainty regarding budgeting, because then you have a budget to the currency exchange rate, which makes it easier for our NAs, and also for us planning things. On the other hand, you might also lose some opportunities if the currency goes down. But we try (with this) to make things as budgetable and planable as possible to ensure that we have a sound base for sending the cash to the NAs the next year.

Reference 5 - 0.20% Coverage

The main currencies that our shared treasury centre is receiving is mostly Euro, some USD, and also nordic currencies.

Reference 6 - 0.66% Coverage

But, it is a bit of a complex mix. You can imagine that, if you look at a spreadsheet structure, it means that you have some incoming currencies, which are mostly hedged (80%), and then you must ensure that the cash needed in the NAs goes to the NAs via secured channels and in smaller instalments, but ensured that it is sent to the right bank accounts - the local bank accounts - with reliable banks.

Reference 7 - 4.09% Coverage

RB: If we start from the "Cash-collection side". This is done in e.g. SOS Norway, and it can be donors with a regular sponsorship, maybe they sponsor a child in Malawi and send a small amount of money every month, or there are also one-off donators. So, the art (?) starts in Norway to ensure that, for example, if they want to fund Malawi, that they attract donors who have interest in funding malawi, for either direct sponsorship of children or also by sponsoring the NAs. Moreover, if you have something called an "earmarked fund", e.g. a donor wants to fund Uganda, you cannot use that money to fund Malawi. So, what NGOs always like is to have money that is not earmarked, because it gives you more flexibility. However, especially the unique selling-point for SOS is that we also own the projects, and our donors like to have direct contact with the beneficiaries. This is why we have this sponsorship system: That you know which child you are sponsoring, and then you commit small amounts of money every month for that child. You can also donate some additional money which is then put into a saving box for this child, so that when the child is grown up, they have a better start for their life. So: The money collected in SOS Norway, they have to know if the money is earmarked. If the money is earmarked for, for example, Malawi, then the money has to be used to fund Malawi. These projects can be of different types and sizes. For example, we have children's villages, we have use facilities, we even still have some hospitals, some schools and some kindergartens. And these institutions need money, and the need of money is framed, because the needs or frames that the NAs send to SOS International, where it is checked for whether it is reasonable. Then, this cash need is communicated to the PSAs. They then think: "OK, we can fund, for example, Malawi, with one million". So, some of the money is earmarked - so it should only be given to, for example, if it's for the child, then - it is very difficult; Because if it is for the child, then the fund has to go to the children's village, to the house where the child lives, and also to the mother that is running this house. So this is a very specific purpose, and that is what the NAs have to ensure internally, that they (the frames) are very strictly followed. However, if you don't have that strict earmarking, then it's easier, and the money can be used for other projects like kindergarten or the school or whatever.

Reference 8 - 1.09% Coverage

And then, as I mentioned, SOS International does not have any free cash. The funding PSAs sent 20-30% at the latest by the end of last year or beginning of this year, to the shared treasury centre. This is then used always to facilitate some periods in between, because normally SOS Norway do not send money on a monthly basis, sometimes they only send it on a quarterly basis, due to it depending on the "cash-needs". The STS (shared treasury service/centre) then send new appeals to SOS Norway so that they get fresh, new money in Norwegian currency, and normally on a monthly basis, this money is then sent via trusted banks to the bank account in Malawi.

Reference 9 - 0.84% Coverage

So, this is the circle from PSA to SOS International, SOS International to the NA. This is the

normal procedure, and normally the system itself is quite secure; it has already been checked by auditors, both systems and control-checks. But, if you think from a blockchain perspective, having total information flow, you have money coming from Norway, and this money is then converted into local currency, and is then sent via the banking system of SOS International to the benefitting organization.

Reference 10 - 1.43% Coverage

Do you also need to understand how the money is spent on-site? EG: Yes, would be great.
RB: OK, so let's use Malawi as example. Malawi may have some projects which only allows to use some earmarked money. So, this earmarked money is normally transferred from the STS to the so-called "earmarked bank accounts", so that only expenses paid out of that bank account can be tracked back, and only the money that has been sent in can be used for that purpose. This is what we normally also audit, to ensure that there is a clear flow of funds, which we can also show to our donors; Because you can imagine we also have some external donors, e.g. NORAD, who funds very specific projects, and really want us to ensure that these are being done. And then there is a "normal" bank account, where the money is sent for the NAs' needs for operations, for example like salaries, etc.

Reference 11 - 0.86% Coverage

NGOs will also have so-called "tied money giving accounts". These are account where, for example if a donor wants to give the child something extra, for Christmas or whatever, then this money is transferred into a separate bank account, which is then 100% funded by cash on the asset side to ensure that, when the child at some point in time leaves our care, they will get something extra to start their business or what they'd like to do. So this is 100% backed with bank transfers only spent when the child is grown up.

Reference 12 - 1.24% Coverage

AS: OK. I have some follow-up questions for you, if that is OK? Firstly, you mentioned the "saving box" for the children. Where are those kept? Is it in banks in, for example, Malawi, or is it at SOS International?
RB: It's kept in banks in Malawi. This is also then something that is discussed with the donor. If we can, we try to keep it in "hot currencies", being USD, but sometimes in some countries you are not allowed to do that, and you have to convert it into local currency. We then, for sure, hope that we get some interest on it. So, it's more of a savings account for the beneficiaries, like if your grandparents would like to donate you something, they can give you a savings account, and then it can be separately kept and gain interest over time.

Reference 13 - 1.50% Coverage

AS: Thank you. You also mentioned the frequency of the transfers of funding. For instance, you said it was on a monthly or quarterly basis, is that correct?
RB: Yes.
AS: But, if there is an instance that makes, for example SOS Malawi, in urgent need for funding, e.g. if there has been a natural disaster or something like that. Is it then possible to send money on a more frequent basis?
RB: Yes, it would be possible, but normally it would mean that there would have to be an appeal first. Because money is only sent if there is an appeal and the PSAs have agreed to fund it separately. You talked about these types of crisis, for example we had this flood in Tanzania and in other regions. If this happens, then it starts with a funding appeal, and then extra money is channelled to them. But we also have more procedures than that, so it cannot be unauthorized payment without the acknowledgement of the PSAs.

Reference 14 - 0.87% Coverage

EG: So, the local countries have their own books where they keep their records. Do you have open access to that, or do you get them once a year?
RB: I think for most of them, we have open access, but in some countries it is a bit more difficult, e.g. in Syria, etc., they are not 100% connected to our system. But, I think 90-95% of them have (inaudible), and we are currently converting to these new system from Microsoft. So, our current project is to only have one unique ERP system, and hopefully get all the countries to use it.

Reference 15 - 1.85% Coverage

EG: OK. And when you are transferring funding, what percentage of the funding remains after a transfer? I.e. what goes to administrative costs, exchange rates, transfer fees, etc.?
RB: It's very low (the percentage lost during transactions). I think, compared to what we had before, I think we are saving every year approximately a few millions by centralizing this all into one SDS (?) and one shared treasury centre, talking with few banks. This money is then, for sure, either given back to the funding PSAs so they can use it for additional funding for different purposes, or sometimes it's also given to some of the NAs who have some extra investments, or something like that. So, it's quite good, maybe it's 1-2% - it should not be more. It's very, very low compared to others. You can imagine, sometimes it is difficult to convert into local currencies and get the money to the countries, like Syria and Venezuela and so on. So, this is quite good in some, but still we have really managed to find good banks who give us good conditions so that we, in our perspective, have a very cheap way to transfer money.

Reference 16 - 1.55% Coverage

AS: So, you have told us about these different kinds of funds; Some of them are earmarked, etc. But, for those funds that are not earmarked for specific projects, is there a system that can track these funds throughout the entire supply-chain?
RB: In the end you'll see, for example let's go back to Norway. Norway has earmarked funds for, let's say a few million, that they just use for Malawi. And then they have non-earmarked funds that they would like to use for, let's say, Angola for example.Then they take this money, they more or less commit to fund Angola for the next year, for example. They take this money, and this money is then, as a normal procedure, they have to pay the 20% in advance to enable our shared treasury centre to run the whole system, and then it is called off every two-three months, for example. Then, Norway pay what is committed to SOS International, and then from SOS International, it channels to Angola.

Reference 17 - 1.87% Coverage

EG: So, when a country like Malawi or Angola is asking for money, do they state different projects that they have planned to do, or to commit to, and what the money is supposed to go to?
RB: It's both. If it is a specific project that is specifically funded, then they normally have separate calls for these projects, because they might follow a different interval of when they really need the money. But, if you have the normal instances, when the village needs tools which always require money to run and to have the beneficiaries to survive, then this is normally done on a monthly basis. So there are normal frequencies and there are extra projects which do not fall into the normal procedures. And, there are still somewhere that some PSAs still do not participate in our shared treasury centre. Those smaller amounts are also channelled not via our STS, but directly channeled from the PSA to the NA and to the specific project. But, we try to, let's say, enhance the reach of the STS so that at some point

we have that 98% of everything is channelled through the same, which from an economic point of view it makes more sense.

Reference 18 - 0.78% Coverage

EG: But then, say if there is earmarked funding, do you have any systems to track and check that the money is spent at what it is earmarked for?
RB: Yes, so for example if you have specific projects, let's say you have a specific accounting project, which shows that this object is bought for this purpose, and is also accounted for, you can do that in NVision, you can do that by setting up some kind of project codes, in the new system you can even set up cost centres or whatever

Reference 19 - 1.98% Coverage

AS: So, we have now spoken about the process where funding goes from the donors to the developing projects and the earmarked projects, etc. Are there any steps in this process where you are looking for changes so that they could be done in more effective ways?
RB: I think, what is really time-consuming now on our side is matching of needs and funds. It's quite a painful process, because, as you know, we have 135 countries and 110 organizations or associations who require money. So, on one hand you have the need and the budget, and on the other hand you have the PSAs who are funding it. And the art is really to fill that up with earmarked money, with money that is free for the country, with money that is totally free and so on, and to ensure that all the needs are funded by the PSAs - especially some PSAs do not want to fund specific countries due to history. For example, France want to go more into the western central parts of Africa, like Algeria, and they do not want to be in countries like South Africa. So, this is a real art. And we have a very complicated system, currently, behind it, and it takes us a lot of time to equalize the needs with the funding and funding available and possible.

Reference 20 - 1.61% Coverage

EG: That was a very good explanation. I have one more question: In regard of the transparency towards donors, of course you have to report for the earmarked funds that the money goes where it is supposed to. But, say that there were to be a blockchain introduced to your system, it will makes almost everything transparent. So, are there any information in the different transactions that are completely confidential and that couldn't be broadcasted to the public on this system?
RB: Well, let me think about it. No, earmarked, I think is not confidential. If it's only used internally and also for the donor, it should not be a problem. I think if it is published on a website or that anyone could look at it, then no, there shouldn't be any problem, I think. If, at some time, we would be able to do so, it would also give our donors more confidence. So, if they give us 100 or 1000 Euros, then they will see where the money is channelled through and what it is spent on: Perfect!

Reference 21 - 2.87% Coverage

AS: OK. So, I have one more question for you, and please correct me if I'm wrong. You mentioned that in your current transactions, you are collaborating with 10-15 banks, is that right?
RB: Yes, maybe even a bit more, but we really try to nail it down to a few.
AS: OK, so if I understand it correctly, SOS Malawi has to use a local bank in Malawi to get out their money. Using Malawi as an example; If it is not possible to cooperate with one of your 10-15 banks in Malawi, if there is just a local bank available there, is that an issue for you?
RB: Mostly not. It may cost a bit more money, because it is not done via one of them, but

normally, for example if we take one of the larger banks that we normally use, and then they would try to transfer the money to this local bank. It may also mean some higher charges for our colleagues, because this local banks normally have higher charges than if you have a world-wide contract. But, it's possible! Yes, it may take longer, and it may be less transparent, because maybe just at the interface, the money might get stuck somewhere. And the requirements from the local banks are different from the sending bank, and then, sometimes, this communication takes a while. To clear it up, sometimes they want to make sure that the money is coming from a "clean" account, especially due to money laundering. Also, now the NGOs are much closer looked at, especially by the U.S. authorities, because they think that maybe NGOs can easily be abused to transfer, I would say, money that comes from illegal sources, and convert it into (il)legal money somewhere. So that's why, especially banks are also now having much stricter requirements to understand where the money comes from and where it is spent.

Reference 22 - 2.73% Coverage

AS: You mentioned that the money sometimes can get stuck on these transfers, due to some administrative work, or something - does this happen often?
RB: It depends. In some countries, yes, it is a permanent problem. Especially in a country where normally U.S. banks don't want to do any business due to bans or whatever. Sometimes it can just happen unexpectedly. In maybe 5% of the cases, and these sometimes are the cases where the country is in urgent cash-need. Our countries also have some kind of financial reserve, and we really encourage everybody to have at least one month of cash reserves so they can survive without any more external funds coming in. But, these countries are normally a bit more short on cash and desperately need it, and then, maybe after one week, our shared treasury centre gets information from the NA saying:
"Hey, we didn't get the money. What's up?". And then the banks need to work and investigate and find where the money got stuck.
AS: And how long does this process normally take?
RB: Well, sometimes it takes up to two weeks. But that's unfortunately something that has to do with our banking system: As long as they are not harmonized, as long as they are not transparent, whatever their interfaces are, there are always some problems. And, whenever it comes to difficult countries, where especially the state is trying to control the inflow of USD, because they urgently need this kind of money for other purposes, this is always an issue. There are many countries like this, for example Zimbabwe, who are currently very short on foreign currencies, so we really need to find ways to deal with that.

