Creating Transparency and Accountability in Non-governmental Organisations Using Blockchain Technology

Master Business Informatics

Thesis Report

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Abstract

Non-governmental organisations (NGOs) rely on donations as one of their main sources of funding. The relationship between donors and NGOs is based mostly on trust, donors trust NGOs to be legitimate organisations. One way for NGOs to show donors they are to be trusted, is by being transparent and accountable about the projects they undertake. Blockchain is a new technological innovation that has potential to change the relationships between NGOs and donors. It can be used to create trust between parties without relying on a trusted third party.

This research focusses on analysing the relationships in the NGO sector and the methods NGOs currently use to be transparent and accountable. Furthermore, an analysis is made on the capabilities of blockchain technology and smart contracts to improve transparency and accountability in the NGO sector. A review of current literature was conducted, and interviews were held with employees of NGOs and institutional donors. The results showed that blockchain technology's main potential lies in allowing individual donors to trace their donations. However, this would require significant effort and there is resistance among NGOs to implement such a blockchain. Additionally, the results showed that there are alternative methods to improve transparency and accountability that require less effort and that could have a significant impact.

Keywords: Non-governmental organisations, Transparency, Accountability, Blockchain, Smart contracts.

CONTENTS

1 INTRODUCTION

Governments and donors give funding to non-governmental organizations (NGOs) with the intention of supporting them to carry out development and aid programs around the world. Once the funds are received by the NGOs, it is difficult for donors to find out what their donations were used for and their requests for disclosure of information about their donations are sometimes denied (Masdar, 2015). Additionally, the multitude of corruption scandals in the past have damaged the reputation of NGOs (Ebrahim, 2003; Gibelman & Gelman, 2001). Nevertheless, NGOs have managed to gather a significant amount of influence on a national and an international level (Lehr-Lehnardt, 2005). NGOs try to provide outsiders with as detailed reports as they can, but they often cannot share details about the spending of individual donations. NGOs receive increased criticism for their lack in transparency and accountability (Lehr-Lehnardt, 2005). There has been a growing demand for information about the spending of these organizations, especially when the NGOs operate across national borders (McGann & Johnstone, 2005).

Improving transparency and accountability in NGOs could reinforce their position as independent aid organizations and improve public perception. Setting a standard of fully transparent and accountable NGOs could also decrease fraud and misallocation of funds within these organizations (Edwards & Hulme, 1995). However, there are certain economic and social forces that need to be taken into account that can influence an NGO's level of transparency (Vaccaro & Madsen, 2009b). For example, the privacy and security of stakeholders needs to be safeguarded.

Blockchain technology is the underlying technology of Bitcoin, which was introduced by Satoshi Nakamoto in 2008. Since then, systems using blockchain technology have been created in a multitude of industries (Zheng, Xie, Dai, Chen, & Wang, 2017). Proponents believe blockchain technology has the potential to disrupt all major industries by improving efficiency and removing the need for third parties to verify transactions (Ammous, 2016; Galen et al., 2018). Current blockchain applications range from completely decentralized public blockchains to centralized private blockchains (Bashir, 2017; Buterin, 2015). Whether a blockchain should be used at all, and which type of blockchain should be used depends on the requirements of the system and the context (Bashir, 2017; Wüst & Gervais, 2018). Additionally, the use of smart contracts allows to create comprehensive distributed applications on top of blockchains (Luu, Chu, Olickel, Saxena, & Hobor, 2016), thereby expanding the use cases and potential of blockchain technology even further. This potential is showcased by the amount and variety of distributed applications currently running on the Ethereum blockchain.

This emerging technology has the potential to bring transparency and accountability to NGOs by providing a secure, immutable, censorship resistant ledger (Pilkington, 2015) in which information about an NGO's activities and transactions is stored. Donors can then use the blockchain to trace funds in a transparent manner, all the way from donation to its application in a project. Donors will then be able to view, in detail, how their donations are used. Additionally, with this information becoming public, NGOs will be forced to become more accountable.

Using blockchain technology in NGOs may also come with additional opportunities. For instance, smart contracts in a blockchain can potentially decrease the response time of an NGO. In case of a natural disaster, the smart contracts could automatically disperse funds and aid to the affected areas. Additionally, an online dashboard can then be used to present the distribution of aid to the outside world, thereby further increasing the transparency of the NGO. This dashboard could also be used to set certain targets and track the progress of reaching them. Once the targets have been reached, smart contracts could automatically disperse additional funds. This research examines these and other

potential ways in which blockchain technology could help NGOs in becoming more transparent and accountable. A literature review is conducted, and interviews are held with employees of NGOs and institutional donors.

The results show that blockchain technology has limited potential to improve the transparency and accountability in the NGO sector. NGOs will never be able to become fully transparent as the disclosure of certain data would incur safety or privacy risks. Also, the relationship between institutional donors and NGOs generally is already trustful. Blockchain technology could be used to improve trust between NGOs and individual donors. However, alternative methods exist that could be used to improve transparency and accountability with less effort. Furthermore, the international aid transparency initiative (IATI) already allows NGOs and institutional donors to report transparency data in a standardised manner using the IATI standard. The IATI data can be used to get an overview of the transactions and activities that occur in the NGO sector. Improvements should still be made however to IATI's adoption among NGOs and their partner organisations, and to its dashboarding and analysis tooling.

2 RESEARCH APPROACH

2.1 PROBLEM STATEMENT

Non-governmental organisations rely heavily on donations from individuals and institutions for their incoming funding. Donors donate to NGOs because they trust them to be legitimate organisations who will use the funds correctly. This relationship of trust is influenced by the degree with which NGOs account for their activities and are transparent about how they spend donations. Being accountable and transparent therefore is crucial to the existence of NGOs. Research has shown that NGOs often struggle with being accountable and transparent, causing the trust that is placed in them to be damaged (Ebrahim, 2003; Gibelman & Gelman, 2001; Masdar, 2015). This research aims to find a solution to the following **problem statement:**

Non-governmental organizations (NGOs) struggle with being transparent and accountable towards their donors, thereby being unable to provide donors with the information they want. Blockchain technology is a potential solution to this problem but it is unknown how a blockchain system could improve transparency and accountability in NGOs.

A solution to the problem statement is found by exploring the concepts of accountability and transparency in the context of NGOs and how they are connected to the relationships NGOs have with their stakeholders. Furthermore, the potential of blockchain technology to improve accountability and transparency in NGOs is explored. This also includes a feasibility and market research to determine whether NGOs are interested in building and using such as blockchain.

2.2 RELEVANCE AND RESEARCH METHOD

Blockchain technology is a relatively young technology and therefore does not yet have an extensive history in scientific research. Real world applications of blockchain technology are not yet widely used and still have shortcomings including scalability, speed and high energy expenditure when compared to other technologies. The humanitarian sector is one of the areas where blockchain technology has significant potential, but no scientific research has been conducted on this topic. The aim of this research is to broaden the scientific knowledge about blockchain technology in general and more specifically how it can be applied in the context of NGOs to improve their accountability and transparency.

In order to fulfil the research goal and answer the research questions of this study, which can be found in Figure 1, a research method will be used that is based on the design science research method (Wieringa, 2014). The design science research method is focused on designing an artefact, based on the needs of stakeholders, and investigating the performance of the artefact in its context. Since the main goal of this research is to identify ways how blockchain technology can improve transparency and accountability of NGOs, this research method is well suited as it can be used to create and evaluate a blockchain technology-based artefact.

This study focuses only on the designing of the artefact itself because development and implementation of the artefact itself is out of scope. The design science research method provides a tool called the design cycle, which can be used to create artefacts (Wieringa, 2014). The design cycle consists of three phases, namely: problem investigation, treatment design and treatment validation.

This research only focusses on the problem investigation and treatment design phases. The treatment validation phase was left out of scope due to the extensive execution of the first two phases. Figure 1 shows the design cycle and the main questions of each phase.

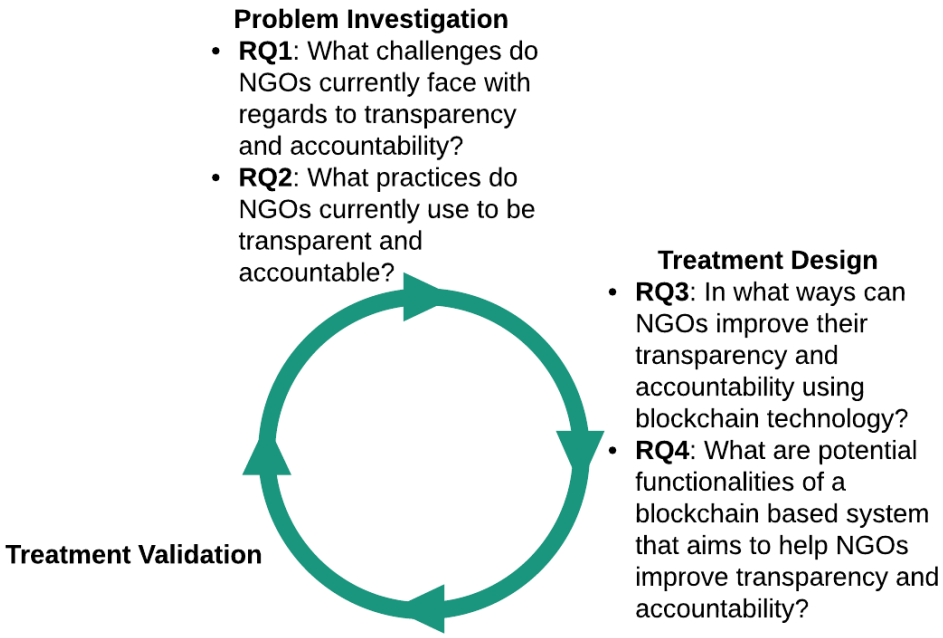


Figure 1: Design Cycle

2.3 Problem Investigation

During the first phase, the problem is investigated mainly through analysing relevant research. Research about accountability and transparency within NGOs, as well as about blockchain technology and its potential, is investigated in a literature review. The review allows to build a body of knowledge, that can be used to formulate requirements for the artefact that is designed in the treatment design phase. How the literature review is conducted is described in section 2.5. In addition to the literature review, interviews are held with employees of NGOs and institutional donors. These interviews gather additional information about the challenges NGOs currently face with regards to accountability and transparency. Furthermore, the interviews will be used to assemble additional requirements for the to-be designed artefact, that were not captured during the literature review phase.

The interviews follow the guidelines of qualitative interviews as defined by Yin (Yin, 2015). In qualitative interviews, there is no strict predefined structure made by the interviewer. The interviewer has a list of topics or questions to cover in the interview, but the interviews do not follow a strict predefined script. This allows for the interview to be adapted to the interviewee and the context at hand, allowing for the interviewer to go into more depth on certain topics that the interviewee has substantial knowledge about. The interview protocol that was used during the interviews with employees of NGOs can be found in Appendix A. The interview protocol that was used during the interviews with employees of institutional donors can be found in Appendix B. Additionally, an informed consent form was signed by the interviewee before the interview, which can be found in Appendix C for employees of NGOs and in Appendix D for employees of institutional donors. To make sure interviewees understand all the concepts that are used during the interview, they were provided with a document containing explanations of the concepts beforehand via email. A Dutch version of this document can be found in Appendix E. In order to extract all relevant information from the interviews, all interviews were recorded, transcribed and analysed.

2.4 Treatment Design

In the treatment design phase, an artefact was designed that could potentially help NGOs to improve their accountability and transparency while utilizing blockchain technology. To construct the artefact, the gathered data from the problem investigation phase was analysed. This resulted in a model that captured the goals and intentions of relevant stakeholders using the iStar 2.0 modelling language. The findings of the literature review and interviews were then used together with the iStar model to construct a conceptual blockchain artefact. This artefact contained the requirements and functionalities of a potential blockchain for improving transparency and accountability in NGOs.

The treatment design phase also included an analysis on feasibility of creating the proposed blockchain system. Additionally, possible alternatives were identified that could potentially also have an impact on transparency and accountability of NGOs. These alternatives possibly could have a larger impact with less required effort when compared to implementing a blockchain system.

2.5 Literature Review Protocol

A literature review was conducted in order to help answer the research questions. In order to get a better understanding of the subject of transparency and accountability in NGOs, initially a short literature review was conducted. This literature review allowed to better understand the concepts and terms regarding this subject. Following this initial review, a list of search terms was defined. This list was used in the remainder of the literature review through the use of academic search engines.

According to Webster and Watson (2010), a high-quality literature review should not be confined to one research method. Therefore, in addition to using search engines, a process known as snowballing is used to find additional relevant research. Following the procedure as defined by Wohlin (2014), two types of snowballing were used:

- *Backward* snowballing: using the citations of a paper to identify new relevant papers that should be included in the literature review.
- *Forward* snowballing: explore papers that have cited the paper under investigation and determine whether they should be included in the literature review.

The papers that were found through the academic search engines were used as a start set for the snowballing procedure. By including snowballing in the literature review process, there is a higher chance of finding research that was published in less known journals and conferences and it reduces the problem of inconsistent terminology. Researchers may use different terminology for the same concepts and by relying solely on search engines, research using deviating terminology may not be found. Snowballing allows to circumvent this problem.

2.6 Interview Selection Criteria

During the interviews, NGOs that could potentially have the most benefit of using a blockchain system to improve accountability and transparency were interviewed. In order to select the best suited NGOs, the following selection criteria were used:

1. The NGO's total yearly income should be at least 10 million euros. These NGOs will most likely benefit the most from improving transparency and accountability as they have a significant number of stakeholders. Additionally, they have more resources at their disposal to invest in improving transparency and accountability.

2. The NGO is not a: zoo, aquarium, museum, art gallery, library, park, nature centre or similar organization. These organizations are not likely to benefit much from becoming more transparent and accountable as their activities are self-explanatory and have low impact. Preferably the NGO's activities should include for example developmental aid work, peace and human rights, child sponsorship, emergency and disaster relief missions, wildlife conservation, animal welfare, hunting and fishing conservation, environmental conservation and protection, medical research and patient and family support. Organizations involved in these types of activities are more likely to benefit from having improved transparency and accountability.

Additionally, the following selection criteria were used to select suitable institutional donors:

1. The donor should have at least 1 million euros available per year for making donations. As the amount of funds available for donation increases, it also becomes increasingly more difficult to track these donations. Tools such as a blockchain are more likely to be used by these organisations.
2. The donor is donating to at least five different NGOs. Difficulty of tracking donations also increases as donations are made to more NGOs.

3 LITERATURE REVIEW

3.1 NGO ACCOUNTABILITY & TRANSPARENCY

3.1.1 Definition of Accountability and Transparency within NGOs

Before diving into details about accountability and transparency in NGOs, it is best to get a definition of these terms and how they relate and manifest within NGOs. In essence, accountability and transparency are closely related, e.g. accountability can be improved by increasing transparency. Like the name suggests, a non-governmental organization is an organization that is not tied to a government. These organizations are considered not-for-profit and aim to serve some societal purpose. They are also known as *civil society organizations, nonprofit organizations* or *private voluntary organizations* (McGann & Johnstone, 2005).

Accountability finds its roots in the practice of account giving, where an actor is obliged to explain and justify its conduct. Thereby, Mark Bovens (2007) has defined accountability as the following: "*a relationship between an actor and a forum, in which the actor has an obligation to explain and to justify his or her conduct, the forum can pose questions and pass judgement, and the actor may face consequences"* In the case of this research, the actor is an NGO, and the forum consists of its stakeholders such as donors and beneficiaries. Bovens (2007) mentions that the *obligation* can be either formal or informal. Formal in this case means that the act of account giving is mandatory, e.g. a government institution requires an NGO to explain and justify its conduct in order to receive funding. Informal on the other hand concerns the voluntary or self-imposed accountability practices of an NGO. Regarding the consequences an NGO may face, these will mostly consist of the loss of donors and funding, as well as a damaged reputation, making it harder to gather new funding. Accountability can manifest itself in NGOs in different ways, which are explained in more detail in section 3.1.3.

Transparency is a fundamental aspect in a relationship between multiple parties, especially in the relationship between an NGO and its stakeholders (Jepson, 2005). NGOs rely on the trust donors have in them to receive funding (Awasthy, Gopakumar, Gouda, & Haldar, 2019). Having a definition of transparency will help to determine how it can be improved. Schnackenberg and Tomlinson (2016) have investigated current literature in order to create a broad definition of transparency. They found that many definitions exist, but they were all specific to a certain context or domain. After analysing all these definitions, they defined transparency as the following: *"Transparency is the perceived quality of intentionally shared information from a sender"*. An interesting part of this definition is that it is about the *perceived quality* of shared information. This means that transparency should be considered from the perspective of the receiver of the information and how they perceive its *quality*.

Schnackenberg and Tomlinson (2016) have also found that transparency can be characterized across three dimensions: disclosure, clarity and accuracy. *Disclosure* can be defined as *"a deliberate, timely, and formal release of voluntary or required information"* (Williams, 2008). It therefore refers to the act of disclosing information itself. *Clarity* is more concerned with the comprehensibility of the disclosed information. Researchers have argued that information which is disclosed by organizations, must be presented clearly and understandable in order for the organizations to be considered transparent (Gaventa & Mcgee, 2013; Street & Meister, 2017; Winkler, 2000). *Accuracy* refers to the correctness and reliability of the shared information, as perceived by the receiver (Angulo, Nacthmann, & Walker, 2004; Bushman, Piotroski, & Smith, 2004). Organizations must take great care to disclose accurate information, as inaccurate information can be an important factor in prompting corporate scandals and reducing trust (Akhigbe & Martin, 2006).

Transparency can be used by organizations to create, maintain and repair trust from stakeholders (Schnackenberg & Tomlinson, 2016). According to Mayer, Davis and Schoorman (1995), trust refers to "*the willingness of stakeholders to be vulnerable to the actions of the organisation"*. This means that transparency practices can be used by NGOs to increase the willingness of stakeholders to be vulnerable to its actions. Following Mayer et al.'s research, it is important here to understand that trust is based on three dimensions: ability, benevolence and integrity. In this context, *ability* refers to the skills and competencies of an NGO, *benevolence* to the belief of a stakeholder that an NGO will act in the best interest of the stakeholder, and *integrity* to the perception of a stakeholder that an NGO will adhere to acceptable principles and ethical standards. An NGO can improve all three dimensions of trust of its stakeholders by improving the three dimensions of transparency within its own organization (Schnackenberg & Tomlinson, 2016).

3.1.2 Concerns about NGO Accountability

Over the last couple of decades, NGOs have had significant influence on both a national, as well as an international level (Lehr-Lehnardt, 2005). This large amount of influence comes with an equal amount of responsibility, especially considering the fact that NGOs rely heavily on donations for their incoming funds. Taking this responsibility and showing donors how their donations were used is crucial for NGOs in order to maintain a trustful relationship with their donors (Burchell & Cook, 2007). However, NGOs are coming under increased criticism about the fact that their processes are not transparent, accountable and democratic (Lehr-Lehnardt, 2005). Donors desire information disclosure about the allocation of their donations, but these requests are sometimes denied (Masdar, 2015), which leads to criticism on the level of accountability of NGOs.

The authority that NGOs have, largely comes from the general perception that NGOs are legitimate organizations. However, as they have gained increased influence, they are also under a higher degree of scrutiny by the public. Concerns about accountability of NGOs have risen since the 1980s, which is caused by a series of highly publicized scandals (Ebrahim, 2003). Such scandals cost NGOs significant amounts of funds due to the misconduct itself, but the loss of public trust has an even stronger long-term impact. Allegations of misconduct have a substantial impact on the reputation of an NGO and resolving this can take a significant amount of time (Gaventa & Mcgee, 2013). These scandals are not isolated events, but rather structural problems that is affecting a wide range of NGOs world-wide (Gibelman & Gelman, 2001). Analysis shows that in many cases, the misconduct took place due to issues with appropriate oversight and the lack of accountability mechanisms. The circumstances within these NGOs were right for exploitation.

Despite the numerous cases of misconduct, the majority of NGOs carry out their objectives correctly without any wrongdoing. However, the scandals that do surface and that are publicized, have a large impact on the public image of the NGO sector as a whole (Gaventa & Mcgee, 2013; Gibelman & Gelman, 2004). This effect is strengthened by the fact that NGOs have a societal status of altruism and morality, making them more susceptible to public disillusionment when compared to other organizations that do not have this societal status. This damaged reputation of the NGO sector as a whole, makes fundraising more difficult for all NGOs.

3.1.3 Forms of Accountability

Different types of accountability exist, which manifest themselves differently within NGOs. They serve different purposes and, in some cases, complement each other. According to Ebrahim (2003), distinctions between accountability practices can be made on three different dimensions. Firstly, there is the distinction between external and internal forms of accountability. Secondly there is a

difference between upward and downward accountability. Lastly, a difference can be made between functional and strategic accountability. In addition to these three dimensions, Vu and Deffains have identified a fourth dimension, which is between formal and informal accountability (2013). Each dimension is explained below and a summary is provided in Table 1.

External and Internal. These types of accountability refer to whether the accountability is directed to the outside world, or to the internal organization itself (Parker & Guthrie, 1993). In case an NGO is accountable to the outside world by for instance filing formal reports to national or international institutions, this is considered external accountability. The purpose of this type of accountability is to show accountability to stakeholders such as donors, governments and beneficiaries. On the other hand, accountability can be expressed within the hierarchy of the NGO itself, in which case it is considered internal accountability.

Both external and internal accountability come with their respective benefits. External accountability allows to satisfy the expectations of stakeholders. In particular, it helps to keep donors satisfied so that they will continue donating. Trust is a crucial aspect in the relationship between NGOs and other organizations (Burchell & Cook, 2007). The relationship between donors and NGOs is also highly based on trust (O'Dwyer & Unerman, 2008) and NGOs should therefore be careful not to damage that trust. Building such a trust-based relationship with stakeholders is fundamental to NGOs and according to Burchell and Cook (2007), in case that trust is somehow damaged, it is difficult to be repaired.

Although this refers more to the internal transparency that results from being accountable to one's own organization, internal accountability has the main benefit that everyone in the organization knows what is going on and they can therefore propose solutions to problems that exist (Vaccaro & Madsen, 2009a). It can also prevent preferential treatment of employees through unfair compensation since employees can see all expenses. To achieve this, an NGO should strive for *radical transparency* by using information technology to create a direct and continuous dialogue with stakeholders (Vaccaro & Madsen, 2009b), which in this case, are its own employees.

Upward and Downward. This distinction in accountability practices refers to the direction to which an NGO is accountable (Ebrahim, 2003). In the case of upward accountability, the NGO is accountable towards its donors. Conversely, downward accountability means the NGO is accountable towards its beneficiaries. In general, upward accountability is practiced substantially more by NGOs as donors actively seek information about fund allocation by NGOs (Andrews, 2014; O'Dwyer & Unerman, 2008). Beneficiaries are generally not actively seeking and are less interested in this information. Therefore, NGOs have a higher incentive to practice upward accountability than downward accountability. Additionally, NGOs mainly focus on upward accountability because stakeholders such as donors tend to have the most economic and political influence (O'Dwyer & Unerman, 2008; Unerman & Bennett, 2004). NGOs rely on donors to receive funding, so it is more logical to focus on an upward form of accountability. Another reason why upward accountability is more prominent than downward accountability, is that NGOs find it difficult to reach beneficiaries and to engage in a dialogue with them (O'Dwyer & Unerman, 2008).

Functional and Strategic. Functional and strategic accountability make a distinction in the purpose of fund allocation. Functional accountability refers to accounting for the allocation of resources and the immediate impact of the NGO's activities. Strategic accountability on the other hand refers to accounting for the impact the NGO's activities have on a broader scale such as other organizations and the broader environment (Ebrahim, 2003). According to Ebrahim, functional accountability practices tend to yield short-term rewards and more immediate effects. NGOs therefore place more

emphasis on functional accountability instead of strategic accountability, which is mostly long-term focused and addresses more complex issues of social and political change.

Formal and Informal. The final distinction is made between formal and informal accountability. Formal accountability refers to the creation of formal reports and distributing them to stakeholders (Connolly & Hyndman, 2013). These formal documents are often a requirement for NGOs in order to receive funds from donors. This type of accountability generally involves formal rules and procedures to make sure the released documents contain the right information (Vu & Deffains, 2013). Informal accountability on the other hand refers to communicating with stakeholders in an informal setting (Masdar, 2015). This typically happens through face-to-face interactions and verbal communication. By using informal accountability practices, an NGO can create closer relationships and build trust amongst its stakeholders.

Formal and informal accountability practices can each be used for different purposes, but they are also complementary (Dixon, Ritchie, & Siwale, 2006; Vu & Deffains, 2013). Information about an NGO's activities and initiatives, that is communicated through formal documents, may not reach all stakeholders as not all stakeholders are interested in receiving such documents. By complementing the formal accountability practices with informal ones, a larger group of stakeholders and potential donors can be reached. Additionally, the information in formal documents can be explained in more depth to stakeholders in an informal setting. Face-to-face communication with stakeholders allows an NGO to give additional explanation about its choices and to take away confusion about what is communicated in formal documents. Informal accountability practices such as web pages or social networks are also effective in reaching individual and anonymous donors (Masdar, 2015).