Trust, Transparency and Pressure

Files\\Interviews\\Interviewee#1 290120 - § 7 references coded [7.50% Coverage]

Reference 1 - 2.05% Coverage

M: Then you asked me do you feel that your donors have trust in SOS? And the pressure from donors and the general public to keep administrative costs as low as possible.
E: As background; when we have been doing research and multiple reports say that in general, people are having less trust in NGOs and in that they money not necessarily go to where they are supposed to. That is the background for the question.
M: Yes, that is very understandable. And I mean, incidents like we have seen at Oxfam obviously not help for the reputation of NGOs. I am certainty not troughing all the NGOs into one bucket, but these kinds of reputational incidents definitely has an impact on donors in particular and consequently also into the recipients of the
money. So I would say, Yes, they still have trust. Yes there have been incidents, but maybe as a general development, one could argue that we, but also others child focused organizations, we are being held more and more accountable. We have to answer to questions like where does the money go, did you make sure that this and this did/didn´t happen, did you put adequate safeguards in place in order to protect the assets as well as the running costs money for the operations and so on and so forth. So yes, there is that development.

Reference 2 - 0.62% Coverage

Keeping administrative costs as low as possible, well this is sort of a general concept. Donors wants the money spent in the programme in the purpose for which he/she makes their donations for. There is also the element of, was the donation spent for the purpose in the programme. Not only the pressure “as low as possible”, but also “was it really spent for the purpose meant to be”.

Reference 3 - 0.42% Coverage

Imagine that working in an NGO is like being exposed to the pressure when you have a cost-cutting in a corporate organization. So if I fly, even long distance, it is always economy class. If you ask my CEO, when he flies to Sierra Leone, he sits on economy class.

Reference 4 - 1.43% Coverage

I can not speak for finance, for the shared treasury services for example. Does SOS trust their intermediaries, e.g. banks governments etc.? I have already told you about the difficulties with different political environments. Just to give you an idea; we are talking about hundreds of bank accounts, so yes ofc does SOS trust their intermediaries. But given the different countries and locations we operate, we depend on a lot of providers. I go back to the region where Malawi is, and actually to a country almost there. You are not free to choose among a big variety of banks that are available on Wall Street, but the programme location uses a bank which is available there, on site. So, not sure if this is an intermediary, but it is definitely a bank. There is not much competition in certain of our programme locations. This is certainly also something that is not really obvious.

Reference 5 - 0.66% Coverage

What I also like to add in that context, this is certainty not blockchain, but there are obviously internal controls built into our systems. There are for example separate and dedicated bank accounts for certain purposes, which facilitate or adds to some transparency. But, there is no doubt about that this does not reflect the degree of transparency, not the same audit trail as the blockchain provides.

Reference 6 - 1.59% Coverage

M: Are unaccounted funds noticed? I´m not sure, if thinkable instances of fraud would necessarily be detected right away with other technology. There is no doubt that the blockchain technology application will provide you with an transparency audit trail. But still, the transaction is then forever stored in a decentralized accounting system, so you can externally verify and check transactions. But it is still only about the transaction, not necessarily what the money was used for or to whom. There are definitely frauds that can be committed, where there is not necessarily the means of the money transfer that is the most relevant part. If you were to commit a fraud, you would probably not actually use the money transfer to take money away. You would probably think about whether you can kick back some money, or can I have some back from a business partner. I am aware of that the blockchain technology can provide an audit trail, but only about the transaction itself right?

Reference 7 - 0.74% Coverage

If the fraud is made well, the cheated money is built into the price. And the transaction, whether it takes place via a standard bank account or via more advanced blockchain technology, it still shows the transaction between two parties. We have to manage out expectations when it comes to fraud detection when we use new cutting-edge technology. Because, I have my doubts that the blockchain technology will “prevent” all fraud only by pushing a button.

Files\\Interviews\\Interviewee#2 060220 - § 5 references coded [6.32% Coverage]

Reference 1 - 0.82% Coverage

OK, so, I think Oxfam hit the NGOs quite badly. There was quite a big scandal in Germany about 10 years ago with UNICEF. So, trust is a big issue, and if you lose trust, you will not attract any NGOs any longer, especially the NGOs when the NGOs are in the spotlight. This is something that we really take care of, which is why we enhanced our compliance function, where we have a colleague and an international director who are heading the integrity, compliance and legal department with 5 people.

Reference 2 - 0.94% Coverage

So, yes, we are actively working on that (trust): We are publishing, for example, our compliance report - a short one integrated in our annual report - and we talk about incidents that have happened, for sure, and we do our best to remediate them. Of course, I think we are working in 135 countries, and most of them are read (?). I think, if you look at the Transparency International Corruption Index, we cannot just close our eyes and say that it won’t affect us. We, of course, have external and internal risks, like fraud and corruption, which may happen somewhere.

Reference 3 - 1.13% Coverage

What we have to ensure is that the confidence is there in that the money is spent properly, because, I think the only thing you see is that money is spent, maybe also for purposes like construction or for children’s clothing, but you do not see the item at the last step, meaning how the negotiations between the organizations and the supply has been made, if they followed our procedures, e.g. that you have three bids, that you have a procurement committee and so on. So, you would only be able to see it if everything was 100% transparent, so also our internal processes would be 100% transparent and would also follow something like a process model and all the data would be kept.

Reference 4 - 0.70% Coverage

That's the future; maybe in 10-15 years, currently I fear we are not there yet. However, I would say: Great! You may have a unique selling point. If not, then others will do it as well - and then we would have to follow anyway. And, doing that would mean that you would have full transparency of the money flow. You may also see what kind of money is used for exchange rate and for admin costs, and so on, and what you spend in the end.

Reference 5 - 2.73% Coverage

AS: You mentioned that the money sometimes can get stuck on these transfers, due to some administrative work, or something - does this happen often?
RB: It depends. In some countries, yes, it is a permanent problem. Especially in a country where normally U.S. banks don't want to do any business due to bans or whatever. Sometimes it can just happen unexpectedly. In maybe 5% of the cases, and these sometimes are the cases where the country is in urgent cash-need. Our countries also have some kind of financial reserve, and we really encourage everybody to have at least one month of cash reserves so they can survive without any more external funds coming in. But, these countries are normally a bit more short on cash and desperately need it, and then, maybe after one week, our shared treasury centre gets information from the NA saying:
"Hey, we didn't get the money. What's up?". And then the banks need to work and investigate and find where the money got stuck.
AS: And how long does this process normally take?
RB: Well, sometimes it takes up to two weeks. But that's unfortunately something that has to do with our banking system: As long as they are not harmonized, as long as they are not transparent, whatever their interfaces are, there are always some problems. And, whenever it comes to difficult countries, where especially the state is trying to control the inflow of USD, because they urgently need this kind of money for other purposes, this is always an issue. There are many countries like this, for example Zimbabwe, who are currently very short on foreign currencies, so we really need to find ways to deal with that.

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Reference 1 - 2.30% Coverage

What are the typical characteristics of such countries?
MW: “Well, when you operate in 136 countries and territories, I do not bear distinguished typical characteristics about the countries, there are just too many. But, let me maybe add a comment on how it is to do business in developing countries.”
“Obviously in Africa, close to where you (Erlend) were in Malawi, there is really decent infrastructure. A couple of weeks ago, when I was in South Africa, I was drinking water from the tap. So, although there are problems in South Africa, but there is infrastructure, there is a legal system so there is a certain structure and infrastructure you can build upon. On the other hand, in Eastern Africa, there is no doubt about it, that if a country is literally destroyed by centuries of civil war, these are very difficult circumstances to operate in. We still speak about the money and where the money comes from and where it goes to: Not all of those countries have stable banking systems. Not all of those countries have stable currencies. So, there are associated risks when running programs in those countries that you have to consider. A $ or a € which goes to the Southern Hemisphere in a country – let’s keep it in Africa – may be received, but it’s not certain in all of those countries that an association is allowed to hold dollars and make payments in dollars. So, this is really relevant, and this is really important.

Reference 2 - 1.22% Coverage

But, again, this is not typical characteristics in
all of these countries, so this has to be really distinguished. But as a rule of thumb, and if we look at Africa, there are many countries there where there are unstable situations and where there is a series of risks. Let me just pick one (country) out, and not commenting on their operations. But if you look at a country like Sierra Leone, where you have three if not more generations which have been exposed to severe civil war situations. Stability has a completely different meaning than for us in central, northern or western Europe. So, typical characteristics vary between very stable banking and currency systems to situations where you’re not really sure what happens to the dollar you send in.”

Reference 3 - 2.53% Coverage

EG: “And also, which is part of our main focus in this thesis, is also the security that the money which is sent there goes to the programs as well. There are, particularly in developing countries, many risks related to corruption and money not necessarily being spent where they are sent to be spent.”
MW: “Yes, that’s obviously a vast topic. Yes, we have to be very clear about that. There are enhanced risks in the field of fraud and corruption-matters in such countries. We will speak about bank accounts, etc., as we go. I’d also like to add one feature, which might probably not be that obvious, but very near that program in South Africa, I saw by Nedbank – a major banking player there – they have their ATMs, and you can have Bitcoin from them! But if you operate programs like we do, for children in need, there are certain needs. If you have your asset, or your money, stored – excuse my French now, but – if you have your valuables stored in a blockchain, but you’re on the ground and you have to feed children, it’s not so sure that in the countries we have just been talking about, that you will find vendors and sources for food and other things you need where you can actually pay when your money is electronic only. I’m very well aware that money transferring is big in Africa already, but if you operate a program, not every transaction can be made via two wallets from a smart phone. This is something we must keep in our minds. (…) There are certain facts about the spending of the

running cost in a program environment, which does not fit into brand new technology only."

Reference 4 - 1.43% Coverage

I can not speak for finance, for the shared treasury services for example. Does SOS trust their intermediaries, e.g. banks governments etc.? I have already told you about the difficulties with different political environments. Just to give you an idea; we are talking about hundreds of bank accounts, so yes ofc does SOS trust their intermediaries. But given the different countries and locations we operate, we depend on a lot of providers. I go back to the region where Malawi is, and actually to a country almost there. You are not free to choose among a big variety of banks that are available on Wall Street, but the programme location uses a bank which is available there, on site. So, not sure if this is an intermediary, but it is definitely a bank. There is not much competition in certain of our programme locations. This is certainly also something that is not really obvious.

Reference 5 - 0.99% Coverage

How long does it take before funding are transferred from e.g. SOS Norway to the projects in developing countries? Technically, the usual time for passing the money onwards is the usual time for bank transfers to be executed. But that is just the money flow. Obviously, these transactions have to be booked as well. I keep coming back to the structure, as this is a federation not a corporate organization. So if you want to transfer money onward, it takes certain level of clearance. Believe me, before Norway passes money onwards, they are going to make sure that the propriate approvals have been attained.

Reference 6 - 0.66% Coverage

So there is a technical side of passing money onwards via bank accounts. So there is nothing special about the time spent for the transfer, just usual time when transfers are made with bank accounts. Approvals and administrative processes also take some time. I´m not sure how the technology for transferring money around would change the manual leg in the transfer process and decision making process. (…)

Reference 7 - 1.36% Coverage

Noticing a fraud will probably be noticed by the victim, by the party losing the money. We have certain knowledge about the bank transfer, and probably the victim notices that something is missing. I´m not sure what new technology will be able to notice. But I do not doubt that there are still fraud out there that go undetected. And I think that is the reality. Obviously, there are fraud detection. Once we are there when we can analyze mass data in order to find patterns in large number of transactions, maybe that is a distinguishable new feature. Maybe we will be able to notice fraud from the analyses of mass data. Honestly, for the time being, in the context we are speaking of fraud now, we do not have neither the capabilities, means, nor the tools to, and not even the data cubes where we can run analyses to identify these kinds of patterns.

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Reference 1 - 0.36% Coverage

For example, due to the U.S. banks are not allowed in some countries, so you cannot use U.S. banks in countries like Iran and Iraq. I hope that all the other banks also have the same set of data, so you can really follow up.

Reference 2 - 0.83% Coverage

But if that is all possible, then fine! It would be good for us, and sometime we are waiting

desperately one or two weeks, thinking that the money is gone, but then the banks have blocked the transfer for some reason. This could be due to an attack or that some additional information is needed. It's not even easy to transfer money from one country to another. So, whenever we have more transparency about that, and we can follow where the money is currently blocked, and then speed that up, then perfect!

Reference 3 - 2.87% Coverage

AS: OK. So, I have one more question for you, and please correct me if I'm wrong. You mentioned that in your current transactions, you are collaborating with 10-15 banks, is that right?
RB: Yes, maybe even a bit more, but we really try to nail it down to a few.
AS: OK, so if I understand it correctly, SOS Malawi has to use a local bank in Malawi to get out their money. Using Malawi as an example; If it is not possible to cooperate with one of your 10-15 banks in Malawi, if there is just a local bank available there, is that an issue for you?
RB: Mostly not. It may cost a bit more money, because it is not done via one of them, but normally, for example if we take one of the larger banks that we normally use, and then they would try to transfer the money to this local bank. It may also mean some higher charges for our colleagues, because this local banks normally have higher charges than if you have a world-wide contract. But, it's possible! Yes, it may take longer, and it may be less transparent, because maybe just at the interface, the money might get stuck somewhere. And the requirements from the local banks are different from the sending bank, and then, sometimes, this communication takes a while. To clear it up, sometimes they want to make sure that the money is coming from a "clean" account, especially due to money laundering. Also, now the NGOs are much closer looked at, especially by the U.S. authorities, because they think that maybe NGOs can easily be abused to transfer, I would say, money that comes from illegal sources, and convert it into (il)legal money somewhere. So that's why, especially banks are also now having much stricter requirements to understand where the money comes from and where it is spent.