Table 1: Accountability practices

Dimension	Practice	Description
Direction	External	Directed towards the outside world, e.g. stakeholders such as donors, governments and beneficiaries
	Internal	Directed towards the internal organization, e.g. the employees.
Targeted stakeholders	Upward	Account is given *upwards* towards stakeholders such as donors and governments.
	Downward	Account is given *downwards* towards beneficiaries.
NGO's impact	Functional	Account is given regarding an NGO's resource allocation and immediate impact.
	Strategic	Account is given regarding the long-term impact on the broader environment of an NGO's activities.
Interaction form	Formal	Refers to communicating with stakeholders through the creation of formal reports and documents.
	Informal	Refers to interacting and communicating with stakeholders in an informal setting.

3.1.4 Reasons for Accountability & Transparency

Like all organizations, NGOs rely on funds in order to operate. In the case of NGOs, one of the main sources of income are donations from donors. Figure 2 shows the income distribution of two large NGOs, the World Wildlife Fund and Oxfam Novib. Both distributions show that donors make up a large part of the income, though this varies between NGOs. Donors can be a variety of entities, e.g. government institutions, large corporations and individual people. Because donations are so important to NGOs, donors are crucial to the existence of NGOs. Having a stable funding is also crucial

to the performance of organisations (Ngoiya, 2004). NGOs need to make sure that they attract donors, and that those donors continue donating. To understand why donors make donations to NGOs, one must look at the relationship between the two.

The relationship between NGOs and its donors, is fundamentally based on trust (Jepson, 2005). Public perception is a crucial aspect for NGOs to build a trustful relationship with its donors. When donors lose trust in the capability of an NGO to act in accordance with its own norms and values, the NGO is no longer perceived as legitimate and the relationship is damaged (Edwards & Hulme, 1995). Since donors typically only donate to NGOs which they trust to be legitimate, once that trust is damaged, donors will cease donating.

In addition to the trustful relationships that NGOs need to maintain with donors, they need to do the same with respect to beneficiaries. Beneficiaries need to trust NGOs in order for them to be able to receive the required aid. Additionally, according to Katharina Wickrama, an expert in the field of humanitarian accountability, it is important to be accountable towards beneficiaries as it allows to gather feedback from them about how to improve aid (Wickrama, 2012). This can save funds as unnecessary aid can be prevented and it improves the satisfaction of beneficiaries because they get the aid that they desire. When delivering aid, NGOs should not assume they have superior expertise to determine what the needs of the beneficiaries are. Beneficiaries should be involved in the decision making and they should have the opportunity to provide feedback and report cost saving opportunities, fraud, corruption and the misalignment between the aid that is given and the aid that they require.

In order to create a trustful relationship with donors, an NGO needs to show the donors that they are in fact legitimate and that they adhere to the norms and values they proclaim. This can be achieved mainly by being accountable towards donors for the donations that they have received. Creating trust through accountability is not only true for NGOs, but for all organisations (Duffy, 2019). Showing donors that their donations are used in a way that is in accordance with the motivation of donors to donate, will increase trust. Additionally, being transparent about the way the NGO operates, will help gain trust as anyone can see whether the NGO operates legitimately. Also, being transparent is a way for NGOs to manage the expectations of donors. Since donors can see how an NGO operates before they make the decision to donate, they will not have expectations that cannot be met by the NGO.

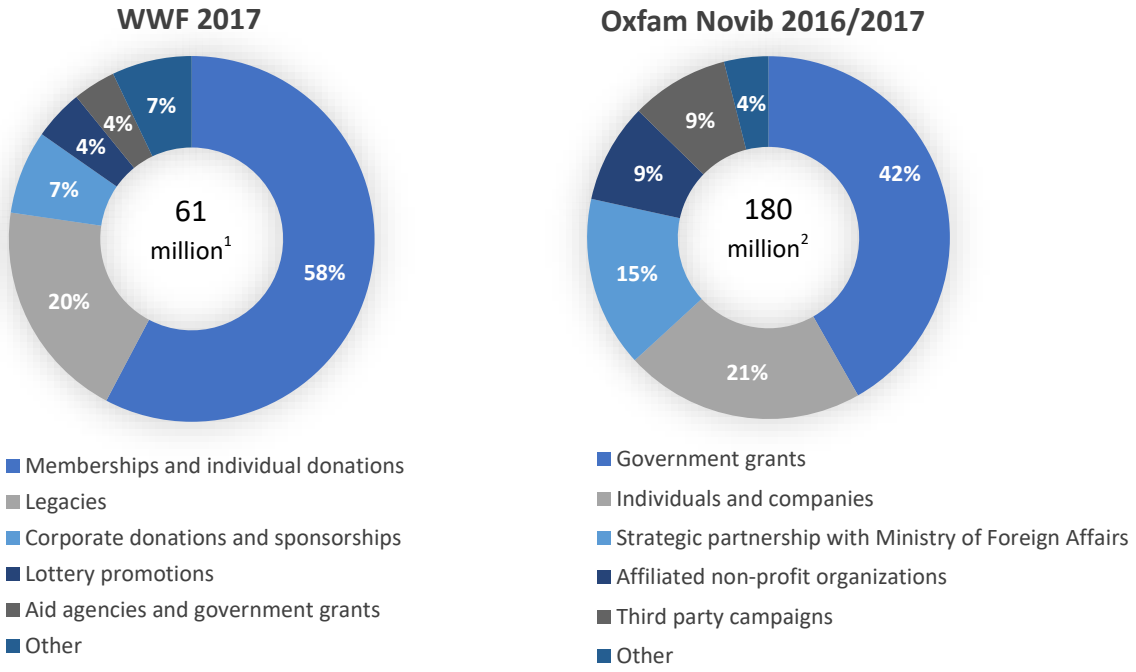


Figure 2: Income distribution of World Wildlife Fund[1] and Oxfam Novib[2]

3.1.5 Limiting Factors

When applying accountability and transparency practices, there are factors that NGOs need to take into account. These factors can limit the degree to which an NGO is able and willing to be accountable and transparent. Firstly, security and privacy of donors, as well as beneficiaries, is an issue that needs to be taken into consideration when implementing transparency (Vaccaro & Madsen, 2009a). Simply releasing all information of stakeholders for the sake of transparency will violate their privacy and in some cases can compromise their security (Vaccaro & Madsen, 2006). Information about financial transactions should be kept confidential to avoid theft and releasing personal information about stakeholders can lead to identity theft. Stakeholders have concerns about whether organizations can keep their personal information confidential (Vaccaro, 2006). Additionally, privacy and security not only apply to external stakeholders such as donors and beneficiaries, but also to employees of the NGO itself (Vaccaro & Madsen, 2006). Releasing details about employees working in hazardous conflict areas can endanger them.

In regard to privacy one must also take into account the new General Data Protection Regulation (GDPR), which is in effect since 25 May 2018 in the European Union. The GDPR is meant to protect the data privacy of EU citizens. The most important aspect of the GDPR with respect to blockchain is the 'Right to be forgotten'. It states that citizens have the right to "*have the data controller erase his/her personal data, cease further dissemination of the data, and potentially have third parties halt processing of the data.*" ("GDPR Key Changes," 2018). This right conflicts with the fact that blockchains are immutable; once information is stored in the blockchain, it cannot be removed or updated (Puthal, Malik, Mohanty, Kougianos, & Yang, 2018). A solution to this problem is not yet available. The issue of integrating GDPR with blockchain is further explored in IQ-17 of the interview, which can be found in appendix A and appendix B.

[1] In euros, source: https://www.wwf.org.uk/sites/default/files/2018-04/WWF-UK%20Annual%20Report%20Summary%202016-17.pdf
[2] In pounds, source: https://www.oxfamnovib.nl/dit-doen-wij/zo-besteden-we-ons-geld

Another factor that should be considered is that donors may not agree with how funds are used (Vaccaro & Madsen, 2009a). If the application of funds is not in line with the expectations of donors, they may put pressure on the NGO to change this, or they could stop donating as they lose trust in the NGO. To prevent this from happening, an NGO could carefully consider what information is distributed to donors. However, donors already actively seek and require information from NGOs about how donations are used, so holding back information is not an optimal solution. Furthermore, donors already pressure NGOs to be more transparent (Vaccaro & Madsen, 2009b). A better solution would be to manage the expectations of donors so that they are in line with how an NGO actually operates. This will allow to increase transparency without disappointing donors.

The last factor concerns the way NGOs need to deal with competitors. When gathering funds from donors, NGOs typically need to compete with other NGOs. This can be a motivator to be less transparent as information about an NGO that is public, can be exploited by competitors to improve their market position (Vaccaro & Madsen, 2009b). This factor becomes increasingly important as competition increases due to the rising number of NGOs.

3.2 Blockchain Technology in NGOs

3.2.1 What is Blockchain Technology

Blockchain technology emerged in 2008 when an author using the pseudonym Satoshi Nakamoto, released a paper called "Bitcoin: A Peer-to-Peer Electronic Cash System" (Nakamoto, 2008). This paper proposed a decentralized system for an electronic currency, called Bitcoin, which made use of existing peer-to-peer technology. The main benefit of such a system over traditional electronic cash systems, is that trusted third parties such as financial institutions, are no longer required to prevent the double spending of currency. Participants in the peer-to-peer network are able make transactions directly to one another without the need of a trusted third party to verify the transactions.

A currency such as bitcoin makes use of cryptographic techniques and is therefore referred to as a cryptocurrency. The reasons why such a cryptocurrency does not need a trusted third party, are its decentralized nature and the irreversibility of transactions. The network is completely open so that anyone can participate and become a node. The transactions that occur within the network are verified by the network itself, i.e., all transactions are verified by all nodes. The network uses a consensus algorithm to reach consensus about whether transactions are valid or not. In the case of bitcoin, a proof-of-work consensus algorithm is used. Proof-of-work currently is the most common consensus algorithm, but plenty of alternatives exist (Zheng et al., 2017). Once a transaction is verified to be correct, it is stored in the network and it becomes irreversible. In the end, nodes end up trusting the network itself instead of a trusted third party to verify transactions correctly (Ammous, 2016; Castor, 2017).

The underlying technology of bitcoin as proposed by Nakamoto in 2008, has now become known as blockchain technology. Due to the distributed way of storing transactions, it is sometimes also referred to as distributed ledger technology. The term *blockchain* originates from the technique that is used to store transactions. Transactions are grouped together into a 'block', where each block contains a hash of the preceding block, thereby creating a 'chain' of blocks, i.e., a blockchain. A copy of the resulting blockchain is then stored by all the nodes in the network.

The combination of openness, decentralization and a storage system where transactions are stored in blocks that are chained together, is crucial to the security of a blockchain. Transactions that have been verified and that are stored in the blockchain cannot be changed since that would require altering an

existing block (Nakamoto, 2008). However, once a block is stored in the blockchain, it becomes impossible to change the contents of the block as this would also require a change in the hash that is stored in the following block. This in turn would require changes in all of the following blocks until the end of the blockchain is reached. Therefore, if a node makes a change to an existing block, the blockchain it has saved would no longer be consistent with the blockchain of the other nodes in the network. The other nodes would then be able to detect the change and it will not be accepted into the blockchain. A blockchain is therefore tamper-proof and censorship resistant; once something is stored in the blockchain, it cannot be changed.

Over time, blockchain technology has evolved and different types of blockchains have emerged, each with varying implementations. Besides the original proof-of-work consensus algorithm, other algorithms such as proof-of-stake, multiple Byzantine Fault Tolerance (BFT) variations and proof-of-elapsed time have been created (Baliga, 2017). Furthermore, a distinction can be made between public and private blockchains. In a public blockchain there are no restrictions as to who can participate in the network; anyone has access to the blockchain. Additionally, all nodes participate in the process of verifying transactions (Buterin, 2015). In a private blockchain on the other hand, accessibility is limited. Write permissions are restricted and are often centralized at a single participant. Read permissions are restricted, but can be open if this is desired (Buterin, 2015). Hybrid solutions also exist, which are partially decentralized blockchains with a selection of nodes who have write permissions.

Decentralized public blockchains such as Bitcoin and Ethereum rely on nodes to join the network in order to operate. Therefore, there needs to be an incentive for nodes to participate in the network. Typically, this incentive takes the form of a coin (cryptocurrency). Coins represent value and can be used to conduct transactions or can be exchanged for fiat currency on cryptocurrency exchanges. Nodes receive coins for participating in the verification process of transactions, this is also known as *mining*.

3.2.2 Main Blockchain Opportunities

Blockchain technology comes with multiple opportunities to change the way sectors and organisations operate. Characteristics such as decentralisation of data storage and transaction verification, immutability of data and the use of consensus algorithms give blockchain technology the potential to introduce radical changes to how technology is used (Ammous, 2016; Baliga, 2017; Bashir, 2017).

Table 2 gives an overview of the five main opportunities that blockchain technology has to offer, namely availability, accessibility, trust, cost saving/efficiency and transparency. These opportunities are explored further in the context of the NGO sector in section 6.3.3.

Table 2: Blockchain opportunities

Blockchain Opportunity	Description
Availability	Blockchain networks generally consist of multiple nodes that each have a complete copy of the blockchain. This increases its availability compared to traditional database technologies that are stored on a single location, or multiple locations in distributed databases. It is highly unlikely that all nodes of a blockchain will be unavailable, therefore making the blockchain highly available (Pilkington, 2015).
Accessibility	Blockchain in general has the potential to be fully accessible by anyone (Bashir, 2017). However, the degree of accessibility differs between public and private blockchains. Public blockchains are fully accessible as their network can be joined by anyone. The accessibility of private blockchains depends on the willingness of the blockchain owners to make the blockchain accessible.
Trust	Given the decentralised verification of transactions and immutability of a blockchains' data, stakeholders are sure that the data that is stored in a blockchain is correct. Stakeholders trust the blockchain network and therefore indirectly also end up trusting each other, whereas without a blockchain, this trust may not have existed (Bashir, 2017; Pilkington, 2015).
Cost saving / efficiency	Verification of transactions is typically done by a trusted third party such as a bank. The decentralized verification of transactions that occurs in a blockchain renders these trusted third parties superfluous. This form of disintermediation offers cost saving opportunities as there no longer is a trusted third party that can charge transaction fees. Additionally, transactions can be verified quicker by the blockchain network, thereby improving efficiency (Bashir, 2017). Blockchain technology is already recognised as offering significant cost savings in the financial sector (Cocco, Pinna, & Marchesi, 2017).
Transparency	When a blockchain is public and therefore accessible to all, its data can also be accessed by anyone. This means that everything that is stored in the blockchain is completely transparent (Jeppsson & Olsson, 2017; Kruijff & Weigand, 2017; Pilkington, 2015). Any organisation storing data about all its activities and transactions in a public blockchain will become fully transparent. Lower levels of transparency can also be achieved by using a private blockchain or by hiding/anonymising data from a public blockchain (Buterin, 2015; Kruijff & Weigand, 2017).

3.2.3 Smart Contracts

The concept *smart contract* was first proposed by Nick Szabo in 1996 as a way to characterize digital contracts, which arose as a result of the increased use of computers. Szabo described a smart contract as *"a set of promises, specified in digital form, including protocols within which the parties perform on these promises"* (Szabo, 1996). The protocols in these digital contracts can be enforced automatically, rendering the contracts 'smart'. Blockchains make use of smart contracts, Ethereum being a prime example of a blockchain with comprehensive smart contract support t (Luu et al., 2016).

Smart contracts enable the creation of extensive applications on blockchains. Ethereum supports stateful smart contracts and is in fact a smart contract platform with its own Turing-complete programming language (Buterin, 2014). Applications that are built on Ethereum are also called *decentralized applications*, referring to the decentralized nature of the blockchain (Baliga, 2016).

Applications range from the automatic execution of contracts without the need of a notary, to far more complex applications such a distributed cloud storage solution called Storj. Storj is a decentralized application running on Ethereum where users offer storage of their personal computers to other users. Smart contracts are used to facilitate the automatic distribution of storage and render a third party storage provider unnecessary (Wilkinson et al., 2014).

3.2.4 Potential of Blockchain Technology in NGOs

The following section mentions some of the hypothetical features and benefits of a blockchain system for NGOs. This shows the potential of blockchain technology to improve transparency and accountability in NGOs. Feasibility of the features was explored in the interviews with NGOs and donors, of which the interview protocols can be found in Appendix A and Appendix B, respectively.

Storing transaction and activity data. Blockchain technology brings opportunities to NGOs to become more accountable, and to increase their level of transparency. As explained in section 3.1.4, improving accountability and transparency will enforce trust stakeholders place in NGOs, which will ultimately lead to an improved relationship between NGOs and their stakeholders.

Accountability and transparency in NGOs can be improved using blockchain technology by storing all information about an NGO's activities in a blockchain. When a donation is made, information about the donation is stored in the blockchain. The donation can then be traced all the way from donation to when it is used in a project. In aggregate, this allows to trace all incoming funds of an NGO and to see how they are spent. The NGO will become fully transparent as all information about its activities and fund allocation will be disclosed in the blockchain. Donors will be able to see in detail how their donations are used in a dashboard, e.g. a donor sees that their donation of 100 euros was used to serve meals to 30 refugees in Uganda. The disclosure of this information will also force NGOs to become more accountable as they will need to justify their decisions. This feature was explored in IQ-11 of the interviews.

Term-based funding. Similar to how decentralized applications are built on Ethereum, smart contracts can be used to create applications that run on the NGO's blockchain. Features can be created that give donors more say in how their donations are used. A smart contract can be created which releases a donor's funds only when those funds will be used according to the donor's terms. Additionally, smart contracts can be used to set certain criteria which should be met by the NGO before additional funds are released, thereby allowing for term-based funding. For instance, a donor could make a donation of 1000 euros and set performance criteria which state what the NGO should do with this donation. In case the performance criteria are met, an additional donation of 2000 euros is released to the NGO. However, this may present a problem with donors setting unreachable performance criteria however. A possible solution to this problem is to allow NGOs to determine what kind of performance criteria donors can set. Such as system could also be used by donors to make donations that are only released to NGOs in case for instance a natural disaster happens somewhere in the world where emergency aid is needed. This feature will be explored in IQ-15 of the interviews.

NGO benchmarking and improved fund dispersion. Having a blockchain which stores all information about the activities of NGOs, makes it easier to assess their performance. The impact and relative effectiveness of NGOs can be determined based on the data that is stored in the blockchain. This will make it easier for donors to determine to which NGO they want to donate, and it will motivate NGOs to be more effective as that will lead to more donations. Additionally, the data could be used to determine which NGO is in most need of funding at any given time. Imagine a donor that has the intention to donate 50 euros to a particular NGO. However, the blockchain data shows that NGO already has more than sufficient funding. It is also shown that a different NGO is unable to reach their

goals because of a lack of resources. The donor can then decide to donate to the second NGO as that will be much more effective. This will improve the dispersion of funds among NGOs. This feature will be explored in IQ-13 of the interviews.

Improved and standardized reporting. Currently, reporting by NGOs is not detailed and only provides information about the general expenditure of the organization. When all the data about an NGO's transactions and activities are stored in a blockchain, reporting can be improved since all the necessary data is already centralized in one location. Instead of having to gather reporting data from across the organization, all the necessary information is already in the blockchain. Additionally, if sufficient NGOs use such a blockchain, the reporting can be standardized across NGOs and thereby making it easier to compare them. This feature will be explored in IQ-14 of the interviews.

Donor expectation management. A blockchain that makes NGOs fully transparent, which in turn motivates them to be more accountable by releasing more information about their conduct, will provide donors with sufficient information to set realistic expectations. Donors know beforehand how their donations will be used and know what to expect from an NGO. This will prevent disappointment among donors and they will be less likely to lose trust in an NGO. Moreover, being able to see in detail how donations are used will reinforce trust among donors.

3.2.5 Challenges of Blockchain Technology in NGOs

Besides the general challenges of blockchain, such as privacy (Jordi-Herrera-Joancomartí & Pérez-Solà, 2016) and scalability (Zheng et al., 2017), there are also challenges that are specific to implementing blockchain technology in an NGO context. This section will elaborate on these challenges, which will also be discussed in the interviews with NGOs.

Less control over released information. Since all the data about an NGO's transactions and activities are stored in the blockchain, which is public, the NGO has less control over what information is released. Most likely the NGOs will want to have some level of control over what information is stored in the blockchain in order to make sure no sensitive information is released. This challenge will be explored in IQ-18 of the interviews.

Accountability in case of misconduct. Storing all this information in the blockchain could potentially reveal any misconduct to the public that otherwise would have remained inside the organization. Since the blockchain is also immutable, this information cannot be removed from the blockchain afterwards. NGOs will need to be aware of this and think about how they will react and who is accountable in case this happens.

Giving the right incentive. A blockchain system that makes NGOs completely transparent and that allows to compare NGOs, could potentially give them the incentive to perform well according to the blockchain criteria instead of giving the best aid that they can. NGOs could start to provide aid that is not actually needed as it will improve their reputation on the blockchain which in turn will generate more donations. Therefore, the blockchain should be designed in a way that motivates NGOs to give the highest quality aid possible where it is actually needed. A possible solution could be to create a feedback system where beneficiaries can give feedback on the aid that is provided by NGOs. This challenge will be explored in IQ-19 of the interviews.

3.3 Blockchain For Transparency and Accountability Assessment Model

The literature review has resulted in an overview on how transparency and accountability work, and also what the main opportunities of blockchain technology are. These aspects can be combined in order to structurally determine what the added value is of blockchain technology in improving

transparency and accuracy in a certain context. Figure 2 shows an assessment model that incorporates the discussed transparency, accountability and blockchain aspects.

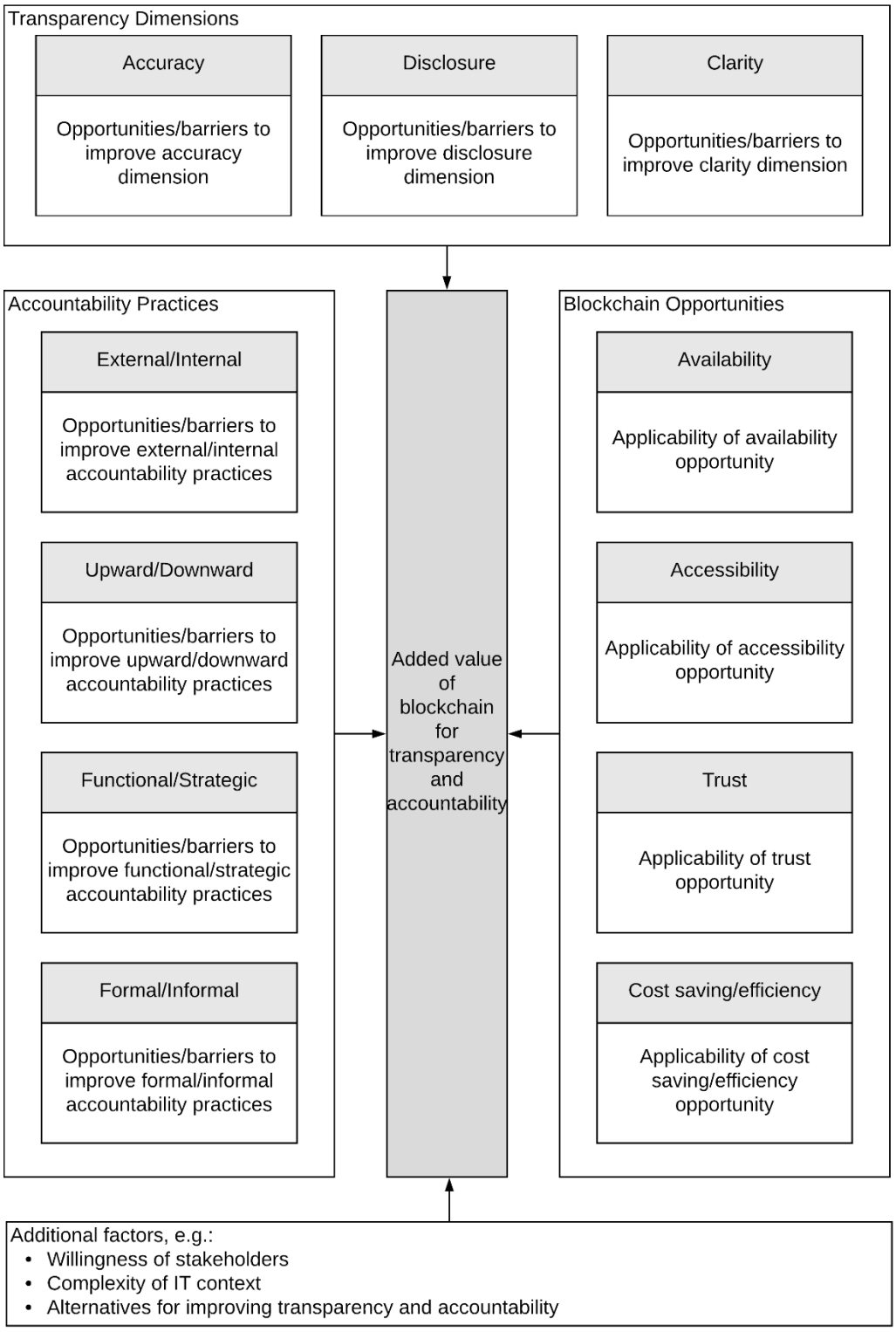


Figure 2: Blockchain for transparency and accountability assessment model

The assessment model uses the dimensions of transparency, the accountability practices and the main blockchain opportunities to structurally determine what the contribution of blockchain technology is to the improvement of transparency and accountability. The model can be applied in any context. When applying the model, an analysis must be made for each of the transparency dimensions,

accountability practices and blockchain opportunities. This will give an overview of the benefits and disadvantages blockchain technology will give, as well as the consequences and adoption barriers that potentially exist. Additionally, the model gives room to determine additional factors that need to be taken into account, such as the willingness of stakeholders and the complexity of the current IT landscape.

After conducting the analysis for each of the model's aspects, an overview is constructed regarding the feasibility and value of implementing a blockchain system in a certain context. A decision can then be made whether blockchain should be implemented or not. The model does not provide a structured way to make this decision as this process depends on the needs of stakeholders. The model only provides a tool to structurally determine the added value and adoption barriers of implementing a blockchain for transparency and accountability.

4 INTERNATIONAL AID TRANSPARENCY INITIATIVE

4.1 GOAL

In an attempt to improve the transparency within the international aid sector, the International Aid Transparency Initiative (IATI) was launched in 2008. The main goal of IATI is to offer organisations tools to create standardised records of how they spent their funds. IATI has created the IATI standard, which consists of rules and guidelines for how organisations should publish data about financial transactions. Organisations using IATI not only include NGOs, but also governments institutions and private sector organisations.

Besides attempting to improve the transparency of NGOs and the aid sector as a whole, IATI uses their standardised reporting guidelines to improve the coordination and effectiveness within the aid sector (Linders, 2013). By having a standardised reporting mechanism that is used by a significant amount of aid organisations, data is gathered throughout the sector as a whole (Mcgee, 2013). These data can potentially yield insight into how the sector is performing and how performance can be optimised. Ultimately, this contributes to the main goal of IATI which is to "*maximise impact on the world's poorest and most vulnerable people*" ("About the IATI Standard | International Aid Transparency Initiative - iatistandard.org," n.d.).

Since its inception in 2008, IATI has become a crucial part in the reporting of organisations throughout the international aid sector. As of the beginning of 2019, 915 organisations are publishing using the IATI standard. Combined, these organisations have reported approximately 1.1 million humanitarian and developmental aid activities and projects ("Home - iatistandard.org," n.d.).

4.2 HUMANITARIAN SUPPLY CHAIN

Considering IATI aims to improve the performance of the international aid sector as a whole, the more widespread its use is, the better this goal can be reached. Organisations throughout the aid giving chain are participating in the initiative. This includes government institutions who act as the sectors' largest donors and NGOs, as well as local organisations who act as implementing partners of organisations (Awasthy et al., 2019). In essence, this means IATI is trying to capture all financial transactions of the chain of international aid giving. Figure 3 gives a representation of what this chain looks like as defined by Oloruntoba and Gray (2006). Their research shows that this chain can be characterized as humanitarian supply chain, which has similarities with business supply chains but also that there are significant differences between these types of supply chains. The main difference is that humanitarian supply chains have a short existence and are typically unstable. Emergency aid chains in particular are of short existence when compared to more long-term aid chains. Another difference between humanitarian and business supply chains is that the destination of goods is mostly determined by the supply chain source in the case of a humanitarian supply chain, whereas business supply chains are more consumer focused. This is in congruence with the fact that the marketing attempts of NGOs are typically largely focused on donors as opposed to beneficiaries, whereas businesses are focused on consumers.

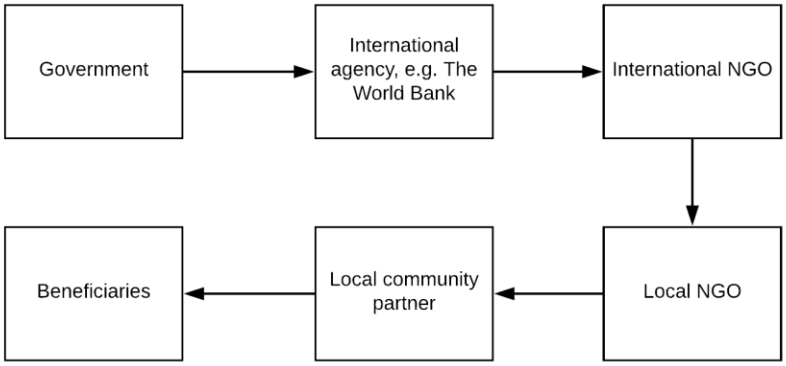


Figure 3: Typical humanitarian supply chain (Oloruntoba & Gray, 2006)

The supply chain shown in Figure 3 shows how a typical humanitarian supply chain is structured. However, supply chains differ in many areas. The chain defined by Oloruntoba and Gray shows funds being transferred through multiple NGOs. This is not always the case however, a lot of funds are also transferred directly from one government to another. Additionally, the interviews with NGOs, which are elaborated on in section 5.1, show that funding is often received directly from government organisations such as the ministry of foreign affairs. Figure 4 shows an alternative supply chain which was most common in the interviewed organisations.

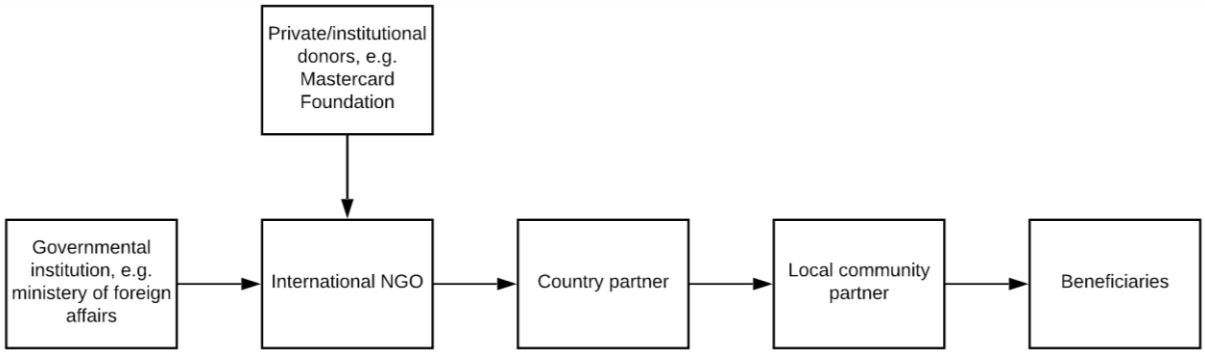


Figure 4: Alternative humanitarian supply chain

It can be concluded that the humanitarian supply chain is quite complex, with various actors acting in an unstable and volatile manner. Transparency initiatives such as IATI have to be able to cope with these kinds of volatile supply chains. The standard needs to be able to handle rapidly changing relationships between actors and roles of actors. For instance, an NGO can be a donor to a country partner, but also a receiver of funds from institutional donors. Furthermore, an NGO that does not implement projects itself, could become an implementing organisation when a natural disaster occurs that requires rapid response.

4.3 THE IATI STANDARD

The set of rules and guidelines that is provided by IATI to organisations is referred to as the IATI standard. These rules and guidelines state exactly how organisations should publish data to IATI so

that the published data is standardised across organisations. It also guarantees that the data meets certain quality requirements.

Considering the volatile nature of relationships between organisations in the international aid sector, the IATI standard has to be able to cope with loosely coupled organisations so that relationships between organisations are easily detectable, but at the same time flexible. Gathering data about financial transactions between organisations is the core goal of the IATI standard. In short, IATI achieve this through giving every organisation that publishes to IATI its own unique identifier. Organisations publish information about transactions using their own unique identifier, as well as that of the receiving organisation. Data about the transaction includes the amount, the currency and information about activities where the funds are used.

Currently, reporting is done through two separate files, namely the organisation and the activity files. The organisation file contains the information about the organisation, while activity files contain information about individual activities and its corresponding partners and funding. Every organisation will have its own organisations file, as well an activity file for each of its reported activities.

Having a reporting structure where organisations report transactions between each other allows to trace funds as they travel through the humanitarian supply chain. When a sufficiently large part of the sector participates in this system of reporting, a complete picture can be gathered of how funds are distributed throughout the sector. This ultimately improves the transparency of the sector as a whole, especially since the reporting is done to a centralised location, enabling the information to be accessed with less effort.

5 FINDINGS

5.1 NGO INTERVIEWS

In total, seven interviews were conducted with people who worked at NGOs. The NGOs that were used for the interviews were selected using the selection criteria mentioned in section 2.6. Table 3 gives an overview of all the organisations and their corresponding interviewees. All interviewees were asked to review and sign the consent form found in Appendix C, which gave the option to remain anonymous. Therefore, some organisations and/or interviewee names remain anonymous. In total, five out of seven NGOs were humanitarian aid organisations. The remaining two NGOs were focussed on health and service. This type of NGOs is focussed on financing medical research and creating awareness about deceases.

Table 3: NGO interviewees

ID	Interviewee name	Organisation name	Type	Role of interviewee
A	David Betge	Anonymous	Humanitarian	Sector specialist land rights
B	Anonymous	Anonymous	Humanitarian	Senior advisor monitoring and evaluation
C	Anonymous	Anonymous	Humanitarian	Planning, monitoring and evaluation advisor
D	Ronnie Dankelman	Liliane fonds	Humanitarian	ICT Specialist and database marketing
E	Wim Blok	Woord en Daad	Humanitarian	Knowledge strategist and planning, monitoring, evaluation and learning advisor
F	Karin Klaassen	Longfonds	Health and service	Manager
G	Anonymous	Anonymous	Health and service	Program manager innovation

5.1.1 Current Transparency and Accountability practices

The most widely known method for NGOs to be accountable and transparent is through publishing an annual report. All interviewees corroborated this as each of them mentioned the annual report immediately when asked about what the current transparency and accountability practices are of their respective organisations. Annual reports typically contain information about the goals of the organisation, and the activities and projects they undertake to reach these goals. Information is provided about where activities and projects are located and what they aim to achieve. Most organisations provide quantitative measures, such as *farmers trained* or *houses built.* Additionally, the reports contain financial information about income and expenses. Financial information also includes budgets for the following year. The organisation of interviewee E was even able to provide budgets for the following five years. Some organisations also provide detailed information about the budgets per project or activity.

Four of the interviewees indicated that storytelling is becoming more and more prominent in the transparency practices of their organisations. The main reason for this is that the work of NGOs

typically is very nuanced, making it difficult to be measured quantitatively. Telling stories about the activities is therefore an easier method to communicate with stakeholders. This method of communication also allows organisation to connect emotionally with donors. Interviewee D indicated they also publish a report in addition to the annual report. This additional report is a down-sized version of the annual report, which consists of stories about the activities of the organisation. This report is specifically aimed at donors to show them what the organisations is achieving in the countries where they work. Stories about individual beneficiaries, combined with pictures are used to show donors what they have achieved through their donation.

The interviewees also indicated that large institutional donors, such as the Dutch ministry of foreign affairs, have their own tools and methods to hold the organisations accountable. Interviewee A mentioned that some large donors occasionally also visit the work NGOs do in the field to see for themselves whether their donations are used properly. During these visits they also use peer reviewing where other NGOs that also receive funding ask questions. *"They do peer reviewing. Suppose they give funding to five organisations, then they visit the field with those five organisations who then ask questions about your work and you provide explanation on the spot."* (personal communication, 2018).

Organisations A, B, C, D and E all also report using the IATI standard. These organisations are mainly focused on humanitarian aid, for which they receive funding from the Dutch ministry of foreign affairs. The ministry has made reporting through IATI mandatory for all organisations receiving funding since 2016.

Another way of being transparent and accountable is through certification. The Central Bureau of Fundraising (CBF) is a Dutch independent organisation that monitors fundraising organisations such as NGOs. They review the fundraising and expenditure of participating organisations and give certifications to those who meet the requirements. As of January 2019, over 680 organisations have received that CBF certification, including those of all of the interviewees.

An important aspect of the transparency of NGOs is for them to gather data from partner organisations. Most of the interviewed organisations do not implement activities themselves but rather partner up with local organisations in other countries. These partners need to report to the systems of the NGOs. Additionally, NGOs conduct audits at their partner organisations. Sometimes, partners themselves collaborate with other organisations to do part of the implementation. These in turn need to report to the partner organisations, thereby creating a chain of reporting.

The subjects on which NGOs are transparent differ depending on the type of organisation. The interviewed humanitarian organisations are mostly focused on being transparent about the activities and projects they conduct. This involves spreading information about where these activities take place and what they are achieving. Interviewee G however, indicated that their organisation, which is mostly focused on funding medical research, also has significant focus on being transparent about how research proposals are reviewed and approved. This of high importance to the organisation. *"We are very good at reporting about the nature of the research that we fund and who is involved. We can be transparent about how we approve research and we do so with the highest quality"* (personal communication, 2018).

5.1.2 Importance of Transparency and Accountability

The degree to which being transparent and accountable is considered important differs between the organisations of the interviewees. They all agree that being transparent is paramount as a lot of their funds are received from taxpayers and donors who put their trust in the NGO to use the money

properly. The interviewees indicated they find it crucial to show donors they are to be trusted. Being accountable and transparent plays a significant role to achieve this.

Not all of the interviewees were positive about the prospect of increasing the transparency of their organisation. Interviewees B, D, E, F and G believed improving transparency would yield benefits to their organisations. Realising impact and communicating about it is critical to these organisations. According to those interviewees, donors are also increasingly seeking transparency from NGOs. Especially the attitude of individual donors is changing as new generations are a lot less likely to engage in a lifelong commitment to an organisation where they automatically deposit a monthly donation. Younger generations are looking to make an impact and require more feedback from NGOs. Interviewee B stated relationships with individual donors are becoming increasingly volatile.

Interviewees from organisations A and C were sceptical about improving transparency and accountability in their organisations. Interviewee A agreed that having trust of donors is indeed paramount to the existence of NGOs but stated that the level of trust donors currently have is already sufficient. The interviewee also indicated that transparency and accountability is often seen as something extra where you do what is strictly necessary to meet requirements but not more. *"Sometimes accountability measures are seen as something extra, or a bonus."* (personal communication, 2018). Interviewee C used to be a proponent of transparency in the past, but recently has become more sceptical. The main reason for this is that transparency comes with risks to those who are working in dangerous countries. Sharing information about activities and projects that are conducted in for example conflict areas or countries with repressive regimes, could pose serious dangers to staff of the NGO, but perhaps more importantly, to staff of partner organisations who reside in those countries. Additionally, interviewee C stated that it is impossible to foresee the consequences of sharing data about activities. The fact that there currently are no conflicts in the areas where the activities take place, does not mean that that will always be the case. Future conflicts could still pose dangers to partner organisations when data about their involvement in the NGO's activities was published in the past.

5.1.3 Transparency and Accountability Challenges

The main challenge according to all of the interviewees of humanitarian organisations is to gather data from partner organisations. This process is difficult due to multiple reasons. Most importantly, this type of organisations operate in fragile working environments where there is limited to no access to an internet connection. According to interviewee B, this makes the data that is gathered is *"slow, incomplete and sometimes unreliable"* (personal communication, 2018). Additionally, these organisations often are not actually implementing the activities as this is done by partner organisations. Therefore, they are not directly in contact with their beneficiaries. These NGOs therefore depend on their partner organisations to gather transparency and accountability data.

Interviewees C, D and E indicated that the dependence on partner organisations for gathering data poses challenges to their organisations. It proves difficult to make partners aware of the importance of them gathering these data. In part this is due to the fact that partner organisations have to report using a multitude of different systems and methods of all of the organisations from whom they receive funds. These are not standardized, thereby creating a lot of extra work for these partner organisations. Additionally, partners are not fully aware of the importance of reporting data. Interviewee D stated that significant improvements can be made by giving partner organisations more incentive to report data timely and completely. One way of doing this is by providing partners with better feedback of the consequences of their reported data.

According to interviewee C, besides the lack of awareness in partner organisations of the importance of reporting, there is also insufficient awareness within NGOs themselves regarding the importance of transparency and accountability. Interviewee A made a similar comment saying that staff often sees transparency and accountability tasks as a burden. Especially staff of humanitarian organisations working in difficult environments are not keen on taking on more tasks and responsibilities with regards to gathering data for transparency.

Interviewee C also emphasized again the importance of the risk transparency poses to staff and partners of NGOs working in dangerous areas. It is challenging to weigh this risk against the importance of transparency and interests of stakeholders such as donors. According to interviewee C, donors lack an understanding for the fact that not all data can be published due to these risks. The interviewee remarked that *"The ministry of foreign affairs should have an answer for this, they should put more thought into this issue. Mainly in the context of IATI, I think that happens too little."* (personal communication, 2018).

Concerning the health and service organisations, the organisation of interviewee G mainly has difficulty with determining the impact of the research they fund. The results of medical research often are not directly apparent. It may take years for research findings to have a measurable effect on actual treatment of a disease.

5.1.4 IATI

Of all the interviewed NGOs, only the humanitarian organisations report using the IATI standard. The reason for this is that the Dutch ministry of foreign affairs has made it mandatory for all of the organisations receiving funds from them to report using IATI. The interviewees saw the potential of IATI but did indicate that considerable improvements must be made in order for IATI to be more useful.

One of the main benefits according to interviewee E is that all relevant actors participate by reporting to IATI. This makes it easier to see discrepancies in budgets and more difficult to report data that is inconsistent with the data that is already available to IATI. The more organisations report using the IATI standard, the larger the effect of this benefit becomes. Furthermore, interviewee A states that because so many organisations report to IATI, there is a lot of peer accountability between them as everyone can look at each other's data. Another benefit of the IATI standard is that it provides NGOs with guidelines and methods for how they should structure their data according to interviewee C. The interviewees also appreciated the possibility to exclude projects from their IATI data files that contained data that could potentially be a risk to staff of NGOs and their partner organisations.

The main problem the interviewees have with IATI is that it is difficult to retrieve useful information from IATI. Considering the number of organisations reporting to IATI, IATI has a large amount of data, which is freely available. However, there is a lack of tools to visualise and analyse this data according to the interviewees. There are a couple of online tools that use the data in IATI to show where projects of NGOs take place and how they are funded, but these are aggregated data. According to interviewees C, *"the dashboarding tools of IATI could be improved significantly"* (personal communication, 2018). Interviewee E added that the analysis tools around IATI are also lacking. Also, interviewee B commented that IATI is used minimally by NGOs themselves, that a lot of the language used by IATI is "*jargon and that there is little structure to the available datasets"* (personal communication, 2018).

5.1.5 Smart Contract Donations

When presented with the idea of using smart contracts to allow donors to have more influence in how their donations are used, all interviewees indicated that this is something that donors are increasingly interested in. Donors are becoming increasingly interested in creating impact with their donation. Using smart contracts could present opportunities for giving directly to a project, thereby giving donors a sense of importance that their donation is crucial to the execution of the project. Interviewee F sees opportunities to present donors with medical research proposals that are in need of funding. *"People really want to make research possible […] so you could put a lot of research on display using a blockchain and smart contracts"* (personal communication, 2018). Donors can then decide for themselves which research projects they would like to support. Additionally, smart contracts could be used to set certain milestones in a project. Once the milestones are reached, additional donor funds are released to support the rest of the project. If the milestones are not reached, the smart contracts transfer the donor funds back to the donors. Interviewee D saw a similar opportunity to have donors directly donate using smart contracts to a project where a school is built in for instance Cameroon. Funds are then transferred to the NGO only when they have acquired the right permits and sufficient funds. Otherwise, funds are transferred back to the donors.

This kind of result-based funding is similar to what some organisations are already implementing without a blockchain. The organisation of interviewee F is participating in so called social impact bonds. These are a form of result-based funding where private investors provide funds to projects that aim to solve societal problems. When the project is a success, the government reimburses the investors with interest. Interviewee E also indicated that they provide donors with the opportunity to support a specific child financially, for which they create a contract with the donor. Using smart contracts could automate this process and thereby make it easier for NGOs to implement result-based funding methods where donors donate directly to an activity or project. In turn this improves transparency and accountability as donors are more aware of how their donations are used.

Interviewee B did indicate that despite the opportunities smart contracts give to donors to have more influence on how their donations are used, only the NGOs themselves know how donations are actually used. Proving that a project is executed the way it was determined in the smart contract can be arbitrary and differs per project. Additionally, interviewee C stated that in the current situation, a lot of discourse is held with large donors when they donate directly to a project. This discourse is crucial as it is impossible to determine beforehand how a project is executed from start to finish. Being able to reason with donors and manage their expectations as the project progresses gives NGOs more freedom to change the course of a project. When the execution of projects is enforced by smart contracts, this flexibility is decreased. Interviewee C stated that this could give NGOs an incentive to report in a way that no longer reflects reality but rather satisfies the criteria of the smart contract. *"You will give an incentive to over-report, to present yourself better than you actually are."* (personal communication, 2018).

5.1.6 Measuring Performance

One of the potential functionalities of the blockchain is to use it for benchmarking NGOs and to standardize reporting. There was consensus among the interviewees that being able to compare their own organisations with others would be something valuable. This would allow the NGOs to learn from one another. Also, it would allow NGOs to see which NGO is most efficient at a certain type of activity and to assign certain tasks to this NGO.

Despite the possibilities of benchmarking and standardized reporting, all of the interviewees did indicate that it is incredibly challenging to measure performance of NGOs in a standardized manner

that allows for benchmarking. The work of NGOs is very context dependent and the way projects are executed is rarely the same between two projects, let alone between two NGOs. According to interviewee A, some organisations focus on projects that achieve slow but sustainable results. These projects are very different from projects that focus on achieving fast results, even though they may both be focused on the same general goal, e.g. food security, and conducted in the same area. *"One organisation immediately has a large amount of impact while the other has no impact for the first few years. But is it really better what the first organisation is doing?"* (personal communication, 2018). Additionally, projects that focus on the same goal but in different areas will also achieve differing results. For instance, interviewee C indicated that the cost per student is significantly higher in the Sahel than in the rural part of Kenia. Determining performance indicators that would capture these qualitative differences in quantitative measures that can be used for benchmarking is incredibly hard. This was also found in sector wide evaluation done by the Dutch Fundraising Regulator (CBF). Measuring impact accurately is something all NGOs struggle with. (CBF, PwC, & Impact Centre Erasmus, 2017).

Interviewee F did see opportunities to measure performance and use this for benchmarking when projects are conducted in cooperation with multiple organisations. The organisation of interviewee F is currently conducting a project with two other organisations. It would be useful to measure the performance of these organisations to create insight into who is most effective and how effectivity can be improved in the other organisations. *"Why is there more success with […] Is it because of the approach or because of […] So the learning effect is valuable."* (personal communication, 2018).

According to interviewee E, NGOs are becoming less focused on measuring performance quantitatively. In the past focus laid heavily on quantitative measurements, but in recent years focus has shifted to measuring performance qualitatively. This is mainly due to how difficult it is it capture the work of NGOs in quantitative measures. Interviewee E characterized this change as a shift in focus from outputs, e.g. number of students reached, to outcomes, e.g. what have students learned. The most prevalent method of communicating outcomes with stakeholders is through storytelling, which is used by all of the interviewee's organisations. This method allows to capture all the nuances in the work conducted by NGOs but does not allow for standardization and benchmarking.

5.1.7 Optimal Transparency

Using a blockchain to store all the transactions and data about projects and activities would allow an NGO to become fully transparent. The interviewees agreed that such maximal transparency is not desirable. Interviewee E indicated that there is a difference between maximal transparency and optimal transparency. NGOs should strive to an optimal level of transparency as donors are not seeking maximal transparency. Interviewees E and F both stated that being maximally transparent could have an adverse effect as donors are presented with an overload of information that could overwhelm them. Besides this information overload, Curtin and Meijer also show that spreading more information could have an adverse effect on the perceived legitimacy of organisations as the chance for negative stories in the press rises (Curtin & Meijer, 2018).

Maximal transparency is also not possible according to interviewees B and C due to the risks this would incur. NGOs that conduct projects that are in dangerous areas with repressive regimes can not be transparent about these projects as that could be dangerous to their staff and partners working in those areas. Interviewee B said *"We do human rights projects or work with local organisations who oppose governments, we will never make those activities 100 percent transparent."* (personal communication, 2018). Additionally, the interviewees agreed that it should remain possible to change

data that is stored in the blockchain. For instance, when new data is gathered that contradicts with previous data.

5.1.8 Tracing Donations

A blockchain that stores data about the transactions of NGOs could potentially give donors the ability to trace their funds to where they are spent in a project. Interviewees A, D, E, F and G saw potential in this functionality. They agreed that it would be valuable to be able to show donors how their donations are used. Interviewee A indicated that it would be most useful for individual donors as the NGO sector has trust issues among this group of donors. According to interviewee A, institutional donors already have the ability to ask NGOs for this information and have their own transparency methods, so for this group it would be less useful. Interviewees E and G on the other hand see more potential in the ability for institutional donors to be able to track their donations as they are the ones that already ask this from NGOs. Individual donors are typically not contacting NGOs to ask for information about how their donations are used.

Interviewee D sees the tracing of funds by donors as a way to improve the reputation of NGOs, and also to gather new donors among younger generations with whom NGOs have a more volatile relationship than older generations. *"It is much harder to build loyalty among younger people."* (personal communication, 2018). As mentioned earlier, donors nowadays want to make an impact. Allowing them to see how their donations are used could be a way to show them what impact they have realized.

Interviewee C made the remark that not all donors necessarily want their donations to be traceable. Donors should have the option to make anonymous donations or donations that are not publicly traceable. Additionally, tracing individual donations is challenging in itself according to interviewee A as the majority of donations end up on a large pool of general funds. *"You give 100 euros for a project in Syria, then that 100 euros goes to a large pool of funds […] How do you trace what actually happens with those 100 euros?"* (personal communication, 2018). Making it possible to trace these funds would require significant adaptations to the current IT landscape of NGOs.