Reference 4 - 2.73% Coverage

AS: You mentioned that the money sometimes can get stuck on these transfers, due to some administrative work, or something - does this happen often?
RB: It depends. In some countries, yes, it is a permanent problem. Especially in a country where normally U.S. banks don't want to do any business due to bans or whatever. Sometimes it can just happen unexpectedly. In maybe 5% of the cases, and these sometimes are the cases where the country is in urgent cash-need. Our countries also have some kind of financial reserve, and we really encourage everybody to have at least one month of cash reserves so they can survive without any more external funds coming in. But, these countries are normally a bit more short on cash and desperately need it, and then, maybe after one week, our shared treasury centre gets information from the NA saying:
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foreign currencies, so we really need to find ways to deal with that.

General

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Reference 1 - 0.72% Coverage

So, the organization (…) it is an international nongovernmental organization (NGO), and also the fairest description of it would be: federation – federation in the sense that, you know, we do have legal bodies. We do have a president, vice-president, senate, management council, management team, CEO, CFO, COO. The federation means that there are so-called participating and supporting organizations, essentially collecting money.

Reference 2 - 0.40% Coverage

A federation is more like a supernational organization with a lot of stakeholders, so there is a lot of complexity also in the structure. If somebody at a certain stage says "A", there are also other people who have a saying before a decision is made.

Reference 3 - 0.33% Coverage

There are also finance responsible people in the regions and on the national level, because in the accounting but also in the program-world, there are a lot of national laws and regulations to consider."

Reference 4 - 1.05% Coverage

"What we provide is internal audit work, but not in a strict, financial sense, because we have our books audited in the form of statutory audits by external auditors. We try to do that for each of our member associations, also for centrally. But the internal audit function provides services mainly following what we call a cross-functional internal audit approach. By cross-functional, I would like you to see that this is not about finance, but we also audit program aspects, we also include supporting functions – that's where we deploy specialist also from different areas – but we're not a mere financial audit and assurance department."

Reference 5 - 0.69% Coverage

We operate the programs ourselves: We're not just collecting money and giving it to somebody else. So, we know who is there, we know what the people need, we also have knowledge about the context and about the respective countries and regions, what happens there on site, because we are there, and these are our own programs. (…) This also gives us a little bit more exposure and also a couple of more risk we have to take care of."

Reference 6 - 0.74% Coverage

MW: "So now we have talked about- in which countries does SOS operate? And you are asking for typical characteristics. So, the standard wording I have to provide you is obviously: SOS operates in 136 countries and territories. Why do we say that? Because not all of those territories are sovereign states, but basically it is 136 countries. Of those are 47 in Africa, 22 in the Americas, 32 in Asia and Oceania, and 35 in Europe – the wider Europe, not just EU.

Reference 7 - 2.30% Coverage

What are the typical characteristics of such countries?
MW: "Well, when you operate in 136 countries and territories, I do not bear distinguished typical characteristics about the countries, there are just too many. But, let me maybe add a comment on how it is to do business in developing countries."
"Obviously in Africa, close to where you (Erlend) were in Malawi, there is really decent infrastructure. A couple of weeks ago, when I was in South Africa, I was drinking water from

the tap. So, although there are problems in South Africa, but there is infrastructure, there is a legal system so there is a certain structure and infrastructure you can build upon. On the other hand, in Eastern Africa, there is no doubt about it, that if a country is literally destroyed by centuries of civil war, these are very difficult circumstances to operate in. We still speak about the money and where the money comes from and where it goes to: Not all of those countries have stable banking systems. Not all of those countries have stable currencies. So, there are associated risks when running programs in those countries that you have to consider. A $ or a € which goes to the Southern Hemisphere in a country – let's keep it in Africa – may be received, but it's not certain in all of those countries that an association is allowed to hold dollars and make payments in dollars. So, this is really relevant, and this is really important.

Income sources

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Reference 1 - 0.44% Coverage

So, we are looking at a total revenue of €1.2bn. This is, really everything coming in. So, if we speak about what we refer to as "sporadic donors" – basically somebody is prepared to give, not in connection with a sponsorship or a regular donation, this is roughly €300m."

Reference 2 - 1.11% Coverage

We then have something which we refer to as sponsorships or committed giving. If somebody wants to give to SOS and does not do a one-off donation, as I just described, you can sponsor a child. (…) They (the child) just lives in the village, but they have sponsors, maybe on the Northern Hemisphere, and basically, those people who give, they also receive specific information back, e.g. the child, once it goes to school, writes a letter and shares information about "I'm going to school now, and I'm interested in this and that and want to be a mechanic or a pilot" (…). Those children, they also tell something about them, and that is, I would say, a more intense relationship for the donor."

Reference 3 - 0.34% Coverage

"We then have major donors. So, these are parties, e.g. wealthy people, sometimes even organizations, who give at a larger scale – a lot of money by a few. There is also some money from foundations and lotteries.

Reference 4 - 0.49% Coverage

Other sources income is corporate donors – corporates who took the decision to collect money themselves and give that to us, trusting us with that money so that we can bring that money into our programs where it's needed. Obviously, these are on a contractual basis, so they also have their saying there."

Reference 5 - 0.83% Coverage

"We now come to a completely different source, which is: There are governmental subsidies for domestic programs in the respective countries. I have to admit that I do not know the current situation in Malawi, but certainly in that region and elsewhere, governments, for example, give money to SOS, for SOS to provide care for certain children, because the government themselves. Maybe the location is remote, maybe a certain care is not available. So, the government subsidies are also a source of income."

Reference 6 - 0.44% Coverage

"We have institutional funding; we also have to mention that. So, not only the EU, but that also definitely a source and comparable – that's why I say supernational organizations. There is also money coming in from emergency appeals – but that's only on a smaller scale."

Reference 7 - 0.70% Coverage

"There is also "other income". If you look at the figures, but "other income" really is now sort of the remainder of everything else. You have the merchandise, for example: A certain member association operates a program and produces something and sells that in a specific country. If money comes in, then this money is obviously also income for the respective members associations. So, that is also income for the organization."

Double Spending

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Reference 1 - 1.75% Coverage

AS: “Just one question, to make sure we got it right. If, for example, SOS Norway generates funding and sends that to you at SOS International to further distribute to developing countries: The funding that goes from Norway to you, is that regarded as your income?”
MW: “(…) We obviously, in the figures I told you about, the KR, € or $ is only counted once. So, the categories I gave you now is mapped about where it comes from. You’re very right in saying that money collected in Norway finds its way into a
bank account from where it is then transported onwards to program locations – we’ll come to that. But it’s only counted once as an income. So, for example, if a donor in Norway, a private individual, gives, then yes; that would be included in what I told you in probably “sporadic donors”. However, if an organization like NORAD (Norwegian Agency for Development Cooperation) provides funds, there are other administrative ways, but also the $ to €, or whatever currency, is only counted once. So, it will not be Norway-income once, and then passed onwards and noted again as income.”

NGOs – Foreign Aid

Challenges

No data.

Blockchain Technology

Blockchain and Distributed Ledger Technology

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Reference 1 - 2.38% Coverage

Two things that we need to start with; first lest try to call it DLT (distributed ledger technology) and not blockchain. I know, we also call it blockchain, because there is a certain hype around it still. However, I think in order to educate the market and educate ourselves, we need to talk about DLT-systems and then we can later on specify what type of DLT. It kind of saying that we all just need a "car". Well, I mean, for what purpose do you need that car? Should it go on the road or should it go in the dirt. How many people should it fit? Which needs does this technology actually try to solve. And I think in the press it is kind of a silver bullet that just kind of "does it all". But there is big differences between the Bitcoin protocol vs. what you guys want to have with increased transparency in NGOs. Their characteristics are simply very, very different. (...).

Reference 2 - 0.97% Coverage

You need to be conscious around saying that blockchain can solve the transparency problem. Because I say that there are three things that needs to be present in order justify why DLT is the right tool in the toolbox. 1) There needs to be an ecosystem - there needs to be multiple actors. So not only one. 2) there needs to be low transparency. And 3) low trust

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Reference 1 - 1.71% Coverage

Then we look at the challenges - can we use blockchain here? If yes, then nice, we might do it, but if we come to the conclusion of using it, then we always use it in combination with other technologies. Because blockchain is only a protocol, you can call it an intermediate layer, not some magic stand-alone solution in a corner that no-one really knows what is. So you have underlying databases, and then you have a protocol-layer, then a user interface, and so on - very easily described. And this is what many people misunderstand in its entirety - they think that you can put everything onto a blockchain, and everything should be controlled by the blockchain, but in reality, the stupidest thing you can do is to put data on a blockchain, you should never do this. The blockchain should verify data, but you should never put data in itself on a blockchain, because then you have a high risk, both in terms of GDPR, data breach elements, etc.

Strengths

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Reference 1 - 0.76% Coverage

Because you can store everything on the blockchain, and then that information becomes immutable. However, if you store a lie, you are making a lie immutable. Therefore, even though the blockchain is called the trustless machine, in reality you need to trust what goes on the blockchain.

Reference 2 - 3.04% Coverage

AS: Yes, and we have also talked about the fact that if these transactions are put on the blockchain, as you are saying, you would still need some form of internal of external control or other parties verifying that the information put on to the blockchain actually is true. You will only get to see the transaction, so if the person that are putting the transactions on the blockchain is corrupt or fraudulent, that will not actually be noticed on the blockchain.
GM: Yes, if you have some type of validator that can add to this (...). In this specific case, even though you are not completely getting rid of the issue of corruption and fraud, you are adding some system that will, to a greater degree than the way it is done today, prevent such fraudulent behavior. Because, it becomes more transparent on the blockchain, and another party validates will add, with its own digital signature, a validation of certain elements. This becomes transparent on a shared type of platform, so in the case of corruption where the validator is also corrupt, you limit a lot of the incentive, in a sense, to be corrupted. Because it is much easier to expose certain behaviors.

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Reference 1 - 2.97% Coverage

AS: And also, regarding trust, that blockchain can help increasing trust amongst parties, is well known. And as we have this case with SOS and NGOs, who have many different steps in their processes before the donation reaches its target. How do you think blockchain can increase trust, both internally in SOS, but also - we have been talking a bit about it already?
NK: Well, you could see that on the first powerpoint-example I gave you, on the lowest level, the blockchain network and the architecture there, that it is programmed correctly. When the platform is programmed correctly it won't be anything people think about, really, because you know that you, as the end-user, just use the software or application, and don't even think/consider that you are using blockchain. So, that will be the end-product for the enduser that blockchain technology facilitates high trust towards the transactions because you have easy access into the transaction flow and which parties that are involved in the supply chain have confirmed continuously that they approve what is happening. And as I've said, this doesn't eliminate risk of, for example, two parties agree separately that they want to "fool" the chain and create a scheme where they two approve, although it's not correct. Also, it can look like someone has signed a transaction, but in reality someone else gained access to their account. So these types of things, you still need auditors, IT-auditors, internal audit, but in a completely new way, system-wise and completely different improvement-level compared to how it is today.

Reference 2 - 2.08% Coverage

But how can you have trust in the blockchain itself, this trust is built on the lowest level of the blockchain network. Here, there are big differences between open- and closed networks. For open, there is mining or verification of transaction of cryptocurrency, in which you can send data in such a crypto-donation, but it is the cryptocurrency that is confirmed, like account X

had 1 Ethereum and sent it to account B - that is what this network does. However in a private network, there is only the involved parties in the transaction that approves. So this is a more architectural question, like: Should the donor see every payment continuously? Should the water-supplier see transactions with the food-supplier, are they related or have anything to do with each other? Maybe not? What if, for example, SOS want to give an extra discount to the water-supplier and not to the food-supplier? These types of questions, regarding data accessibility, and in Fabric, this is something called “Channels” - I recommend that you, if you are to research/use Fabric, then a quick way to determine this is through Channels.

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Reference 1 - 1.44% Coverage

EG: By looking at the blockchain technology, without relating it to any specific use cases, what main strengths would you like to highlight?
TB: What is important to understand is that this (blockchain) is not only a technology. It is also a network, meaning that a blockchain technology is not necessarily something that you should install on your server and then you get the value. It can be compared with TCP IP, the technology behind the Internet, it is an important question whether you install this as an internal network (intranett) or as an open network, looking at the uses. It is a lot more things to do on the Internet than on the internal network, even though it is the same technology.

Reference 2 - 1.89% Coverage

Thus, I would say that the most interesting aspect of the blockchain technology is … First of all it is an open infrastructure for handling of value, which also is global. The fact that it is open means that anyone can build upon the technology, it is open source. Anyone can further develop the technology, and the fact that it is global means that anyone in the world can use it in the way they desire. Then, in the open blockchains, you have the ability to e.g. store data in such a way that you can prove that something has existed in any form at a given time, thus securing other systems e.g. books (regnskap) that you are doing yourself. Thus, you can at a later point in time prove that you have data (the books) that has not been altered. This aspect is not something that lies specifically within the blockchain technology, but in the possibility to store data and infrastructure that other businesses can’t manage.

Reference 3 - 0.53% Coverage

However, possibly the most important aspect, because of its powerness, is the possibility to transfer digital values. Not only abstract values, but simply put money. The possibility to erase boundaries and make it programmable is extremely powerful.

Weaknesses

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Reference 1 - 0.76% Coverage

Because you can store everything on the blockchain, and then that information becomes immutable. However, if you store a lie, you are making a lie immutable. Therefore, even though the blockchain is called the trustless machine, in reality you need to trust what goes on the blockchain.