5.1.9 Blockchain for Transparency and Accountability

Generally, the interviewees saw that blockchain potentially could contribute to the improvement of transparency and accountability of NGOs. However, this was mainly due to the popularity of blockchain. The interviewees did not have concrete ideas on how to implement such a blockchain, they mainly had doubts about whether a blockchain could actually improve transparency and accountability.

One of the main reasons for implementing a blockchain solution in NGOs is to prevent fraud. According to the interviewees however, a blockchain only has limited potential for preventing fraud. The blockchain could prevent new data that is stored in the blockchain to contradict the blockchain's existing data. This could counteract NGOs from double counting results, e.g. two NGOs working in the same area claiming to have reached the same group of beneficiaries while in reality, both NGOs only reached a portion of that group. The prevention this type of fraud through double counting could also be detected and prevented using a traditional reporting system that covers the incoming and outgoing transactions of actors in the NGO sector, such as IATI. This is not inherent to blockchain technology. Interviewees A and B also indicated that a blockchain will necessarily not make the data that is reported by NGOs reliable. Especially humanitarian NGOs work in areas without an internet connection so there will always be a delay between when a transaction occurs, and when it is recorded in the blockchain. According to interviewee A *"in a lot of countries is it very easy to get receipts for everything, you won't change that so that problem persists."* (personal communication, 2018).

This problem of blockchain data not being reliable is often referred to as “garbage in, garbage out”. Data that is stored in the blockchain cannot be tampered with, but that does not make the data itself reliable. Moreover, it is possible that the data in the blockchain could become less reliable according to interviewee A as the fact that data in the blockchain can not be tampered with could incentivize staff to over-report.

The main reason to improve transparency and accountability of NGOs is to improve trust of donors and thereby generating more donations. According to interviewee B, providing donors with data about all the transactions of an NGO will not necessarily improve trust on donors. When scandals at NGOs become public, this evokes emotions among donors. Providing them with a blockchain that stores data about the NGO’s transactions will not change these emotions. *“When sexuality or criminality is involved, people have an emotional reaction, facts no longer matter.”* (personal communication, 2018).

5.1.10 Other Blockchain Functionalities

The interviewees were asked about additional functionalities of a blockchain system that were not discussed in the interview. Interviewee A mentioned using blockchain as a shared ledger for project management. Each step of a project’s set up and execution requires the approval of certain actors. Each step and associated approval of certain actors could be recorded using a blockchain.

Additionally, interviewee A indicated that the blockchain could be used to allow beneficiaries to verify the benchmarks conducted by NGOs. When an NGO for example conducts a survey among beneficiaries, those beneficiaries can then verify that the survey was conducted and can also review whether the results provide an accurate picture. *“Self-organised feedback from your target group is much more difficult. Often you conduct a survey with a questionnaire, which does not have a lot of nuance, and you don’t ask everything, so you only get the answers that are in your questionnaire.”* (personal communication, 2018).

Allowing donors to track the progress of beneficiaries or projects through a blockchain would also be a valuable functionality according to interviewee D. For example, donors would be able to see how a school is doing that was built in a project a few years ago. The project itself is finished but information about how the school is doing is still stored in the blockchain. Allowing the associated beneficiaries to verify this information would make the information trustworthy for donors.

5.1.11 Ways to Improve Transparency and Accountability

There may be better and simpler ways to improve transparency and accountability then using blockchain technology. When asked the interviewees gave quite a few ways for how this can be done.

Interviewees A and B both stated that offering better transparency and accountability training to staff members could already yield benefits. Staff are mostly hired for their expertise and not for their focus on transparency and accountability. Beter training could make them more skilled and aware about these issues. Furthermore, according to interviewee B creating new software and tools that offer better transparency and accountability functionality could also provide benefits.

As mentioned earlier in section 5.1.4, improving the dashboarding and analysis tools of IATI would make the data that is available in IATI significantly more usable. Currently it is difficult to extract useful information from IATI. Many NGOs only publish to IATI but do not actually access the datasets themselves due to this reason. Interviewee C commented *“I consider myself to be within the 10 percent within the organisation that is best able to work with data […] and I don’t succeed in for instance comparing our dataset to that of another organisation.”* (personal communication, 2018).

Section 5.1.3 already discussed that NGOs have trouble with gathering sufficient and quality data from partner organisations. Partners are not aware of the importance of reporting to NGOs from whom they receive funding. Because NGOs heavily depend on partners to gather their data, this makes it difficult for NGOs to generate insight in what is actually happening at the end of the aid chain, where beneficiaries receive aid. Creating awareness among partners about the importance of reporting would allow NGOs to gather higher quality data timelier and reliably. One way of doing this according to interviewee D, is by giving partners more incentive, e.g. by giving them more in return or by providing them with feedback on what the data they report is used for and what it achieves. Furthermore, having a standardized reporting mechanism instead of proprietary systems for each NGO, would make reporting significantly more easy for partners. The IATI standard is an example of such a standardized method. However, according to interviewee E, most partner organisations are not yet reporting using IATI.

According to interviewee E, improvements can also be made in how effectivity and performance of NGOs is measured, as also discussed in section 5.1.6. The context in which NGOs operate, as well as their underlying goal, e.g. long-term sustainable results versus fast results, is crucial to the way they execute their activities and projects. Measuring effectivity in a standardized manner across NGOs, areas and types of activities has proven to be incredibly challenging.

Interviewee G indicated that a lot of improvements in transparency and accountability can also be made by implementing more and better storytelling practices. This method of communicating results with stakeholders is still relatively new to NGOs. Interviewee E agreed with this statement, saying *"With numbers you can never tell the whole story, we are searching more and more for ways to add qualitative information to the quantitative data."* (personal communication, 2018). According to interviewee G, presenting donors with for example an infographic or a video, provides them with significantly more information than a blockchain with a large amount of data. A regular donor prefers information to be presented in an understandable and attractive manner.

Another way of improving transparency is by providing donors with personalised reports. Based on the interests and characteristics of a donor, an NGO could generate a personalised report that contains information about activities and projects that the donor is interested in. This way, donors are more likely to read the report compared to presenting them with a generalised report. Though this method is not related to generating better insight in the execution of NGO activities, it can be used to improve how transparency and accountability information is communicated with donors.

5.2 Donor Interviews

In addition to the interviewed NGO staff members, interviews were also held among employees of institutional donors. These organisations have the most demand for transparency from NGOs. In total three interviews were held at organisations that were selected using the selection criteria found in section 2.6. Table 4 gives an overview of the interviewees and their corresponding organisations. All interviewees were asked to review and sign the consent form found in Appendix D, which gave the option to remain anonymous. Therefore, some organisations and/or interviewee names remain anonymous.

Table 4: Donor interviewees

ID	Interviewee name	Organisation name	Type	Role of interviewee
H	Anonymous	Anonymous	Foundation	Employee
I	Vincent van Thuijl	Dutch ministry of foreign affairs	Governmental	Advisor strategy and innovation
J	Anonymous	Anonymous	Governmental	Open data and business intelligence specialist

5.2.1 Current Transparency and Accountability Practices

The current transparency and accountability practices vary between the interviewees' organisations. While the organisations of interviewees I and J rely mainly on IATI for gathering transparency data, the organisation of interviewee H was not using IATI at all. Interviewee H indicated that its organisation is qualified as a Public Benefit Organisations (PBO) by the Dutch Tax and Customs Administration. Organisations with this qualification need to meet certain requirements, one of which is to publish information regarding its finances and activities. In return, these organisations receive certain tax benefits. However, the information about finances and activities that is published by organisation H is quite limited and does not contain detailed information about individual projects and donations. The interviewee of organisation H stated that the organisation was working on creating a new website that would include additional information about the projects they support. Transparency and accountability however are not a high priority for the organisation as the company that they are a part of intentionally does not want to use the foundation as a marketing tool. *"we don't see the foundation as a marketing tool. It is something we do as a supplement to our other activities concerning corporate responsibility."* (personal communication, 2019). The foundation is rather a tool to give back to the communities of countries in which they produce goods.

Interviewee H did indicate that they hold their partner organisations accountable and require them to report on how projects are progressing. The reporting frequency and methods are included in the contracts between the organisation and its partners. These contracts also include key performance indications on which should be reported. The organisation provides partners with a reporting format that contains all the required reporting information. However, partners are free to use other reporting formats provided that they contain the required reporting information. This also helps the organisation to gather additional data as partners often provide more data than is strictly required when they can use their own reporting formats.

Both interviewees I and J indicated that their organisations mainly rely on IATI as a tool for transparency and accountability. They use IATI to report data about their own organisation, as well as from the organisations that they make donations to. For the Dutch ministry of foreign affairs this is crucial as they support between 1.800 and 2.000 projects each year. Having a standardised reporting method such as IATI helps to maintain oversight on such a large number of projects. Therefore, they have made it mandatory for all organisations that receive more than 250.000 euros in donations from the ministry to report using the IATI standard. They also provide organisations with reporting guidelines, a helpdesk and applications that can be used to report to IATI.

5.2.2 Transparency and Accountability Challenges

Regarding the transparency and accountability challenges faced by the organisations, interviewee H indicated that organisation H mainly had difficulty gaining insight into the reliability of the reports of its partner organisations. It is often challenging to determine whether for example a financial report is legitimate and whether the accountant that audited the report really exists. This is mostly a problem

when dealing directly with local organisations that implement the projects as the organisation does not have the ability to properly monitor these partners due to the large distance. *"Sometimes when we work with a local partner, they send us a financial report that is audited by a local accountant, but we have no idea whether that accountant really exists."* (personal communication, 2019). This makes it difficult to detect and prevent fraud from partner organisations. When working with larger NGOs this proves to be less of a problem as these NGOs often have local country offices that allow them to monitor local partners more closely. Interviewee H also stated that it is currently not possible to see how, where and by whom data is collected. Before the data has reached the organisation, it has gone through multiple mutations as it travels through the chain of organisations.

Interviewee I mentioned that improvements can be made to the quality of the data that is collected from partners through IATI. The correct data should be published in the correct format. Additionally, at this moment it is not yet possible to get a detailed understanding of how donations are spread to the partners of NGOs to whom is donated. *"We give funds to a large organisation, who then spreads that to other organisations […] we don't know a lot about what is really happing at the local NGOs, what they are doing."* (personal communication, 2019). This is corroborated by interviewee J who states that it is currently not yet possible to get a complete overview of what is happening in the NGO sector as not all relevant actors are publishing using the IATI standard. In part, this is also due to the varying kinds of relationships between organisations. For example, the ministry of foreign affairs mainly makes large donations to NGOs, while NGOs themselves also have relationships with local partners who implement their projects. These different types of relationships are now all supported by IATI, making the standard quite complex. Therefore, the Dutch ministry of foreign affairs has created elaborate publishing guidelines to help partners use the standard.

5.2.3 IATI

The organisation of interviewee H is currently not using IATI to report data or to retrieve data from their partners. The interviewee also stated that the organisation does not want information about their donations to be made publicly available.

Both interviewee I and J indicated that their organisations used IATI extensively to publish data about themselves and to retrieve data from NGOs to whom they donate. Both interviewees indicated that IATI allowed for the standardization of reporting, which significantly decreased the administrative load of maintaining all the supported projects. This standardization also allowed for a more data driven approach to managing projects and distributing funds among NGOs. Having a standardized, structured data set of all the projects that are conducted in the NGO sector allows to have an overview of what is happening in the sector and where donations are needed the most.

Interviewee J did indicate that it is challenging to get partner NGOs to publish data about their activities using IATI. They believe it is dangerous to publish this data due to security risks. However, according to interviewee J, this is only true for a part of the activities. Information about most activities is already published through other mediums such as websites and annual reports. *"a large part of the activities is already published […] So often It is an excuse to not have to meet the requirements."* (personal communication, 2019). Additionally, it is possible to anonymise or exclude certain data that does in fact pose security risks. According to interviewee J it is a matter of having the correct process in place to determine whether certain data can be published or not.

In addition to the benefits IATI provides, interviewee J also stated that IATI is causing a shift in how transparency is perceived. Transparency was always practiced for the sake of being transparent. However, transparency is now seen more and more as a way towards more effective cooperation in the NGO sector, which is achieved by creating a complete overview of who is doing what.

5.2.4 Blockchain for Transparency and Accountability

The interviewees did see potential in blockchain technology to improve transparency and accountability, but did not believe it would have a large enough impact to justify the cost of its implementation. The organisation of interviewee H does not have the need to be able to trace donations in detail. The interviewee indicated that their donations are always meant for a project in its entirety, they intentionally do not set constraints on what parts of the project they want their donations to be used for. Therefore, they are not interested in detailed monitoring of how donations are spent. *"Our donations are for the project in its entirety […] so we don't have the need to see what your donation is spent on exactly"* (personal communication, 2019). The interviewee did see the tracing of donations as a way to prevent fraud where donations are used for different projects than they were meant to be used for. However, even though the data in a blockchain is immutable, that does not mean that the data is correct. Fraud is therefore still possible according to the interviewee.

Interviewee I saw potential in using blockchain to allow for the tracing of funds and to donate more directly to projects and partners. This is functionality that would mostly benefit individual donors however, as large institutional donors such as the ministry of foreign affairs already have abilities to trace donations through IATI and NGO reports. They also intentionally want a large NGO to act as an intermediary between them and local organisations so that the NGO can manage the implementation of projects. *"As the ministry of foreign affairs, you always want to have large parties who can help you with the implementation."* (personal communication, 2019). Interviewee I also mentioned that the blockchain should never be the only medium for transparency as it gives a limited view. It should be used in conjunction with other transparency media that provide additional views.

Interviewee J acknowledged that blockchain technology could be used for transparency purposes but emphasized that it should not be used as a substitute for the IATI standard. According to the interviewee, blockchain technology is best suited for environments where there is low trust, without a trusted authority and where the data volumes are also relatively low. The NGO sector is a complex sector where data volumes are high and where there is generally a trustful relationship between NGOs and institutional donors. Therefore, traditional technology is sufficient for an application such as IATI, as stated by interviewee J. Using blockchain would only introduce unnecessary complexities and limitations on data volumes.

An area where blockchain technology could be beneficial according to interviewee J, is in verifying whether transactions have taken place at the end of the humanitarian supply chain and in tracing goods. However, the organisation of interviewee J, being a large institutional donor, is not interested in this type of donation tracing. Additionally, when it comes to tracing goods, interviewee J indicated that this should only be done with goods that are traceable. Otherwise it would only create a false sense of trust.

5.2.5 Smart Contract Donations

Using smart contracts to enforce the execution of projects according to its contract's criteria is not desirable according to the interviewees. Interviewee H explained that during a project's implementation it often happens that the direction and goals of the project change. This means that the criteria that were determined before the start of the project would need to be modified. Smart contracts deployed on a blockchain are immutable however, they are not meant to be modified. Therefore, smart contracts to enforce the contracts between donors and NGOs is not desirable.

Interviewee J indicated that the application of smart contracts would require the criteria in the smart contract to be measurable. The NGO interviews already showed that measuring performance is quite challenging, as explained in section 5.1.6. This finding was corroborated by interviewee J, saying that

measuring the criteria set in the smart contract would be difficult. *"This makes assumptions about our capabilities to measure results which are not true and of which you can ask yourself the question whether they will ever become true."* (personal communication, 2019). Additionally, enforcing criteria through smart contracts could potentially incentivise NGOs to focus on influencing the criteria that are measured, instead of focusing on delivering the best possible aid.

5.2.6 Measuring Performance and Optimal Transparency

Measuring performance of NGOs to achieve standardised reporting to allow for benchmarking was found to be valuable by the NGO interviewees, but unattainable due to the difficulty of measuring performance. The donor interviewees share this understanding. They also see the potential but recognise that it is challenging to quantitatively measure the performance of NGOs. In addition, Interviewee H stated that total standardisation of reporting is undesirable since they intentionally let partners use their own reporting formats so that they can add additional information that would not be added when using a standardised reporting format. However, standardisation would be beneficial for certain information such as budgets and finances. *"It's about the extra narrative information […] you don't want to standardise that."* (personal communication, 2019).

Interviewee I saw the most benefit of standardisation and benchmarking when it is applied to countries instead of NGOs. This would also allow for better cooperation between countries as they are better aware of where each country is financing projects. Benchmarking on results would be most interesting but according to interviewee I results are difficult to measure. For example, when a project aims to improve freedom of speech in a certain country, it is impossible to determine whether any effect is caused by that single project. Additionally, the results of these kinds of projects are not easily quantifiable. Interviewee J agrees that results are difficult to measure, and the projects that NGOs conduct are largely dependent on their context. However, according to interviewee J, NGOs do operate in a similar way so measuring performance and benchmarking is possible on certain aspects. Interviewee J did remark that the term benchmarking is often negatively associated, which may cause resistance among NGOs.

Similar to the NGO interviewees, the donor interviewees agreed that maximum transparency is not desirable and should not be the goal. Interviewee H even stated that organisation H does not want any of their donations to become publicly available. Interviewees I and J indicated that data about activities and projects should be made public, unless this would incur safety or privacy risks. Interviewee J calls this principle "Open, unless…", which is also applied in for example the IATI exclusion policy of ICCO Cooperation (ICCO Cooperation, 2017). This principle means data about activities and projects should always be published, unless it incurs safety or privacy risks. Interviewee J commented *"I think we can make 80 percent of our administration transparent and public, but it will never be 100 percent."* (personal communication, 2019).

5.2.7 Ways to Improve Transparency and Accountability

Alternative ways to improve transparency and accountability, without the added complexities of implementing a blockchain system, could also be beneficial. Interviewee H stated that it would be valuable if there were an internationally approved party that would have the task of verifying reports of organisations working in the NGO sector. Currently, organisation H has difficulty checking the reliability of reports they receive from their partners. Approval from an internationally trusted party would make reports from partners more trustworthy.

Interviewee I indicated that transparency could also be improved by increasing the involvement of individual donors, which is also something individual donors are seeking more and more. *"Donating is something people feel good about, but the trend is that people want to have something in return."*

(personal communication, 2019). One way to give back to donors, according to interviewee I, is to give them something back that has value. This could be in the form of coins or points that represent value and could for example be used to receive discounts on certain goods and services. Besides the extra incentive this would give individuals to donate, the increased involvement of donors could be used to provide them with additional transparency information. This could be combined with the reporting back of beneficiaries instead of NGOs. This way, donors are connected directly to beneficiaries.

According to interviewee J, improvements could also be made with regards to the use and awareness of IATI among NGOs. IATI is currently mostly adopted by large NGOs, which in part is also due to the fact that it has been made mandatory for NGOs who receive donations from the Dutch ministry of foreign affairs. However, support for IATI could still be improved significantly according to interviewee J. To get a complete overview of the NGO sector, all actors should report using IATI, which is not the case currently. Data quality and the number of actors that report to IATI should be improved. Furthermore, interviewee J stated that this is also a matter of improving the awareness among actors of their position in the network of organisations that are active in the sector. This would create an incentive to improve the reporting to IATI as NGOs will be better aware of the dependencies in the sector and the importance of sharing information.

Improvements to IATI itself should also be made according to Interviewee J. Access to the available IATI data is already being improved by storing all data in a centralised location from where it can be accessed and queried more easily. Additionally, an IATI data validator is being created that can be used to automatically check the technical consistency and correctness of IATI data files. Organisations can use this validator to improve the data quality of their IATI data files. The validator also makes sure that transactions in the data files exist and are valid. Initiatives such as these make it significantly easier for NGOs and partners to report using IATI.

5.3 Key Interview Findings

The interviews with NGO staff members and institutional donors have led to a large number of findings, which have been discussed in the above sections. To structure the findings, they have been summarized into key findings, which can be found in Table 5. Together with the results of the literature review, the key findings are the input for analysis conducted in chapter 6.

Table 5: Key Interview Findings

ID	Finding
KF-1	Measuring performance of NGOs in a standardized manner that allows benchmarking is very difficult due to the highly nuanced and context dependent nature of their work. However, benchmarking is a functionality that is valuable to institutional donors and NGOs themselves.
KF-2	The IATI standard is used by a large portion of NGOs and thereby IATI acquired a significant amount of data. However, there is a lack in dashboarding functionality and analysis software to easily extract useful information from this data.
KF-3	NGOs are increasingly focusing on qualitative transparency and accountability methods such as storytelling to provide donors with information about their activities and projects.
KF-4	Transparency and accountability practices of donors vary considerably. Some rely mostly on IATI while others do not use IATI but rely on unstandardized reports from partners.
KF-5	Fraud in NGOs cannot be prevented using blockchain technology. NGOs often work in unstable conditions without an internet connection where it is relatively easy to acquire fraudulent receipts. Data is therefore often delayed, unreliable and/or incomplete.
KF-6	NGOs rely heavily on partners for gathering transparency and accountability data. However, there is a lack of awareness among partners on the importance of gathering this data. NGOs therefore have difficulty gathering sufficient data from partners.
KF-7	There is a difference between maximum transparency and optimal transparency. NGOs should strive for an optimal level of transparency where donors acquire the right amount of information, presented in a manner that is understandable.
KF-8	A significant portion of NGOs projects are conducted in hazardous areas. Data about these projects can not be made public as this will create risks to NGO staff and partners working in these areas.
KF-9	Scandals in NGOs evoke negative emotions among donors, which damages their trust. Providing donors with large amounts of quantitative data through a blockchain does not mitigate these emotions.
KF-10	NGOs have an increasingly volatile relationship with individual donors and therefore it becomes more difficult for NGOs to build long-term relationships with donors. Individual donors nowadays are looking to make an impact with their donations and require NGOs to provide them with feedback on what impact was realised.
KF-11	Smart contracts offer NGOs opportunities to better involve donors in the decision-making process on how donations are used. Donors will be able to donate directly to projects and NGOs can define project milestones using smart contracts. Once a milestone is reached, more donor funds are released to the NGO to continue with the project. However, this functionality already exists as crowdfunding. Smart contracts are not strictly necessary.
KF-12	Smart contracts are not suitable for contracting between institutional donors and NGOs as it should be possible to make modifications to the contract's criteria. Additionally, the methods for measuring results are not reliable enough to accurately determine whether a contract's criteria are met.
KF-13	Allowing donors to trace donations would be most useful for individual donors as they don't have a way to do this currently. Institutional donors already have close relationships with NGOs through which they gather information about how their donations are used.
KF-14	NGO Transparency and accountability practices are mainly upward, external and functional.
KF-15	IATI allows to get a complete overview of what activities take place in the entire NGO sector. This in turn allows for a more data driven approach to managing projects and spreading funds through the sector, which is valuable to large institutional donors.
KF-16	Reporting can be standardised on certain aspects such as financial information. Other aspects such as context information can not be standardised.

6 ANALYSIS

This chapter analyses the data that was gathered during the literature review and the interviews in order to construct a concept for a blockchain for transparency and accountability. First, the context in which the blockchain will need to operate will be modelled using the iStar 2.0 modelling language. Next, the iStar model and the key findings of the interviews are used to identify the requirements and functionalities of the blockchain system. Lastly, an analysis is given on the feasibility of creating the proposed blockchain system and whether this is a worthwhile investment.

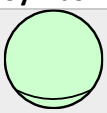
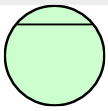
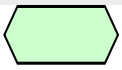
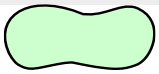
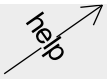
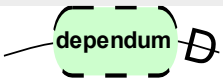
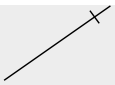
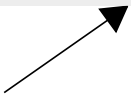
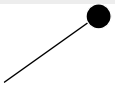
6.1 ISTAR 2.0 MODEL

The requirements of a blockchain for transparency and accountability depend mostly on the needs and wants of its stakeholders and the characteristics of the context that it operates in. The literature review and interviews have provided data that help determine these requirements. In order to extract the requirements from the data, the needs and wants are visualised using the goal- and actor-oriented modelling language iStar 2.0.

The iStar 2.0 modelling language is an evolution of the i* modelling language that was created in the mid-nineties. It standardized the language's modelling concepts across domains and offers capabilities to model the intentional, social and strategic dimensions of actors (Dalpiaz, Franch, & Horkoff, 2016). Modelling concepts are provided for agents and roles and their corresponding goals, tasks, qualities and resources. The relationships and dependencies between these concepts can also be visualised.

Figure 5a and Figure 5b show the iStar 2.0 model including all the stakeholders of the NGO sector and their goals, tasks, qualities, resources and corresponding relationships and dependencies. NGOs, donors, partners organisations, staff members and beneficiaries are represented as roles since these can be fulfilled by multiple parties. Given the importance of IATI in the humanitarian aid sector, it is also included in the model. IATI is a unique organisation and is therefore visualised as an agent. The roles' and agents' goals are represented as ovals, tasks as hexagonals, qualities as cloud-shaped shapes and resources as rectangles. The dependencies are visualised using lines including a "D" to show the directionality and an intentional element indicating the nature of the dependency. Table 6 gives an overview of all the modelling elements of iStar 2.0 and their corresponding descriptions, as defined by Dalpiaz et al. (2016). Appendix F shows multiple zoomed-in parts of the model for better readability, as well as the complete model. A list of the roles and agents and a corresponding description can be found in Table 7.

Table 6: iStar 2.0 legenda (Dalpiaz et al., 2016)

Element	Symbol	Description
Role		A r*ole* is an abstraction of an actor and its behaviour. It can be fulfilled by actors that have the specific role. E.g, the role "institutional donor" can be fulfilled by the dutch ministry of foreign affairs as this is an institutional donor.
Agent		An *agent* is a concrete actor with physical manifestation, such as an organisation or an individual. In the context of the NGO sector, IATI is the only agent as it is a unique organisation. Therefore, an abstraction to a role is not necessary.
Is-a actor link		This association link can be used to represent the generalisation and specialisation of actors. For instance, the NGO and partner staff member roles are specialisations of the staff member role.
Participates-in actor link		The *participates-in* generalisation can be used to represent associations between two actors that are not generalisations or specialisations. For instance, an NGO staff member works for an NGO and therefore the NGO staff member role has a participates-in association with the NGO role.
Goal		*Goals* represent a certain state of affairs that an actor is striving to achieve.
Task		*Tasks* represent the actions that an actor aims to undertake in order to achieve its goals.
Resource		*Resources* represent physical or informational entities that are required to fulfil the tasks of actors.
Quality		*Qualities* represent attributes or characteristics for which actors wish to reach some level of achievement. For instance, a staff member strives to improve the quality of the aid that is given to beneficiaries.
Contribution		*Contribution links* represent the effect of goals and tasks to the level of achievement of a quality. The contribution can be one of four types: *make, help, hurt* or, *break*.
Dependency		*Dependencies* characterise the relationships between actors, where one actor depends on another actor to fulfil its goals, tasks or resources. The dependum element representat he nature of the dependency while the 'D' indicated the direction of the dependency.
And refinement		An *and-refinement* between goals and tasks means that all child goals and tasks need to be fulfilled in order to achieve the parent goal or task.
Or refinement		An *or-refinement* between goals and tasks means that at least one child goal or tasks needs to be fulfilled in order to achieve the parent goal or task.
Qualification		*Qualifications* are used to relate qualities to their corresponding goal, task or resource. For instance, a *data* resource has the qualities *data quality, data completeness* and *data timeliness.*
Needed by		The *Needed by* relationship indicated which resources are needed to perform a certain task. For instance, *funds* are needed by a donor in order to perform the tasks of donating to NGOs.

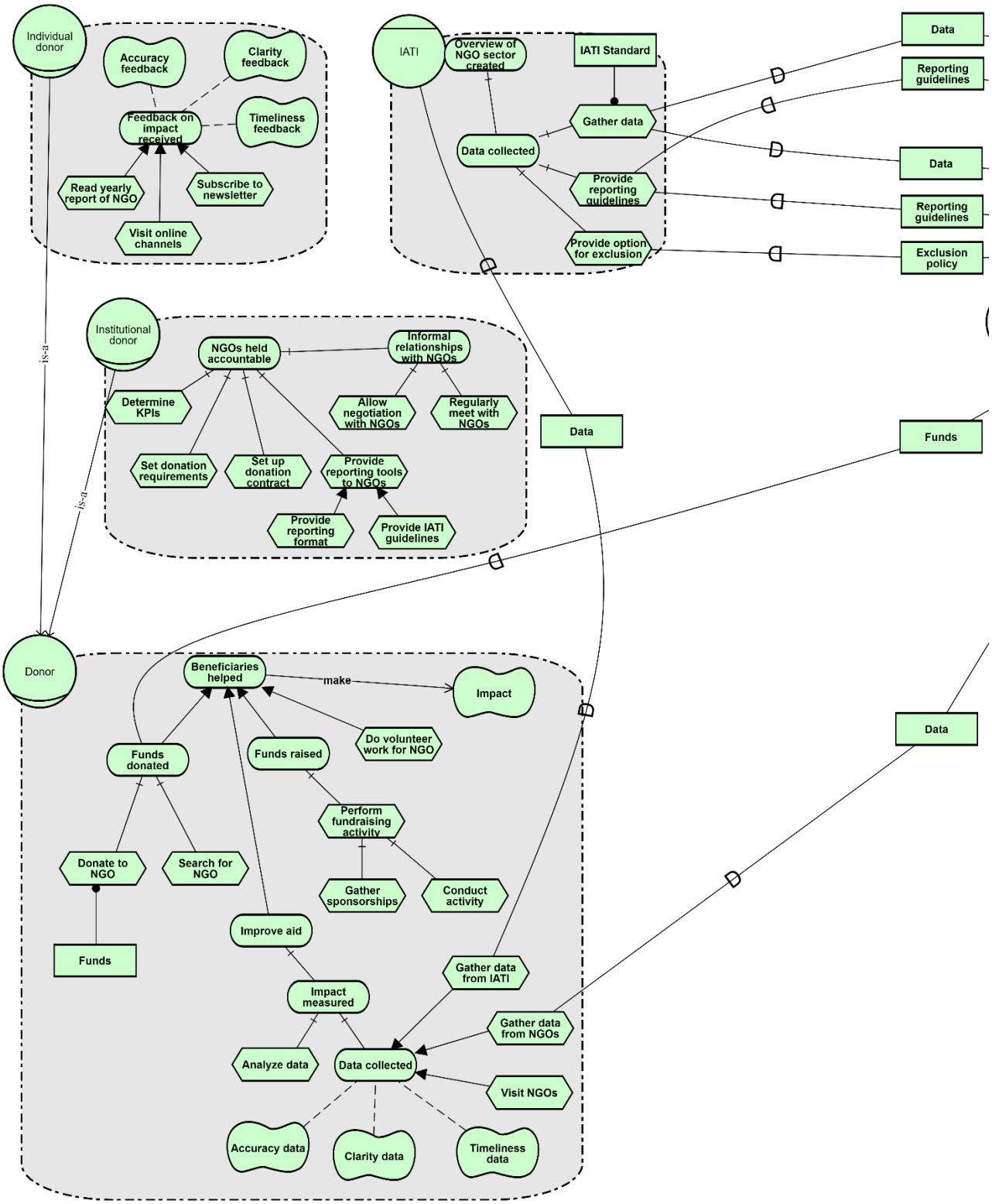


Figure 5a: Donor part of iStar 2.0 model including agents, roles, goals, tasks, qualities, resources and their relationships and dependencies.

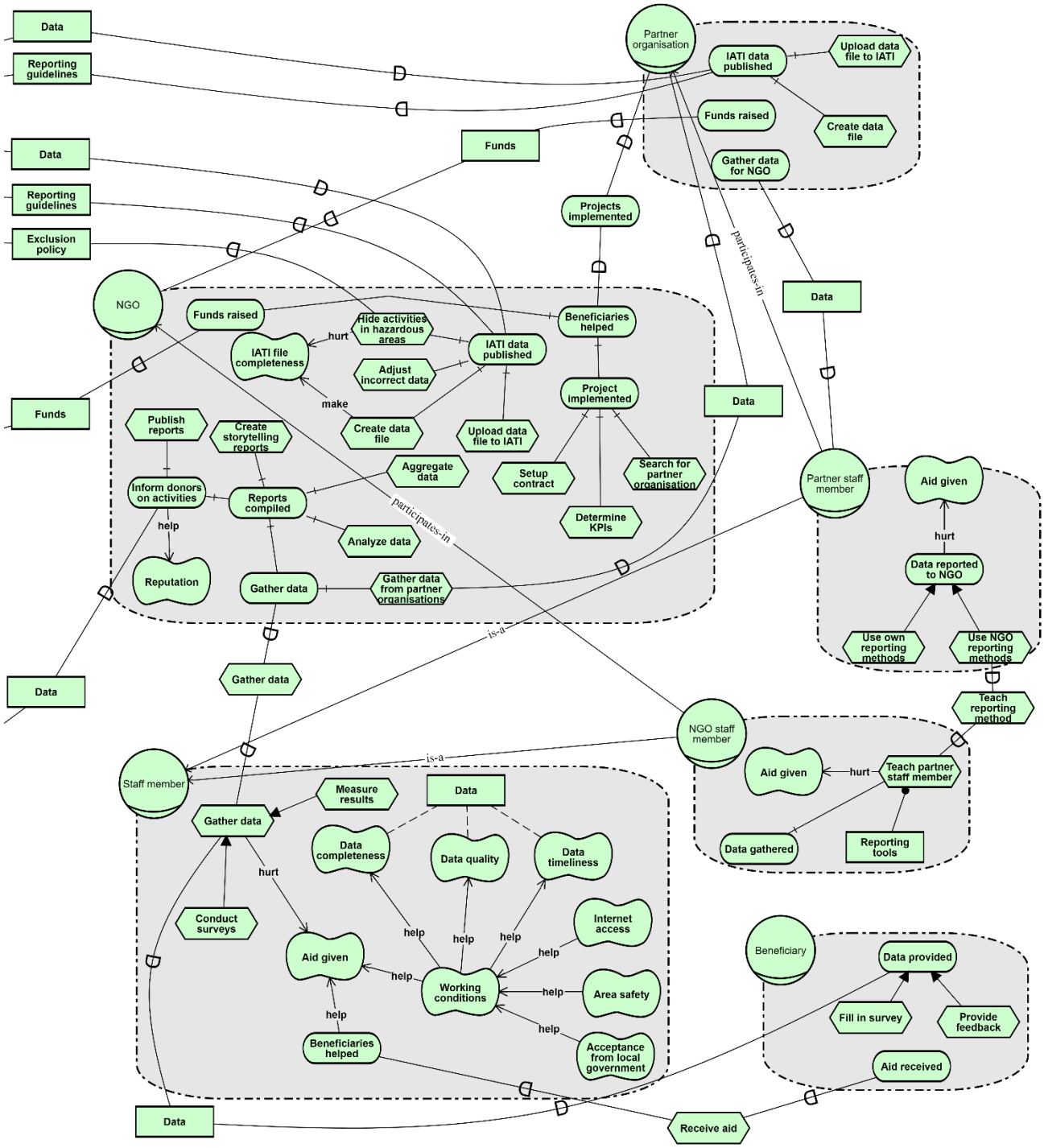


Figure 5b: NGO part of iStar 2.0 model including agents, roles, goals, tasks, qualities, resources and their relationships and dependencies.

Table 7: Role and agent descriptions

Role/agent	Description
Donor	**Donors** are interested in helping **beneficiaries** by donating funds to **NGOs**. Funds can either be their own funds or can be gathered by performing a fundraising activity. Donors are also interested in determining the impact their donations have and therefore seek information about how their donations are used.
Individual donor	An **individual donor** who donates their personal funds or participates in fundraising activities. **Individual donors** mostly seek out information from **NGOs** through their yearly reports, online channels or newsletters.
Institutional donor	**Institutional donors** are governmental organisations such as the Dutch ministry of foreign affairs or private foundations that have large amounts of funds available for donation. Due to their large donations they typically have personal relationships with **NGOs** and are much more interested in keeping **NGOs** accountable. They set up contracts with **NGOs** and require **NGOs** to report back.
NGO	Non-governmental organisation that receives funds from **donors** and uses it to implement projects that aid **beneficiaries**, often together with **partner organisation(s)**. They gather data from **partner organisations** and **beneficiaries** so they can report back to **donors** what they have achieved with their donations.
Partner organisation	**Partner organisations** are local organisations that work with **NGOs** to implement projects to help **beneficiaries**. In many cases the **partner organisation** is the one that is in direct contact with **beneficiaries** whereas the **NGO** is not. In some cases, **partner organisations** also directly work with **institutional donors** to implement projects.
Staff member	**Staff members** for their respective organisations to aid **beneficiaries**. They are directly in contact with **beneficiaries** to provide aid. Additionally, they gather transparency and accountability data for their organisations.
NGO Staff member	**Staff member** of an **NGO** that works with **partner organisations** to implement projects and help **beneficiaries**. They are also help partner **staff members** in gathering data for the **NGO**.
Partner staff member	**Staff member** of a **partner organisation**. Is mostly concerned with directly helping **beneficiaries** and collecting transparency and accountability data for the **NGOs** that their organisation works with.
IATI	International Aid Transparency Initiative that aims to gather transparency data from all organisations operating in the humanitarian aid sector. They provide reporting guidelines in the form of the **IATI standard** and have an exclusion policy so that organisations can exclude activities from their data files that pose risks to **staff** of **partner organisations**.

6.2 Blockchain For Transparency and Accountability

As can be seen in the iStar model, there significant dependency between actors when it comes to gathering transparency and accountability data. Donors depend on NGOs and IATI for their data while IATI itself depends on NGOs and their partner organisations for gathering data. NGOs and their staff members in turn depend on partner organisations. Staff members of NGOs and partner organisations ultimately depend on beneficiaries. This means data goes through multiple organisations and possibly mutations before it reaches donors. These dependencies also exist in the opposite direction as beneficiaries depend on NGOs and partner organisations to receive aid. Partner organisations depend on NGOs for funding, and to a smaller extent also on donors. NGOs in turn depend on donors for

funding. The dependencies between actors reflect the humanitarian supply chain, which is elaborated on in section 4.2.

The model also shows the conflicting interests of staff members. On the one hand their personal goal is to provide the best aid that they can to beneficiaries. On the other hand, they are required by their organisation to gather data for transparency and accountability purposes. These tasks conflict as time spent on gathering data cannot be spent on helping beneficiaries. This means staff members typically do what is strictly necessary to gather enough data, but not more. Additionally, staff members of partner organisations often need to use reporting tools of the NGOs that they work with. They need to be trained by the NGO's staff members to use these tools, which is also in conflict with the interest of both staff members to provide aid to beneficiaries. This results in partner staff members often not knowing how to properly report to NGOs and not being aware of its importance. A standardised reporting system such as IATI, that is used across the sector, could potentially help solve this problem.

A blockchain system for transparency and accountability will need to be able to satisfy all the goals and tasks of each of the actors (Mcgee, 2013). In order to describe the required features of the blockchain in a structured manner, a list of user stories has been made for each of the actors, shown in tables 8, 9, 10 and 11. The user stories follow the guidelines for high-quality user stories of Lucassen, Dalpiaz, van der Werf and Brinkkemper (2015). No user stories have been made for IATI as this is not an actor that is actively participating in the process of delivering aid to beneficiaries. Additionally, the IATI standard essentially has the same goal as the proposed blockchain system, namely to improve transparency and accountability in the NGO sector. Therefore, it could potentially be the actor that implements, or is substituted by, the blockchain.

Table 8 shows the user stories for individual and institutional donors, as well as user stories that apply to both groups. As there is only one user story for beneficiaries, this one is included with the staff member user stories in Table 11.

Each table includes two columns names *Blockchain* and *Smart Contracts*. These columns indicate the appropriateness and relevance of blockchain and smart contracts to fulfil the user stories. The *blockchain* column shows whether the user story can be fulfilled using public or a private blockchain. The majority of user stories can be fulfilled using a public blockchain. However, a total of seven user stories require a private blockchain to be implemented. This means that considering the current requirements of the actors, it is only possible to fulfil them using a private blockchain.

The column *Smart Contracts* indicates whether a user story that is associated with smart contracts can be fulfilled using smart contracts. User stories indicated with a minus sign are not associated with smart contracts. User stories US-6 and US-12 are indicated with a cross, meaning these user stories cannot be fulfilled using smart contracts. Both NGOs and institutional donors have indicated in the interviews that they often need to make changes to existing contracts, which is not possible with smart contracts. Additionally, the column *Key Findings* links the user stories to their corresponding key interview findings. Because the literature review, interviews and iStar model were all a part in establishing the list of user stories, not all user stories are directly linked to one or more key interview findings.

Table 8: User stories donors

ID	User Story	Blockchain	Smart Contracts	Key Findings
US-1	As a **donor** I want to donate to **NGOs** so that I can help beneficiaries and make an impact.	Public	V	KF-10
US-2	As a **donor** I want to be able to keep my donations private so that my privacy is guaranteed.	Private	-	-
US-3	As an **individual donor** I want to receive information on how my donation was spent so that I know what impact I have achieved with my donation.	Public	-	KF-10 KF-13 KF-14
US-4	As an **individual donor** I want information presented to me to be accurate, clear and in time so that I can understand the information.	Public	-	KF-10
US-5	As an **institutional donor** I want to set up contracts with **NGOs** so that I can make agreements on how donations are used.	Public	V	KF-11
US-6	As an **institutional donor** I want to be able to modify contracts with **NGOs** so that the execution of projects remains flexible.	Private	X	KF-12
US-7	As an **institutional donor** I want to give **NGOs** the ability to provide additional information besides standardised reporting mechanisms to that I receive all the available information from partners.	Public	-	KF-3 KF-4 KF-9 KF-16
US-8	As an **institutional donor** I want to publish data about my donations so that other actors in the sector are aware of my activities.	Public	-	KF-15
US-9	As an **institutional donor** I want to have an overview of what activities are taking place in the sector so that I can accurately make donations where this is needed most.	Public	-	KF-15
US-10	As an **institutional donor** I want to be able to perform benchmarking on the measurable results of **NGOs** so that I can compare the performance of **NGOs**.	Public	-	KF-1 KF-2

Table 9: User stories NGOs

ID	User Story	Blockchain	Smart Contracts	Key Findings
US-11	As an **NGO** I want to set up contracts with **partner organisations** so that I can make agreements on how projects are implemented.	Public	V	KF-11
US-12	As an **NGO** I want to be able to modify contracts with **partner organisations** so that the execution of projects remains flexible.	Private	X	KF-12
US-13	As an **NGO** I want to receive donations from **donors** so that I have sufficient funds to implement projects.	Public	-	KF-13
US-14	As an **NGO** I want to publish data about my activities so that I can be accountable towards my **donors**.	Public	-	KF-10 KF-14
US-15	As an **NGO** I want to be able to hide/anonymise data about certain activities so that I can minimise security and/or privacy risks.	Private	-	KF-7 KF-8
US-16	As an **NGO** I want to be able to adjust incorrect data so that donors are correctly informed.	Private	-	KF-5
US-17	As an **NGO** I want to provide **donors** with additional information besides standardised reporting mechanisms so that I can provide them with all the necessary information.	Public	-	KF-3 KF-4 KF-9 KF-16
US-18	As an **NGO** I want the results of my activities to be measured fairly so that I can focus on implementing projects.	Public	-	KF-1 KF-16
US-19	As an **NGO** I want to work with **partner organisations** so that they can help me implement projects.	Public	-	KF-6
US-20	As an **NGO** I want to be able to perform benchmarking on the measurable results of myself and other **NGOs** so that I can improve myself.	Public	-	KF-1 KF-2

Table 10: User stories partner organisations

ID	User Story	Blockchain	Smart Contracts	Key Findings
US-21	As a **partner organisation** I want to publish data about my activities so that I can be accountable towards the **NGOs** that I work with.	Public	-	KF-6
US-22	As a **partner organisation** I want to be able to hide/anonymise data about certain activities so that I can minimise security and/or privacy risks.	Private	-	KF-7 KF-8
US-23	As a **partner organisation** I want to be able to adjust incorrect data so that **NGOs** and donors are correctly informed.	Private	-	KF-5
US-24	As a **partner organisation** I want to provide **NGOs** with additional information besides standardised reporting mechanisms so that I can provide them with all the necessary information.	Public	-	KF-3 KF-16
US-25	As a **partner organisation** I want the results of my activities to be measured fairly so that I can focus on implementing projects.	Public	-	KF-1 KF-16
US-26	As a **partner organisation** I want to receive funding from **NGOs** so that I have sufficient funds to implement projects.	Public	-	KF-6

Table 11: User stories staff members and beneficiaries

ID	User Story	Blockchain	Smart Contracts	Key Findings
US-27	As a **staff member** I want to use standardised reporting mechanisms so that I can minimize my time spent on reporting.	Public	-	KF-16
US-28	As a **staff member** I want to be able to gather data from **beneficiaries** so that I can provide my organisation with the necessary data.	Public	-	KF-6
US-29	As a **staff member** I want to be able to report data at a later moment in time so that I am not limited by poor working conditions.	Public	-	KF-5
US-30	As an **NGO staff member** I want to help **partner staff members** to use reporting methods of my organisation so that the data that is reported to my organisation is of high quality.	Public	-	KF-6
US-31	As a **beneficiary** I want to provide feedback on the aid that I receive so that I can contribute to the improvement of aid.	Public	-	-

6.3 Feasibility and Alternatives

Blockchain technology has potential to improve transparency and accountability in the NGO sector. However, it is crucial to examine the feasibility of creating such as blockchain and to take alternatives into consideration when deciding whether to implement such a blockchain or not.

6.3.1 Transparency Dimensions

The literature review showed that the concept of transparency can be characterised across three dimensions: disclosure, clarity, and accuracy (Schnackenberg & Tomlinson, 2016). The potential of blockchain technology to improve each of these dimensions needs to be analysed.

Disclosure. Defined as "*a deliberate, timely, and formal release of voluntary or required information*" (Williams, 2008). When considering blockchain technology, it can be used as a way to deliberately release voluntary or required information in a formal manner. However, the technology does not offer advantages over other technologies in this regard. When it comes to the timeliness of released information, blockchain generally offers advantages due to disintermediation and the decentral verification of transaction (Bashir, 2017; Pilkington, 2015). However, in the context of the NGO sector, actors want to have control over what information is released due to safety and privacy risks, which is also reflected by user stories US-2, US-15 and US-22 and is corroborated by research (Fast, 2007, 2010). This means the time between the creation of information and its release is mostly taken up by the process where actors determine whether the information can be released. Any time gains will therefore be marginal. Additionally, there generally is a trustful relationship between actors and IATI only exists to create and maintain a standardised reporting format and associated tooling. IATI's data validator can check for inconsistencies and incorrect transactions in the data files of actors. Disintermediation and decentralised verification of transactions is therefore not strictly necessary. Moreover, decentralised verification could potentially increase the time it takes to release information.

Clarity. Refers to the comprehensibility of shared information. information which is disclosed by organizations, must be presented clearly and understandable in order for the organizations to be considered transparent (Gaventa & Mcgee, 2013; Street & Meister, 2017; Winkler, 2000). Blockchain technology in essence is a distributed database protocol (Bashir, 2017). It is not a method of presenting information, only of storing it. In order to clearly present information to stakeholders, it is typically aggregated and mutated before it is released. Blockchain technology will therefore not improve the clarity dimension of transparency.

Accuracy. Refers to the correctness and reliability of shared information, as perceived by the receiver (Angulo et al., 2004; Bushman et al., 2004). Data that is stored in a blockchain is immutable, so it is guaranteed that the data is the original data that has not been tempered with. This does not mean however that the data is correct as the initially stored data can still be incorrect. The concept of "garbage in, garbage out" ("garbage in garbage out," n.d.), that generally applies to software systems also applies to blockchain technology. Furthermore, the fact that data is immutable means that incorrect data also cannot be corrected, thereby decreasing the reliability of the data (Puthal et al., 2018). One way to work around this problem is to flag incorrect data and to store a new corrected version of the data(Van Den Broeck, Cunningham, Eeckels, & Herbst, 2005). This could potentially improve the perceived reliability of the receiver of the data as they become aware of the fact that incorrect data is actively being flagged. However, whether this effect actually exists on the perceived reliability would require additional research.

6.3.2 Current Transparency and Accountability Practices

Besides the characteristics of transparency, it is also valuable to consider how blockchain technology could contribute to the dimensions of transparency and accountability practices that are most prominent in NGOs. NGOs are mostly focused on external accountability practices that are directed upward towards donors, in both a formal and informal fashion. The information that is communicated mostly concerns functional information as opposed to strategic information.

External and upward. The direction and targeted stakeholders of accountability practices are not influenced by the technology that is used to store data. Blockchain technology is therefore suited for external upward accountability practices, but it does not provide benefits over traditional data store technologies.

Formal and informal. For formal accountability practices, blockchain technology is appropriate. The data that is stored in the blockchain can be directly communicated to stakeholders in a formal fashion. For informal communication on the other hand, the data would most likely need to be mutated so that it can be presented in informal settings. This is independent of the technology that is used to store data however.

Functional. Functional accountability practices are concerned with communicating information about resource allocation and immediate impact, as opposed to information about long-term impact on the broader environment of strategic accountability practices (Ebrahim, 2003). Information about resource allocation and immediate impact is quantifiable. Blockchain technology is most suitable for storing quantitative data and is therefore an appropriate method for functional accountability practices. However, the interviews showed that it can be difficult to quantitatively measure impact. Qualitative methods should therefore also be used to communicate information about impact to stakeholders. Blockchain technology is less suitable for storing qualitative data so it should be used together with other qualitative accountability methods such as storytelling.

6.3.3 Blockchain Opportunities for NGOs

Blockchain technology offers five main opportunities, which are discussed in section 3.2.2. These are further explored here in the context of the NGO sector. The potential of each opportunity to have an impact on the NGO sector is explored so that a better analysis can be made concerning the applicability of a blockchain technology in the NGO sector.

Availability. The high availability of data that is offered by blockchain technology will not have a large impact on the NGO sector. This sector does not require transparency and accountability data to be highly available. Downtime can have significant consequences in for instance the financial sector (Boggs & Bozman, 2009; Spremic, Bajgorić, & Turulja, 2013), but for the NGO sector these consequences are negligible, transparency and accountability data are not essential to the execution of an NGOs core activities.