Reference 2 - 3.04% Coverage

AS: Yes, and we have also talked about the fact that if these transactions are put on the blockchain, as you are saying, you would still need some form of internal of external control or other parties verifying that the information put on to the blockchain actually is true. You will only get to see the transaction, so if the person that are putting the transactions on the blockchain is corrupt or fraudulent, that will not actually be noticed on the blockchain.
GM: Yes, if you have some type of validator that can add to this (...). In this specific case, even though you are not completely getting rid of the issue of corruption and fraud, you are adding some system that will, to a greater degree than the way it is done today, prevent such fraudulent behavior. Because, it becomes more transparent on the blockchain, and another party validates will add, with its own digital signature, a validation of certain elements. This becomes transparent on a shared type of platform, so in the case of corruption where the validator is also corrupt, you limit a lot of the incentive, in a sense, to be corrupted. Because it is much easier to expose certain behaviors.

Reference 3 - 1.27% Coverage

But scalability, for sure, certain parameters, because you know, one of the problems of blockchain is scalability in terms of how many transactions can this blockchain operate per section. And vChain has, with this model, Proof of Authority, can reach many transactions per second, and if in the future there will be any needs to increase the throughput, then the committee can request an update of the protocol. So, this is important when looking ahead, which platform to choose.

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Reference 1 - 2.26% Coverage

JS: So the Oracle problem in blockchain is how to get data from the off-chain on to the chain. There is an inherent problem in that. I mean it is how to link the physical. It has two dimensions, it is typically the problem of connecting the physical world with the virtual world. How do you really make sure that the physical assets is actually represented on the chain. That is a classical problem and it is still there, it is very relevant to try to solve that. There are things that are being developed right now in terms of secure IOT devices, but again, I think also with the Control part of your education it is definitely a thing where you have to provide audit or at least assurance for that this physical thing is actually there and not just on the ledger. So that is one problem and we typically call that the Orakle (?) problem.

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Reference 1 - 2.13% Coverage

MC: You’re not going to have a truly decentralized system where you can actually check that there is a correspondence to reality. That’s a fundamental problem of public blockchain, that… You come from this idea that it’s transparent and there’s no need for trust, because

everything is true, etc. But it's one thing that only applies if the actual asset that you are using, or that you are transacting here, stays within the blockchain itself. And what we're doing here, is that we're talking about actual real-world things, right? So, you can see that a transaction happens, but you have to verify that that thing actually happened in real life as well, and that it happened because of that transaction. That is one of the problems you're never gonna get rid of. You need to, like you said, have some people who need to carry out that verification. And, no matter how smart your technical solution are, you can never be 100% certain that those people aren't corrupt, in a sense. So, in general, I think it will be very hard to solve that problem with a blockchain, in spite of all the hype about the trust and all that stuff. And, there is also the question of if that is the biggest problem? Perhaps you should rather solve; If you made a much more efficient transaction system, you might solve
some of that problem incidentally, right, because you will have fewer steps, meaning fewer places where it can go wrong.

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Reference 1 - 0.66% Coverage

it's definitely more difficult. So, this is then the double verification, so that in one blockchain, there's nothing more than what is called "shit (?) in, shit out"; If you don't know any of the information on the blockchain's source, then you should be very sceptical to that. Because just the fact that it is on a blockchain, that gives zero security in itself.

Reference 2 - 0.69% Coverage

As long as there are humans and machines involved in the process, there is nothing that you can trust 100%. You can minimize risk, but you can not be 100% risk-free. However, you can get a long way with this system, and you can definitely make a hype, but you can not make something that will make you 100% risk-free of fraud only because of the fact that you take use of a blockchain.

Reference 3 - 3.30% Coverage

So in terms of the audit, there is no challenge to do this. We have our own EY Blockchain Analyzer. Given that you don't design your own coin privacy structure, and making these solutions at private systems etc. Because you also have the question of "are you sure that every single donor, one that maybe donates quite a significant amount, would like to, theoretically, traceable and stored on the blockchain?". Not necessarily, maybe. In Norway you get deductions if you donate to charities, then you have to register this in your tax statement etc. Then you have another layer that will have to be verified. A different case is if you donate from your own wallet, you have to be identified and signed etc., then the media etc. can see who is giving to who. Then you are in need of a whole different safety structure. A thing that you should bear in mind is that the world, as it is today, is not ready for this, because you have to consider the complexity of the donor process here in this case. But the transactions, are quite simple, if you would like to add some transparency. However, then again it is the question of what can this (transparency) be able to measure, well it can measure whether a token is on the blockchain, but you still need someone to verify where to money come from. I imagine that, in the lacuh of such a project, the flow will be that e.g. NOK gets in to the system, and then the challenge will be that you will need to have an
exchange or these tokens (NOK gets transformed to tokens, and then tokens gets exchanged to local currency etc). This is not a free infrastructure, they will still need to take a percentage in order to finance this infrastructure. So there are many aspects in this big picture, that at first glance might seem pretty easy to do, but that in reality will be really complicated.

Files\\Interviews\\Interviewee#5 070220 - § 2 references coded [1.12% Coverage]

Reference 1 - 0.17% Coverage

Code-bug (?) in a smart contract is a known phenomenon, especially in the Ethereum system.

Reference 2 - 0.95% Coverage

And as I've said, this doesn't eliminate risk of, for example, two parties agree separately that they want to
"fool" the chain and create a scheme where they two approve, although it's not correct. Also, it can look like someone has signed a transaction, but in reality someone else gained access to their account. So these types of things, you still need auditors, IT-auditors, internal audit, but in a completely new way, system-wise and completely different improvement-level compared to how it is today.

Files\\Interviews\\Interviewee#5 040220 - § 4 references coded [5.61% Coverage]

Reference 1 - 0.78% Coverage

EG: How "mature" is the technology? How far has it come? And how is the general knowledge of the technology?
TB: The general knowledge of the technology is quite low. Many have heard of it, however few understand how it can be used and what it is and what it actually isn't. However, this is changing at a rapid pace. Both the maturity of the technology, as well as the knowledge of it.

Reference 2 - 0.81% Coverage

Big consortiums which were supposed to use blockchain for everything and solved every problem got a lot of attention, then people have realised that this actually is not that easy and quick fix. Some of the problems that were tried to be solved were more about coordination rather than technology. So, people learn quickly, but the general knowledge and understanding is till quite low.

Reference 3 - 1.92% Coverage

AS: What basic infrastructure is necessary in order to implement a blockchain-based system?
TB: Before answering that question, it is important to know what you would like to use the blockchain for. Let us say that you would like to trace an ecologic fruit. The problem is that regardless of how safe the blockchain is, you will not be able to solve the problem of the fact that whoever that is adding the data to the blockchain can lie. If the farmer saying that this fruit is ecologic lies, it doesn't help that this data follows the fruit all the way along the blockchain. If the truck says that "it was only 4 degrees, not any more, in the container, if the censor if bugged or something like that, if they tweak the data, it doesn't help that the data is stored on a blockchain. In the very end, if you scan the connected QR-code it will not help if you can´t know exactly if the QR code isn't lying. That will not be solved by the blockchain.

Reference 4 - 2.10% Coverage

EG: Apart from the technical challenges, is there any other challenges with such a solution? Regulatory challenges, for instance?
TB: The main challenge is knowledge. Regulatory challenges are present as well, uncertainty etc. There is no doubt that there are challenges, but these are possibly to solve. We are able to transfer money today, in a relatively ok efficient way, but there has to be a way to do this in a much more efficient way.
Regulatory, it is becoming much clearer how people can operate and innovate with such solutions. But then again, the main challenge is knowledge and understanding of the technology and the aspects that come with such solutions. And for NGOs, it might be a problem that there can be a lack of enough people from finance, accounting, economics, cash

flows etc. among those people which are actually the most dedicated about doing the right thing. Thus you might end up in a situation which those that are most eager to help, don't really know how it will function financially.

Requirements for Implementation

Files\\Interviews\\Interviewee#3 050220 - § 3 references coded [7.89% Coverage]

Reference 1 - 0.93% Coverage

EG: Let's say you want to implement such a system for an NGO, which has many offices in developing countries in Africa, for instance, what type of general infrastructure is necessary for being able to introduce such a system?
JS: Internet. I think that's it. But of course you will run into the Orakle (?) problem, do you know what that is?

Reference 2 - 1.99% Coverage

I think the African continent has evolved immensely in the past years, and they have kind of leapfrogged one or two technology generations due to the introduction of the internet through their mobile phones. So, it may not be the case that they don't have internet, but there are certain things that you need to be aware of when proposing these types of solutions. Also, from a cultural point of view: In the western part of the world, we like everything to be controlled and standardized because we see the benefit. However, it is not certain that people who have not been brought up with the standardization sees this kind of control as a good thing. So, there is also a cultural aspect to implementing new technology. (...)

Reference 3 - 4.98% Coverage

There are two terms that you should consider: On the one hand, you can draw a continuum going from the one hand called SCOT (Social Construction Of Technology (?)), and then on the other hand it is called technological determinism. The SCOT is where the social context points to and affects how we developed technology and, in this case, an information system. On the other side, we have technological determinism, which is where the technology was just kind of put in there, and it changed the way that we do things. The two classical examples here are: The SCOT is the bike: The bike was first developed weirdly: It had a large wheel on the front and a small wheel at the back, and it was very impractical. Then, over time, it developed into the bike as we know it today. (...) On the other hand, there is a famous article around technological determinism, where an architect in the New York area, who was a racist. He created bridges that were fairly low, meaning that only cars could go from Brooklyn and New Jersey into Manhattan. So what do you think was the result of that?
AS: Well, since you said he was a racist, and not many coloured people had cars.
JS: Exactly, so they were taking the bus, and the bus couldn't go under the roof of the bridge. So, you have these two ends of the continuum where blockchain is definitely somewhere in between. The dimensions here are actually quite important for the sake of your thesis, because if you want to provide a bit more abstraction level to your thesis and making sure that it is not just a consultancy report (...) make sure that you also provide that type of perspective on "what does technology, and what does information systems actually provide? So, there is a term called the socio-technological system, and it is certainly within that area that you are right now.

Files\\Interviews\\Interviewee#4 040220 - § 2 references coded [3.27% Coverage]

Reference 1 - 1.92% Coverage

AS: What basic infrastructure is necessary in order to implement a blockchain-based system?
TB: Before answering that question, it is important to know what you would like to use the blockchain for. Let us say that you would like to trace an ecologic fruit. The problem is that regardless of how safe the blockchain is, you will not be able to solve the problem of the fact that whoever that is adding the data to the blockchain can lie. If the farmer saying that this

fruit is ecologic lies, it doesn't help that this data follows the fruit all the way along the blockchain. If the truck says that "it was only 4 degrees, not any more, in the container, if the censor if bugged or something like that, if they tweak the data, it doesn't help that the data is stored on a blockchain. In the very end, if you scan the connected QR-code it will not help if you can´t know exactly if the QR code isn't lying. That will not be solved by the blockchain.

Reference 2 - 1.34% Coverage

AS: What is necessary in order to implement/set up such a crypto exchange? If SOS for instance, would like to build such an exchange? For example, Malawi, one of the poorest countries in the world, how challenging would it be to be successful with such a system?
TB: What is needed is that the NGO has to figure out what is the "gangbar" (viable) currency for those in need (the locals). And what is the closest place in which there already exists liquidity between crypto currency and this local currency. Then the NGO has to build the infrastructure for this exchange, which is close enough to the ones in need. So, it would vary from country to country.

Use Cases – NGOs

Files\\Interviews\\Interviewee#3 050220 - § 3 references coded [6.78% Coverage]

Reference 1 - 2.15% Coverage

Because I say that there are three things that needs to be present in order justify why DLT is the right tool in the toolbox. 1) There needs to be an ecosystem - there needs to be multiple actors. So not only one. 2) there needs to be low transparency. And 3) low trust. So certainly you have low transparency, and you have low trust. The question is do you have an ecosystem? And you might have, so that is fine. I mean, the money that goes in to the NGO need to be distributed to parties in the ecosystem, and in that case you can argue that there is an ecosystem. However, there are also the possibilities to use, IBM call them "Trust anchors". I think actually that is a way from getting from a centralized to a less centralized model, and then over time maybe to an entire decentralized model.

Reference 2 - 2.21% Coverage

So I think that you should definitely explore the possibilities for trust anchors, and I think the most mature trust anchor you would find right now is a platform called "Hadera". They have just launched, last week, called the "Hadera consensus service", and they have also announced a partnership with IBM and the hyperledger fabric platform. So they have actually combined, and I think that combination is quite strong. Because then you begin to also get the business blockchains, which we also talk about at Deloitte, because then you would get the true decentralization and ordering of the transactions from the trust anchors, however you still control who sees what and who participate in the ecosystem. So it is kind of a hybrid between a less centralized and the entire decentralized setup.

Reference 3 - 2.42% Coverage

AS: In which part of an organization do you think that DLT can streamline operations?
JS: In the transactions-heavy part. That will be in finance, HR etc. Going back to the three criteria; in the parts where you have multiple actors, that goes outside of the organization. I think that is pretty important. It needs to have some interaction with either your customers, vendors, suppliers. These kinds of ecosystems problems.
Actually, the phrasing of the question, I think you should try to broadend it up. So I would suggest to SOS that they say "Ok, so this problem is an industry-wide problem. It is not only SOS, it is a problem for all NGOs that accepts payments and wants to distributed that wealth to foreign countries. So I would actually argue that NGOs they need to come together, because then you will actually have that network, right. And so, right now we are helping.

Files\\Interviews\\Interviewee#5 070220 - § 3 references coded [3.68% Coverage]

Reference 1 - 1.40% Coverage

Alibaba has launched a similar project last autumn, a "charity chain", where they handle several millions (money) using their new platform. We (BDO) have got specific requests from our customers, especially customers that are into aid, on how blockchain an effectivize the finance department in organizations. Many of these organizations have significant overhead, as they have to, almost manually, trace and make sure that their transactions go through along the chain. And specifically for the donors, they have to know where the money ended up and what percentage of the money got lost along the way, administrative costs, fees, exchange rates etc. And the percentage that was given to the NGO, what was that percentage used for by the NGO.