Accessibility. Data accessibility that comes with public blockchains would improve the transparency and accountability of NGOs as it becomes easier for stakeholders such as donors to view the data. However, NGOs and institutional donor have both indicated in the interviews that they wish to be in control of which data becomes public, as some data poses security risks if it were published. This means a private blockchain would need to be used, which are not inherently accessible (Buterin, 2015). The level of accessibility would then depend on the built in accessibility settings (Bashir, 2017; Buterin, 2015). The accessibility opportunities of blockchains therefore do not offer significant benefits to the NGO sector.

Trust. The NGO sector does not have a single trusted third party that verifies transactions between actors. Generally, there is a trustful relationship between NGOs and institutional donors, as indicated by both parties in the interviews. NGOs struggle more with maintaining a trustful relationship with individual donors (Masdar, 2015). Individual donors often are unable to find out how their donations are used, which is essential to creating trust (Burchell & Cook, 2007). A blockchain system could be used to allow donors to track their donations. However, more research needs to be conducted on the degree to which this functionality could increase trust of individual donors. Their trust is damaged

most by scandals such as sexual misconduct. Whether the tracing of donations can mitigate the effects of these scandals would require additional research.

Cost saving / efficiency. The opportunities for disintermediation of blockchain technology do not apply to the NGO sector as there are no intermediaries. Cost savings and efficiency improvements could mainly be achieved in the construction of standardised reporting methods. However, blockchain technology is not strictly necessary for this. The IATI standard is already capable of standardising reporting of NGOs and donors (Linders, 2013). The interviews also showed that IATI has already made monitoring of projects easier and more effective for institutional donors. Blockchain technology would not offer advantages when it comes to cost saving and efficiency over traditional reporting technologies used by IATI.

Transparency. The main goal of the blockchain system discussed in this research is to improve transparency and accountability of NGOs. The degree to which blockchain technology could achieve this goal depends on the type of blockchain that is used (Buterin, 2015; Kruijff & Weigand, 2017). The interviews have shown that both NGOs and institutional donors do not strive for maximum transparency, but rather optimal transparency. They have certain data that would incur safety or privacy risks when published. This means that either not all data will be published, or access will need to be restricted using a private blockchain (Buterin, 2015). In conclusion, the potential of blockchain technology to achieve maximum transparency will not be fully utilised when applied in the NGO sector.

6.3.4 Willingness of Stakeholders

Implementing a blockchain system for transparency and accountability will require significant effort from its main stakeholders, namely donors and NGOs and their partner organisations. During the interviews with NGO employees, it became apparent that they do not feel the urgency to start implementing a blockchain system themselves. Generally, NGOs indicate that they have a trustful relationship with institutional donors. With individual donors this is also the case but to a lesser extent. The NGOs indicated that the implementation of such a blockchain would need to be initiated by institutional donors who have the most need for transparency from NGOs.

The interviews with institutional donors showed that they currently do not see blockchain technology as a suitable technology for acquiring data about the projects they support. The Dutch ministry of foreign affairs, which is the largest institutional donor in the Netherlands, mainly relies on IATI for gathering transparency data from NGOs. They indicate that blockchain technology is best suited for environments where there is low trust and without a trusted central authority. However, in the context of institutional donors and NGOs, both trust levels and data volumes are high. Blockchain would therefore only introduce unneeded complexities and restrictions (Bauerle, n.d.). The institutional donors stated that blockchain technology would be most beneficial for tracing goods and verifying transactions at the end of the humanitarian supply chain. They indicated however that this would mostly benefit NGOs and should therefore be implemented by NGOs, the institutional donors themselves have no demand for this functionality.

The institutional donors also remarked that with the introduction of IATI, it has proven to be quite challenging to convince NGOs to report using a new transparency method. A large portion of NGOs are already reporting to IATI, but significant improvements must still be made in order to be able to use IATI to get a complete overview of what activities take place in the sector. Introducing another new transparency method in the form of a blockchain would most likely receive resistance from NGOs and partner organisations. Moreover, IATI is a standardised reporting format based on XML, which is less invasive in the already complex IT landscapes of organisations than a blockchain system.

6.3.5 Alternatives

The interviews with NGOs and donors have shown that transparency and accountability can be improved significantly with other means than blockchain technology. Most improvements can be made with regards to the adoption and tooling around IATI. Adoption of IATI among NGOs has already improved significantly, but adoption among their partner organisations is still lacking. When the whole sector is using the IATI standard to report data about their transactions and activities, a detailed overview can be constructed of how funds are spread throughout the sector. Additionally, the NGOs have indicated that significant improvements can be made to the dashboarding and analyses tools of IATI. Currently it is difficult to generate useful insights from IATI data.

Other methods to improve transparency and accountability mostly concern procedural and communicational aspects. NGO and partner staff members are crucial to the transparency of their organisations as they are the ones that need to gather data and use their organisations' tools and methods. The interviews have shown that improvements can be made through better training of staff so that they are more aware of the importance of transparency and accountability, and also more capable of implementing its practices.

It has also become apparent that it is very difficult to measure results and impact of the projects of NGOs. This is corroborated by research findings (Ebrahim, 2005; Hofmann, Roberts, Shoham, & Harvey, 2004) The way these projects are implemented and the results that are achieved to a large degree depend on their context. The goals and context of projects conducted by NGOs vary considerably, making it problematic to define standardised measurements for results and impact. However, there are existing methods that help in constructing a tailored approach to measuring impact of NGOs, the most prominent being theory of change (Brest, 2010; Taplin & Clark, 2012). More research into how this can be improved is needed so that results of NGOs are more easily measured and compared.

With regards to communication with stakeholders, improvements can be made by presenting information more understandable. Presenting information in an understandable manner to donors helps them understand the information and increases their trust in the NGO. This can be done through for example storytelling, which is already increasingly being used by NGOs. Storytelling can be combined with more involvement of beneficiaries. Allowing beneficiaries to directly give feedback to donors gives donors more insight into the impact that their donations have.

6.3.6 Applying Blockchain Assessment Model

This section applies the blockchain technology for transparency and accountability assessment model that was discussed in section 3.3. This assessment model allows to structurally show the benefits, drawbacks and adoption barriers for applying blockchain technology for transparency and accountability. Figure 6 shows the assessment model as it is applied in the context of the NGO sector. Each of the discussed transparency dimensions, accountability practices and blockchain opportunities are represented in the model, as well as the additional factors that need to be taken into account.

The model has a red indication for the *accuracy* dimension. This is due to the fact that blockchain data is immutable, and therefore incorrect data that is stored in a blockchain cannot be corrected. This will decrease the accuracy of the data. As mentioned earlier, this can be circumvented by flagging incorrect data and storing a corrected version. This could potentially increase accuracy as it is perceived by the receiver, but it is not determined if this is true. Because the accuracy of the data itself is decreased, this is marked as a drawback of blockchain technology.

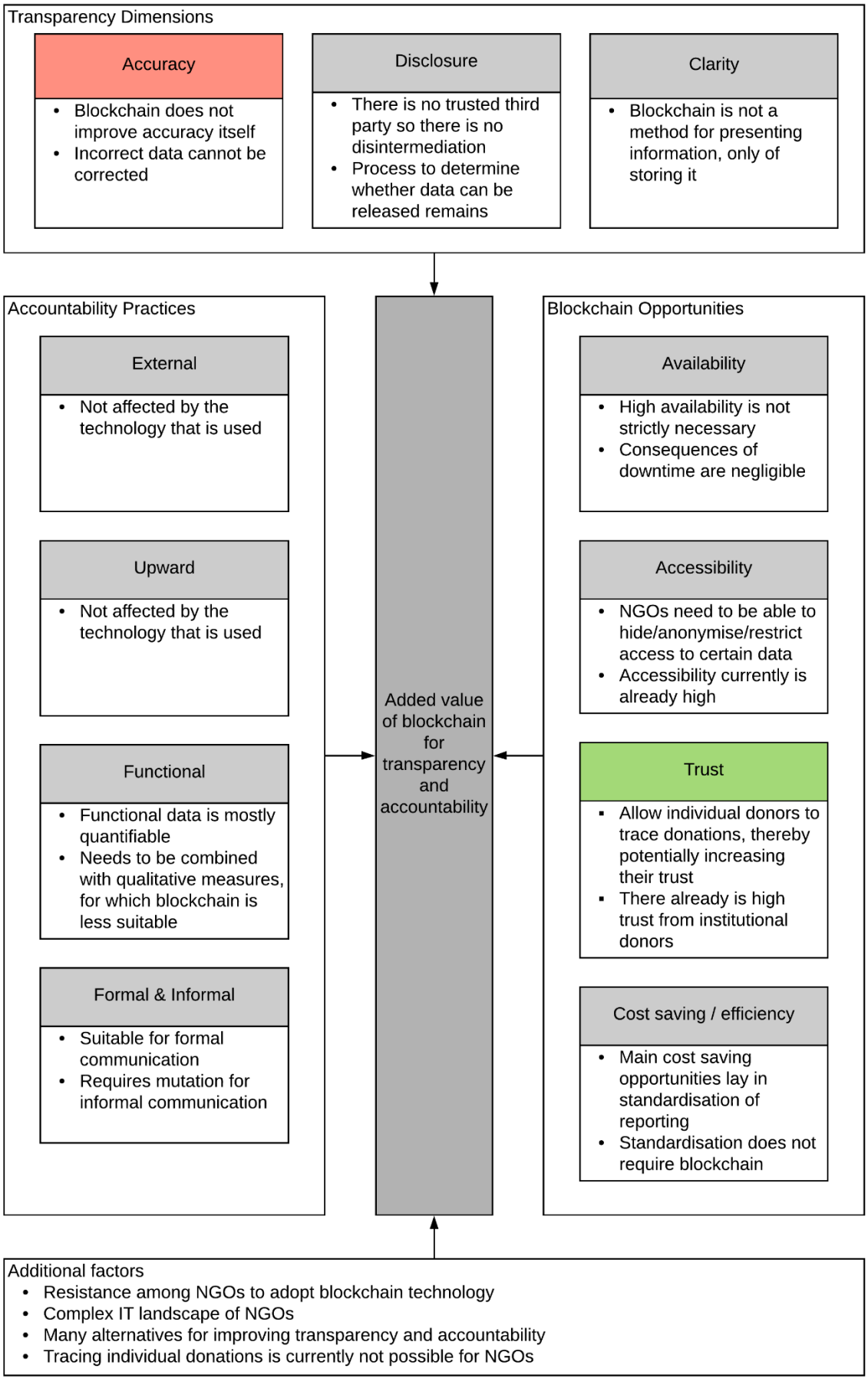


Figure 6: Blockchain for transparency and accountability assessment model applied for the NGO sector

A green indication is given to the *trust* opportunity of blockchain. This is because blockchain technology can be used to allow individual donors to trace their donations, which could potentially increase the trust that individual donors place in NGOs. However, more research needs to be conducted into the degree to which such a functionality could increase this trust. Trust is damaged most by scandals such as sexual misconduct and it is not determined how allowing donors to trace their donations could restore this damaged trust (Kepplinger, Geiss, & Siebert, 2012). Additionally, the interviews have shown that it is currently not possible for NGOs to trace the donations of individual donors. Relatively small individual donations often end up on a large pool of funds before they are used by an NGO. Allowing for the tracing of individual donations would therefore require significant alterations to how NGOs currently handle individual donations. To that end it is worthwhile to first conduct further research into the effect that allowing individual donors to trace their donations has on the trust that they place in NGOs.

Apart from the *accuracy* dimension and the *trust* opportunity, the other aspects of the model remain grey, meaning that blockchain technology has no significant effect on these aspects. This indicates that the application of blockchain technology in the NGO sector will have no significant effect on transparency and accountability. Furthermore, the additional factors that are shown in the model indicate that implementing blockchain technology is challenging. The interviews have shown that there is a resistance among NGOs to implement blockchain technology, and that they currently have a complex IT landscape that does not allow for the tracing of individual donations. This means significant effort would need to be put into incentivizing NGOs to invest in making their IT systems suitable for implementing blockchain technology. Additionally, several alternatives to improve transparency and accountability of NGOs exist, which also needs to be taken into account when deciding whether it is worthwhile to implement blockchain technology.

In aggregate, the model shows that there are no significant benefits to implementing blockchain technology for the improvement of transparency and accountability of NGOs. Most transparency dimensions and accountability practices are unaffected. In fact, the accuracy dimension could be decreased. Furthermore, the blockchain opportunities are not fully utilised. Only the trust opportunity could be utilised by allowing individual donors to trace donations. However, more research needs to be conducted to the effect this functionality really has. Lastly, multiple factors exist that make the implementation of blockchain technology challenging and several alternatives for improving transparency and accountability exist.

7 DISCUSSION

The research findings have given more insight into the application of blockchain technology in the context of improving transparency and accountability of NGOs. Additionally, the research has given insight into the perceptions of NGOs regarding blockchain technology, and transparency and accountability itself. Furthermore, the research has resulted in an assessment model that can be used to determine the added value and adoption barriers of implementing blockchain technology to improve transparency and accountability in a certain context. This assessment model does not provide an unambiguous recommendation as to whether or not blockchain should be implemented, but it does provide a structured method to determine all the relevant factors that should substantiate the decision. This research has also shown that the assessment model was successfully implemented in the context of NGOs, showing that blockchain technology does not have a significant effect on the transparency and accountability of NGOs.

During the research, it proved to be challenging to find willing participants for the interviews. Among NGOs it was difficult to find suitable candidates who were also willing to be interviewed. This resulted in only a limited set of interviewees. Results of the interviews could have been improved if more willing participants were found as this would have created a larger amount of interview data. It could also have been valuable to find a more varied set of interviewees. Speaking to multiple employees in different positions at the same organisations would have given a broader view. The same applies to the interviewees of institutional donors. In part this was also because there are only a few very large organisations who are actively promoting transparency and accountability. Other, smaller institutional donors, are less active when it comes to transparency and accountability and were therefore less willing to be interviewed.

Threats to internal validity are mainly concerned with the bias of interviewees with regards to blockchain technology. Blockchain technology currently is a popular subject that receives much attention. Proponents and opponents are relatively extreme in their perceptions. This was also true for the interviewees as many of them indicated being so called *blockchain sceptics*. This leads to believe these interviewees were not looking at the technology objectively but had a predetermined bias. The same applies to the bias of interviewees regarding transparency and accountability by itself. Introducing new transparency and accountability practices and methods will give more tasks and responsibilities to the interviewees, thereby possibly giving them a bias towards rejecting these new practices.

External validity threats are mainly caused by the limited scope of the research. The organisations and interviewees that participated in the research all come from the Netherlands, thereby possibly creating a narrow scope. This could potentially impede generalising the results or applying them to the NGO sector as a whole. This threat can be eliminated by validating the results with individuals working for organisations in countries outside the Netherlands.

7.1 FUTURE RESEARCH

Future research could focus on researching why there is resistance among NGOs to adopt a new technology such as blockchain. Using technology is not the core business of NGOs but it could help them to become more effective. A few of the interviewees also indicated that they see blockchain as a threat, because to a certain degree, they themselves are a trusted third party. It would be of great value to further investigate this issue. Blockchain technology could potentially disintermediate the NGO sector as it allows donors to directly donate to local organisations who implement projects.

The interviews with institutional donors also showed that they find IATI to be unsuitable for blockchain technology. They find traditional technology to be capable for the application of IATI. It would be interesting to further research this issue and find out how blockchain technology could improve IATI. Given the fact that IATI is trying to capture all transactions that happen in the humanitarian aid sector, blockchain could be a suitable technology to facilitate this in a decentralised manner.

Another relevant area that requires additional research is the effect that the tracing of donations by individual donors has on the trust individual donors place in NGOs. Typically, trust of individual donors is damaged most by scandals as those evoke certain emotions among donors. It needs to be researched to what degree the ability of tracing donations can strengthen or repair damaged trust of individual donors. It could be that such a functionality incentivizes donors to donate, but does not actually increase the trust they place in NGOs.

The research has focussed on transparency and accountability as a way to improve trust of donors, and consequently to generate more funding through donations. Future research should also focus on other forms of generating funds. For instance, a system using blockchain technology and smart contracts could introduce a form of result-based funding where funds are distributed to NGOs based on results and not needs. This research could even be made broader by investigating how modern technologies could introduce new ways of generating funds by NGOs. The interviewees have indicated that it is challenging to reliably measure the impact of NGO activities. New technologies could help facilitate this in combination with impact measuring methods such as theory of change.

8 CONCLUSION

8.1 RESEARCH QUESTION 1

What challenges do NGOs currently face with regards to transparency and accountability?

The most prominent challenge when it comes to transparency and accountability, is to acquire appropriate data from the partner organisations with whom NGO work together to implement projects. Partner organisations often lack awareness on the importance of reporting data back to NGOs, and also struggle with using the multitude of different reporting methods and systems that are used by various NGOs and donors.

Another challenge faced by NGOs is that they find it difficult to reliably measure the results and impact of their activities. NGOs indicate that their activities are highly context dependent and therefore it is difficult to create a standardised method for measuring results, that allows to compare the performance of different projects and NGOs. This challenge applies to measuring direct impact of activities, but also to measuring long-term effects of for instance medical research or sustainable development projects. A sector wide investigation also confirmed that it is challenging to measure the impact of NGOs. However, there are methods that allow for the creation of tailored approaches to measuring impact of NGOs, such as theory of change.

NGOs also struggle with the potential safety and privacy risks that come with publishing certain transparency and accountability data. Publishing data about certain projects that are conducted in hazardous areas could incur safety risks to staff members of the NGO or its partner organisations. Additionally, it is also difficult to foresee the risks published data could have in the future. This means NGOs are often hesitant to release data about these projects.

8.2 RESEARCH QUESTION 2

What practices do NGOs currently use to be transparent and accountable?

Transparency and accountability practices of NGOs are mostly external and directed upward towards donors. The information that is being communicated generally concerns functional information about direct results, as opposed to strategic information about long-term effects and goals. Information is communicated using both formal and informal methods.

The most common transparency and accountability practice of NGOs is to publish an annual report that contains information about the projects and activities they conduct, as well as financial and budget information. Additionally, institutional donors often visit the projects they fund to see the progress that is being made. Furthermore, NGOs use certification by for instance the Dutch Fundraising Regulator as a way to show donors they are legitimate organisations.

The interviews also showed that NGOs are shifting increasingly from quantitative to qualitative transparency and accountability practices such as storytelling. As indicated earlier, it is difficult to measure the results of NGOs quantitatively. Qualitative measures also allow NGOs to provide donors with more context and reasoning behind their decisions.

Use of the IATI standard is also becoming much more prominent among NGOs. Most humanitarian organisations are already reporting using this standard, which is mostly because it has been made mandatory by the Dutch ministry of foreign affairs. While significant improvements still need to be made to the number of organisations that use the IATI standard, especially among partner organisations, it is already possible to use IATI data to get a high-level overview of the transactions and activities that take place in the NGO sector.

8.3 Research Question 3

In what ways can NGOs improve their transparency and accountability using blockchain technology?

Of the three transparency dimensions *disclosure, clarity* and *accuracy*, blockchain technology could potentially only make a contribution to the *accuracy* dimension. Data in the blockchain is immutable and the decentralised verification of data makes sure new data cannot contradict existing data. Due to the immutability, it is also impossible to modify incorrect data however, thereby decreasing accuracy. Flagging incorrect data and storing the corrected data is one way to mitigate this problem.

Considering the five blockchain opportunities *availability, accessibility, trust, cost saving / efficiency* and *transparency* in the context of NGOs, only the *trust,* and to a lesser extent, *transparency* opportunities could be utilised. The relationship between institutional donors and NGOs generally is trustful but in the relationship between individual donors and NGOs, improvements to trust can be made. This can be done by utilising blockchain technology to allow individual donors to trace their donations and to provide them with more accurate data.

The degree to which the *transparency* opportunity can be utilised, depends on the type of blockchain that is used. Both NGOs and institutional donors have indicated that they will not publish all their data in the blockchain as this would incur safety risks. Certain data will therefore not be stored in the blockchain, or its accessibility would need to be restricted using a private blockchain. Therefore, the transparency opportunity of blockchain technology is not fully utilised.

8.4 Research Question 4

What are potential functionalities of a blockchain based system that aims to help NGOs improve transparency and accountability?

The main contribution blockchain could make to the improvement of transparency and accountability of NGOs, is to allow donors to trace their donations. Donors would then be able to see the contribution their donation has made to a certain project. Both NGOs and institutional donors have indicated that this functionality would mostly benefit individual donors, as institutional donors already have the ability to find out what their donations were used for. Individual donors currently do not have this ability and are increasingly looking for feedback from NGOs about the impact of their donations. However, the tracing of donations would require a large adaptation to the current IT landscapes of NGOs. Donations currently end up on a large pool of funds that are then distributed among projects and partner organisations. It would require significant effort to allow for the tracing of a single donation throughout this process.

Another potential functionality is to use blockchain to allow beneficiaries to provide feedback on the aid they receive or on for instance surveys that they participated in. This way, NGOs and donors have

a better way of evaluating the impact of their projects. Additionally, beneficiaries could provide donors with information about their progress after a project has finished. This improves the involvement of donors with the beneficiaries they have helped.

In addition to storing transaction and activity data, the blockchain could also be used to store data about impact measurements, which could be directly accessed by NGOs and institutional donors. Currently, this data goes through multiple mutations before it reaches these two groups. Having access to the raw data would help them to assess the performance of projects.

In conjunction with blockchain, smart contracts could be used to allow donors to directly donate to a certain project. However, this functionality does not strictly require the use of blockchain and smart contracts as plenty of crowdfunding platforms already exist that function with traditional technologies.

8.5 General Conclusion

The research results have shown the capabilities of blockchain technology to contribute to transparency and accountability challenges of NGOs. Blockchain technology is still a maturing technology with significant potential. In the context of the NGO sector however, its potential is limited due to the way NGOs will intend to use the technology. NGOs require control over which data is published as some data may incur safety or privacy risks. This means that a private blockchain would need to be used. In essence, the blockchain would then be nothing more than a data store with only limited capabilities to prevent fraud and no significant benefits over traditional technologies when it comes to storing transparency and accountability data. The research has also shown that the most prominent reason for a decrease in trust from donors, namely scandals, cannot be prevented using blockchain technology.

Smart contracts can be used to allow donors to directly donate to certain projects. However, plenty of crowdfunding platforms already allow for this kind of functionality, without the use of blockchain technology or smart contracts. Nevertheless, smart contracts and blockchain could potentially be used to create a decentralised crowd funding platform, for which initiatives already exist. However, this would require a public blockchain that would be separate from the blockchain used to store transparency and accountability data.

The interviews with NGO employees have shown that there is resistance among NGOs to adopt this new technology. The interviewees pointed towards institutional donors as the ones who would need to initiate the creation of a blockchain. The interviewees of institutional donors on the other hand indicated that their needs are mostly already met by the IATI standard. They believed blockchain technology would be more suitable for verifying transactions at the end of the humanitarian aid chain, which would need to be initiated by NGOs themselves. This indicates the unwillingness in the NGO sector to adopt this new technology. Stakeholders point to each other to be the ones who should initiate adoption.

Furthermore, the interviews have shown that blockchain technology only has limited capabilities to prevent fraud in NGOs. The data that is stored in the blockchain would not be able to contradict existing data, but NGOs would not publish all their data in the blockchain due to safety risks. Therefore, validation would happen on an incomplete dataset. Additionally, the fact that NGOs have the ability to hide or anonymise certain data, also gives them the ability to hide fraudulent data. Moreover, the interviewees have indicated that it is not difficult to acquire receipts for all kinds of things and that

poor working conditions cause data throughput to be slow, incomplete and unreliable. It would therefore be challenging to detect fraud in these data.

Besides fraud, scandals such as sexual misconduct can cause significant damage to the trust of donors in NGOs. Blockchain technology cannot prevent such scandals. Furthermore, when such scandals become public, they evoke an emotional reaction among donors. Quantitative data about financial transactions and activities will not mitigate these emotions and restore trust.

The interviews have also shown that there are other ways to improve transparency and accountability. The main improvement can be made to the adoption and tooling around the IATI standard. More organisations should adopt the standard and dashboarding and analysis tools around IATI should be improved. Additionally, institutional donors indicate that the IATI standard is sufficient for their needs. Other methods to improve transparency and accountability include better training of staff, increasing the awareness around transparency and accountability, standardising impact measurements and reporting, and presenting information to donors more understandably.

The research has resulted in an iStar model that represents how transparency and accountability is currently practiced in the NGO sector. The model thereby gives an overview of the context in which a potential system for transparency and accountability would need to operate. This model allowed to create a list of user stories that describe the basic functionality that this system would need to be able to fulfil. Additionally, the literature review resulted in an assessment model that can be used to determine what the added value is of implementing blockchain technology to improve transparency and accountability in a given context. When the assessment model was applied in the context of NGOs, it became apparent that blockchain only has potential to increase trust of individual donors by allowing them to trace donations. However, it is not determined whether this functionality would indeed increase their trust. Furthermore, additional factors such as resistance in NGOs and the current complexity of the IT landscapes of NGOs would cause implementation of a blockchain system to be challenging.

Ultimately, this research has given a better understanding of how transparency and accountability are manifested in the NGO sector, and what the high-level requirements are of a system that would aim to improve transparency and accountability in this sector. Additionally, the research has shown that applying blockchain technology for this purpose would only have limited effect, require significant effort, and would not fully utilise the opportunities that blockchain technology has to offer.