Reference 2 - 0.86% Coverage

NK: (...) If you set the slides in presentation mode we can go through the slides together. This is like a general case that I use to explain the logic of how blockchain and smart contracts can be used in aid.
So the thought here is that an NGO issues a smart contract on a blockchain network, here we do not give that much attention to whether the blockchain is private or public, in this case it doesn't really matter. By the way, are you familiar with smart contracts?

Reference 3 - 1.43% Coverage

But then again, compared to today´s system, this can be a significant upgrade. That can be the key takeaway in your conclusion of your thesis. "Of course there are still great risks, and aspects of the process that can go wrong, but with the right control procedures in place, and with the right structure, you will get a significant upgrade on today´s systems. Both in terms of transparency and "audit" (etterkontroll) of the transactions, cost efficiency due to the fact that you don't need
the same level of (etterkontroll) as earlier, and that the smart contracts can automatize many of the steps needed in these transactions. And the fact that you can offer "complete" new contracts to the donors, in which the donors themselves have a greater level of control."

Use Cases in an Organization

Files\\Interviews\\Interviewee#3 050220 - § 2 references coded [1.74% Coverage]

Reference 1 - 1.18% Coverage

AS: In which part of an organization do you think that DLT can streamline operations?
JS: In the transactions-heavy part. That will be in finance, HR etc. Going back to the three criteria; in the parts where you have multiple actors, that goes outside of the organization. I think that is pretty important. It needs to have some interaction with either your customers, vendors, suppliers. These kinds of ecosystems problems.

Reference 2 - 0.56% Coverage

EG: Following that question, in what part of an organization can the blockchain or the DLT be used as a cost-efficient tool?
JS: So that's kind of the same answer, right: In the transaction-heavy areas.

Files\\Interviews\\Interviewee#4 040220 - § 1 reference coded [2.60% Coverage]

Reference 1 - 2.60% Coverage

AS: This leads us to our next question; in which part of an organization can blockchain or DLT-systems be cost-efficient?
TB: Payments and transfers, without doubt. What is interesting here is that, technically, this has been possible with cryptocurrencies and stable coins for a long time. However, the problem has been that goin from fiat currency to cryptocurrency is way too expensive and inefficient. The volatility has been too high, and so has the fees etc. Over the past years, there has been built trading infrastructure, because of peoples´ demand to trade cryptocurrencies, and the result is that the fees go from high percentages (e.g. 10%?) to (0,01 and 0,0001%). The expenses for going fiat-crypto-fiat has gone from high to really low in quite a short time. The other problem for cryptocurrencies such as Bitcoin has been scaling. However, solutions such as the lightning (?), which also is experiencing significant growth, are solving the technical scaling problem. So, in the coming years, you will see a significant growth in the use of cryptocurrency as a payment structure, where you originally want to transfer one fiat currency to another, but where you today will have several problems in doing this, due to geography etc.

Streamline Accounting Processes

Files\\Interviews\\Interviewee#7 130220 - § 1 reference coded [2.90% Coverage]

Reference 1 - 2.90% Coverage

AS: Do you have any thoughts on how the audit process will change when you do transactions on the blockchain and via Stablecoins, compared to general bank transactions?
GM: You mean from an accounting perspective?
AS: Yes, from an accounting perspective. We know you're not an accountant, but do you have any thoughts?
GM: Yeah. Once you have all these transactions on a public ledger, then obviously you can make many of these checks automatic, and so of course the benefit will be huge there. Now, I'm not from this industry, so I can't expand (?) too much on this, but it's clear to me that if I have a ledger of transactions, that can be audited, so a ledger that is auditable by a thirdparty in a transparent way, then I can automate a lot of this accounting and auditing process. And, yes, whereas it's not possible to make it automatic, you can still rely on the fact that whatever accountant will put their digital signature on an outcome of an accounting or auditing activity. So, also from, again, an accounting perspective, accounting accountant, it has a value from an anti-corruption perspective.

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Reference 1 - 2.44% Coverage

AS: Talking about SOS International, they are characterized by many different transactions. They get money transactions from Norway transferred over to SOS International, who then transfers the money to regional offices in developing countries, who then transfers it over and eventually to the final recipient being the projects. They are using bank transfers for this, but if these transfers were put on a DLT-system, do you think this will provide advantages in terms of the auditing processes?
JS: It would provide, I would argue, a lot of benefits. I think, also from the Deloitte paper, there is a section about "corporate-coin", which kinds of answers that problem. What happens when you move money, even internally from branch to branch, of course you are exposed to risks and delay in cash flow. So, if you are moving money from Norway to a branch in Brazil, it is a hassle.

Files\\Interviews\\Interviewee#6 140220 - § 2 references coded [6.89% Coverage]

Reference 1 - 3.60% Coverage

AS: Yes, and you have some really interesting thoughts on that perspective, thank you. And we were also wondering about if you have any thoughts on the audit process. Lets that that if you are about to do all of these transactions via, let´s say a stable coin, how would be the audit process, audtitng the processes on the blockchain, compared to the adutit process of the transactions in the way they are doing it today. Do you have any thoughts?
MJ: Well. It depends on how you design the system. On the one hand, you can couple the blockchain to your existing ERP system, and in that way tokenize the transactions received in the ERP system. Thus transform these transactions to represent other assets. In an ideal world, you would go from 100% analog to 100% digital. But that would not be the case in the real world. You need to do a reality check, you cannot just go from analog to digital in one day. Like when Norwegian block exchange says that "Now you can buy on our block exchange, so now Norwegian will sell all of their tickets via cryptocurrency. By doing this we have estimated that we will save 2 mrd. NOK, thus or deficit of 2 mrd. NOK is covered.". No that, will not be the case that all of your customers suddenly will be able to pay for tickets using

cryptocurrency. However, they could have the aim that 1 million of their customers will use this solution during 1 year, and that could be a more realistic solution. But, in our world, in my opinion, you will have to do some delimitations; “yes it could be possible in an ideal world, given this an that”. But and ideal world doesn’t exist. So you have to consider what percentage of the (Norwegian´s) customers would have used this system, and that is a question that you have to consider. Furthermore, what is the cost-benefit here, versus transparency etc. You have to be realistic about the project. So that you don´t end up with “in theory, it is possible”. Because in theory it is possible, but not necessarily in reality.

Reference 2 - 3.29% Coverage

So in terms of the audit, there is no challenge to do this. We have our own EY Blockchain Analyzer. Given that you don’t design your own coin privacy structure, and making these solutions at private systems etc. Because you also have the question of “are you sure that every single donor, one that maybe donates quite a significant amount, would like to, theoretically, traceable and stored on the blockchain?”. Not necessarily, maybe. In Norway you get deductions if you donate to charities, then you have to register this in your tax statement etc. Then you have another layer that will have to be verified. A different case is if you donate from your own wallet, you have to be identified and signed etc., then the media etc. can see who is giving to who. Then you are in need of a whole different safety structure. A thing that you should bear in mind is that the world, as it is today, is not ready for this, because you have to consider the complexity of the donor process here in this case. But the transactions, are quite simple, if you would like to add some transparency. However, then again it is the question of what can this (transparency) be able to measure, well it can measure whether a token is on the blockchain, but you still need someone to verify where to money come from. I imagine that, in the lacuh of such a project, the flow will be that e.g. NOK gets in to the system, and then the challenge will be that you will need to have an exchange or these tokens (NOK gets transformed to tokens, and then tokens gets exchanged to local currency etc). This is not a free infrastructure, they will still need to take a percentage in order to finance this infrastructure. So there are many aspects in this big picture, that at first glance might seem pretty easy to do, but that in reality will be really complicated

Files\\Interviews\\Interviewee#5 070220 - § 2 references coded [4.77% Coverage]

Reference 1 - 0.88% Coverage

So you can see on the picture that this is a new type of accounting technology. You got double bookkeeping in the 14-15th century, Excel in the 70s, 80s, early 90s, and now the DLT, which is a natural prolonging of this. So you can see the quotes from Finansavisen:
“The first useful area of use is, unsurprisingly, transactions in every form”. So, brought to a head, we work with accounting and auditing, and accounting book transactions, and auditing audit transactions.

Reference 2 - 3.90% Coverage

AS: So we have this aspect of how blockchain and DLT can streamline transactions and accounting in, for example, such organizations like SOS. Do you have any thoughts about this? Of course, they have several transactions crossing borders, different currencies, etc. The money goes through SOS International and then out to all these different countries.
NK: Absolutely, and then you are more relating to finance, for example looking at how banks and financial institutions use blockchain, because they use lots of money on exactly this, sending money back and forth, and capital is frozen during these processes, and they might not be coordinated meaning you have to go up afterwards to see if all parties agree. So, this is somewhat of the same concept, at least in terms of the money - the capital. However, directly

regarding the accounting system, this will be internally at the company, but there has been talk about accounting systems implementing blockchain or blockchain solutions, so that we have what's called "triple bookkeeping" - meaning that when you sign off on the debit-side in your system, I sign off on my credit-side, so that this is matching. There has been some talk about this in theory, but I have not seen any concrete examples of this, other than that I know Zapp (?) has been in the media internationally talking about this. However, this is not as concrete as the aid-example I provided, where you have the transactions, whilst the accounting later e.g. for SOS… They are interconnected in the way that they become more effective due to the parties being on the same wavelength. However, if you think one step further in, at the accounting system, how debit and credit are booked and how this is done with the other party, whether this is integrated - I have not seen that accounting systems have reached this level yet. It's likely to be a natural next step, but it is hard for me to concretize, as I have little experience within accounting systems. So, I would suggest Googling this more (...), but as far as I have heard so far, this is still more on a theoretical basis.

Files\\Interviews\\Interviewee#4 040220 - § 2 references coded [5.16% Coverage]

Reference 1 - 2.60% Coverage

AS: This leads us to our next question; in which part of an organization can blockchain or DLT-systems be cost-efficient?
TB: Payments and transfers, without doubt. What is interesting here is that, technically, this has been possible with cryptocurrencies and stable coins for a long time. However, the problem has been that goin from fiat currency to cryptocurrency is way too expensive and inefficient. The volatility has been too high, and so has the fees etc. Over the past years, there has been built trading infrastructure, because of peoples´ demand to trade cryptocurrencies, and the result is that the fees go from high percentages (e.g. 10%?) to (0,01 and 0,0001%). The expenses for going fiat-crypto-fiat has gone from high to really low in quite a short time. The other problem for cryptocurrencies such as Bitcoin has been scaling. However, solutions such as the lightning (?), which also is experiencing significant growth, are solving the technical scaling problem. So, in the coming years, you will see a significant growth in the use of cryptocurrency as a payment structure, where you originally want to transfer one fiat currency to another, but where you today will have several problems in doing this, due to geography etc.

Reference 2 - 2.56% Coverage

EG: On the accounting specific, do you think that blockchain can help with the accounting and registering of transactions for organizations?
TB: Well, not really. There are many things that can be more efficient with accounting systems. For instance, integrate them with platforms where these tasks are done automatically, but there is not any need for a blockchain in order to do this. Blockchain technology might actually complicate this, in short term, because you will have people in different departments which will have to face new problems and questions on how to
account for these new digital assets on the blockchain. (...) This is not a technology for the accounting service. It is a lot to get from digitalization. There is no problem to have an cloudbased accounting system, in which the HQ has access to all its subsidiaries books etc. Google Cloud etc. But there is no need for a blockchain here. You can even have the cryptography which will secure that only the right persons have access to the right aspects etc. (...). Distributed databases have existed for a long time. Remember, in auditing you would like to have the opportunity to alter/change the numbers. Like for instance if an accountant makes a wrong entry.

Conceptual Design

Possibility 1) Shadow Transactions

Files\\Interviews\\Interviewee#7 130220 - § 3 references coded [8.29% Coverage]

Reference 1 - 2.35% Coverage

GM: But like, are they willing to change? Because here we could act in two ways: 1) we move everything to the blockchain, also the transactions themselves. 2) The other way is that the transactions stay in the traditional model (bank transfers etc.), but we record, through some traceability record, the transactions on the blockchain. And we could think of a system where.. If you want to do a transaction via the normal bank, first you need to be authorized to do the transaction, also on the blockchain platform. So the blockchain platform will be able to add identities for all the actors that are involved in these transactions, and a record of what the actors receive, in terms of money, of what reasons they receive money, for what reason they have spent it, so forth. So, make this system very, very transparent, even though the money still flows through the traditional banking system.

Reference 2 - 2.10% Coverage

The other solution (2) could be that we rely on the traditional system, but we put on top this blockchain layer to grant more transparency, and you could think of smart contracts that are able to give you a sort of status, sort of score, or greenlight whenever you want to make a new transaction for certain actors. I don't know what is going to be your suggestion, but maybe they want to trace all these things. Maybe they send money twice, not necessarily the same money, like two buckets of money that are meant to go to the same organization. But, you will do this only if you are sure that everything was OK from the previous situations (transactions). So the blockchain can reveal through smart contracts, as a kind of an indicator that "Ah, there is a red flag. This transaction should not go through."

Reference 3 - 3.85% Coverage

So you can think of the blockchain as a trustless machine, IF the asset that you are referring to on the blockchain is native to that blockchain, a native digital asset to that blockchain. So for Bitcoin, don´t need a third party in order to do a transaction, because everything is native to that blockchain. But when it comes to put information on the blockchain, information that are not native to the blockchain, then you need to be sure that information actually is accurate. So, what the service that we do, is to verify through, either traditional auditing approaches, or data drive type of approaches, you can think of sensors, IoT or other types, to verify certain information. So that you can put a layer, and element of trust, in that information. And this could be an element, also in this case, because you have situations where you need to demonstrate that a certain project delivers certain results, so you could have a situation where you receive the money and the blockchain registers that you receive a transaction, "this money is of this amount, and they are meant for this project etc". Then on the blockchain itself, you can say the status of the project, "completed", "successful", "failed" etc. And then you could have a third party organism (organization) that validate that the information that is put on the blockchain is true. So that you build a more trustable type of ecosystem, in this case. So I think of this as very relevant for your case.

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Reference 1 - 1.06% Coverage

In the other model, you would shadow where the money goes, when and so on. You would have to make all the people who are making up the current process, take part of that. Because

they would sort of have to report what happened, they have to do it in a way that can be trusted and so on. But in this other system (with crypto transactions), you know, you can change the actual flow of the money. You can change which steps they go through, when going from point A to point B. And the problem, you said, with the initial model (SOS CVI´s system) is that there are some unnecessary steps. Well, necessary steps, but they are not really providing anything besides of the potential for getting lost along the way, etc.

Possibility 2) Use Cryptocurrencies or Stablecoins

Files\\Interviews\\Interviewee#7 130220 - § 9 references coded [20.33% Coverage]

Reference 1 - 2.35% Coverage

GM: But like, are they willing to change? Because here we could act in two ways: 1) we move everything to the blockchain, also the transactions themselves. 2) The other way is that the transactions stay in the traditional model (bank transfers etc.), but we record, through some traceability record, the transactions on the blockchain. And we could think of a system where.. If you want to do a transaction via the normal bank, first you need to be authorized to do the transaction, also on the blockchain platform. So the blockchain platform will be able to add identities for all the actors that are involved in these transactions, and a record of what the actors receive, in terms of money, of what reasons they receive money, for what reason they have spent it, so forth. So, make this system very, very transparent, even though the money still flows through the traditional banking system.

Reference 2 - 1.47% Coverage

So we have this two type of approaches. If you imagine two axis, it could be “semi decentralized” and “fully decentralized” or “semi blockchain” or “fully blockchain”. So the first approach would be a “fully blockchain” solution, which means that, you are transferring coins on the blockchain, Bitcoin, Ethereum or whatever. This need to then be plugged in, anyway, with the banking system because the local projects would need local money (currency) anyway. We are not in a phase where Bitcoin or Ethereum is used worldwide for this type of projects, yet.

Reference 3 - 2.95% Coverage

AS: Of course, as SOS is operating in more than 136 countries, they are exposed to a lot of different currencies and banking systems, which might be not particularly stable. When they are operating in Norway, Denmark and Sweden, they have stable banking systems and currencies, but for instance in Africa, that is not always the case. So, what do you think of the possibility of taking use of stablecoin for these transactions?
GM: Yes, definitely. So this would be the kind of step 2 (or 1? The one where you put all the transaction on the blockchain), where SOS puts their transactions on the blockchain. And a stablecoin could be one of the solutions. And then you could use a stablecoin that are already existing, and I suppose that the European Bank will issue at a certain point a stablecoin. I know, because I am working with the San Marino state, that they want to issue a stablecoin, which has a different purpose than a “normal” stablecoin, as it is meant for investments for investment in innovation type of projects that they are building. So you could refer to those, and these are at the moment pegged to the US dollar.

Reference 4 - 0.68% Coverage

If you think about a European Central bank that are issuing a stable coin, then you can trust the stable coin much more than a stable coin issued by a private company. You need to trust that they actually have the funds in the bank, so that would be the situation.

Reference 5 - 4.30% Coverage

Or, in the same way, SOS could create their own stablecoin, and they could choose how to peg it. They could peg it just to one currency, or to a basket of currencies, like the Libra concept, who wanted to relate one Libra to a basket of currencies and other commodities including gold, if I’m not mistaken. So, the way to implement a stablecoin itself, from a functional perspective, makes sense, because then you have everything moving to the

blockchain. So, then you also save a lot of costs related to the infrastructure that you need to maintain, or the banks that you pay, as well as all these problems with the fluctuations. SOS could become a kind of bank in that sense. Then also, the projects, maybe they don't need at this point to run a local currency. Maybe they don't need to exchange to local money. Maybe they can pay their suppliers (...) in this stablecoin currency, and SOS takes the responsibility to exchange this stablecoin in the local- or the USD at the time it is requested. This will also fight a lot of criminality and other types of corruption when it comes to, you know, in these third-world countries, even the banks could be nasty, or this remittance situation, like Western Union. Actually, in these countries, people maybe don't have access to a bank account. So, you actually give them a sort of bank account, because then all their money is in their "wallets" on their smartphones, or even on normal phone. And, nowadays, in Africa, for instance, mobile phones are very much widespread, right? So, it's not really a barrier that. So, you can also think to target this type of situation. So, very interesting, yes.

Reference 6 - 3.45% Coverage

AS: So, if SOS are about to launch their own stablecoin, can that be run on the Hyperledger Fabric system, or does it mean that they have to create their own network?
GM: I'm not sure if it can be run on the Hyperledger, because the Hyperledger doesn't support, from my knowledge so far, these types of applications, it doesn't support coins. So, you should go through another type of blockchain. Of course, Ethereum will be one, but, for instance, we work with another one, vChain, and some peculiarities that are interesting for many applications. For example transaction fees are very low, and there is a governance mechanism, there is not consumption of energy like Bitcoin. This governance mechanism is very important, because when you run a totally decentralized blockchain like Ethereum and Bitcoin, you don't have control over the evolution of the network, what happens to the protocols, etc. While if you move to, for instance, vChain, it runs a different type of consensus mechanism called Proof of Authority. Then, all the nodes that are validators of transactions, but most importantly they are KYC (Know Your Customer) and AML (AntiMoney-Laundering) process to be validated by the vChain foundation. The vChain foundation, at that point, allows you to be an authority node, so validator (...)

Reference 7 - 1.27% Coverage

But scalability, for sure, certain parameters, because you know, one of the problems of blockchain is scalability in terms of how many transactions can this blockchain operate per section. And vChain has, with this model, Proof of Authority, can reach many transactions per second, and if in the future there will be any needs to increase the throughput, then the committee can request an update of the protocol. So, this is important when looking ahead, which platform to choose.

Reference 8 - 1.35% Coverage

AS: And vChain, is that a public or private platform?
GM: It's public permissioned. So, it's public in the sense that anyone can read the blockchain and write on the blockchain. It's permissioned in the sense that only those designated nodes can validate transactions. So, only these 101 authority nodes, so Proof of Authority, authority nodes, while in Bitcoin and Ethereum we are in Proof of Work. Ethereum are trying to move to Proof of Stake. I don't know how much you know about this, if you want me to explain.

Reference 9 - 2.52% Coverage

AS: And, for an NGO like SOS, we are unsure of their knowledge of this technology. Like many other organizations, they know about it, but knowledge is not there. Do you think that, maybe in the short-term, it would be easier for them to use a private blockchain, but then in

the long-term, change into a public one?
GM: I'm sceptical about the private blockchain, because then you start losing on transparency, and potentially also integrity, because you don't know what happens in a private blockchain. One, you don't need to store the raw data. Actually, you won't store the raw data. You just store the digital signatures of those raw data, you can store some smaller raw data. So you keep the private information, but you still guarantee the immutability and the transparency. So, this is my take on private and public blockchain. But, I mean, if they're interested to talk. As I've said we are also working with San Marino state, and we bring vChain in DNV GL.

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Reference 1 - 1.75% Coverage

AS: Do you have any thoughts on, let say, if organizations like SOS CVI put all of their transactions on the blockchain, in the form of either a cryptocurrency or a stablecoin, how will their business-model change, and do you think it will effect the way donors have trust in these organizations?
MC: That is a really complex question. That depends entirely on what it is they do, exactly. But I would say that, what is my initial impression, is that there is certainly is some possibilities here. So you mention specifically that they would actually do their transactions, using blockchain, you mention yourself that is not necessarily, the way this would work. You could actually just "shadow" their existing transaction in their existing system. That is something that I can see as an actual use case. You simply have some kind of decentralized auditing, essentially, on what is going on, where do the money go, if you can get that set up to function, as intended. I don´t know how that would work, but you know, things are possible. I could see that really work, and I could see that such a system is something that donors etc. would be really interested in.

Reference 2 - 0.44% Coverage

As regard actually doing the transactions themselves, now we are talking about putting a whole lot of money through an entirely new infrastructure, instead of using an old one. That is a totally different story, with a totally different system, and potentially different participants.

Reference 3 - 1.06% Coverage

In the other model, you would shadow where the money goes, when and so on. You would have to make all the people who are making up the current process, take part of that. Because they would sort of have to report what happened, they have to do it in a way that can be trusted and so on. But in this other system (with crypto transactions), you know, you can change the actual flow of the money. You can change which steps they go through, when going from point A to point B. And the problem, you said, with the initial model (SOS CVI´s system) is that there are some unnecessary steps. Well, necessary steps, but they are not really providing anything besides of the potential for getting lost along the way, etc.

Reference 4 - 1.04% Coverage

EG: And also different transaction costs etc.
MC: Yeah, the more steps you have, obviously a larger slice of the overall pizza you are giving away to stuff that don't go to the actual purpose of the donations. So that is where the second option (crypto transactions) certainly is more interesting, in that sense. That you can change something more fundamentally than you can the other way. The other one is simply a model to increase trust and transparency, right, which is good enough. But it will take a lot of people to colaborate etc. so it will not be easy. But the other one, changing the flow of funds

and so on, in some case that can be easier. Because it requires less parties, in a sense.

Reference 5 - 1.11% Coverage

I mean, I don´t know how their (SOS CVI) processes work, but someone receives some money and that needs to go somewhere, and we need to ensure that it actually does. I mean, that could be probably quite simple, you wouldn't necessarily have to make your own system for it. I would probably just use some kind of existing asset, that has proven to be successful out there, it just have to have certain types of properties. You need to track where the money goes, and you want to make that part of it public, we are talking about the ability to trace certain individuals´ money to see whether they are used for the right purpose, right. So, I would probably find any of the existing infrastructures out there, and build a new application on top.

Reference 6 - 0.82% Coverage

That doesn´t mean that you will get rid of the connections to the banks, you still need to have a ramp on to that new infrastrucutre. You need to, unless people have cryptocurrency already - which I expect most people don´t - you still need an unwrap to that new infrastrucutre. You need to convert that currency to cryptocurrency etc. So that needs to be built into it, and that would probably make more sense to do through a bank, somehow. That is what the exchanges do today, they have some kind of relation to a bank, which can handle that for them.

Reference 7 - 1.16% Coverage

But, it could be interesting in the perspective of your
case, like the entire correspondent banking problem of moving money from one place to the other. I think there could definitely be some interesting things to look at there too. Also, it's important to know that it's another problem you solve; it's not the problem of accountability or transparency, it's the problem of efficiency, making sure money don't get lost, making sure it gets there fast and doesn't cost a lot. That is something I definitely think you can use the technology to solve. But, it's important to make it clear that that's two very separate problems, and you would go about them in two very separate ways. It's not something you sort of build one solution to to be a "be-all end-all" solution.

Reference 8 - 2.24% Coverage

AS: If you're thinking of our thesis here, where you have SOS who, of course with cryptocurrencies you have the volatility aspect of it. But, if you're using a stablecoin you are less exposed to…
EG: You're locked to some sort of other currencies, etc.
MC: For the one problem you have, it's not really relevant, because if you just want transparency for the transactions, you don't even need cryptocurrencies, you'll just need a sort of tracking system. So, for the other one, it depends. It depends on whether you want to have money around in that system, right. So, in general, if you just have a transaction system, (...) I just want to make sure the money gets there, but then it's the question of if they convert that money into the local currency in a local account, they probably need to do that eventually anyways - then it probably doesn't matter if the underlying currency is stable or not, because that transaction will generally happen very fast, it's not like the market is going to crash in the meantime. So, the stableness part of a stablecoin is a part that's only relevant if you leave money in account, right, and you don't want the value of it to change. So, if that's not the case, you probably don't need to consider it as much. I mean, there might be fluctuations, like there is with normal currencies too. So, I wouldn't consider that so much. Saying that, I think stablecoins is something that we definitely need, but for another reason than what you're looking at.

Reference 9 - 1.18% Coverage

AS: Why?
MC: Well, you're looking at transactions, and stablecoins are fundamentally about solving the problem of volatility, right. Volatility is not related to transactions, it's related to the, sort of, storing of the value, right. So, in that sense, I wouldn't personally think it's all that relevant to you. It might be if, for instance, people need to have money in an account somewhere, which they can regularly pay from to other guys, then it might be better to have it in some kind of stablecoin. Again, I would say, there's no particular reason, I think, that they should want to build their own infrastructure around this. That seems awfully complicated, given that there is already hundreds of frameworks out there that does what you want them to do, stablecoin or not.

Reference 10 - 1.61% Coverage

AS: But, for instance, SOS CVI told us that some people have a sponsorship program, where you donate to one specific child, and then they provide some sort of savings account for when they get older. So, if you think of that aspect, it could be better to use a stablecoin, maybe. Because, that is money that can be stored for maybe 15 years.
MC: Yeah, you could. The alternative to that would probably to use a normal bank account like you do today. And now they have relations with, you said, 20 different banks to do that. So, this is a judgement call you have to make, whether it's better for us, simply to govern that ourselves, or do we want to have all of this money in some stablecoin account instead. And then, who is governing that? Who's in control of that? Is that something we control ourselves, or are we dependent on, let's say, they just use something that already exists? Let's say we put this money into an account on Dai, for instance (...) What if that ecosystem breaks down in the meantime? It's certainly not as safe, currently, as having it in a bank somewhere.