REFERENCES

About the IATI Standard | International Aid Transparency Initiative - iatistandard.org. (n.d.). Retrieved February 28, 2019, from https://iatistandard.org/en/about/iati-standard/

Akhigbe, A., & Martin, A. D. (2006). Valuation impact of Sarbanes-Oxley: Evidence from disclosure and governance within the financial services industry. *Journal of Banking and Finance*, *30*(3), 989–1006.

Ammous, S. (2016). Blockchain Technology: What is it good for? *IEEE Design and Test of Computers*.

Andrews, A. (2014). Downward Accountability in Unequal Alliances: Explaining NGO Responses to Zapatista Demands. *World Development*, *54*, 99–113.

Angulo, A., Nacthmann, H., & Walker, M. A. (2004). Supply chain information sharing in a vendor managed inventory partnership. *Journal of Business Logistics*, *25*(1), 101–120.

Awasthy, P., Gopakumar, K. V., Gouda, S. K., & Haldar, T. (2019). Trust in humanitarian operations: a content analytic approach for an Indian NGO. *International Journal of Production Research*, 1–16.

Baliga, A. (2016). The Blockchain Landscape. *Persistent Systems Ltd*.

Baliga, A. (2017). Understanding Blockchain Consensus Models. *Persistent Systems Ltd.*

Bashir, I. (2017). *Mastering Blockchain*. Packt Publishing Ltd.

Bauerle, N. (n.d.). What are Blockchain's Issues and Limitations? Retrieved April 2, 2019, from https://www.coindesk.com/information/blockchains-issues-limitations

Boggs, R., & Bozman, J. S. (2009). Reducing Downtime and Business Loss: Addressing Business Risk with Effective Technology. *IDC, Tech. Rep.*

Bovens, M. (2007). Analysing and Assessing Accountability: A Conceptual Framework. *European Law Journal*, *13*(4), 447–468.

Brest, P. (2010). The Power of Theories of Change. *Stanford Social Innovation Review*, *8*(2), 47–52.

Burchell, J., & Cook, J. (2007). Stakeholder dialogue and organisational learning: changing relationships between companies and NGOs. *Business Ethics: A European Review*, *17*(1), 35–46.

Bushman, R. M., Piotroski, J. D., & Smith, A. J. (2004). What Determines Corporate Trans Pareney? *Journal of Accounting Research*, *42*(2), 207–252.

Buterin, V. (2014). A next-generation smart contract and decentralized application platform. *White Paper*.

Buterin, V. (2015). On Public and Private Blockchains. Retrieved April 21, 2018, from https://blog.ethereum.org/2015/08/07/on-public-and-private-blockchains/

Castor, A. (2017). No A (Short) Guide to Blockchain Consensus Protocols. Retrieved April 1, 2019, from https://www.coindesk.com/short-guide-blockchain-consensus-protocols

CBF, PwC, & Impact Centre Erasmus. (2017). *Impact Challenge*.

Cocco, L., Pinna, A., & Marchesi, M. (2017). Banking on blockchain: Costs savings thanks to the blockchain technology. *Future Internet*, *9*(3), 1–20.

Connolly, C., & Hyndman, N. (2013). Charity accountability in the UK: Through the eyes of the donor.

Qualitative Research in Accounting and Management, *10*(3/4), 259–278.

Curtin, D., & Meijer, A. J. (2018). Does transparency strengthen legitimacy? *Information Polity*, *11*(2), 109–122.

Dalpiaz, F., Franch, X., & Horkoff, J. (2016). iStar 2.0 Language Guide.

Dixon, R., Ritchie, J., & Siwale, J. (2006). Microfinance: accountability from the grassroots. *Accounting, Auditing & Accountability Journal*, *19*(3), 405–427.

Duffy, B. J. (2019). Accountability : The Foundation of Trust in Public Administration. *American Society for Public Administration*.

Ebrahim, A. (2003). Accountability in practice: Mechanisms for NGOs. *World Development*, *31*(5), 813–829.

Ebrahim, A. (2005). *NGOs and Organizational Change: Discourse, Rporting, and Learning*. Cambridge: Cambridge University Press.

Edwards, M., & Hulme, D. (1995). *Non-Governmental Organisations - Performance and Accountability: Beyond the Magic Bullet*. London: Routledge.

Fast, L. A. (2007). Characteristics, context and risk: NGO insecurity in confict zones. *Disasters*, *31*(2), 130–154.

Fast, L. A. (2010). Mind the gap: Documenting and explaining violence against aid workers. *European Journal of International Relations*, *16*(3), 365–389.

Galen, D., Brand, N., Boucherle, L., Davis, R., Do, N., El-Baz, B., … Wharton, K. (2018). Blockchain for Social Impact: Moving Beyong the Hype. *Center for Social Innovation, RippleWorks.*

garbage in garbage out. (n.d.). Retrieved April 1, 2019, from http://www.oxfordreference.com/view/10.1093/oi/authority.20110803095842747

Gaventa, J., & Mcgee, R. (2013). The impact of transparency and accountability initiatives. *Development Policy Review*, *31*, s3–s28.

GDPR Key Changes. (2018). Retrieved May 20, 2018, from https://www.eugdpr.org/key-changes.html

Gibelman, M., & Gelman, S. R. (2001). Very public scandals: Nongovernmental organizations in trouble. *Voluntas: International Journal of Voluntary and Nonprofit Organizations*, *12*(1), 49–66.

Gibelman, M., & Gelman, S. R. (2004). A loss of credibility: Patterns of wrongdoing among nongovernmental organizations. *Voluntas: International Journal of Voluntary and Nonprofit Organizations*, *15*(4), 355–381.

Hofmann, C., Roberts, L., Shoham, J., & Harvey, P. (2004). *Measuring the impact of humanitarian aid: a review of current practice*. London: Overseas Development Institute.

Home - iatistandard.org. (n.d.). Retrieved February 28, 2019, from https://iatistandard.org/en/

ICCO Cooperation. Exclusion Policy for IATI (2017).

Jeppsson, A., & Olsson, O. (2017). *Blockchains as a solution for traceability and transparency*. Lund University.

Jepson, P. (2005). Governance and accountability of environmental NGOs. *Environmental Science and Policy*, *8*(5), 515–524.

Jordi-Herrera-Joancomartí, & Pérez-Solà, C. (2016). Privacy in Bitcoin Transactions: New Challenges from Blockchain Scalability Solutions. In *International Conference on Modeling Decisions for Artificial Intelligence* (pp. 26–44). Springer, Cham.

Kepplinger, H. M., Geiss, S., & Siebert, S. (2012). Framing Scandals: Cognitive and Emotional Media Effects. *Journal of Communication*, *62*(4), 659–681.

Kruijff, J. de, & Weigand, H. (2017). Understanding the Blockchain Using Enterprise Ontology. In *International Conference on Advanced Information Systems Engineering* (pp. 29–43). Springer, Cham.

Lehr-Lehnardt, R. (2005). NGO legitimacy: reassessing democracy, accountability and transparency. In *Cornell Law School Inter-University …* (p. 6).

Linders, D. (2013). Towards open development: Leveraging open data to improve the planning and coordination of international aid. *Government Information Quarterly*, *30*(4), 426–434.

Lucassen, G., Dalpiaz, F., Van Der Werf, J. M. E. M., & Brinkkemper, S. (2015). Forging high-quality User Stories: Towards a discipline for Agile Requirements. In *2015 IEEE 23rd International Requirements Engineering Conference, RE 2015 - Proceedings* (pp. 126–135). IEEE.

Luu, L., Chu, D.-H., Olickel, H., Saxena, P., & Hobor, A. (2016). Making Smart Contracts Smarter. In *Proceedings of the 2016 ACM SIGSAC Conference on Computer and Communications Security - CCS'16* (pp. 254–269). ACM.

Masdar, N. M. H. (2015). The Practices of Upward Accountability in the Malaysian NGO. *Procedia Economics and Finance*, *31*, 152–160.

Mayer, R. C., Davis, J. H., & Schoorman, F. D. (1995). An Integrative Model of Organizational Trust. *The Academy of Management ReviewAcademy of Management*, *20*(3), 709–734.

McGann, J., & Johnstone, M. (2005). The Power Shift and the NGO Credibility Crisis. *The Brown Journal of World Affairs*, *11*(2), 159–172.

Mcgee, R. (2013). Aid transparency and accountability: "Build it and they'll come"? *Development Policy Review*, *31*(S1), 107–124.

Nakamoto, S. (2008). Bitcoin: A Peer-to-Peer Electronic Cash System.

Ngoiya, F. (2004). Multiple Accountabilities, Autonomy and Performance of Executive Agencies: a Comparison of Tanzanian National Road Agency (TANROADS) and The UK Highways Age. In *The Second Africa Technology Transfer Conference Pietermaritzburg* (pp. 1–51).

O'Dwyer, B., & Unerman, J. (2008). The paradox of greater NGO accountability: A case study of Amnesty Ireland. *Accounting, Organizations and Society*, *33*(7–8), 801–824.

Oloruntoba, R., & Gray, R. (2006). Humanitarian aid: An agile supply chain? *Supply Chain Management: An International Journal*, *11*(2), 115–120.

Parker, L. D., & Guthrie, J. (1993). The Australian public sector in the 1990s: New accountability regimes in motion. *Journal of International Accounting, Auditing and Taxation*, *2*(1), 59–81.

Pilkington, M. (2015). Blockchain Technology: Principles and Applications. *Research Handbook on Digital Transformations*, 1–39.

Puthal, D., Malik, N., Mohanty, S. P., Kougianos, E., & Yang, C. (2018). The Blockchain as a Decentralized Security Framework [Future Directions]. *IEEE Consumer Electronics Magazine*, *7*(2), 18–21.

Schnackenberg, A. K., & Tomlinson, E. C. (2016). Organizational Transparency: A New Perspective on Managing Trust in Organization-Stakeholder Relationships. *Journal of Management*, *42*(7), 1784–1810.

Spremic, M., Bajgorić, N., & Turulja, L. (2013). Implementation of it governance standards and business continuity management in transition economies: The case of banking sector in Croatia and Bosnia-Herzegovina. *Economic Research-Ekonomska Istraživanja*, *26*(1), 183–202.

Street, C. T., & Meister, D. B. (2017). Small business growth and internal transparency: the role of information systems. *MIS Quarterly*, *28*(3), 473–506.

Szabo, N. (1996). Smart Contracts: Building Blocks for Digital Markets. *EXTROPY: The Journal of Transhumanist Thought*.

Taplin, D., & Clark, H. (2012). Theory of change basics: A primer on theory of change. *New York: ActKnowledge*.

Unerman, J., & Bennett, M. (2004). Increased stakeholder dialogue and the internet: Towards greater corporate accountability or reinforcing capitalist hegemony? *Accounting, Organizations and Society*, *29*(7), 685–707.

Vaccaro, A. (2006). Privacy, security, and transparency: ICT-related ethical perspectives and contrasts in contemporary firms. *IFIP International Federation for Information Processing*, *208*(Tavani 2004), 245–258.

Vaccaro, A., & Madsen, P. (2006). Firm Information Transparency: Ethical Questions in the Information Age. *Libraries: Network, Socialize, Transform. Rhode Island Library Association Annual Conference*, *223*, 145–156.

Vaccaro, A., & Madsen, P. (2009a). Corporate dynamic transparency: The new ICT-driven ethics? *Ethics and Information Technology*, *11*(2), 113–122.

Vaccaro, A., & Madsen, P. (2009b). ICT and an NGO: Difficulties in attempting to be extremely transparent. *Ethics and Information Technology*, *11*(3), 221–231.

Van Den Broeck, J., Cunningham, S. A., Eeckels, R., & Herbst, K. (2005). Data cleaning: Detecting, diagnosing, and editing data abnormalities. *PLoS Medicine*, *2*(10), e267.

Vu, T. T., & Deffains, B. (2013). Formal and Informal Mechanisms of Accountability in Local Governance. Towards a New Authoritarian Governance Model. *Business Systems Review*, *2*(2), 330–367.

Webster, J., & Watson, R. T. (2010). Analyzing the Past To Prepare for the Future : Writing a Review. *Management Information Systems Quarterly*, *26*(2).

Wickrama, K. (2012). TEDxGenevaChange - Katharina Samara Wickrama - Accountable aid [Video file]. Retrieved April 3, 2018, from https://www.youtube.com/watch?v=ep7RWMI0YbE

Wieringa, R. (2014). *Design Science Methodology for Information Systems and Software Engineering*. *Proceedings of the 32nd ACM/IEEE International Conference on Software Engineering - ICSE '10* (Vol. 2). Springer-Verlag Berlin Heidelberg.

Wilkinson, S., Boshevski, T., Brandoff, J., Prestwich, J., Hall, G., Gerbes, P., … Pollard, C. (2014). Storj A Peer-to-Peer Cloud Storage Network. *Technical Report, Storj.Io*, 1–37.

Williams, C. C. (2008). Toward a taxonomy of corporate reporting strategies. *Journal of Business Communication*, *45*(3), 232–264.

Winkler, B. (2000). Which kind of transparency? On the need for clarity in monetary policy-making. *European Central Bank Working Paper Series*.

Wohlin, C. (2014). Guidelines for snowballing in systematic literature studies and a replication in software engineering. In *Proceedings of the 18th International Conference on Evaluation and Assessment in Software Engineering - EASE '14* (p. 38). ACM.

Wüst, K., & Gervais, A. (2018). Do you need a Blockchain? In *2018 Crypto Valley Conference on Blockchain Technology (CVCBT)* (pp. 45–54). IEEE.

Yin, R. K. (2015). *Qualitative research from start to finish*. Guilford Publications.

Zheng, Z., Xie, S., Dai, H., Chen, X., & Wang, H. (2017). An Overview of Blockchain Technology: Architecture, Consensus, and Future Trends. In *Proceedings - 2017 IEEE 6th International Congress on Big Data, BigData Congress 2017* (pp. 557–564). IEEE.

APPENDICES

APPENDIX A - INTERVIEW PROTOCOL NGOS

Interview Protocol

Research project: bringing transparency and accountability to NGOs through blockchain technology

Interview overview:

1 Introduction
2 Interviewee and organisation background
3 Current transparency and accountability practices and issues
4 Introduction to blockchain
5 Potential of blockchain to increase transparency and accountability in NGOs
6 Potential functionalities of a blockchain system
7 Feasibility of a blockchain system

9 Introduction

1. Explain the purpose and context of the research to the interviewee
    - Master thesis for Master of Business Informatics at Utrecht University
    - Exploring possibilities of blockchain technology to improve transparency and accountability in NGOs
    - Identifying functionalities, challenges, benefits and drawbacks of a blockchain based system for NGOs
    - Determining feasibility of such a blockchain system
2. Ask the interviewee for permission to record the interview
3. Let the interviewee sign the informed consent form

10 Interviewee and organisation background

IQ-1. What are your current tasks and responsibilities within your organisation?

IQ-2. For how long have you been working at this organisation?

11 Current transparency and accountability practices and issues

Explain the concepts of transparency and accountability to the interviewee, make sure she/he fully understands the concepts in relation to their own organisation.

Definition accountability: This refers to the practice of account giving. There is a relationship between an NGO and its stakeholders, such as donors and beneficiaries. The NGO has the obligation to explain and to justify its conduct while the stakeholders can pose questions and

pass judgement. The NGO may face consequences based on the interactions in this relationship.

Definition transparency: "The perceived quality of intentionally shared information from a sender" (Schnackenberg & Tomlinson, 2016) Transparency therefore refers to how a stakeholder perceives the information that is shared by an NGO. Transparency has three dimensions:

1. *Disclosure: "deliberate, timely and formal release of voluntary or required information" (Williams, 2008)*
2. *Clarity: refers to the comprehensibility of the shared information, information should be presented clearly and understandable in order for the organisation to be considered transparent.*
3. *Accuracy: refers to the correctness and reliability of shared information, as perceived by the receiver.*

IQ-3. Could you explain to me how your organisation is currently trying to be transparent and accountable? To whom are these practices targeted (beneficiaries/benefactors)?

IQ-4. What are the main issues your organisation experiences when dealing with transparency and accountability? What are the causes of these issues?

IQ-5. How important is it to your organisation to improve transparency and accountability? Why is this important/unimportant?

IQ-6. Do you think your organisation would benefit from improving transparency and accountability?

IQ-7. Is your organisation willing to invest in improving transparency and accountability?

12 Introduction to blockchain

Discuss the interviewee's current knowledge about blockchain technology and fill any knowledge gaps.

Definition blockchain: a peer-to-peer, immutable, transparent, decentralized, distributed digital ledger. It is an online ledger which performs transaction peer-to-peer and that can be accessed by anyone. Transactions are validated using a consensus algorithm and cannot be altered once they are stored in the blockchain. This gives the following benefits:

1. *Transparency: transactions are visible to anyone.*
2. *Accuracy: data stored in the blockchain is always the truth as it is immutable and the result of a consensus algorithm.*
3. *Speed: disintermediation will make processes more efficient and faster.*
4. *Disintermediation: there is no more need for a third party such as bank or government to authenticate transactions.*

IQ-8. Could you explain whether your organisation is currently involved in implementing blockchain technology in any part of inside or outside the organisation?

13 Potential of blockchain to improve transparency and accountability in NGOs

IQ-9. How do you think blockchain technology could improve transparency in your organisation?

IQ-10. How do you think blockchain technology could help your organisation to become more accountable?

14 Potential functionalities of a blockchain system

IQ-11. A blockchain could be used to store all data about the organisation's transactions and activities. If this blockchain is public, this would make the organisation completely transparent. What are your thoughts on such a blockchain system? *(Is a private blockchain a better solution?)*

IQ-12. A blockchain that stores information about all activities and the expenditure of funds can be used to show donors in detail how their donations are used. How do you think this would impact the trust your organisation's donors have in your organisation?

IQ-13. Having a blockchain that is used by multiple NGOs to store data about their conduct would allow for the benchmarking of these NGOs relative to each other. What do you think about such a benchmarking functionality?

IQ-14. Such a blockchain could also be used to improve and standardize reporting across NGOs. How do you think this would influence your organisation?

Explain the concept of smart contracts to the interviewee

Definition smart contracts: digital contracts with rules and agreements that are executed automatically and that are stored in the blockchain. After creating a contract, its content can be viewed but cannot be changed. Allows to automate processes and create complex applications on top of a blockchain. Ethereum is a prime example of a blockchain with smart contract support. It has a turing-complete programming language called Solidity which enables the creation of smart contract applications, also called decentralized applications due to the decentralized nature of blockchain.

IQ-15. Currently, donors have no real say in how their donations are used. The combination of smart contracts and blockchain would allow donors to make donations and to set certain criteria that state for what purpose that donation should be used. What are your thoughts regarding such a functionality? *(Is it a good idea to give donors this option?)*

IQ-16. Can you think of any other functionalities of a blockchain system that would benefit your organisation? *(for instance: improved knowledge sharing within the organisation)*

15 Challenges of a blockchain system

IQ-17. One of blockchain's main characteristics is that it is immutable, so data that goes into the blockchain cannot be removed. Do you see any issues that this could present? *(for instance: GDPR incompatibility, right to be forgotten)*

IQ-18. Having a blockchain where all data about the organisation's conduct is stored would give less control over what information is released to the public. Do you see any issues with this? *(for instance: privacy concerns, misconduct made public)*

IQ-19. A possible danger of completely transparent NGOs is that they become motivated to perform well according to the criteria of the blockchain, instead of to actually delivering the best aid that they can. How do you think such a blockchain system could incentivize NGOs to deliver the best possible aid?

16 Feasibility of a blockchain system

IQ-20. What are your thoughts regarding the feasibility of creating such a blockchain system? What are the main issues you see? *(Is it something the organisation would be interested in?)*

IQ-21. Can you think of ways to improve transparency and accountability in NGOs without the use of blockchain technology? *(What is the added value of blockchain technology?)*

IQ-22. Do you have any final remarks concerning the topics we discussed?

17 Closing

1. Close the interview by thanking the interviewee for participating.
2. Explain what will happen with the interview and that the results of the research will be shared with him/her.
3. Share some information about other blockchain research conducted at UU. (e.g. Jacco's DSS).

References

Williams, C. C. (2008). Toward a taxonomy of corporate reporting strategies. *Journal of Business Communication*, *45*(3), 232–264. http://doi.org/10.1177/0021943608317520

Schnackenberg, A. K., & Tomlinson, E. C. (2016). Organizational Transparency: A New Perspective on Managing Trust in Organization-Stakeholder Relationships. *Journal of Management*, *42*(7), 1784–1810. http://doi.org/10.1177/0149206314525202

APPENDIX B - INTERVIEW PROTOCOL DONORS

Interview Protocol

Research project: bringing transparency and accountability to NGOs through blockchain technology

Interview overview:

1 Introduction
2 Interviewee and organisation background
3 Current transparency and accountability practices and issues
4 Introduction to blockchain
5 Potential of blockchain to increase transparency and accountability in NGOs
6 Potential functionalities of a blockchain system
7 Challenges of a blockchain system
8 Feasibility of a blockchain system
9 Closing

18 Introduction

4. Explain the purpose and context of the research to the interviewee
    - Master thesis for Master of Business Informatics at Utrecht University
    - Exploring possibilities of blockchain technology to improve transparency and accountability in NGOs
    - Identifying functionalities, challenges, benefits and drawbacks of a blockchain based system for NGOs
    - Determining feasibility of such a blockchain system
5. Ask the interviewee for permission to record the interview
6. Let the interviewee sign the informed consent form

19 Interviewee and organisation background

IQ-23. What are your current tasks and responsibilities within your organisation?

IQ-24. For how long have you been working at this organisation?

20 Current transparency and accountability practices and issues

Explain the concepts of transparency and accountability to the interviewee, make sure she/he fully understands the concepts in relation to their own organisation.

Definition accountability: This refers to the practice of account giving. There is a relationship between an NGO and its stakeholders, such as donors and beneficiaries. The NGO has the obligation to explain and to justify its conduct while the stakeholders can pose questions and pass judgement. The NGO may face consequences based on the interactions in this relationship.

Definition transparency: "The perceived quality of intentionally shared information from a sender" (Schnackenberg & Tomlinson, 2016) Transparency therefore refers to how a stakeholder perceives the information that is shared by an NGO. Transparency has three dimensions:

4. *Disclosure: "deliberate, timely and formal release of voluntary or required information" (Williams, 2008)*
5. *Clarity: refers to the comprehensibility of the shared information, information should be presented clearly and understandable in order for the organisation to be considered transparent.*
6. *Accuracy: refers to the correctness and reliability of shared information, as perceived by the receiver.*

IQ-25. Could you explain to me how your organisation is currently trying to be transparent and accountable? To whom is this targeted?

IQ-26. In what ways does your organisation gather transparency and accountability data from partner organisations?

IQ-27. What are the main issues your organisation experiences when attempting to be transparent or when gathering data from partners?

IQ-28. How important is it to your organisations to improve transparency and accountability of your own organisation and of your partners?

IQ-29. Do you think your organisation could benefit from improving transparency and accountability of your own organisation or that of partners?

IQ-30. Is your organisation actively investing in improving transparency and accountability?

21 Introduction to blockchain

Discuss the interviewee's current knowledge about blockchain technology and fill any knowledge gaps.

Definition blockchain: a peer-to-peer, immutable, transparent, decentralized, distributed digital ledger. It is an online ledger which performs transaction peer-to-peer and that can be accessed by anyone. Transactions are validated using a consensus algorithm and cannot be altered once they are stored in the blockchain. This gives the following benefits:

5. *Transparency: transactions are visible to anyone.*

6. *Accuracy: data stored in the blockchain is always the truth as it is immutable and the result of a consensus algorithm.*
7. *Speed: disintermediation will make processes more efficient and faster.*
8. *Disintermediation: there is no more need for a third party such as bank or government to authenticate transactions.*

IQ-31. Could you explain whether your organisation is currently involved in implementing blockchain technology in any part of inside or outside the organisation?

22 Potential of blockchain to improve transparency and accountability

IQ-32. How do you think blockchain technology could improve transparency and accountability of your organisation?

IQ-33. How do you think blockchain technology could improve transparency and accountability of partner organisations?

23 Potential functionalities of a blockchain system

IQ-34. A blockchain could be used to store all data about the organisation's transactions and activities. If this blockchain is public, this would make the organisation completely transparent. What are your thoughts on such a blockchain system? *(Is a private blockchain a better solution?)*

IQ-35. A blockchain that stores information about all activities and the expenditure of funds can be used to show donors of NGOs in detail how their donations are used. Would this be something your organisation would be interested in from partners?

IQ-36. Having a blockchain that is used by multiple NGOs to store data about their conduct would allow for the benchmarking of these NGOs relative to each other. What do you think about such a benchmarking functionality?

IQ-37. Such a blockchain could also be used to improve and standardize reporting across NGOs. How do you think this will impact your organisation?

Explain the concept of smart contracts to the interviewee

Definition smart contracts: digital contracts with rules and agreements that are executed automatically and that are stored in the blockchain. After creating a contract, its content can be viewed but cannot be changed. Allows to automate processes and create complex applications on top of a blockchain. Ethereum is a prime example of a blockchain with smart contract support. It has a turing-complete programming language called Solidity which enables the creation of smart contract applications, also called decentralized applications due to the decentralized nature of blockchain.

IQ-38. The combination of smart contracts and blockchain would allow donors to make donations and to set certain criteria that state for what purpose that donation should be used. What are your thoughts regarding such a functionality?