Reference 11 - 2.19% Coverage

AS: But, you still have, because, well, they operate in 136 countries, so they will be exposed to a variety of different banking systems, etc. But they'll still have, if we use Malawi as an example, one of the countries that is sponsored by SOS Norway, let's say the banking system there crashed, or something like that. Then, you still have the risk of the savings getting lost. So, there definitely is a trade-off that we have to discuss here.
CM: It is interesting, but you got to also ask yourselves "Is that a development that a charity organization even wants to support?" Don't you think they would rather want to support the local economies by having money locked up in savings account. That would have a stabilizing effect, right. Whereas, funnily enough, these stablecoins, which we think of as exactly a stable alternative, they have the funny side-effect of de-stabilizing economies that are already not really stable, because they provide incentive for people to pull out their money and put it into stablecoins instead, right, like they've been doing with the USD for hundreds of years now. And that's interesting, and I don't know if, like, ideologically that is something that those kinds of organizations should support. But, that is more of a political question, and philosophical almost, than a technical one. And, you have to really get into the macro-economic effects of this, which I assume is a bit outside of the scope.

Reference 12 - 1.31% Coverage

AS: And, if you just, when you think of NGOs that provide foreign aid, what fundamental problems come to your mind? For NGOs, like SOS, that provide foreign aid, you mentioned that we have to think of the fundamental problems that they are facing.
CM: Well, the fundamental challenges related to introducing new technologies such as blockchain, and what I mean by that is that, just because you have new technology, that

doesn’t make all of your existing challenges go away. So, if you just put in the new technology and substitute it with what you did before, but you don’t change the process around it, you’re not going to change any of the problems either. That’s why I said that if you still let them use their correspondent model, making money go step-by-step, so down the same pipeline, then you’re not going to solve any problems. What you need to solve is that.

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Reference 1 - 4.81% Coverage

And you mentioned the possibility to create a stablecoin, in order to get the transactions online, and also in order to reduce the intermediaries and transaction fees etc. Do you have any thoughts on the feasibility of implementing/designing such a system in our cas with SOS? MJ: Technically, there is no problem setting up such a system. Then you´ll need to find out which parties that are actually willing to accept the coin as a viable coin (currency). That is the most important question, because the transaction in itself is not that difficult. If you then take use of Bitcoin, USDC (?) or an E-kronor, about to be launched in Sweden, which people trust, is actually completely irrelevant. As long as there is not only one country involved, but several, you will always have the need to exchange between several currencies, e.g. from local currency to USD. Or EUR to USD. That is not a problem, because is there one thing that we actually are not in need of today, is more stablecoins. For example you have the Tether (USD Stablecoin) that is trading at 70-80 cent, then you understand that there is something missing, as it is supposed to be traded at a 1:1 to the USD. If is a bit difficult to have a stablecoin constant at a 1:1 the e.g. the USD, despite that is supposed to always be the case. This is because you have some “idiots” out there trading, and some algorithms, which makes the coin trading at 1,04 or 0,95. It is stable, in the sense that it is not a 10000% price drop/increase, like Bitcoin, but you still do not have a 1:1 to the USD at any time. And another aspect that you have to include is that, for politicians, it is really easy to make exceptions for themselves, especially if there is some kind of tax-benefit included. So an aspect that a lot of people forget is that in many “institutions” today, including in Norway, if you trade one token, from one wallet to another, it is classified as a taxable transaction. In other word, if you have a token, where you have transferred/exchanged from NOK to EUR to USD, then you have to take the exchange rate for those transactions to see whether there has been some volatility/changes to those transactions, compered to whether there has been volatility to the UN coin (used as stablecoin in this example). If it (FN coin) always trade at 1USD, you will not have a problem, but if it trades at 0,97 one day and 0,3 the other, you have a problem. One case is if your transfer is supposed to finance i banana in the developing country, but if it is an amount of 40 million NOK, or whatever, you have a taxable aspect which is of quite significance, which can be taken use of by some creative people.

Reference 2 - 0.91% Coverage

As for th technical aspect of this, if your system transfers the money from one wallet to the other, to a third, and a fourth, but neither the receiver or sender is abel to see, however the systems accepts the transactions, they you have a lot of data to handle. That is the same case why I, in an interview with Finansavisen, stated that the Libra coin (facebook´s cryptocurrency), the project will not be a failure. This was because they (Facebook) haven´t thought about the tax aspect of this. (...).

Reference 3 - 1.48% Coverage

Technically, it is easy and feasible to set up a solution as the one the UN are considering, with a UN Token. However, that is best if you are only looking for the ability to trace where the money is sent. Then you can say that you, in the different steps in the supply chain, minimize

1-3 steps, which do not take up a big percentage of the funding along its way to the end projects. However, can you know for certain that the person collecting the assets funded by the donors actually will use the assets that he gets in an ethically and correct way? No. If you additionally want to safeguard against this, you will need sensor technology to verify and trace the asset, and that is a whole need platform, which might not be that suitable in all the SOS countries. So you will never be able to secure the whole supply chain. (...)

Reference 4 - 1.33% Coverage

You will need a system where you think of a bigger ecosystem that can take part in the verification, not only being reliable or trusting one single party. Because we do indeed see that there are untrusty parties within these organizations (the NGOs). Thus, you will to a certain extent be able to minimize some of the corruption and fraud, but not all of it. As long as there are humans and machines involved in the process, there is nothing that you can trust 100%. You can minimize risk, but you can not be 100% risk-free. However, you can get a long way with this system, and you can definitely make a hype, but you can not make something that will make you 100% risk-free of fraud only because of the fact that you take use of a blockchain.

Reference 5 - 2.05% Coverage

MJ: Of course, and then it comes to how you design the structure. Because the thought here is that the donors, when they donate money, actually would like it to be so that they money they donate goes directly to the enr project or developing countries. Then the "smart" consultant would say that "With blockchain you can do this peer-to-peer, and then it would be simple and secure. Then the SOS will provide the donors with a QR-code, so that the money from the donors can be sent directly to wallets, that you will have to trust." But if that is the case, why would the NGO put all this effort into collecting donations? Because their business model is actually based on being an intermediary, taking a percentage of the donations! So when that is their business model, we come to the question of "Do the NGOs really want it to be in that way that donors can donate directly? That is quite an important question in this case. Because if they want this business model to continue on, they could rather send all the tokens to their own (SOS´) wallet, and then transfer them to the developing countries, and taking a cut of the donations.

Reference 6 - 3.30% Coverage

So in terms of the audit, there is no challenge to do this. We have our own EY Blockchain Analyzer. Given that you don't design your own coin privacy structure, and making these solutions at private systems etc. Because you also have the question of "are you sure that every single donor, one that maybe donates quite a significant amount, would like to, theoretically, traceable and stored on the blockchain?". Not necessarily, maybe. In Norway you get deductions if you donate to charities, then you have to register this in your tax statement etc. Then you have another layer that will have to be verified. A different case is if you donate from your own wallet, you have to be identified and signed etc., then the media etc. can see who is giving to who. Then you are in need of a whole different safety structure. A thing that you should bear in mind is that the world, as it is today, is not ready for this, because you have to consider the complexity of the donor process here in this case. But the transactions, are quite simple, if you would like to add some transparency. However, then again it is the question of what can this (transparency) be able to measure, well it can measure whether a token is on the blockchain, but you still need someone to verify where to money come from. I imagine that, in the lacuh of such a project, the flow will be that e.g. NOK gets in to the system, and then the challenge will be that you will need to have an

exchange or these tokens (NOK gets transformed to tokens, and then tokens gets exchanged to local currency etc). This is not a free infrastructure, they will still need to take a percentage in order to finance this infrastructure. So there are many aspects in this big picture, that at first glance might seem pretty easy to do, but that in reality will be really complicated.

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Reference 1 - 2.80% Coverage

NK: What is important to think about when designing such a structure is the difference between public and private solutions (blockchains). And how mature these systems are. Maybe in the short term, it will be significantly easier to come up with such a solution with a private blockchain, rather than a public. More specifically, Hyperledger of R3. However, in the long term, this is a bit of speculation, but I vision that these public solutions can be more likely. So, I think that over the next 5 years I find it difficult to vision other than private blockchain solutions for these use cases. So if you are interested in the architecture of transactions, I would have started out by doing some research on the Hyperledger Fabric, as they have come the longest way as of now. I´ll send you the link. If I were you, I would have done some research on the basics of the Hyperledger Fabric. (...). Then you will gain an understanding of the different transactions in the chain, and you can vision where you will put SOS, the donors, end projects etc. However, you will ofc face several questions regarding consensus mechanisms, whom will have access to which parts of the chain, what aspects that should be centralized vs. decentralized etc. This system is not a plug-and-play solution, but I think that it will add great value if you do some research on that (Hyperledger Fabric). Especially take a look at “key concepts”. (...). Additionally, I would recommend you to try to get in touch with someone from IBM.

Reference 2 - 2.15% Coverage

The questions of whom should have access to the platform, which parts should be public vs. private, centralized vs. decentralized etc. is typical questions that you will face if you want to design such a system. And if the platform should be designed for a specific case, here SOS, you can look at the example of Alibaba. Here, Alibaba designed a huge system that several NGOs could join, and then you won’t face all of these (abovementioned) questions. Then you could recommend that SOS take use of such a “plug-and-play” platform designed and implemented by a third party (here Alibaba). This would be a much easier solutions for you, however it would be important that you include a section where you discuss Alibaba´s incentives to design such a system, what data does Alibaba get through this system, expenses for SOS by joining such a system, data security for donors by using a third party´s (Alibaba) platform. I do not say that such a solution does not make sense, I just emphasize that you would need to discuss the questions, and potential problems, by taking use of such a third party. What does Alibaba control, and what will SOS be able to control.

Reference 3 - 2.66% Coverage

AS: That’s very good, Niklas. We have also read about crypto-donations emerging, and I believe it was UNICEF who are now accepting crypto-donations. Do you have any thoughts regarding implementation of this into aid, specifically for SOS, how this can change aid?
NK: It will be much of the same, in that you swap out the lowest level with an open blockchain network. For an NGO, if it’s crypto, it will be like a smart contract, only that instead of money flowing through that smart contract, it will be cryptocurrencies flowing through the smart contract. Now, what’s important there, which is not in a private network, is regarding identities on both donors and receivers. However, there is currently emerging solutions to this, just that this platform in itself, e.g. Ethereum, hasn’t got any stance on that.

But what other third-party solutions, YouPat (?), Civic, identifies parties' crypto accounts, for instance due to white-washing, AML and other financial regulations, which such companies/organizations must comply to. Therefore, it could be problematic if all donors were anonymous, for example. So, this is just a little bit different type of question, but crypto is exciting, and crypto is emerging, so it's also maturing very quickly. Additionally, in practice for SOS, where it should be in their value chain, then you have to look down at the lowest line regarding how the blockchain network will look.

Reference 4 - 3.21% Coverage

AS: Do you think that such use of crypto-donations, e.g. in NGOs, are further away than just using blockchain and regular smart contracts with regular fiat currency?
NK: It depends. If you think about the Alibaba case, where an organization can use an already created platform, then I believe this is much more adjacent than crypto. However, if the organizations have to build their own platforms, then crypto is likely to be more adjacent, because you don't have to use the infrastructure, which is a bit "heavy" for organizations to create themselves. However if it's like "the internet is the internet", meaning that there is a platform ready to be used and you just plug-and-play, then that is a much easier way towards the goal. It's really only the biggest companies in the world that are currently working on creating their own platforms for their own use - Walmart, Equinor, etc. - it's at that level. Therefore it is more likely that companies like IBM, Alibaba create solutions for private enterprise, almost like a cloud, just blockchain, that you and your ecosystem can use, or open blockchains and the crypto-world. One of those two routes, it is difficult to estimate. In the beginning it's likely to be more enterprise-blockchain because they are safer and data-secure, but on longer-term it will be more network effects and open blockchain networks that will be used. Moreover, there will be some interoperability between these platforms, meaning that they can speak with each other, you can share data between platforms because they have the same standard - such as the internet which has the same TCPIP. There are many different internet networks, it's just that you can speak together through TCPIP.

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Reference 1 - 1.18% Coverage

TB: Do you plan to investigate how use of blockchain and cryptocurrency can change how the last mile problem will be in the future, or how an NGO itself can be a part of changing the way it is doing its business? I mean, if they take use of a cryptocurrency today, they will still face the last mile problem. However, in the future you may see that cryptocurrencies are more stable and it may be taken use of in many countries, a stable coin, a bitcoin or others, which can be transformed to mobile credit (mobile money) or other credit, then we will have another possible solution.

Reference 2 - 0.69% Coverage

TB: Exactly, the question of time is essential here. I would image that for NGO there are a lot of money that are "tied up" related to transfers and different intermediaries etc. Tied up on their travel towards the end goal. I think that the effect of losing up this money and decrease the time aspect of transfers would be significant.

Reference 3 - 2.26% Coverage

Especially for organizations that take money into organization, and then transfer the money out again to a lot of different locations, preferably with transparency along the way, a cryptocurrency or a stable coin can be a great opportunity. (...). Thus you can gather all the money at the main office, then sending it out to various locations. The problem then is that

you would have to find someone at the end locations which can exchange the money (crypto) to the desired currency. The specific of such a solution will vary from destination to destination, but there are projects that have been successful doing this. I think it is in the Philippines, where almost every other store can take cryptocurrency as payment.
So rather than making their own cryptocurrency or "super" blockchain solution, I think it is more likely and important to take use of open source systems, which is already being used and developed by others, thus also become a part of the development, rather than thinking that you put all these NGOs together in a room and expect that they will come up with a solution.

Reference 4 - 2.40% Coverage

EG: So you will need to have people along the supply chain that can verify these instances anyway.
TB: Yes. However, the aspect that I find really interesting is that you are able to, especially in terms of the transfer of financial assets, where you can have more transparency, by doing the transactions on the Bitcoin. Then you can trace the money and the business can make it more trace-friendly. The same is the case for stable coins and open networks, e.g. USDT (?) a USD-backup stable coin which can be transferred on the Ethereum network. Then it will be easier for the organization to prove that "the money is at this place in the supply chain now". However, you will still have this "last mile problem" when the money (crypto) is supposed to be exchanged for the desired currency as the money then goes "dark". But this point (the exchange) you can put as close to the point desired. An example of this is SunExchange. (...). The blockchain technology makes it possible to get rid of a lot of the intermediaries along the supply chain, and transfer more trust to the end point. However, you still have the aspect that someone needs to verify data along the way.

Reference 5 - 2.73% Coverage

TB: So, in Norway you would most likely have trust in the organization (SOS Norway), but you can be sceptical about how much of the money (what percentage) actually reach the end project at the very end. How much has gone to high salaries, bonus, transfer fees, exchange rates, administrative costs etc. The level of trust may be varying due to such factors. If you give 100 NOK, how much comes though in the end. Until now, you have been forced to trust whatever percentage given by the NGO because there has been a lack of opportunity to monitor this. However, if the organizations commit to the use of a blockchain as an infrastructure for the transactions of value (money), then it can be public for everyone where this money goes until they reach a point of exchange (from crypto to fiat, e.g.). Then it will be easier for an organization to be effective to do these transfers in an efficient and transparent way. Furthermore, it will make it more difficult for those organizations that are not that efficient, because they will get competition from those that are (efficient). Internal in the organizations there are also possibilities for value creation, as whenever you are able to to faster payments and transfers, without high fees, you can give more on a frequent basis rather than just "all or nothing" payments.

Reference 6 - 1.56% Coverage

Thus, from the perspective of those building a Children's village, they will know their balance (disponiblet). Let's say they receive money every week, for the weekly/monthly payments, instead of receive for the whole project in one payment. Thus, they know that they (the receiving part) will have to prove progression to the sending organization, in order to receive additional money. In an inefficient and expensive payment system, this will not be possible as it might take three weeks to send the funds, and you risk that it gets stuck along the way, forcing you to do bigger bulk transactions. In a more efficient system, like the one in Bitcoin,

you will be able to fine-tune the money stream, forcing results before sending additional funds.

Reference 7 - 2.60% Coverage

AS: This leads us to our next question; in which part of an organization can blockchain or DLT-systems be cost-efficient?
TB: Payments and transfers, without doubt. What is interesting here is that, technically, this has been possible with cryptocurrencies and stable coins for a long time. However, the problem has been that goin from fiat currency to cryptocurrency is way too expensive and inefficient. The volatility has been too high, and so has the fees etc. Over the past years, there has been built trading infrastructure, because of peoples´ demand to trade cryptocurrencies, and the result is that the fees go from high percentages (e.g. 10%?) to (0,01 and 0,0001%). The expenses for going fiat-crypto-fiat has gone from high to really low in quite a short time. The other problem for cryptocurrencies such as Bitcoin has been scaling. However, solutions such as the lightning (?), which also is experiencing significant growth, are solving the technical scaling problem. So, in the coming years, you will see a significant growth in the use of cryptocurrency as a payment structure, where you originally want to transfer one fiat currency to another, but where you today will have several problems in doing this, due to geography etc.

Reference 8 - 3.67% Coverage

AS: We have spoken a lot of blockchain in NGOs and aid, but do you have any thought on the use of crypto donations in NGOs? Do you have any thoughts on the feasibility of such systems?
TB: Yes, and exactly that (crypto donations) is something that I find really interesting. The combination of people having smartphones, with camera and access to Internet, even in the projects countries (developing countries). Let's say that an aid NGO sets up a local crypto exchange, and a local platform where locals can pitch their ideas and projects and what they need money for. A system in which they (the locals) can write and post pictures about their projects and the NGO facilitate for the platform and the exchange, but they (the NGO) lets donors donate directly to the ones i need. Of course, you still have the issue of corruption etc., however, that direct person-to-person, across countries and continents, have never before been possible. Not it is, and I can send a bitcoin to anyone anywhere in the world, and they can receive that money instantly. In comparison to an exchange of any other currency (other than crypt) which is a claim on another person, I can not send that directly to a person in South Africa. Because I have an account in DNB (Norwegian bank), but the person in South Africa hasn´t, which means you have to go through (korrenspondendsbanksystemet), which is a chain of banks trusting each other. With bitcoin and stablecoins, decentralized such as e.g. Die, but also centralized such as USDT, it is possible to transfer directly to the one in need for money to buy a shovel etc.
Aid organizations that facilitate such transfers will build infrastructures and support projects like this, combined with reporting to avoid fraud, can be really interesting.

Reference 9 - 1.34% Coverage

AS: What is necessary in order to implement/set up such a crypto exchange? If SOS for instance, would like to build such an exchange? For example, Malawi, one of the poorest countries in the world, how challenging would it be to be successful with such a system?
TB: What is needed is that the NGO has to figure out what is the "gangbar" (viable) currency for those in need (the locals). And what is the closest place in which there already exists liquidity between crypto currency and this local currency. Then the NGO has to build the

infrastructure for this exchange, which is close enough to the ones in need. So, it would vary from country to country.

Possibility 3) Consortium

Files\\Interviews\\Interviewee#3 050220 - § 2 references coded [10.60% Coverage]

Reference 1 - 8.84% Coverage

AS: In which part of an organization do you think that DLT can streamline operations?
JS: In the transactions-heavy part. That will be in finance, HR etc. Going back to the three criteria; in the parts where you have multiple actors, that goes outside of the organization. I think that is pretty important. It needs to have some interaction with either your customers, vendors, suppliers. These kinds of ecosystems problems.
Actually, the phrasing of the question, I think you should try to broadend it up. So I would suggest to SOS that they say "Ok, so this problem is an industry-wide problem. It is not only SOS, it is a problem for all NGOs that accepts payments and wants to distributed that wealth to foreign countries. So I would actually argue that NGOs they need to come together, because then you will actually have that network, right. And so, right now we are helping. There is a news article on DR where you can find that blockchain technology can help pig production. Meat going to China. What we have actually done there, is that we have put all the meat producing companies together in the same room and, I mean as with the NGO, they all have the problem around traceability. The chinese consumers are so focused on traceability and transparency on where the meat has been, at which temperature it has been stored, what grain the pig has eaten etc. All these kind information that we take for granted. We trust that whenever we go to the supermarket, things are well and ok. However, that is not the case in other places. So if you can provide that information the the consumer, it definitely provides certain behavior and also decisions to buy. So they saw that the entire market, and the entire industry benefited from creating this joint platform, and it actually says
"let's be common around the infrastructure of the platform, because no single one, not even the largest player, would be trustworthy enough. However, if you come together as an industry, and then you can start applying game theory on that, I mean then it would be very hard for one to cheat. They would benefit more from all of them being together. And I think that is the same paradigme here in the NGO space. And I think that agreeing on the infrastructure, and then competing on the client-facing parts, the value proposition, that is fine. That is all individual and normally, but let's agree on the infrastructures, structures alike. So, they kind of saw that the entire market and the entire industry actually benefits from creating this joint platform, and it actually provides - it actually says: "Okey, let's be common around the infrastructure of the platform", because no single one, not even the largest player would be trustworthy enough. However, if you come together as an industry, and you can apply game theory to that, then it would be very hard for one to cheat, because there would be this game where everyone benefits from all of them being together. I think that it is the same paradigm in the NGO space, and I think that agreeing on the infrastructure and then competing on the client-facing part, so the interfacing and the branding-side of it - that's fine. But, let's agree on the infrastructure and standards.

Reference 2 - 1.76% Coverage

AS: We haven't really thought about the aspect of change management for our thesis, at least not thus far. Do you think that it's an aspect that can provide value to our thesis?
JS: I mean, if you go with the stance that you suggest that SOS should form a consortium together with, let's say, Red Cross, Save the Children, etc., then there needs to be a consideration around change management. How does that affect the finance organizations in the different organizations? How would it be perceived by the public? There are many thoughts there where the human aspect is easily forgotten as we get so excited about the

technological pieces.

Files\\Interviews\\Interviewee#4 040220 - § 2 references coded [2.37% Coverage]

Reference 1 - 0.70% Coverage

AS: You mentioned these banks that dropped out of the consortium (R3), why did they do so?
TB: Well, some of the least management-friendly structure that you can have is a consortium, especially when it includes competitors. Then they are supposed to sit together and agree on how to innovate, that is a really difficult thing to do. (...).

Reference 2 - 1.67% Coverage

EG: Speaking of, the one we interviewed yesterday (Jonas) from Deloitte, suggested that the NGOs might benefit from constructing a consortium for innovation on blockchain in foreign aid, do you think that this can be difficult? Maybe not a realistic solution?
TB: I am quite sceptical about such a solution, yes. It happens from time to time that you can get value from such structures, however the problem is that it quickly turns into something quite creationist. You try, top down, to change all the parts of your organization at once, then something goes wrong and the project fails. (...). They should absolutely try to cooperate about possible solutions, but rather than starting a “super project”, they should look at what is out there, what is being used and how can we take use of those solutions.

Possibility 4) Change Business Model

Files\\Interviews\\Interviewee#8 180220 - § 1 reference coded [2.72% Coverage]

Reference 1 - 2.72% Coverage

I mean, I don´t understand SOS CVI´s operating model, but if you did this you should actually not just rethink their transaction flow, you should rethink their operating model. Because they don´t have to coordinate it in the same way as they have used to, they can coordinate it differently. Why not skip the middlemen, in a sense, right. They could perhaps act as some sort of broker, right. Let´s say "here are some useful purposes that you can donate money to." List them on the website of whatever, and then you (the donors) can just pick it. That way, the money never even goes to SOS right, it just goes straight to the receiver, right. Maybe they will have to take some part of it out in order to manage their administrative costs, right. But that would be much less than it is today. But what I am saying is that, in terms of the transaction part of it, that is simply what every cryptocurrency does today, track where the money is going, make sure that the receiver is publicly known, so that you can verify that the transaction got sent to the right receiver etc. So anyone can verify that, and you don't have to make the sender public, right. The actual part that is very different, is what you build on top of that, to soft of fit that into their operating model. So I think that we are actually talking more about sort of a business model-change, more than a technological challenge change. Which is interesting, and it is important to think that way when you are doing with these technologies. Because what people tend to think is that what is going on today, and then just taking new technology and still doing the same stuff. Which is not very useful when it comes down to it, because this is a technology that, when it comes down to it, fundamentally changes how things can be done, in like an overall system.

Traditional Banking System

Files\\Interviews\\Interviewee#8 180220 - § 4 references coded [5.63% Coverage]

Reference 1 - 1.13% Coverage

AS: However, they (SOS CVI) are still experiencing problems. For instance, they told us that sometimes the funds might get lost along the way, it might be gone for like two weeks.
MC: Yeah right, in the corresponding banking system?
AS: Yes, and they are not able to trace them, and they are not able to know why the transactions have stopped. Usually, in most cases, they get their money in the very end. But, it is a complicated structure and process for all of these transactions.
MC: And I guess that particular problem is not one that is so specific for your use case, because this is an underlying problem with the corresponding banking work. And certainly a problem that many people have looked towards the blockchain, as a potential solution.

Reference 2 - 1.29% Coverage

AS: But, if you think of the traditional way that transactions are done today, like SOS CVI. Do you have any thoughts on challenges in the way they are doing their transactions today?
MC: The current banking systems? EG: Yes.
MC: You have already mentioned some of them, I mean the corresponding banking system obviously has some limitations, right. Essentially, it is built on a process that was invented hundreds of years ago, and we kept building on top of it, repeating the same steps, but adding new technologies to it. If we were to start over today, and to it all from scratch, it would have looked very different. So obviously, it has its problems. But you have a problem that is not very easy to fix, because it is so ingrained and it takes so many different stakeholders to agree to actually do something about it. (...). So that is certainly a problem.

Reference 3 - 2.04% Coverage

I mean, to your initial point that this was made to make banks redundant. I think it is quite clear by now that is not going to happen. The traditional financial systems still have its place, right. And that is because, funnily enough, for some of the reasons that you mentioned before, that money can get lost in the existing system, things take time etc. But, someone will actually take that time and find out what happened, where the money went and give that back to you. For something like public cryptocurrencies, especially for the early ones, if you somehow send that money to the wrong address, that will also get lost, you will never see that money again no matter what you do, right. So, that by itself is enough of an argument that public cryptocurrency, as it is today, will not completely replace the role we (financial services institutions) will have in the industry, because a lot of people will simply not be willing to take that risk upon themselves, they would rather let the banks take that risk on their behalf, like the traditional system. But that is a problem, that public blockchain systems generally have to deal with, when they function in that was as originally envisioned, like Bitcoin and so on. How do you deal with a system where there is no one who is really accountable, ultimately, for making sure that “shit don´t go wrong”.

Reference 4 - 1.16% Coverage

But, it could be interesting in the perspective of your
case, like the entire correspondent banking problem of moving money from one place to the other. I think there could definitely be some interesting things to look at there too. Also, it’s important to know that it’s another problem you solve; it’s not the problem of accountability or transparency, it’s the problem of efficiency, making sure money don’t get lost, making sure it gets there fast and doesn’t cost a lot. That is something I definitely think you can use the

technology to solve. But, it's important to make it clear that that's two very separate problems, and you would go about them in two very separate ways. It's not something you sort of build one solution to to be a "be-all end-all" solution.