IQ-39. Can you think of any other functionalities of a blockchain system that would benefit your organisation? *(for instance: improved knowledge sharing within the organisation)*

24 Challenges of a blockchain system

IQ-40. One of blockchain's main characteristics is that it is immutable, so data that goes into the blockchain cannot be removed. Do you see any issues that this could present? *(for instance: GDPR incompatibility, right to be forgotten)*

IQ-41. Having a blockchain where all data about the organisation's conduct is stored would give less control over what information is released to the public. Do you see any issues with this? *(for instance: privacy concerns, misconduct made public)*

IQ-42. A possible danger of completely transparent NGOs is that they become motivated to perform well according to the criteria of the blockchain, instead of actually delivering the best aid that they can. How do you think such a blockchain system could incentivize NGOs to deliver the best possible aid?

25 Feasibility of a blockchain system

IQ-43. What are your thoughts regarding the feasibility of creating such a blockchain system? What are the main issues you see? *(Is it something the organisation would be interested in?)*

IQ-44. Can you think of ways to improve transparency and accountability of your organisation and that of partners without the use of blockchain technology? *(What is the added value of blockchain technology?)*

IQ-45. Do you have any final remarks concerning the topics we discussed?

26 Closing

4. Close the interview by thanking the interviewee for participating.
5. Explain what will happen with the interview and that the results of the research will be shared with him/her.
6. Share some information about other blockchain research conducted at UU. (e.g. Jacco's DSS).

References

Williams, C. C. (2008). Toward a taxonomy of corporate reporting strategies. *Journal of*

Business Communication, *45*(3), 232–264. http://doi.org/10.1177/0021943608317520
Schnackenberg, A. K., & Tomlinson, E. C. (2016). Organizational Transparency: A New Perspective on Managing Trust in Organization-Stakeholder Relationships. *Journal of Management*, *42*(7), 1784–1810. http://doi.org/10.1177/0149206314525202

APPENDIX C - INFORMED CONSENT FORM NGOS

Informed Consent Form

Research project: research into the potential of blockchain technology to improve transparency and accountability within non-governmental organisations (NGOs)

The interviewee states:

- I voluntarily agree to participate in the research project
- I agree that I will not be paid for my participation
- I have been informed of the nature of the research project
- I understand that my participation in the research project involves being interviewed twice
- I understand that I can withdraw my participation in the research project at any given time
- I agree that the interviews will be audio recorded and transcribed
- I understand that data gathered from my participation can be used in a scientific publication

Anonymity:

- ○ The interviewee wants to remain anonymous
- ○ The interviewee's organisation wants to remain anonymous

Interviewer: Matthijs Teerlink

Date:

Signature:

Interviewee:

Organisation:

Date:

Signature:

APPENDIX D - INFORMED CONSENT FORM DONORS

Informed Consent Form

Research project: research into the potential of blockchain technology to improve transparency and accountability within non-governmental organisations (NGOs)

The interviewee states:

- I voluntarily agree to participate in the research project
- I agree that I will not be paid for my participation
- I have been informed of the nature of the research project
- I understand that my participation in the research project involves being interviewed once
- I understand that I can withdraw my participation in the research project at any given time
- I agree that the interviews will be audio recorded and transcribed
- I understand that data gathered from my participation can be used in a scientific publication

Anonymity:

- ○ The interviewee wants to remain anonymous
- ○ The interviewee's organisation wants to remain anonymous

Interviewer: Matthijs Teerlink

Date:

Signature:

Interviewee:

Organisation:

Date:

Signature:

APPENDIX E - TERM EXPLANATION DOCUMENT

Extra uitleg termen

Transparantie
Transparantie heeft hoofdzakelijk te maken met het delen van informatie met de buitenwereld door een partij. In de context van NGO's betreft dit vooral het delen van informatie over activiteiten en het gebruik van donatiegelden. Het delen van deze informatie is belangrijk voor NGO's omdat het aan potentiële donoren laat zien dat zij een legitieme organisatie zijn en bij bestaande donoren schept het vertrouwen. Daarnaast is het delen van deze informatie vaak een vereiste van donoren en toezichthouders/keurmerken.

Bij het delen van de informatie, is het vooral belangrijk hoe belanghebbenden van de NGO de informatie interpreteren. Als de informatie niet goed begrepen kan worden of als onbetrouwbaar wordt gezien, kan dit de NGO juist schaden. Hierbij zijn een aantal factoren van belang. Ten eerste is het belangrijk dat de informatie tijdig en op een formele wijze gedeeld wordt. Ten tweede moet de informatie op een wijze gepresenteerd worden zodat deze gemakkelijk te begrijpen is voor belanghebbenden. Als laatste is het van belang dat de informatie correct en betrouwbaar is.

Accountability
Accountability refereert aan het afleggen van verantwoording door een organisatie voor haar activiteiten. In de context van NGO's betreft dit het verantwoorden van activiteiten en hoe donorgelden worden gespendeerd richting belanghebbenden. De belanghebbenden hebben dan de mogelijkheid om vragen te stellen en een oordeel te vellen. Op deze manier zijn NGO's aansprakelijk voor de gevolgen van hun acties.

Het afleggen van verantwoording kan op verschillende manieren en met verschillende intenties plaatsvinden. Een NGO kan dit bijvoorbeeld doen richting donoren of begunstigden. In de meeste gevallen kiezen NGO's ervoor om te focussen op het verantwoorden richting donoren omdat deze groep het belangrijkste is voor de NGO. Donoren hebben in veel gevallen de meeste financiële waarde voor NGO's en het afleggen van verantwoording is een goede manier om het vertrouwen in de organisatie onder deze groep te vergroten.

Blockchain
Blockchain is de technologie achter cryptocurrencies zoals Bitcoin. Het is een technologie die gebruik maakt van bestaande peer-to-peer technologie en cryptografie om transacties op een veilige en decentrale, gedistribueerde manier op te slaan.

Een publieke blockchain zoals de Bitcoin blockchain is volledig open, waardoor iedereen de inhoud van de blockchain kan zien en ook deel kan nemen aan het netwerk. De transacties in het netwerk vinden plaats direct tussen twee partijen(peer-to-peer) en zijn ook zichtbaar voor alle andere deelnemers(nodes). Uiteraard moeten transacties wel altijd geverifieerd worden om te bepalen of zij geldig zijn. In traditionele systemen zijn hier derde partijen zoals bijvoorbeeld banken of overheidsinstanties voor nodig. In een blockchain zijn deze derde partijen niet meer nodig omdat de verificatie van transacties plaatsvindt in het netwerk zelf. Een zogenaamd consensus algoritme zorgt ervoor dat transacties door alle nodes in het

netwerk geverifieerd worden. Op het moment dat minimaal 51% van alle nodes een transactie goedgekeurd heeft, is de transactie valide en wordt deze in de blockchain opgeslagen.

Het opslaan van transacties gebeurt door meerdere transacties te bundelen in een 'block'. Door middel van cryptografie worden deze blocks aan elkaar gekoppeld waardoor een ketting van blocks ontstaat: de blockchain. Dit mechanisme zorgt ervoor dat wanneer één block in de ketting gewijzigd wordt, alle daaropvolgende blocks ook gewijzigd moeten worden. Aangezien iedere node in het netwerk zijn eigen kopie van de blockchain heeft, kan zo'n wijziging alleen in de blockchain opgenomen worden wanneer 51% van de nodes deze wijziging overnemen. Het is hierdoor onmogelijk om transacties nog te wijzigen wanneer deze eenmaal zijn opgeslagen in de blockchain. Ook is het onmogelijk voor hackers om de blockchain te hacken; er is niet meer één centrale locatie waar de blockchain is opgeslagen die gehackt kan worden.

Het gebruik van blockchain technologie heeft veel voordelen waarvan de volgende de belangrijkste zijn:

1. Transparantie: de blockchain is open en de inhoud is zichtbaar voor iedereen.
2. Accuraat: de data die opgeslagen is in de blockchain is altijd accuraat aangezien deze geverifieerd is door een meerderheid van het netwerk en het onmogelijk is de data aan te passen of te hacken.
3. Snelheid: doordat een blockchain niet meer afhankelijk is van derde partijen kunnen processen efficiënter en sneller verlopen.
4. Veiligheid: doordat een blockchain gedistribueerd is en gebruik maakt van cryptografie is het onmogelijk om de blockchain te hacken of de data te wijzigen.

Smart Contracts

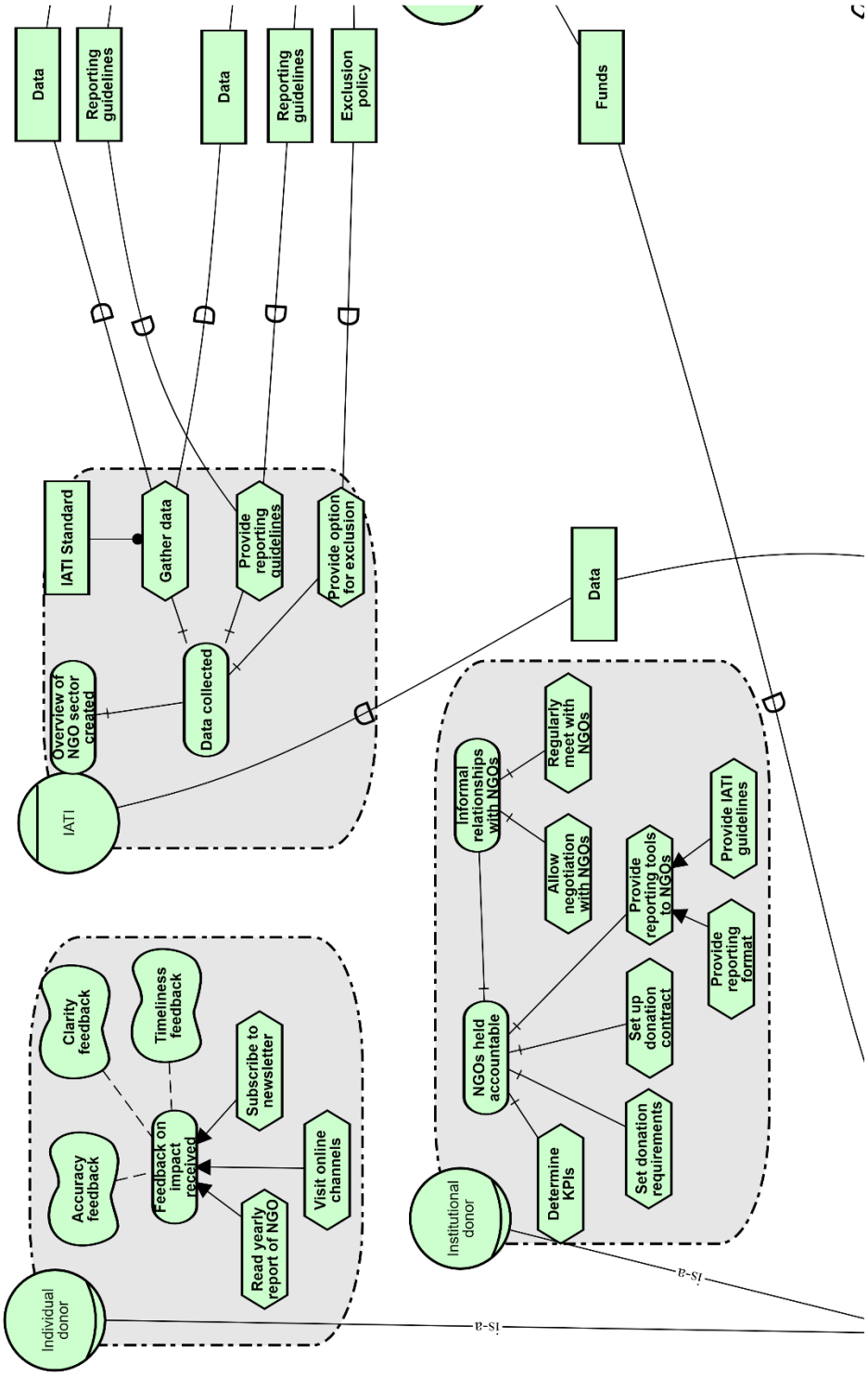
Een smart contract is een digitaal contract dat automatisch uitgevoerd kan worden. Net als in traditionele contracten, kan het contract regels en afspraken bevatten tussen partijen, alleen zijn deze nu vastgelegd in een programmeertaal. Dit zorgt ervoor dat wat vastgelegd is in het contract, automatisch uitgevoerd kan worden zonder de tussenkomst van bijvoorbeeld een notaris. In combinatie met blockchain technologie worden de smart contracts in de blockchain opgeslagen. Wanneer een smart contract eenmaal is opgeslagen, kan deze nog wel worden ingezien, maar niet meer worden aangepast. Het blockchain netwerk voert het contract vervolgens automatisch uit.

Het gebruik van smart contracts geeft de mogelijkheid om veel processen te automatiseren zonder dat er nog een derde partij nodig is. Een goed voorbeeld is het automatiseren van een crowdfunding platform zoals Kickstarter. Wanneer financiers een project willen steunen sturen zij in het huidige systeem geld naar Kickstarter. Op het moment dat het project zijn financieringsdoel heeft bereikt, geeft Kickstarter het geld van de financiers aan het projectteam. Een systeem dat smart contracts gebruikt zou de rol van Kickstarter echter kunnen automatiseren. In zo'n systeem zou het geld van een financier vastgehouden worden in een smart contract. Pas op het moment dat het financieringsdoel van het project is behaald, stuurt het smart contract het geld van de financier naar het projectteam. Mocht het financieringsdoel niet bereikt worden, dan geeft het smart contract het geld terug aan de

financier en ontvangt het projectteam niks. In essentie wordt er zo een tussenpartij overgeslagen, wat veel geldbesparing en efficiëntie met zich mee kan brengen.

Smart contracts maken het mogelijk om complexe applicaties te bouwen die gebruik maken van een blockchain netwerk. Doordat een blockchain een decentraal netwerk is, worden deze smart contract applicaties ook wel *decentralized applications* genoemd. Er zijn op dit moment al meerdere blockchain platforms die het gebruik van smart contracts ondersteunen. Het bekendste voorbeeld is de Ethereum blockchain, waar op dit moment (17-07-2018) al 1708 applicaties op draaien.

Upper left part:



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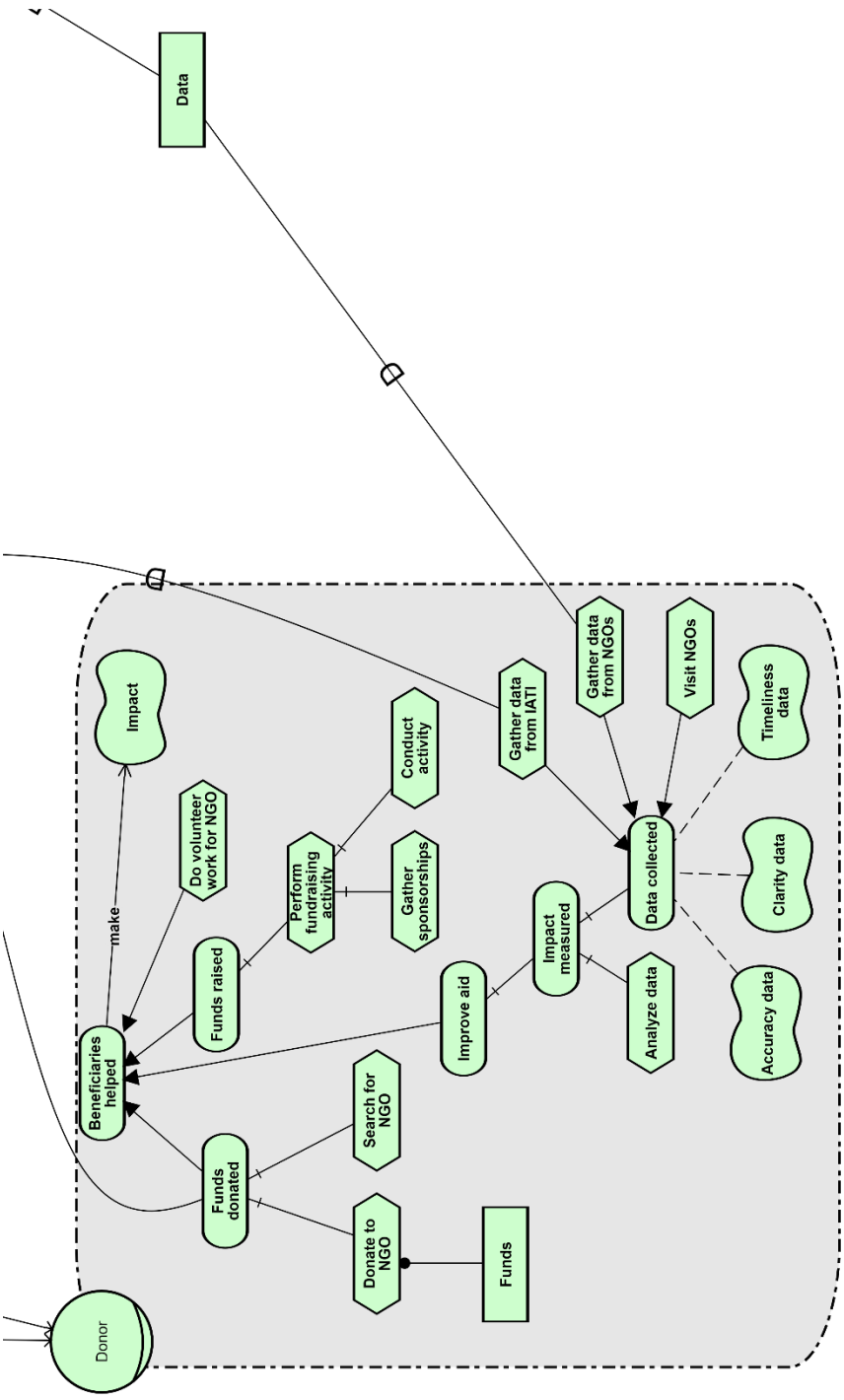

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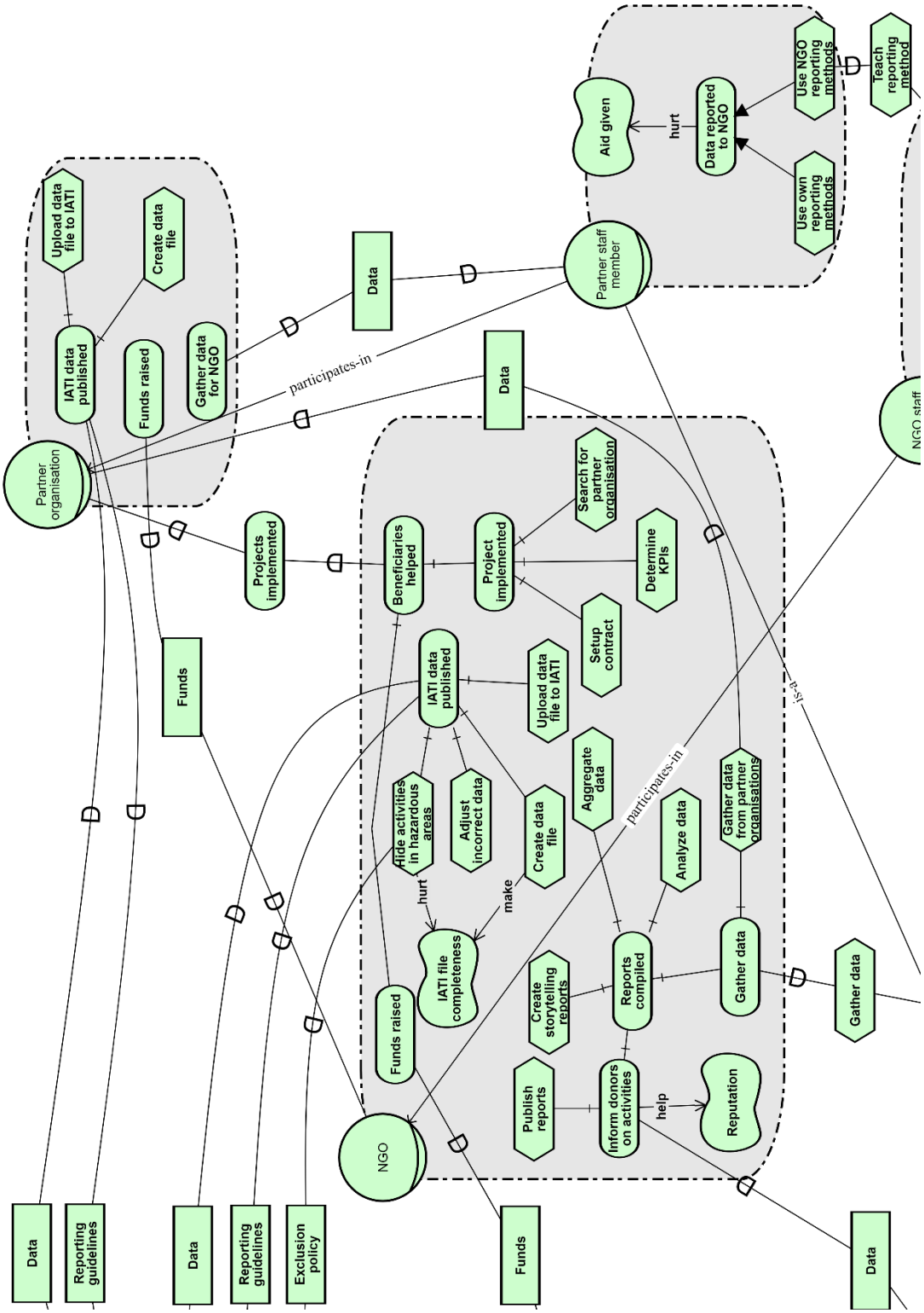

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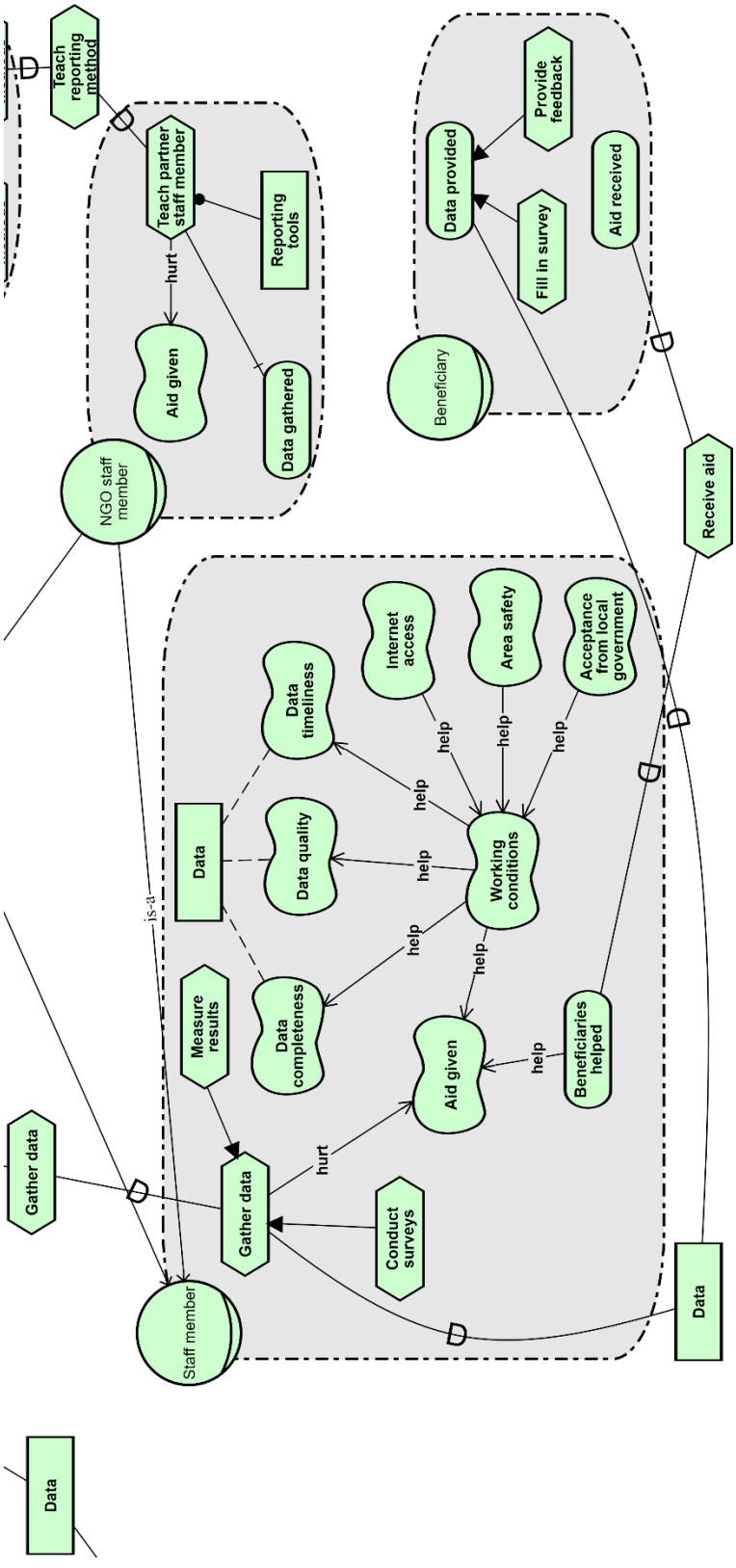

Complete model: