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Distributed Ledger Technology as an Intermediary of Trust for Stakeholders of ODA – A case study of the German Development Banks blockchain initiative TruBudget

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Abbreviations

DAC	Development Assistance Committee
DLT	Distributed Ledger Technology
MSP	Multi-Stakeholder-Partnerships
ODA	Official Development Assistance
OECD	Organization for Economic Co-operation and Development
PoA	Proof of Authority
PoS	Proof of Stake
PoW	Proof of Work
USD	United States Dollar
UNICEF	United Nations International Children's Emergency Fund
WFP	World Food Program
WWF	World Wildlife Fund

Symbols

$	United States Dollar
€	EURO

1 Research Problem

Since the origins of civilization, trust has played an essential role in the development of human life. Beginning with the formation of hunter-gatherer communities, reliant on the trust in one another for survival, eventually leading up to our current modern-day dependency of citizens to trust in governments, public institutions, and private organizations to deliver services required for our day-to-day life. A breach of this trust by any public official, which is abusing its power for personal gain, is identified by the World Bank as a form of corruption (World Bank 2021a).

A breach of trust in this context can have many shapes and forms, such as embezzling funds, extraction, or favoritism, and is fundamentally linked with the question of who is entrusted with power and how to make sure that this power is not abused. Hereby, the World Economic Forum recognizes that "public-sector corruption is the single largest challenge, stifling social, economic and environmental development" (World Economic Forum 2020, p. 4). Especially corruption in the context of Official Development Assistance (ODA) seems to pose a prevalent issue hereby. Since corruption worldwide is distributed asymmetrically, it is the least developed countries that are plagued by the most rampant corruption. Hence, the world's least developed countries, which also receive the most development aid, also consistently ranked lowest on indices such as the corruption perception index (Transparency International 2021; World Bank 2021b), indicating that in the context of Official Development Assistance (ODA), corruption and at its core the abuse of entrusted power, pose a relevant issue for the charity sector and all stakeholders involved.

The relevance of ODA can hereby be described as follows. ODA is commonly considered to be an integral part of enabling developing countries to achieve their Sustainable Development Goals (SDG), with scholars arguing that development aid can have significant positive long-term effects on the economic prosperity and growth of the receiving countries (Minoiu and Reddy 2010). However, at the same time, since the origins of ODA, a large body of literature has emerged, questioning the effectiveness of development aid, identifying administrative inefficiencies, monitory complexity as well as corruption as some of the key inhibitors for effective foreign aid utilization (Christie 2020; Dávid-Barrett et al. 2020; Quibria 2017; World Bank 2021a). Thus, depicting a duality regarding the perception of ODA and its effect on countries.

As a result, the aforementioned interplay between complexity and corruption within the charity sector has led to decreasing stakeholder trust in ODA over the past decades, with stakeholders unsure whether their funds will reach their designated destination and be

employed efficiently (Christie 2020; Dávid-Barrett et al. 2020). However, current literature highlights the importance of the cooperation of different stakeholders within ODA in order to provide development aid to realize the respective SDG outlined for each project, with some authors going as far as calling the Multi-Stakeholder-Approach "fundamental" to achieve SDGs (Eweje et al. 2020; Haywood et al. 2019). Similarly, the United Nations Agenda 2030 promotes Multi-Stakeholder-Partnerships in the context of development efforts to support institutional coherence and achieve SDGs (United Nations 2015). Thus, in order to increase the efficiency of ODA and decrease the potential for corruption, the question of how to ensure trust between stakeholders seems to play an essential role.

Stakeholders in this context refer to the Multi-Stakeholder Partnerships (MSP), which can be found within ODA, meaning both public and private organizations affiliated with the charity sector, e.g., governments, businesses, civil society, financial institutions, and the academic sector (Eweje et al. 2020; Fowler and Biekart 2017; Haywood et al. 2019). These individual stakeholders, hereby, typically can be categorized into donors of ODA, recipients of ODA, and intermediaries who facilitate ODA for other stakeholders.

Following Fowler and Biekart (2017), it can be argued that the multi-stakeholder approach to development aid hereby necessitates a distinct type of neutral host or "interlocutor" to facilitate conversations and transactions between the different stakeholders involved (Fowler and Biekart 2017). Neutrality in this context refers to the lack of dependency of such an interlocutor or intermediary on any other stakeholder involved.

However, instead of installing a neutral interlocutor, donors have historically relied on the creation of parallel structures of ODA management, in which the responsibility to ensure the correct use of funds lies largely with the donor or an intermediary, which is donor- and not recipient-driven. Funds are often disbursed directly from the donor or an intermediary to the service providers and contractors to achieve the respective predefined goals (Kleffmann 2022; Knack 2013). While this does mitigate risks of corruption, recipients of ODA are not encouraged in this context to develop secure channels and expertise to manage funds for the achievement of SDGs themselves. Rather a dependency is created in which recipients are reliant on donors to provide administrative structures (Kleffmann 2022). Thus, once funds are disbursed outside of these secure channels managed by donor countries, recipient countries might find themselves unable to ensure the correct use of funds, as no expertise has been built to generate secure channels independently, posing a problem for the sustainability of ODA in this context.

Additionally, the lack of harmonization within the charity sector leads to another problem, which can be described as a lack of oversight. According to Christie (2020), administrative complexity regarding the monitoring of development aid flows increases the difficulty of efforts to trace ODA and can thus be seen as one of the major contributors to a lack of accountability within the sector. Managing and monitoring the flow of foreign aid is notoriously difficult, as oversight of development projects requires considerable administrative capacities, which oftentimes are costly or unfeasible to implement for public and private charity organizations (4th High Level Forum on Aid Effectiveness 2011; Kleffmann and Zakotnik 2020).

Furthermore, overly complex processes and administrative parallel structures within the charity sector can be seen as major obstacles for stakeholders, which create costly inefficiencies within ODA management. Hereby, while administrative complexity is not necessarily a contributor to corruption or inefficiency by default, some of the structures which have formed over time within the charity sector are widely considered as complex to the point that can be considered as detrimental to the quality of aid management for ODA stakeholders, e.g., through duplication of administrative structures, a lack of interoperability within the parallel structures as well as the persistence of power imbalances which encourage unsustainable dependencies within the charity sector (Christie 2020; Kleffmann and Zakotnik 2020; Zwitter and Boisse-Despiaux 2018). The 2005 Paris declaration by the OECD member states, which was further corroborated by its signing countries in 2008 in Accra and 2011 in Busan, assesses the lack of unified and harmonized processes for ODA as a costly additional burden that contributes to aid inefficiency. Thus, the declaration aimed to function as a roadmap for donors and recipients to improve aid quality by decreasing administrative complexity (4th High Level Forum on Aid Effectiveness 2011).

However, research suggests that the impact of the declaration was rather limited. While fragmentation of aid slightly reduced after the Paris declaration, coordination among donors even weakened, thus limiting positive effects (Nunnenkamp, Öhler, and Thiele 2013). Additionally, persisting fragmentation, as well as lack of coordination in ODA, suggest that the declaration has not functioned as an effective tool to improve the aid quality for donors and recipients, with some scholars constituting that “although the Paris Declaration enjoyed political support up to the High-Level Meetings in Accra in 2008 and in Busan in 2011, its role in framing donor action has declined” (Brown, 2020; Lundsgaarde & Engberg-Pedersen, 2019, 19; Reinsberg, 2019). Therefore, donors and recipients find themselves in a complex landscape of different requirements for ODA, necessitating large administrative capacities to manage the complexity (4th High Level Forum on Aid Effectiveness 2011; Kleffmann and Zakotnik 2020).

With current ODA management systems falling short of the desired outcomes for enabling sustainable development and efforts to improve current systems falling short of resolving the underlying issues, scholars have been setting their eyes on emerging technologies such as Distributed Ledger technology to pose a solution (Christie 2020; Rugeviciute and Mehrpouya 2019)

Revisiting Fowler and Biekarts (2017) vision of a neutral Interlocutor or intermediary of some sort for the stakeholders involved in ODA management, DLT seems to be a promising technology able to fill the role. As an inherently trust-generating technology, DLT and its sub-category blockchain technology have been proclaimed as a potential Panacea for trust in the charity sector by scholars in recent years (Berg, Davidson, and Potts 2017; Christie 2020; Rugeviciute and Mehrpouya 2019; Shahaab 2020). With detrimental administrative complexity and the resulting decreasing lack of trust among stakeholders at the forefront of the previously outlined issues, a technological solution based on DLT might bring the answer to the question of how to ensure trust between ODA stakeholders. Thus, increasing the efficiency of ODA and decreasing the potential for corruption in the charity sector.

1.1 Research Motivation

Since its conception, Bitcoin has introduced DLT, and its subcategory, referred to as blockchain technology, into the mainstream literature. The basic concept of the Blockchain, as envisioned by Satoshi Nakamoto in 2008, describes a peer-to-peer network database, which allows the creation of cryptographically encrypted records of transactions that are interlinked and distributed across all participants of the network. Its design is supposed to promote trust between participants of the network without the need for an intermediary to determine if a transaction of some records is trustworthy or not (Nakamoto 2008; Rauchs et al. 2018). While the original motivation, as outlined by Nakamoto, was rooted in creating a decentralized payment system not relying on financial institutions as intermediaries, by now, multiple different use cases have been identified in which DLT could potentially be beneficial. Proclaimed as a sort of panacea for all by some authors (Christie 2020; Rugeviciute and Mehrpouya 2019; Shahaab 2020), e.g., by putting an end to corruption, fixing the global financial markets, and more, blockchain technology has since to prove that its applications can deliver on their theoretically envisioned cures.

DLT in itself, as outlined, is an umbrella term, encompassing a plethora of possible iterations, each differing in their respective design choices depending on the use case

(Rauchs et al. 2018). While interest in the emerging technology has attracted investments of both actors from the public as well as private sector institutions in the cotext of ODA (Reinsberg 2019; Rugeviciute and Mehrpouya 2019; World Economic Forum 2020; Zwitter and Boisse-Despiaux 2018), scholars such as Christie (2020) attest that little empirical research on actual DLT use-cases in the charity sector has been conducted as of yet.

Indeed, especially the relationship between DLT and ODA management, specifically focusing on the role of trust among the stakeholders involved, seems to pose a gap in the current literature. Additionally, while popular examples of DLT use-cases are often based on existing public blockchain networks, which are then used as a starting point for a solution built on top of the existing structures, little research is conducted on novel blockchain solutions featuring an independent blockchain network. Examples of use-cases of DLT in the charity sector are UNICEF as well as the WFF, both utilizing an existing public blockchain in the context of their respective use case (UNICEF 2019; WWF Australia 2018). Both the gap in the literature, as well as an overview of current examples of actual use-cases of DLT in the charity sector, will be outlined in more detail in the literature review.

Another example of a use-case of DLT in the charity sector can be found in the blockchain solution “Trusted Budget Expenditure” (TruBudget), an initiative by the German development bank (KfW). The KfW has pioneered the area of utilizing DLT within the charity sector by developing its open source platform TruBudget. TruBudget is a blockchain-based platform with the purpose of improving aid effectiveness and aid quality by reducing the administrative complexity of managing ODA (Kleffmann and Zakotnik 2020). Since November 2018, the KfW has been piloting a prototype of TruBudget, in cooperation with the finance ministry of Burkina Faso as well as with the Brazilian Development Bank (BNDES) (Bundesfinanzministerium 2019; Kreditanstalt für Wiederaufbau 2019).

Once again, following Fowler and Biekart, it can be argued that the multi-stakeholder approach to development aid necessitates a distinct type of neutral host or “interlocutor” to facilitate conversations and transactions between the different stakeholders involved (Fowler and Biekart 2017). With TruBudget’s core value proposition being the facilitation of trustworthy transactions between stakeholders of ODA, one could argue that TruBudget could potentially fill this role of neutral host or “interlocutor” for the management of ODA (Kleffmann and Zakotnik 2020). As such, the blockchain solution could potentially substitute previous systems relying on donor countries, creating administrative structures for the stakeholders involved, thus redefining the role of trust

between ODA stakeholders, void of power imbalances. In this context, the following section will outline a concrete research objective and goal.

1.2 Research Objective & Goals

While the relationship between DLT and ODA has been investigated by several researchers (Reinsberg 2019; Rugeviciute and Mehrpouya 2019; Zwitter and Boisse-Despiaux 2018), which will be outlined in more detail in the literature review, only few empirical investigations on actual use-cases of blockchain technology in the charity sector have been conducted so far (Christie 2020). This thesis aims to investigate the use-case of blockchain technology as a tool for managing ODA and its effects on stakeholder trust by analyzing the open source Blockchain-based platform "Trusted Budget Expenditure" (TruBudget) developed by the German development bank (KfW) and its stakeholders. For this analysis, the main focus of this thesis will be on the relationship between three elements within ODA and the charity sector:

1) Perceived Stakeholder Trust, the firm belief in the reliability, truth, or ability of other ODA stakeholders to fulfill their commitments;

2) Complexity, the administrative complexity of monitoring and managing ODA;

3) DLT, as a decentralized facilitator of transactions, referring to peer-to-peer networks recording, maintaining, and verifying changes to the network's records in collective responsibility without the need for a central authority (Christie 2020; Rauchs et al. 2018).

Instead of viewing corruption and aid as inextricably linked, this thesis aims to approach the topic of development aid and corruption from the perspective of managerial issues, displaying the connection between corruption and Administrative Complexity as well as the resulting negative effects on stakeholder trust. Thus, concluding in the research question:

What is the impact of Distributed Ledger Technology on perceived Stakeholder Trust within the Charity Sector, amid monitory and administrative complexity of official development aid management?

This thesis will follow an exploratory multiple case study research design on the implementation of the blockchain-based platform TruBudget within the context of ODA in Brazil and Burkina Faso. Hereby, this thesis will aim to generate insights from the

relevant stakeholders, which are involved with the project, following a qualitative research method, utilizing semi-structured interviews.

The thesis is structured as follows. First, the literature review will contain an introduction to the topic of ODA, contextualizing the current relationship between the ODA and corruption within the complex administrative landscape of the charity sector, while introducing the relevant stakeholders as well as important definitions in the context of this work. Following, the term Distributed Ledger Technology will be introduced thoroughly, explaining the general technological background of DLT as well as the relationship between DLT and trust, current use-cases, as well as the potential dangers of the technology in the context of the charity sector and ODA. The literature review will be concluded by describing the gap in the literature this thesis aims to fill. After the literature review, the in-depth methodology will be explained in detail in section three. The insights generated from the literature review combined with the qualitative research will then be displayed in section four as the results, answering both the research question and additional hypotheses, which have been derived. Finally, the findings will be summarized in the conclusion, additionally giving an outlook on the future of DLT and ODA.

2 Literature Review

In the following chapter, the relevant literature regarding the previously defined research question will be systematically analyzed following a structured literature review approach to synthesize the information available from the current state of research in the area (Armitage and Keeble-Allen 2008). Hereby, the literature review will be divided into three main parts, pertaining to 1) official development assistance, 2) distributed ledger technology, and 3) real-world examples which utilize distributed ledger technology in the context of the official development assistance. Lastly, based on the literature review, the gap in the literature will be outlined as well as additional hypotheses to support the initial research question will be derived.

2.1 Official Development Assistance

Firstly, the term Official Development Assistance (ODA) needs to be defined. The OECD Development Assistance Committee (DAC) defines ODA as government aid, which is provided by official agencies, including state and local governments or by their executive agencies, to encourage and "promote the economic development and welfare of developing countries" (OECD 2021). Hereby, the term ODA has been referred to by scholars as the global standard for determining the efforts of donors in aiding development goals (Hynes and Scott 2013).

As previously introduced, ODA faces several issues such as parallel structures within administrative processes which have evolved within the charity sector, which decrease the efficiency of ODA, monitory difficulties which decrease accountability as well as decreasing stakeholder trust (Christie 2020; Nunnenkamp et al. 2013).

One of the key variables in this context are the stakeholders involved with ODA and the charity sector. Simplified, the main stakeholders of ODA can be summarized as: The *donor*, usually a country or charitable organization; the *recipient*, usually a developing country or country in an emergency situation (E.g., natural disaster); the *Intermediary*, a facilitator who administers the flow of ODA for the *Donor* and *Recipient* and often function fiduciarily. In the following, the roles of *Donor, Recipient,* and *Intermediary* will be defined further and elaborated on to give a better perspective on which the next section on how the aforementioned challenges within ODA have formed and persisted will build upon.

2.1.1 Donors of ODA

Under the umbrella of ODA, the record sum of over 160 billion USD has been allocated towards charitable projects around the world in 2021. Unsurprisingly the largest sums have been allocated by industrialized countries, with the U.S. having allocated over 35 billion USD, which equates to roughly 0.2% of its federal budget, and Germany having allocated 28 billion USD or 0.7% of its federal budget. This makes Germany and the U.S. the largest individual contributors to ODA worldwide in absolute numbers (OECD 2021).

Besides individual countries acting as donors for development assistance, state unions such as the EU also act as donors through official institutions such as the European Investment Bank. According to the EIB, official development in the sum of 78 billion euros has been allocated over the course of the previous decade, not including allocation inside of Europe. While counted collectively, the European Union totaled over 50% of annual ODA in 2020 (European Commission 2021; European Investment Bank Group 2021), it becomes apparent that it is individual countries that are responsible for the majority of funding, with countries such as Germany making up over 35% of all EU funding of ODA. According to the OECD, over 70% of ODA in 2020 have been allocated by individual countries in bilateral agreements instead of going through an organization such as the World Bank, an EU, or UN agency (OECD 2022c).

While state unions and institutions such as the EU, OECD, and UN have guidelines in place which encourage the disbursement of development assistance, it is individual countries voluntarily choosing to offer ODA to other countries. Thus, in summary, aid can be both bilaterally as well as multilaterally distributed, with the majority of aid currently falling under the category of bilateral agreements.

Therefore, in the context of this thesis, the focus for stakeholders, which can be surmised as donors of ODA, will be on individual countries, rather than state unions or non-private organizations, as it is the countries that make the decision to allocate the most funds for ODA worldwide. More specifically

2.1.2 Recipients of ODA

Following the World Bank standard for country classification in terms of development, all countries which are considered as *least developed* as well as *low- or middle-income* countries, with the exception of member states of the EU and G8, are eligible for ODA according to the OECD (OECD 2022b; World Bank 2022a). Thus, while developed

countries also regularly receive funding either directly or indirectly, e.g., through membership within the EU, it would not be classified as ODA.

A common topic emerging from the literature when investigating recipients of ODA is potential links to corruption. Indeed, the list of recipients of ODA directly correlates with the list of perceived corruption in a country, the Corruption Perception Index (CPI), with some of the most corrupt countries, according to the CPI, also receiving the largest allocations of funding (OECD 2022a; Transparency International 2021). This suggests a potential issue that has been introduced previously pertaining to a link between the allocation of development aid and persisting corruption (Quibria 2017).

Hereby, for those countries which both top the list of perceived corruption and net ODA received, another theme emerges. The developing countries that receive the most ODA to achieve their Sustainable Development Goals (SDG) unsurprisingly find themselves with the highest reliance on developed countries to continuously support them. In this context, ODA can even be seen as an essential part of some countries national financial situation. While the number of countries this applies to is low, countries such as Syria, Yemen, and Somalia, among others, generate over 30% of their GDP through ODA (World Bank 2022b), exemplifying the power hierarchy in the charity sector.

Scholars hereby discuss the duality of development aid, which on the one hand, can be seen as an enabler for economic growth, while, on the other hand, seems to be inextricably linked to corruption for the recipients, with some scholars arguing that development aid might even be indirectly fueling corruption (Asongu 2012; Minoiu and Reddy 2010; Quibria 2017). It is, however, important to mention in this context that while there is a correlation, it is not obvious that it is ODA by default, which is fueling corruption directly, rather the argument could be made that in transparency due to administrative and monitory complexity within ODA enables corruption (Christie 2020).

The countries investigated in the context of this thesis as stakeholders, more specifically net recipients of ODA, are Brazil and Burkina Faso. According to the World Bank, Brazil is currently considered a middle-income country. Brazil is a net receiver of ODA, receiving 0.016% of its GNI in ODA in 2019. This equates to over 400 million USD, with Germany as the largest donor, responsible for over 50% of all ODA flowing into the country (OECD 2022a; World Bank 2022b). Thus, the dependence on ODA can be considered negligible for the country, however, that does not rule out the dependence of specific sectors on foreign aid, such as the environmental sector.

Burkina Faso, according to the World Bank, is currently considered a low-income country, net receiving 7,5% of its GNI in ODA in 2019, which equates to over 1100 million USD. Hereby, Germany is the 4th largest contributor, responsible for 6% of all ODA flowing into the country. Hereby, ODA in relation to Burkina Faso's GNI has decreased over the past decades, having reached its peak in 1994, with over 20% of its GNI directly stemming from ODA (OECD 2022a; World Bank 2022b).

Both Brazil as well as Burkina Faso have made economic progress over the past decades, reducing their reliance on development aid (Transparency International 2021). Both cases will be elaborated in more detail in a later section of this thesis, in the context of the specific projects utilizing TruBudget.

2.1.3 Intermediaries in ODA

In order to facilitate the flow of funds from the donor to the recipient, intermediaries are often necessary, which can administer and monitor the processes connected to ODA. As previously outlined, both bilateral as well as multilateral agreements for the allocation of funds, are common in ODA, with the majority of funding falling on the former. Both in the case of bilateral and multilateral agreements for ODA, intermediaries facilitate the flow of funds, e.g., national and international agencies or institutions such as the World Bank, EU, and UN Agencies, and national development banks collect funds from donors to disburse them to the designated causes. In other words, intermediaries within the charity sector can be seen as the link between donors and recipients in the context of multi-stakeholder partnerships (Pattberg & Widerberg, 2014; European Commission, 2021; Fowler & Biekart, 2017; OECD, 2022c).

Thus, the main role of intermediaries can be summarized as providing communication between the stakeholders involved to achieve whatever process was agreed upon by the stakeholders. Furthermore, in the context of ODA, this entails also collaborating with all involved stakeholders, ensuring that funds are not misplaced or lost due to inefficiencies and/or corruption. Since not every stakeholder is able to individually ensure the legitimacy of how funds are used and by whom, intermediaries can also be viewed as generators of trust. Thus, they verify that 1) funds will arrive where they are supposed to and 2) that funds are also used the way they were intended to be used. At its core, an intermediary has fiduciary responsibilities which are tied to the trust it can generate for the stakeholders involved, that agreements will be kept, and funds will be used efficiently.

The intermediary is an entity figuratively speaking located in between the stakeholders, which requires the trust of the stakeholders involved to administer, facilitate and monitor the allocation of ODA (Fowler and Biekart 2017; Pattberg and Widerberg 2014).

Hereby, the role of trust in the context of intermediaries within the charity sector can be seen as essential for stakeholders involved to act within the charity sector. Since investment is inherently built on trust that the investment made will have a return, e.g., achieving a Sustainable Development Goal, declining trust is likely to have a negative effect on how much investment is provided (Bottazzi, Da Rin, and Hellmann 2016; Heinemann and Trefs 2020). Without a certain degree of trust towards the intermediary to verify for both donor and recipient that an agreed-upon contract, outlining, e.g., the allocation of funds toward a specific development project, is abided by, it is likely that ODA would decline.

With ODA plagued by Information asymmetries, which will be elaborated on in more detail in a later section, and our new conception of how quickly information (e.g., on the status of funding, workflows, and allocation of funds) should be available in the so-called information/knowledge society, the meaning of trust is hereby changing.

In this context, the World Bank Development Report 2021 outlines the pivotal role of data structures and data usage in the management of ODA. Hereby, the report mentions intermediaries which have an increasing responsibility to provide stakeholders with data that is reliable, understandable, and overall usable to the data users, which also includes providing the necessary data infrastructure (World Bank 2021c). This suggests that in order for intermediaries to fulfill their role as trust generators, they must keep pace with the new requirements for trust. As previously mentioned, Fowler and Biekart argue in this context that the multi-stakeholder approach to development aid necessitates a distinct type of host or “interlocutor” to facilitate conversations and transactions between the different stakeholders involved (Fowler and Biekart 2017). Hereby, scholars (Fowler and Biekart 2017; Pattberg and Widerberg 2014) have outlined the administrative requirements, such as accurate monitoring of ODA, as essential, for successful multi-stakeholder partnerships.

Over the decades of ODA, large intermediaries have formed, e.g., national as well as international intermediaries such as national development banks, state union development banks, or other governmental institutions. This thesis will focus on intermediaries responsible for ODA, focusing on bilateral agreements in the charity sector and how perceived stakeholder trust has been affected in this context. More specifically, this thesis will focus on the largest intermediary in the context of ODA disbursed by the German

state. For Germany, the second largest individual contributor of ODA in absolute numbers, this intermediary is the KfW (Kreditanstalt für Wiederaufbau: *German Development Bank*).

In order to mitigate risks within the charity sector, donor countries such as Germany often rely on direct disbursement of ODA to the service contractors of the recipients. Meaning that instead of disbursing the funds to the recipient itself, which would then in turn pay service providers and contractors to fulfill an SDG, the responsibility of managing the workflow is largely taken over by the donor itself (Bundesministerium für wirtschaftliche Zusammenarbeit und Entwicklung 2021; Kreditanstalt für Wiederaufbau 2021). While risks are mitigated through this process, as now funds can be directly disbursed depending on the actual progress of a project, they create a parallel structure that operates without the involvement of the recipient. Thus, recipients are not encouraged to develop their own secure channels but rather rely on donor structures (Kleffmann 2022).

The KfW verifies the adequate usage of funds via such direct investments, which rely on the close monitoring of the status of the respective development project. Funds are disbursed, according to the status of the project, directly via the KfWs channels to the contractors fulfilling the project. Thus, responsibility for the successful disbursement of funds lies almost entirely with the KfW itself. Partner countries, on the other hand, do not require and are therefore not encouraged to develop their own secure channels to manage ODA (Kleffmann 2022; Knack 2013; Kreditanstalt für Wiederaufbau 2016, 2021).

In order to tackle the previously outlined challenges of ODA management, the role intermediaries currently fulfill and how they fulfill them seem to be in need of change. One avenue for change in this context might be found within emerging technology such as DLT and Blockchain technology.

2.1.4 Challenges of Official Development Assistance

In recent years the perception of aid effectiveness has been declining, and with it, stakeholder trust in the charity sector has as well. The report of the UK Charity commission of 2021 outlines that general trust in charities among the population has been decreasing in the past decades, from around 67% to only 55% of the population trusting charities to deliver on their prospects (Charity Commission for England and Wales 2021). Thus, pressure on donors and recipients has been increasing to provide information on how funds are used and what SDGs have been achieved as a result. Especially donors, which are funded by taxes rather than private non-profit organizations, find themselves

in need of explaining the processes surrounding ODA (Christie 2020; Lundsgaarde and Engberg-Pedersen 2019; Zwitter and Boisse-Despiaux 2018).

While actual aid effectiveness might only be distorted due to a lag between the point of intervention and the actual improvement being measurable (Birdsall et al. 2010), the perceived decline in effectiveness and the resulting declining trust of the stakeholders involved might have immediate consequences.

The potential negative effects of declining stakeholder trust can be assumed to pertain to reduced investment as well as overall declining interest in ODA by the involved stakeholders. Without trust in the effectiveness of ODA in achieving Sustainable Development Goals, stakeholders might be incentivized to reduce their current allocation of funds towards ODA. It is therefore unlikely that donor countries will increase or potentially even maintain their current efforts to allocate funding for development aid.

In the following, this thesis will outline prominent themes which can be described that have led to the status quo. Furthermore, the implications of solving these problems for the charity sector will be elaborated on. Hereby, the relationships of stakeholders to each other as well as towards aid effectiveness can be used as a starting point, in which some common themes in the literature can be identified which result in this perceived decrease in aid effectiveness and its resulting decrease in trust within the stakeholders of the charity sector.

More specifically, Christie (2020) identifies three major reasons for the decrease in stakeholder trust within the charity sector, 1) administrative complexity; 2) monitory complexity; 3) poor regulatory design. In the following, these reasons will be further elaborated on.

2.1.4.1 Administrative Complexity in ODA

Administrative complexity in the context of this thesis refers to the detrimental administrative structures, processes, and procedures within the charity sector, which have formed over the past decades, that are nowadays applied by donors, recipients, and facilitators of ODA (Christie 2020).

Hereby it is important to point out that administrative complexity is not by default a contributor to negative or adverse effects. Complexity itself might also pertain to additional standardized processes which help verify the reliability of the information or

the identification of stakeholders or similar. Adding such processes could be viewed as adding additional complexity. However, not adding processes for verification introduces the potential for abuse of information asymmetries. A stakeholder with more information, an agent, might utilize the information advantage for his benefit by strategically withholding information, e.g., in order to collect funds allocated for a specific project twice. Thus, some administrative complexity might even be seen as a prerequisite for successful ODA management.

However, while administrative complexity, in theory, might pose benefits to the success of ODA, the reality within the charity sector displays issues with the practicality of the theory. Due to a multitude of individual regulations and structures within the charity sector, which are usually imposed by the donors, partner countries often times find themselves confronted with excessive administrative requirements. In other words, there are hurdles stakeholders need to overcome in order to receive and/or partake in the distribution of ODA, which oftentimes exceed the respective administrative capacities (Christie 2020; Kleffmann and Zakotnik 2020).

Indeed, scholars suggest that the excessive administrative parallel structures within the charity sector, which have formed over the last decades for the various different donors and recipients of foreign aid, combined with the lack of standardization within those structures, drive up the cost of maintaining administrative oversight. Many of the structures lack interoperability, which requires stakeholder administrations to incorporate many different technologies, procedures, and processes to manage ODA, which in turn increases cost. While this problem has been addressed before, proposed solutions such as the Paris declaration, an effort to standardize ODA management, have fallen short of their desired outcomes. Scholars have hereby assessed that even after proclamations of the OECD countries to improve ODA, previous issues have persisted or even increased in severity (4th High Level Forum on Aid Effectiveness 2011; Lundsgaarde and Engberg-Pedersen 2019; Nunnenkamp et al. 2013).

Summarized, the overly complex parallel structures within the charity sector are impairing the quality of development aid, with historic efforts to reduce the complexity realizing only limited impact. In this context, the German Development bank lists the administrative complexity and the lack of standardization as one of the key drivers for the development of solutions such as TruBudget to improve the quality of development aid (Kreditanstalt für Wiederaufbau 2019).

2.1.4.2 Monitory Complexity in ODA

Following the administrative complexity, monitoring issues ensue. Tracing and tracking the flow of foreign aid from its starting point to its designated point of action is often difficult and involves information asymmetries that can be exploited (Reinsberg 2019). Information asymmetries hereby describe the difference in information availability for different actors within a defined context. One actor acts as a so-called agent, an actor with more information, while another actor acts as a principal, an actor with less information. Information asymmetries are often the subject of game theory, which in this context can be used to exemplify the relevance of monitory difficulties in the context of the charity sector. Game theory refers to the study of the behavior of different actors within the context of a pre-defined system, e.g., a system in which one actor, an agent, has a knowledge advantage over another actor, a principal. An example commonly referred to as a Principal-Agent-Problem (De Fraja and Delbono 1990; Fudenberg and Tirole 1991; Muggy and L. Heier Stamm 2014)

Stakeholders in ODA often times have to rely on trusting each other without the possibility to verify the reliability of shared information. Lack of interoperability, as well as the lack of administrative capacities, increase the difficulty of monitoring the flow of ODA throughout the entire process from donor to recipient until a project is realized. As a result, duplication of projects, embezzlement of funds, or similar inefficiencies occur. Thus, the aforementioned overly complex administrative structures impair the process of tracing monetary flows, thus impairing accountability in the event of ineffective spending or corruption (Christie 2020; Hynes and Scott 2013; Zwitter and Boisse-Despiaux 2018).

Thus, the different stakeholders within the charity sector have different information available to them, which allows them to either benefit or potentially detriment from this information asymmetry.

If monitoring the flow of development aid management is not possible or only possible in a limited capacity, the recipient of aid can be seen as an Agent from a game theoretical perspective, while the donor is a Principal (Fudenberg and Tirole 1991). What this means is that in a scenario in which a donor allocates funds to be disbursed to a recipient, the donor will have to rely on the goodwill of the recipient to use the allocated funds as efficiently as possible towards the designated goal which was agreed upon beforehand, as there is no way to verify that this is actually the case.

Hereby, ODA is mimicking the game theoretical approach of a moral hazard in which a principal, an actor with less information, e.g., an insurance company, has to trust an agent,

an actor with more information, e.g., an applicant for an insurance, to abide by the determined explicit and implicit agreement. In our example, should the applicant apply for the insurance based on their current lifestyle, whilst harboring the intention to change his lifestyle dramatically after the insurance is made, this might pose an economic issue for the insurance company. After all, a healthy lifestyle might result in a lower subscription cost. A principal can never be sure that an agent will make good on his promise, instead, the principal has to rely on the morals of the agent to not exploit the information advantage, thus posing a moral hazard.

To mitigate this risk, the German Development Bank is utilizing methods that include a sort of direct payment only after the verification of the status of a project via on-site inspections. What this means is that information asymmetries are decreased by expending additional funds on administrative tasks, e.g., an employee of the KfW flies to Burkina Faso to inspect the status of a development project. Furthermore, funds are disbursed directly to contractors via secure channels provided by the KfW. While this does not reduce the risk of the misappropriation of funds to zero, it ensures that funds are spent in accordance with the status of the project (Kleffmann 2022; Knack 2013).

However, as already aforementioned, these monitory mechanisms increase the administrative cost considerably, as well as undermine the authority of the partner country which is receiving ODA. Instead of encouraging to build secure channels in cooperation with the partner country of ODA, countries such as Germany largely rely on their own secure channels and mechanisms. Thus, creating a dependency for the partner countries, for which no secure channels have been established. In other words, donor and recipient often times cannot see eye to eye, but rather exhibit power imbalances, which are likely to impact the trust relationship of the involved stakeholders.

In summary, monitory complexity pertains to the persistent issue of administrative complexity and is inextricably linked to information asymmetries as well as the current power imbalances. Hereby, research suggests that the role of intermediaries might be in need of change in order to aid stakeholders in improving the quality of ODA. Specifically, the question of trust within the charity sector and our understanding, as well as expectation of data availability, seem to be pivotal in this context (Fowler and Biekart 2017; Pattberg and Widerberg 2014; World Bank 2021c).

2.1.4.3 Regulatory Problems in ODA

Hereby both administrative complexity and monitory complexity can also be linked to the weak international guidelines and a lack of willingness to unify donor structures or, in other words: poor regulatory design. While OECD member states have in the past declared guidelines towards more standardization and harmonization of administrative structures in ODA management, such as during the Paris Declaration of Aid Effectiveness in 2005 (4th High Level Forum on Aid Effectiveness 2011), these declarations of betterment have yet to prove effective in achieving their goals. Scholars attest that while having a positive short-term effect, after over a decade, the original intent of harmonizing the fragmented structures has not been achieved, with fragmentation persisting (Lundsgaarde and Engberg-Pedersen 2019; Nunnenkamp et al. 2013).

In summary, the fragmentation of administrative structures and regulations in place leads to increased cost and monitory complexity. This decreases the accountability for stakeholders as well as increases the inefficiency, e.g., spending funds on parallel administrative structures, which could have instead been used on other projects. Furthermore, monitory complexity exacerbates information asymmetries between stakeholders, which in turn have to rely on trust, unable to verify the actual use and/or allocation of funds in a reliable manner.

A potential solution to the described challenges might be found within DLT-based solutions such as TruBudget. In the following DLT and its often synonymously used subcategory Blockchain technology will be introduced. Hereby the focus will be on how the blockchain can support the charity sector by strengthening the credibility of intermediary structures, reducing information asymmetries, increasing monitory capacities, and ultimately increasing the trust of the involved stakeholders within the sector.

2.2 Relevance of Blockchain Technology

While conceptualized in 1991 by Stuart Haber and W. Scott Stornetta, 2008 marks the beginning of more widespread adoption of blockchain technology in the form of Bitcoin. The Bitcoin was developed by the pseudonym Satoshi Nakamoto as a “peer-to-peer electronic cash system” (Nakamoto 2008), which solved the issue of how to create trust between two parties that are willing to conduct a transaction without requiring a middleman to facilitate the transaction. More specifically, it posed a solution to the so-called “double-spending” problem, which describes a phenomenon with digital cash, in

which a single unit of currency or store of value can be spent multiple times at the same time (Reinsberg 2019; Rosenfeld 2014).

Since 2008, blockchain technology has attracted a multitude of investors and developers, creating various use-cases for how the blockchain might be applied to real-world problems, aside from the primary use-case of Bitcoin as a sort of currency and store of value. Common use-cases include the management of supply chains via the utilization of smart contracts, health care systems, financial applications, e.g., regarding so-called decentralized finance, and, most importantly for this research, the charity sector (Mohanta, Panda, and Jena 2018; Reinsberg 2019; Zwitter and Boisse-Despiaux 2018), among others, which will be explained more in-depth in a following section.

As of today, blockchain technology in the form of cryptocurrency has accumulated a market capitalization of over two trillion USD (CoinMarketCap 2021), not including investments into non-public projects as well as investments that were made aside from the "official" exchanges for crypto-currencies, e.g., through direct investments, research and development projects.

Overall, the tonus of researchers, practitioners, and investors over the past decade has been positive towards the innovative potential of the emerging technology. Notably, the country of El Salvador has established the cryptocurrency Bitcoin as legal tender starting in 2021, meaning that vendors, citizens, and the economy as a whole are legally allowed to pay for goods and services with Bitcoin instead of another FIAT currency (Perez and Ostroff 2021). Similarly, VISA, as of 2021, has implemented so-called "crypto solutions and capabilities" which refer to VISA enabling its customers to utilize selected cryptocurrencies as a means of payment with vendors who accept VISA (VISA 2021). However, the blockchain applications within the charity sector, which go beyond accepting cryptocurrencies as donations (Taylor 2019), have yet to establish meaningful use-cases which are widely adopted.

Overall it can be summarized that a plethora of researchers (Reinsberg 2019; World Economic Forum 2020; Zwitter and Boisse-Despiaux 2018) acknowledge the potential implications a successful implementation of blockchain technology could have in public administrations specifically in the charity sector. One of those use cases, the blockchain-based platform Trusted Budget Expenditure (TruBudget), by the German development bank, will be outlined more in-depth in later sections, however, to understand the implications of blockchain technology in a real-world context, a common understanding of the underlying technology is required first. Thus, in the following, the complex topic

of blockchain technology will be broken down into different parts, offering a definition on which this thesis is based on.

2.2.1 Definition - What is Blockchain Technology?

Blockchain technology is part of the umbrella term of distributed ledger technology, which describes multi-party systems in which transactions of, e.g., property rights are facilitated not by a central authority but rather by a decentralized consensus, "despite parties who may be unreliable or malicious ('adversarial environment')." (Rauchs et al., 2018, 15). In this context, a distributed ledger can be defined as a collection of agreed-upon data in a network (Property rights, contractual rights, etc.), which is shared between all permissioned participants that have access to the network.

The name blockchain hereby originates from blocks of transactions being digitally chained to one another in chronological order. This chaining of blocks of transactions means that all transactions made on the blockchain are stored on the blockchain indefinitely and can "never" be deleted. Unlike a database in which individual entries are typically able to change without putting the integrity of the other entries in question due to the chain structure of the blockchain, this is not the case. A new block builds on the properties of the latest block. Thus, changing one of the blocks would also put the integrity of all the other blocks attached to it at risk (Brühl 2017; Nakamoto 2008).

Within the context of blockchain networks, different iterations can be differentiated. Among the most common categorizations to differentiate blockchain networks is the categorization of private, public, and hybrid forms of blockchain networks. These iterations differentiate in their governance models, meaning how participants are enabled to interact with the blockchain itself, e.g., in a permissioned or permissionless way (Rauchs et al. 2018). First, the subject of the functionality of the blockchain regarding the generation of records (blocks) will be elaborated on in the following section. Afterward, the subject of private, public, and hybrid Blockchains will be elaborated on.

2.2.2 Blockchain and Trust

As previously outlined, trust can be described as a cornerstone of human society. Without trust, human interaction, as it takes place today, could not exist. Any given interaction, starting from buying a bottle of milk in the supermarket to renting an apartment, requires varying degrees of trust. Buying milk requires trust from the customer into the supermarket that the milk is fresh and did not turn bad. Renting an apartment requires

trust from the landlord into the tenant that he will pay rent on time. Large supply chains, which can be described as an intricate network of trusted intermediaries, are reliant on maintaining trust among participants in order to keep the supply chain going.

What is common for almost all use-cases of the blockchain is the ability of the blockchain to offer a solution to automate this trust for the participants of a given network without the requirement for any third-party involvement. Instead, the Blockchain employs a novel way of generating and storing records of transactions. At its core, the blockchain has thus been described by scholars as a sort of trust machine, industrializing our perception of the dynamics of trust generation within the context of human as well as machine-to-machine interaction (Berg et al. 2017; Yang et al. 2019).

In the following, the functionality of blockchain technology, as well as its different iterations, will be outlined, explaining this novel approach to record generation and storage.

2.2.3 Functionality - How does the Blockchain work?

In the case of the Bitcoin network, block creation functions via cryptographic algorithms and a so-called consensus mechanism utilizing a Proof of Work (PoW). Transactions made on the Bitcoin network are sent to all nodes of the network. Nodes hereby refer to access points and can be seen as a decentralized group of validators in the network. The nodes try to verify the transactions and combine them into a block to attach them to the blockchain. Hereby, a mathematical problem needs to be solved, a cryptographic algorithm, in order to verify the transactions (Nakamoto 2008; Rauchs et al. 2018).

This cryptographic algorithm requires information from previous blocks, the hash value, which can be found in the Blockheader. Hash value in this context refers to the value which represents encrypted information, in the case of the Bitcoin network, a hash refers to the encrypted transactions within a block. The function used to encrypt these transactions into a hash in the case of the Bitcoin network is the SHA 256 function. The same information will hereby always result in the same hash value, while different information will always result in a different hash (Nakamoto 2008; Rauchs et al. 2018).

This also clarifies how the integrity of any block that is created depends on previously existing blocks. If a single transaction were to change in one block, the hash value of that block would change as well, thus changing the input for the following blocks in a sort of chain reaction.

Besides the hash value of the previous block, the new transactions are also encrypted or "hashed". The hashes of the combined new transactions are referred to as a Merkle root. Utilizing both the Merkle root as well as the hash value, through a trial-and-error approach, a mathematical problem can be solved, resulting in finding a number that satisfies the requirements, the NONCE (Number Only Used Once). It is important to highlight that the NONCE is basically created through brute force by trying millions of different hashes in parallel until the one hash is found that satisfies the requirements.

This also means that for the Bitcoin network, this described verification process, the PoW, requires computational power, which then again translates to real-world cost for electricity. Thus, providing this computational power necessitates some sort of incentive, in the case of the Bitcoin network, this incentive is found in rewards for finding the NONCE and creating a new block. Rewards hereby refer to a certain amount of Bitcoin, which are awarded to the creator of the block. The incentive is, therefore, monetary (Nakamoto 2008; Rauchs et al. 2018).

In summary, first transactions are sent to the nodes of the network, which seek to verify them for rewards. These transactions are then encrypted into a Merkle root by the decentralized nodes. The Merkle root is used together with the hash value of the previous block to find the NONCE, another unique hash, through trial-and-error. Once this is done, the newly created block is sent to all nodes in the network, which then validate the block. If a consensus is reached, the block is attached to the blockchain by all nodes, which then repeat the process for the next transactions. In the case of the Bitcoin network, one iteration of this process takes 10 minutes (Brühl 2017; Nakamoto 2008; Nofer et al. 2017; Rauchs et al. 2018).[1]

Hereby, sometimes multiple participants of a network are able to create a new block at the same time, causing the blockchain to temporarily fork. Forking in this context refers to the blockchain splitting up into multiple parts, which are then simultaneously continued until, eventually, the longer chain is chosen by the network participants, causing the remaining fork to be discontinued (Lai and LEE Kuo Chuen 2018; Rauchs et al. 2018).

In other words, the PoW ensures that records of a blockchain can be trusted, as they have been verified throughout the prior described process. Besides the PoW, other verification methods for transactions have been conceptualized and implemented in various blockchain projects. Other methods include the Proof of Stake (PoS), which creates and

[1] Sidenote: While finding the NONCE is a costly and time-consuming endeavour, using the NONCE to verify if it is in fact correct is straightforward

verifies blocks by utilizing network participants "stake" in the network. The stake is represented by, e.g., how many tokens a network participant holds. Trust is hereby created by the inherent interest of stakeholders to ensure the integrity of transactions and thus the blockchain, as otherwise, this stake might be at risk of devaluing (Rauchs et al. 2018). Since rewards for creating a new block on any blockchain are typically paid out in the form of token or currency, which is directly tied to the success and thus, the integrity of the network, cost within PoS is both reputational as well as indirectly monetary.

2.2.4 Smart Contracts

First proposed in 1994 by Nick Szabo, smart contracts are an integral part of contemporary blockchain-related use-cases. As previously established, blockchain technology as a subcategory of DLT has unique properties when it comes to generating and storing records digitally in a peer-to-peer environment with anonymous actors. Smart contracts utilize those properties to expand its potential from mere record keeping to a plethora of innovative use-cases by adding functionality.

In the context of blockchain technology, smart contracts can be described as a digitization of contractual agreements which can execute autonomously, when pre-defined conditions are met. Thus, contractual obligations are enforced without the need for a third-party intermediary to ensure execution. Rather, smart contracts utilize the same mechanisms to generate trust, which underlie blockchain technology in the first place. Based on trust-generating mechanisms, smart contracts offer additional functionality, which enables participants to digitize complex agreements as a series of immutable and transparent lines of code, living on the Blockchain (Kaulartz and Heckmann 2016; Meitinger 2017). In other words, while the blockchain can ensure that transactions that take place are trustworthy, smart contracts can enable participants to tie contractual conditions to transactions to automate otherwise complex processes.

Hereby, smart contracts offer the potential to reduce the cost of contractual processes considerably while simultaneously increasing the speed at which the respective contracts are executed. Smart contracts are thus a sort of digital reflection of contracts, which "formalize and secure relationships over computer networks" (Szabo 1997:1). In turn, this allows for those contracts to be automated and integrated into various use-cases, ranging from supply chains to financial markets or the charity sector (Reinsberg 2019; Zwitter and Boisse-Despiaux 2018).

Especially in the charity sector, guaranteed execution of smart contracts could improve the credibility of the stakeholders involved, as it enforces the pre-defined logic regardless of individual malintent. Reinsberg (2019), in this context, outlines the potential of smart contracts in providing so-called prediction markets which could decrease information asymmetries related to the verification of real-world events among stakeholders across the entire aid delivery chain. While out of the scope of this thesis for an in-depth explanation of prediction markets, briefly, prediction markets can be described as mechanisms that are designed to forecast future events, analyzing the inputs of market participants (Carvalho 2020).

2.2.5 Overview: Private and Public Blockchains

As previously outlined, blockchain technology can be seen as a sub-category of DLT. Blockchain technology, in turn, can again be divided into sub-categories that describe different iterations of the technology. A common categorization of blockchain technology differentiates between private, public, and consortium blockchains (*also referred to as "hybrid" blockchains).* While both private, as well as public blockchains, operate according to the same basic principles of a blockchain, which outline, e.g., the decentralized distribution of shared records of the participants, some unique features can be attributed to each, with consortium blockchains being made up of features from both (Yang et al., 2020; Bauer et al., 2019; Marikyan et al., 2021; Morkunas et al., 2019).

One key difference between private and public blockchains pertains to the access to and authority over the respective network. In a private blockchain, access for participants to the network is permissioned and thus limited. This means, that both read and write functions that interact with the blockchain network are only available to authorized participants. In a public blockchain, on the other hand, the number of participants is potentially unlimited, as access to the network is permissionless. Thus, the number of nodes in a private blockchain is often substantially lower than the number of nodes in a public network (Rauchs et al. 2018; Yang et al. 2020). In other words, the governance of a private blockchain in regard to who can modify, as well as interact with the network (E.g., accessing records) itself, is controlled by a defined number of participants. For public permissionless blockchains, anyone can set up a node to become a participant of the network, in turn, to be part of the governance processes.

This key difference, in turn, makes public permissionless blockchains decentralized among all participants, which in this context could refer to anyone capable of setting up a node in the network. Private blockchains, on the other hand, are also decentralized

within the network of participants, which in this context, however, only refers to specific authorized participants (Bauer et al. 2019; Marikyan et al. 2021; Morkunas et al. 2019).

2.2.5.1 Private vs. Public: Transaction Cost

The difference in who can be a participant and part of the network for private and public iterations of the blockchain can have far-reaching effects on the design of key features, such as what form of verification for transactions (Consensus) is used. Thus, private and public blockchains can differentiate in their consensus mechanisms. Since private blockchains are permissioned, with only authorized participants accessing the network, the inherent dynamic towards trust can be described as different to that of a public and permissionless blockchain, in which access is granted to anyone. Access hereby again refers to both read and write access to the network. For a public permissionless blockchain, participants are unverified and anonymous. This, in turn, means that in case of participants conducting fraudulent or otherwise illegal activities linked to the utilization of a public blockchain can not be easily enforced in the real world (Lai and LEE Kuo Chuen 2018). Thus, public blockchains such as the Bitcoin network usually rely on some form of consensus mechanism, which ensures that the majority of mostly anonymous participants are in agreement with changes, via costly mechanisms such as the PoW (cost hereby refers to monetary, reputational, or other cost). Trust generation within the context of a public permissionless blockchain thus can be seen as a main driver of cost (Berg et al. 2017; Nakamoto 2008).

Private blockchains, on the other hand, do not face the same issues with creating trust among anonymous and unverified participants (Mohanta et al., 2018; Rauchs et al., 2018; Yang et al., 2020). Instead, since participants within the network of a private blockchain are permissioned and typically known, it can be assumed that for private blockchains, at least some form of trust is already established among participants. Thus, hereby minimizing the need to artificially create trust among participants through, e.g., energy-intensive mechanisms such as the PoW. Rather, liability towards contractual obligations of participants within a private blockchain network are enforced by real-world authorities since potentially fraudulent or illegal activities can be traced back, and the responsible participants can be identified (Lai and LEE Kuo Chuen 2018).

Thus, private blockchains can be described as less reliant on creating trust among participants, which in turn opens the opportunity to employ different consensus mechanisms, which are typically less costly in comparison to those of most public Blockchains. A common example of a consensus mechanism utilized in a private

blockchain network includes the so-called Proof of Authority (PoA). Simplified PoA grants each participant in a private blockchain network a voting right to achieve consensus, similar to an election. (Sedlmeir et al. 2020).

In other words, transaction costs of a public blockchain typically far exceed the transaction costs of a private blockchain with the equivalent number of transactions which are being processed.

2.2.5.2 Private vs. Public: Transaction speed

Additionally, creating trust in a permissionless public blockchain does not just have negative implications on the cost per transaction but also impairs the speed of each transaction request which needs to be handled. While private blockchains can generate high transaction processing rates, the transaction processing rate of public blockchains is usually limited. In order to ensure trust among the anonymous and unverified participants within a public blockchain network, a majority of nodes need to reach a consensus. Thus, in the context of a permissionless network, which allows for a potentially infinite number of participants, this poses a significant scalability challenge. The Bitcoin network, as an example, has a throughput rate of seven transactions per second, with new blocks being created roughly every ten minutes. For a transaction to be actually finalized, however, typically, participants require six confirmations, meaning that 60 minutes elapse from transaction request to finalization, not taking into account the limited number of transactions being verified per block. Due to its extensive consensus mechanism, which acts as a de facto performance bottleneck, transaction processing rate is limited for the Bitcoin network. Hereby exemplifying the challenges for public permissionless blockchains in general (Lai and LEE Kuo Chuen 2018; Yang et al. 2020).

Since private blockchains contain a network of nodes of verified participants, which are trusted among each other, verification is much simpler without requiring energy extensive consensus mechanisms. Thus, private blockchains typically can reach much higher transaction processing rates than their public counterparts, while additionally also easing the process of scaling up the transaction processing rate if need be.

2.2.5.3 Private vs. Public: Scalability

A contemporary issue of our time pertains to the consumption of energy and the scalability of technology in this context. While the Bitcoin network, as well as other

public blockchains have a reputation to consume vast amounts of energy, private blockchains are often seen as a less demanding alternative. It is however important to point out that due to the heterogeneity of iterations that fall under the term of blockchain and distributed ledger technologies, generalizations such as these are to be taken into account with caution. While the PoW has shown issues regarding increasing energy demands, when network utilization increases, different consensus mechanisms such as PoS do not face the same issues. PoS while introducing other difficulties, has no significant demand for energy in its mechanism to generate blocks for a blockchain. Instead trustworthy block creation is incentivized by reputational cost as well as the stake of the participant within the network (Rauchs et al. 2018; Sedlmeir et al. 2020).

Since private blockchains are neither limited in their transaction processing rate nor by the cost per transaction, scalability of private blockchains is high. Similarly, energy consumption due to the relative ease of increasing the network throughput is typically considerably lower for a private blockchain than that of a public blockchain, in which decentralized consensus mechanisms have to generate trust among anonymous participants (Cao et al. 2020; Schäffer, di Angelo, and Salzer 2019; Yang et al. 2020).

2.2.5.4 Private vs. Public: Security

With private blockchain networks typically offering higher transaction processing rates at lower costs per transaction than public blockchain networks, the notion to dismiss public blockchains as an inferior iteration of DLT arises. However, while scalability of public blockchains typically exacerbates weaknesses within the respective network, e.g. Bitcoin networks demand for energy, public blockchains also offer potential benefits towards a private blockchain.

For example, since private blockchains operate only within the context of verified and authorized participants the number of nodes is typically significantly lower than that of a comparable public blockchain network. This in turn also means that collusion in the form of a 51% attack, in which the majority of the network participants collude to impose potentially fraudulent activities onto the network, is theoretically easier to achieve than in a fully distributed and decentralized network. However, since participants are identified and known, any fraudulent activity might cause legal repercussions (Lai and LEE Kuo Chuen 2018).

Since a public permissionless network not only allows for more participants, it also incorporates higher levels of privacy for those participants. Thus, the larger a public

permissionless blockchain network grows, the more difficult it is to collude with other participant and generate a malevolent majority of corrupted nodes (Lemieux 2016; Rauchs et al. 2018; Yang et al. 2020).

In other words, immutability of a public blockchain is ensured by the size of the network, larger typically means higher immutability of records, as more nodes would need to be corrupted[2]. In a private blockchain this immutability is ensured by the pre-existing trust of and into the authorized participants. Hereby, users utilizing a private blockchain might find themselves similarly dependent on the governance structure of the private blockchain network as they would be on any other public or private organization offering a service.

Additionally, private blockchains due to their limited amount of nodes are also more prone to external threats. While hacking nodes on a public blockchain network, does not pose a significant security risk for the network at large, the low number of nodes within a private blockchain network, make hacks more feasible (Rauchs et al. 2018; Schäffer et al. 2019; Yang et al. 2020).

2.2.5.5 Private vs. Public: Summary

In summary, both private and public blockchain networks, while based on the same principles of permanent record generation and storage, display distinct differences. In the table below, a summary of the previously outlined features and differences is provided. To make them comparable these differences are visually condensed.

These differences consequently lead to several benefits as well as pitfalls of the respective iteration of the blockchain, each with their own unique drawbacks and advantages. As an example, looking at the Bitcoin network as an illustration of a public blockchain network, we can identify issues with scalability and interoperability of the network. As previously outlined, the Bitcoin network utilizes a PoW verification method. The computational power needed for the PoW is significant. Additionally, the time that elapses from a request of a transaction until its verification is around 10 minutes, since the so called blocksize, which refers to the amount of transactions that can be verified per block is also limited, it can be seen as a bottleneck for the scalability of the Bitcoin network (Rauchs et al. 2018; Schäffer et al. 2019; Sedlmeir et al. 2020). At the same time however, security of records on the Bitcoin blockchain can be considered as almost immutable. While transaction processing rates might stagnate for the Bitcoin network, immutability of

[2] Sidenote: This is hereby not taking into account other security breaches which might exist in any technology.

records as well as protection from sybil attacks scale with the number of participants. Sybil attacks hereby refer to a coordinated effort of a majority of network participants to alter records to their benefit. Naturally, the more participants a network has, the less likely it is to secretly collude with enough participants with malintent (Lemieux 2016; Rauchs et al. 2018; Yang et al. 2020).

Private blockchains on the other hand can be seen as somewhat of an inverse of public blockchains in regards to both scalability and security. While private blockchains are highly scalable in terms of transactions processing rates, immutability is dependent on a comparably low number of network participants. As previously depicted, pre-established trust between network participants plays a considerable for private blockchains, as typically verification mechanisms are less sophisticated as those of public blockchains (Mohanta et al., 2018; Rauchs et al., 2018; Yang et al., 2020). In other words, both the typically more centralized private blockchains as well as the typically more decentralized public blockchains offer both advantages and drawbacks to each other.

	 **Private Blockchain**	 **Public Blockchain**
 **Governance**	Permissioned	Permissionless
Access	Permissioned; Authorized Participants	Anyone
Data handling	Read and Write access for authorized participants	Read and Write access for anyone
Consensus	Partially decentralized, similar to a vote of permissioned Participants	Decentralized, creates trust among anonymous Participants
Relationship of Actors	Pre-Existing Trust among Participants	Anonymous Participants with no established Relationship
 **Scalability**	High	Medium
Transaction Speed	High Transaction Processing Rate	PoW, limited transaction speed; PoS,
Transaction Cost	Low Cost per Transaction	PoW, high transaction cost; PoS, low energy cost
Energy Cost	Minimal	PoW, high energy cost; PoS, low energy cost
 **Security**	Prone to attacks	Secure
Immutability	Partial	Full
Collusion	Low Risk	Minimal

Table 1: Overview Private & Public Blockchain Characteristics

2.3 DLT in the Charity Sector

As already pointed out, Blockchain technology in itself does not refer to one single set of rules for one specific iteration of a ledger or database. Instead Blockchain technology, while narrower than the term DLT, is still broad enough, to allow for a multitude of different design choices to be made, with many different technologies working together to fulfill a use case (Marikyan et al. 2021). Thus, Blockchain technology can be seen as a framework, which can be applied in different ways, to create different results.

As previously outlined, typically scholars differentiate between private, public and consortium blockchains (Bauer et al. 2019; Marikyan et al. 2021; Morkunas et al. 2019) as well as between the different verification mechanisms used for transactions e.g. PoW and PoS. In this context different design choices for specific iterations of Blockchain technology will naturally have different benefits and pitfalls. Tension points for different design choices include the degree of data decentralization, accessibility, scalability, privacy, interoperability and immutability of the network (Marikyan et al. 2021; Parra Moyano and Ross 2017). In this context “Table 1. Public and Private Blockchain Network Comparison” depicts the differences at a glance.

Viewing these differences from the perspective of use-cases illustrates that the suitability of blockchain technology for any sector is dependent to a large extent on the design choices made for the respective iteration. While a public blockchain might offer benefits as a legal tender, as is the hypothesis of the El Salvadorian state, it might be less suitable for use-cases dealing with sensitive personal data e.g. healthcare. Since this thesis aims to focus on the charity sector, and more specifically the effects of DLT on the perception of trust among ODA stakeholders amid monitory and administrative complexity, the following section will outline some examples of projects which utilize DLT or blockchain technology specifically for the purpose of improving the charity sector.

2.4 Examples of DLT in the Charity Sector

As the popularity of blockchain technology increases, so does the interest of several industries into specific solutions which are catered toward the needs of the respective industries' opportunities. Use-cases for various industries have been hypothesized by researchers and practitioners, with some projects piloting initiatives in areas such as supply-chain management, workflow management or more closely related to the perhaps originally intended purpose, in the area of facilitating financial transactions, as outlined in the Bitcoin whitepaper by Satoshi Nakamoto (Christie 2020; Nakamoto 2008; Zwitter and Boisse-Despiaux 2018).

Hereby use-cases utilize the properties of the blockchain which as previously outlined, harbor the potential to provide immutable trustworthy records of transactions, automate contracts and generate high transaction speeds at a lower cost than regular networks. As this thesis aims to focus on the charity sector the following section will outline the current state of blockchain solutions introduced in the charity sector to provide an overview of contemporary initiatives.

Within the charity sector major players such as UNICEF, WFP and the WWF have recognized the potential of blockchain technology and are working on several projects. As of 2019 UNICEF has launched its own cryptocurrency fund, allowing donations in cryptocurrencies to support receiving, holding and disbursing funds in cryptocurrencies such as Bitcoin (UNICEF 2019). Similarly, the World Food Program (WFP) has created the worlds largest implementation of blockchain technology for humanitarian assistance, enabling people in need to access multiple forms of assistance from multiple organizations via one single access point (World Food Programme 2022). Both UNICEF as well as the WFP hereby are utilizing already existing public blockchain networks in their solutions, on the other hand the World Wildlife Fund (WWF) in Australia has developed its own blockchain solution, a platform named OpenSC, aimed at improving the fishing industry in regards to human rights and sustainable production (WWF Australia 2018).

Furthermore, initiatives such as the DLT4Good project piloted by the European Commission and European Parliament show the relevance of the technology for the charity sector. The project of the EU institutions aims at stimulating research as well as experimentation within the charity sector, targeting DLTs potential to provide public value for society (Polvora, Brekke, and Hakami 2021).

Additionally, Christie (2020) provides an outline on some additional contemporary projects in the area of Blockchain technology, which have piloted their first iterations of solutions including from workflow management projects by the red cross, identity management systems by the United Nations, as well as financial solutions piloted by the Women's World Banking Global Network (Christie 2020).

In the past decade several countries have started to develop and pilot DLT based solutions for various use cases. The government of Canada as well as Mexico have utilized the public blockchain Ethereum in the context of invitation to tenders.
(Suominen 2021; Weingärtner et al. 2021)

The main focus of this thesis lies within the case study of the blockchain based solution for the charity sector, Trusted Budget Expenditure, developed by the German development bank. TruBudget is a platform designed to manage the workflow as well as the flow of funds of ODA between stakeholders. It can be seen as a collaboration tool, which saves information transparently, and is retraceable for all stakeholders, thus functioning as a sort of neutral intermediary. The private platform utilizes Blockchain technology in order to generate records of transactions and workflows, as to what action had been conducted at what point in time between which participants (Kreditanstalt für Wiederaufbau 2019).

2.5 Gap in the Literature

Due to increased interest in DLT, private and public charity organizations have been enabled to generate considerable sums of investment for research and development projects in recent years (Rugeviciute and Mehrpouya 2019). This has led to the ideation of several DLT projects in the charity sector, which are being implemented public organizations such as the German development bank (Bundesfinanzministerium 2019; Christie 2020). As this thesis aims to conduct a case study on the project of TruBudget to showcase the effect of DLT on trust relationships within the charity sector, the following will outline a condensed outline on the gap in the literature this thesis tries to fill in this context.

Christie (2020) outlines the lack of research into the relationship of Trust, DLT and ODA, hereby aiming to fill part of this gap by providing an overview on the topic in form of a literature review. Indeed, contemporary research has long focused on more tangible issues, such as energy consumption of PoW blockchain technology, disruptive potential of the technology itself, issues pertaining mostly to the financial sector among other subjects of research. Especially the charity sector has understandably not been the subject of an in-depth case study for an application of the blockchain for ODA. The reasoning hereby, follows the long-term orientation of projects within ODA and the charity sector.

Understandably projects which are designed for a span of 10 years or more, have not yet been subject of research, as mostly, these projects featuring blockchain technology, do not yet exist. While interest has peaked into the technology, actual projects take time to prepare, this holds especially true when dealing with implementing advanced technology into likely less advanced structures e.g. the administrative body of a developing country. Therefore, the analysis of TruBudget poses a new challenge but also promises to provide first insights into such a project, utilizing blockchain technology with the purpose of

improving the charity sector. With TruBudget's pilot cases already running for four years, working with partner countries from Africa and South America, this blockchain project promises to be an insightful case for study.

Furthermore, the previous overview on the contemporary landscape of DLT projects in the charity sector showcases several distinctions among projects. The first distinction pertains to the difference between public and private blockchain network-based projects.

Hereby, projects based on public blockchain networks, naturally are tied to the underlying network e.g. in the case of the WFPs platform based on Ethereum (World Food Programme 2022). The popularity of large public blockchain networks has driven research and investment to largely funnel into projects attached to these brand-like networks. Private blockchains on the other hand, which might offer substantial benefits towards public blockchains in specific use-cases have not been thoroughly investigated. Thus, this thesis furthermore aims to fill the gap by investigating a private blockchain network, detached from brand names which might have an effect on trust perception regarding DLT in ODA otherwise.

Additionally, as previously outlined, DLT refers to an umbrella term, including different iterations of multi-party systems that operate without the need for a central authority, with individually diverging design choices and thus diverging properties (Rauchs et al. 2018). These different properties might lead to vastly different outcomes when applied to the same context. While research suggests that DLT poses the potential to revolutionize and improve the charity sector in various instances (Helo and Hao 2019; Rugeviciute and Mehrpouya 2019; Zwitter and Boisse-Despiaux 2018), it is now a question of how and in what iteration this potential can also translate to the real world. Thus, necessitating an in-depth analysis of cases in which DLT has been implemented to see how a specific iteration of DLT fairs when applied to a specific context. Therefore, the novel use-case of TruBudget does not only offer insights into the research subject of DLT and ODA in general, but due to its unprecedented nature offers a unique insight into a never seen before application of the blockchain.

3 Methodology

3.1 Research Design

As outlined above, this thesis aims to investigate the impact of DLT on stakeholder trust within the charity sector, meaning how the different stakeholders involved, donor, recipient intermediary perceive the technologies on ODA. To answer the proposed research question and its hypothesis, this research will conduct an exploratory multiple case study research design on the implementation of blockchain technology in the charity sector, as outlined by Yin. An exploratory multiple case study hereby refers to a qualitative method, used to gain a deeper understanding of the perceptions of actors regarding a specific phenomenon (Yin 2018).

DLT is widely considered as an emerging technology, which has not yet seen many practical use-cases which could be subject to analysis. With little empirical evidence proving its benefits or pitfalls, the discussion surrounding DLT in the context of ODA has been driven by theory rather than practice. Thus, to understand what implication the technology might have when applied to a real-world scenario, such a scenario needs to be investigated and analyzed.

Therefore, the approach of a case study, to investigate a current DLT project within the charity sector seems plausible. Hereby, desktop research has been conducted to create an overview on the current landscape of DLT projects within the charity sector. Several large-scale projects have been identified, including projects by renowned institutions such as the KfW, UNICEF, WFP, WWF and the European Parliament as well as European Commission, as well as several small-scale projects such as AIDChain or BitGive which either directly or indirectly support charitable causes utilizing DLT (Kreditanstalt für Wiederaufbau 2019; UNICEF 2019; World Food Programme 2022; WWF Australia 2018).

From these cases an additional abstraction has been done to fit the project both to the previously outlined gap in the literature as well as practical requirements. Therefore, projects which are not either backed by a governmental institution or one of the leading charitable NGOs have been disregarded to narrow the selection down. Additionally, maturity of the project (funds allocated, partnerships), relevance of the use-case, availability of literature, availability as well as the accessibility of the key stakeholders for comments or interviews have been considered. In conclusion, based on the current landscape of blockchain-based solutions in the charity sector, the platform of Trusted Budget Expenditure has been chosen for further analysis in the context of this thesis.

In order to increase the generalizability of the case study of TruBudget, several cases within the project have been analyzed in order to create a more insightful picture on the various stakeholder perceptions influenced by multiple countries, cultures and economic situations encompassed herein. In the following further justification for the case of TruBudget as well as the case selection within will be outlined.

3.2 Case Selection within Trusted Budget Expenditure

An essential part of any case study is the selection of adequate cases, which are representative of as well as offer comprehensive and mature insights into the researched subject. TruBudget is a platform originating from the German development bank KfW, connecting it to the development efforts of the German state, which as previously outlined, is the second largest contributor to ODA worldwide (OECD 2021). Thus, TruBudget is directly linked to one of the most important stakeholders in ODA in regards to contribution size. It can therefore be assumed that the platform TruBudget poses as a representative case for the charity sector, due to the influence of the German state within this sector as a whole.

Furthermore, the German state has in recent times shown several initiatives surrounding DLT, including a blockchain strategy published in September 2019, which outlines potential applications for DLT, such as TruBudget (Bundesfinanzministerium 2019). Thus, it can further be assumed that the efforts of the German state to utilize DLT in a real-world scenario, at least formally, are mature and credible. It can therefore also be assumed that in case of a successful implementation of TruBudget in its pilot projects, the German state would have the authority as a major contributor to advocate for a more widespread adoption of DLT in ODA and/or provide a relevant example on which to build on.

TruBudget can be seen as a unique project in the charity sector. As previously outlined, contrary to TruBudget, which facilitates the management of workflows in the context of ODA for both *Donor* and *Recipients* of aid, DLT applications used in ODA often pertain to the facilitation of services for individual recipients or donors of aid. Donations to charitable organizations, e.g. citizens donating cryptocurrencies to a charity such as Green Peace, UNICEF; enabling donors to access services directly through the project by the WFP. TruBudget fulfills a unique role in ODA at the moment, which makes it a promising case to study, in regards to its potential effects on trust, as well as by extension, the effects of DLT as a whole on trust in complex multi-stakeholder scenarios.

Thus, TruBudget offers unique insights to the research question proposed in this thesis. Due to Trusted Budget Expenditure being an open source project, data accessibility e.g. on the technical design of the Blockchain, is ensured. Thus, the process of analyzing the projects design choices as well as how the stakeholders are interacting with the platform is supported. This is further corroborated by the availability of German- and English-speaking stakeholders, increasing the availability of information on the project.

As already mentioned, within the context of the German development bank, there are currently two pilot projects which utilize TruBudget to manage workflows. With one of its pilot projects in Burkina Faso and the other in Brazil, perspectives of different stakeholders, specifically a low-, middle-, and high-income country on the effects of DLT on Trust can be analyzed. The platform iterations utilized by the finance ministry of Burkina Faso as well as the Amazon Fund in Brazil have been selected for further analysis. The further reasoning for this selection is twofold.

Burkina Faso has been described by the involved stakeholders as the most advanced iteration and implementation of TruBudget to date (Kleffmann 2022; Ploen 2022), thus making it a prime candidate for further analysis on stakeholder trust. Similarly, the project involving the amazon fund in Brazil, utilizing TruBudget, while currently on hold, had already been functionally implemented for the stakeholders (Odonera 2022), thus enabling a first analysis of the impacts on stakeholder trust.

Secondly, due to the scope of this thesis similar projects in Ethiopia and Georgia, were not further considered, as literature as well as field research suggested that the status of the projects was not yet mature enough to promise meaningful results in the context of this thesis.

The process for the case selection is visualized in the Figure 1: Case Selection Process, which can be found on the next page.

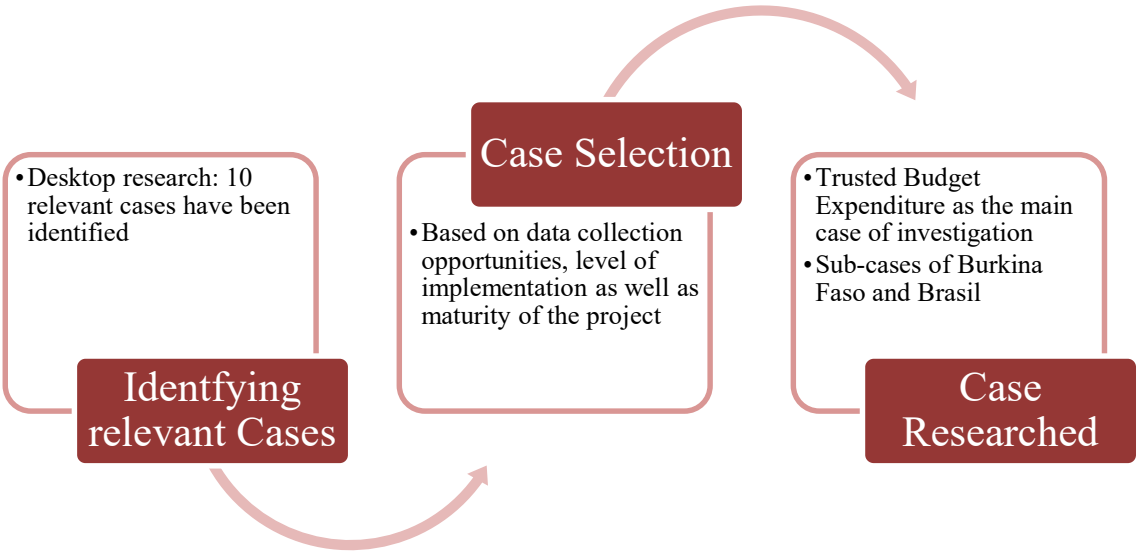

Figure 1: Case Selection Process

3.3 Data Collection

The data on the implementation case of TruBudget will be collected via a combination of data gathering methods, both qualitative as well as quantitative. These methods include desktop research, document analysis and interviews, which is common within case study research methodology (Baxter and Jack 2015). The focus for the data analysis will be on the conducted interviews, as both desktop research and document analysis are limited by the current availability of information. Due to the long-term nature of ODA, projects commonly take years to come to fruition. The blockchain solution TruBudget however, has only been implemented in its pilot cases in 2018 and 2019 respectively (Bundesfinanzministerium 2019), meaning that documents on the success or failure of projects directly related to the platform of TruBudget are not readily available yet. Thus, interviews with the relevant stakeholders will be the focus of the data analysis.

Relevant stakeholders in this context refer to a set of stakeholders which capture a holistic view on the process of Official Development Assistance from donating funds to facilitating the transaction to receiving the aid. As previously outlined, the relevant Stakeholder categories have thus been identified as: 1) the donor of ODA, 2) the facilitator of transactions of ODA, 3) the recipient of ODA. The following table shows the stakeholders which perspectives have been used in the context of this research.

Stakeholder	Donor/Facilitator	Recipient	Recipient	Facilitator
 **Organization**	Kreditanstalt für Wiederaufbau	Finance Ministry of Burkina Faso	Brazilian National Development Bank	Bearingpoint
 **Context**	Utilizes TruBudget as a Workflow Management Tool	Utilizes TruBudget as a Workflow management tool	Utilized TruBudget for audit purposes	Supports the transaction of Information & implementation of TruBudget
 **Involvement since**	2018, ongoing	2018, ongoing	2018, on hold since 2020	2019, ongoing

Table 2: Overview of Stakeholders

Since the relevant Stakeholders are likely to show differences in how and why they engage with TruBudget, e.g. Developers of the platform have a different set of insights than recipients or users of the platform, the questions for each interview will be altered for each individual stakeholder to fit the respective stakeholder profile. In order to ensure comparability between interviews, every set of stakeholder questions will be designed in regards to the research question and the three attached hypotheses.

In order to complement the explorative nature of this study, the interviews were conducted in the form of semi-structured interviews. This allowed interview partners to express their independent thoughts on so far, somewhat unchartered territory, as outlined previously, thus generating valuable insights (Wholey, Hatry, and Newcomer 2010). After conducting the interviews, e-mail correspondence for follow up questions and clarifications was used to avoid miscommunication or misinterpretations by the researcher.

As shown in Figure 2 four stakeholders were interviewed with an average interview length of 45 minutes preceded and followed by email correspondence. The interview partners were: Piet Kleffmann, founder of the project TruBudget and current lead manager of the Project within the KfW; Jure Zakotnik, Lead Developer on the Project

TruBudget for the KfW; Marcio Odonera, prior Lead Developer on the project TruBudget for the BNDES and the Amazon Fund; Lennart Ploen, Manager at Bearingpoint functioning as a contact point for all stakeholders involved with TruBudget. In the following these Stakeholders will be often references by their last name for simplicity.

3.4 Data Analysis

As part of the collection of data via desktop research as well as conducting the semi-structured interviews, the data from the interviews has been structured and analysed according to the grounded theory approach. The term grounded theory hereby refers to a systematic method for constructing theoretical analysis from data, which has proven to be one of the most utilized methods for analysing qualitative data by researchers across disciplines (Charmaz and Belgrave 2012). Grounded theory is an inductive systematic approach, in which induction and abduction, meaning the process of selecting and constructing theories, are occurring reciprocally (Thornberg and Charmaz 2013). The interviews conducted have been coded according to the grounded theory method, following open, axial and selective coding respectively.

Furthermore, the grounded theory approach aids the process of explaining the behavior of the actors involved in the context of this exploratory multiple case study. From the data analysis the hypothesis underlying the research question have been refined and updated.

3.5 Hypothesis

The use-cases introduced in the previous sections, utilizing blockchain technology for the purpose of improving the charity sector, follow different approaches. Thus, in order to further build on the previous insights and refine the research question of this thesis: "*What is the impact of Distributed Ledger Technology on perceived Stakeholder Trust within the Charity Sector, amid monitory and administrative complexity?",* additional hypotheses have been created, which tie into the aforementioned literature review. Hereby, following the data analysis and the grounded theory approach.

Therefore, in this section, briefly the hypothesis and there underlying reasoning will be outlined. These hypotheses will guide the following discussion of the results as a sort of framework.

3.6 Reasoning for the Hypothesis

In order for blockchain technology to pose a suitable solution for the problem at hand, which are currently prevalent within the charity sector, e.g. corruption, decreasing trust among stakeholders, power imbalances among others, it will need to fulfill several conditions.

While researchers such as Christie provide an overview on projects in the context of DLT and ODA, contemporary researchers does not yet deliver insights on an in-depth analysis of an actual use-case, they do however offer insights in what those conditions for success might be. Thus, in the following those conditions will be defined in the form of hypothesis of what blockchain technology might be able to provide for the charity sector.

As outlined, persisting information asymmetries play a major role regarding the administrative and monitory complexity within the charity sector. Parallel structures in which usually donor countries and contributors to ODA dictate the terms as well as largely handle the oversight of development projects, have led to underdeveloped capabilities of recipients of ODA regarding the management of development funds (Kleffmann 2022; Knack 2013).

Instead, recipients are often dependent on direct investments, as such from the German development bank. Through TruBudget, the developers seek to put both recipient and donor on eye level to each other, by encouraging mutual responsibility for each stakeholder, facilitated through a neutral intermediary in the form of the blockchain. Thus, the first hypothesis derived pertains to:

H1: *Blockchain Technology encourages all involved stakeholders to share responsibility more equal*

The second hypothesis, similarly, pertains to persisting information asymmetries within the charity sector. While currently stakeholders of ODA have to rely on either verifying the status of projects and spending of funds largely themselves, or alternatively rely on trust, the blockchain in the form of TruBudget allows for traceability of actions taken. Through immutable records of the workflow of development projects, stakeholders can retrace the actions which have led to specific outcomes, thus potentially reducing information asymmetries, as information can now be clearly comprehended by all stakeholders involved. Thus, the second hypothesis derived pertains to:

H2: *Blockchain Technology reduces information asymmetries in official development assistance*

Furthermore, through decreasing information asymmetries, efforts in monitoring the management of ODA would be improved considerably, as now responsibility on verification of specific actions would be shared more equally between the stakeholders. For example, the responsible ones are incentivized to only incorporate verified actions into the workflow of a given ODA related project conducted on TruBudget, as the blockchain would otherwise proof potential misconduct in hindsight. Therefore, the third Hypothesis derived pertains to:

H3: *Blockchain Technology reduces monitory complexity of development aid flows*

Lastly, in conclusion, more equal responsibility, reduction in information asymmetries as well as reduced monitory complexity, could potentially benefit both the perceived stakeholder trust within the charity sector, as well as increase the accountability. The blockchain in the form of TruBudget therefore seems to have a positive effect on both trust and accountability. Thus, the last hypothesis derived pertains to:

H4: *Blockchain Technology increases stakeholder trust and stakeholder accountability in organizations affiliated with official development assistance*

The hypothesis generated, function as a baseline for further discussion, which will be utilized to further analyze the cases of study in this research. Followingly, the further structure of this thesis pertains to an in-depth case description including the results of data collection, followed by a discussion, concluded with a final summary as well as an outlook to the future. The hypothesis will be utilized as a inductive framework, stemming from both the literature review and the qualitative research.

4 Results

The following section summarizes the findings of both the qualitative as well as quantitative data collection methods explored during the research for this scientific work, including desktop research, document analysis and interviews. It outlines the general layout of Trusted Budget Expenditure, picking up on criteria for blockchain solutions previously outlined within the literature review such as Governance, Scalability, Security, Maturity.

4.1 Trusted Budget Expenditure

Trusted Budget expenditure is a blockchain based solution for the workflow management of ODA. It was developed by the German development bank, which in turn is working on behalf of the German ministry of Finance and the German State (Bundesministerium der Justiz 1969). TruBudget utilizes blockchain technology in order to generate transparent and verifiable workflow management, by securing steps of the workflow which were conducted on the TruBudget platform on a distributed ledger, viewable by any stakeholder involved in order to create mutual trust (Bundesfinanzministerium 2019; Kleffmann and Zakotnik 2020).

As part of the German Blockchain strategy the German ministry for economy and energy (BMWI) has outlined the importance of distributed ledger technology, and more specifically the blockchain in the form of projects such as TruBudget among other use-cases. TruBudget, thus, can be located in the larger context of digitalization efforts by the German government, which have been increasing in intensity since passing the “Online Zugangs Gesetz” in 2018, which is mainly focused on digitizing national services (Bundesfinanzministerium 2019; Halsbenning 2021).

Within this context, the motivation for the development of TruBudget can be summarized in three major objectives. As already outlined, according to the Founder of the project Piet Kleffmann and the lead developer Jure Zakotnik, both leading the development of TruBudget, the platform is designed in order to decrease parallel structures existent in the charity sector, which create the necessity for costly administrative oversight, by the donor countries, in order to ensure the adequate utilization of funds. Thus, one key objective of the TruBudget is to improve the availability and traceability of information, thereby reducing the substantial administrative cost which is attached to this administrative management otherwise (Kleffmann 2022; Kleffmann and Zakotnik 2020; Zakotnik 2022).

The second objective pertains to the reduction of information asymmetries for the stakeholders involved. As each stakeholder has access to the information available, due to the distributed nature of the blockchain, each stakeholder is potentially enabled to trace the developments within projects in real-time. According to Zakotnik and Kleffmann, this development is founded on changing expectations of Stakeholders to have information readily available at almost all times. Furthermore, according to Kleffmann, TruBudget hereby improves current documentation processes, which Kleffmann outlines as inefficient, due to reports 'already containing outdated information while they are written' (Kleffmann 2022; Zakotnik 2022).

In other words, the collaborative workflow management tool is designed to make information available and accessible for each stakeholder, instead of siloing information in individual IT systems. Furthermore, through decreasing information asymmetries as well as improving information quality, TruBudget is designed to act as a neutral intermediary for ODA. Instead of exacerbating the previously outlined current power imbalances, TruBudget could act as an equalizer of some sort, enabling all stakeholders to meet on an equal footing, according to Kleffmann and Zakotnik (Kleffmann 2022; Zakotnik 2022).

In this context Kleffmann speaks of specific functions which have unilaterally been taken over by donor countries such as Germany and the KfW, in order to ensure adequate use of funds. Kleffmann hereby refers to direct investments, which have been touched upon previously in the literature review. According to Kleffmann, TruBudget however, could improve the distribution of these functions and responsibilities, encouraging recipients to not rely on donors providing the administrative oversight to ensure the adequate utilization of funds and realization of projects. According to Kleffmann inequality in terms of how responsibility is shared, especially in the context of previously mentioned power imbalances, contain special importance for TruBudget as unsustainable ODA otherwise creates dangerous dependencies for recipients of ODA which are costly, inefficient and not sustainable long-term (Kleffmann 2022). Thus, improving the sustainability of ODA can be described as the second major objective of the TruBudget Platform.

Thirdly, beside TruBudget as a blockchain solution for workflow management in ODA, it can also be viewed as a risk mitigation tool, as one of its general purposes is mitigating the risk emanating from corruption and fraud in ODA. Hereby, this risk mitigation does not just extend from Donor to Recipient on a high level, but rather incorporates the operational level of ODA. Thus, TruBudget is designed to generate a trustworthy environment also for the employees working within ODA on an operational level,

creating both accountability but also security for each stakeholder, according to Kleffmann (Kleffmann 2022).

In summary TruBudget is designed to benefit both donors as well as recipients of ODA, both on a management and operational level. Hereby it is important to highlight that all stakeholders interviewed gave a similar account on what TruBudgets designed purpose constitutes. Lead developer in the project, Jure Zakotnik, describes TruBudget as a collaboration tool, similar to "Sharepoint" [3], which enables Stakeholders to access information on ODA disbursement and utilization by partner countries in real-time, thus creating the perception of accountability. Each of the stakeholders interviewed highlight the role the blockchain plays in generating credible and trustworthy information which can be used by the stakeholders to ensure the adequate and sustainable utilization of funds. Additionally, recipients are enabled to develop their own secure processes, thus reducing the dependence on Donors to administer and manage the disbursement of ODA, while additionally creating the capabilities for Recipients to realize national projects, unrelated to ODA, more efficiently as well (Kleffmann 2022; Odonera 2022; Zakotnik 2022).

4.2 Technical Details

In the following the technical details of TruBudget will be analysed and outlined. As explained within the literature review of this thesis, "the blockchain" does not exist. Instead blockchain technology and on a higher-level distributed ledger technology are umbrella terms, which encompass a multitude of different iterations of technology, which share some technological as well as conceptual similarities, while simultaneously varying considerably in their actual technical makeup.

This includes the general choices made by the KfW in terms of design of functional elements of the platform. Specific instances building on top of these general functional building blocks and design choices e.g. how the platform is implemented in the use-cases of Brazil and Burkina Faso, will be outlined in the respective sections for each case. TruBudget both benefits and suffers from the advantages and disadvantages of a private blockchain network, as outlined in previous sections.

These advantages and disadvantages will be outlined building on previously established categories (see Table 1.) of Governance, Scalability, Security as well as an added category

[3] Sharepoint is an online collaboration tool for documents developed and sold by Microsoft

of Maturity. The analysis will give both more details on the meaning of each category in the context of ODA and the charity sector, as well as in the context of TruBudget.

4.2.1 Governance (access data handling consensus relationship of actors)

When discussing governance in the context of a blockchain solution, the term itself can be interpreted in multiple variations. According to Zakotnik it is important to keep the distinction between the technical governance and the governance extending beyond the pure technical aspects. E.g. the technical governance of TruBudget could outline that the different nodes which exist within the blockchain network of TruBudget all possess equal voting rights. Beyond this technical governance aspect, the governance of who is allowed to create such a node however could differ, and would extent beyond the pure technical logic of the technology. TruBudget itself does not enforce any specific governance model on its users and stakeholders. Rather, stakeholders themselves have to agree upon how to organize the governance of their unique iteration of the blockchain solution (Zakotnik 2022).

In this context, the governance model of TruBudget in the cases of both Burkina Faso as well as Brazil constitutes a private and permissioned blockchain network, with Burkina Faso and Brazil respectively being tasked with the further development of the platform. More on the specifics of these iterations will be elaborated in a following section (Kreditanstalt für Wiederaufbau [2019] 2022; Odonera 2022; Ploen 2022; Zakotnik 2022).

For the governance of TruBudget, as a private permissioned blockchain, this means that only specific actors involved with the project of TruBudget are verified to have read and write functionality on TruBudget. In other words, anyone involved with the platform needs to have the permission to generate records, inputs of any sort or even the structure of the network itself. While this increases accountability on the one hand for anyone working with the platform, as records of who did what specifically will be traceable, it also puts pressure on those operating the platform to work with high quality data before inputting information, as any input can be viewed as final. Inputs can be reviewed at a later stage in time, e.g. in the context of ODA with corruption still posing a prevalent issue, any order to disburse funds could be reviewed and traced to verify that no funds have been lost. The responsible of giving the order, and inputting incorrect data could be identified and prosecuted if malintent can be proven. This in turn requires, that anyone tasked with data handling on TruBudget, out of self-interest, should want to only input information on the platform that has a high-quality standard, meaning that it is reflecting

the truth as well as possible. It can be therefore described at least in theory as a sort of self-perpetuating accountability platform.

Furthermore, the governance of a private permissioned blockchain typically is based on pre-established trust among participants of the network. Indeed, in the context of ODA specifically trust seems to play an integral role, as outlined within the literature review. Donors often rely on direct investments to disburse funds, instead of utilizing existing channels from their partner countries. Thus, secure channels are developed only usable by the donor country, but not by the recipient, leading to the aforementioned power imbalances and dependencies (Kleffmann 2022). Therefore, pre-established trust among the stakeholders utilizing TruBudget can be seen as a crucial pre-requisite for the platform to function. An important part of the governance of a blockchain solution is the consensus mechanism used within the network. With TruBudget being a private permissioned blockchain solution, and trust playing such an integral role for the makeup of the platform, TruBudget relies heavily on that trust also in its consensus.

The consensus mechanism of TruBudget, in principle, is configurable, which means it can be changed by the stakeholders involved, to fulfil their respective needs in the network. Current iterations, utilize the so-called round-robin model for consensus mechanism (Kreditanstalt für Wiederaufbau [2019] 2022; Zakotnik 2022). The American Computer Security Research Centre (CSRC) defines round-robin as follows: “A consensus model for permissioned blockchain networks where nodes are pseudo-randomly selected to create blocks, but a node must wait several block-creation cycles before being chosen again to add another new block. This model ensures that no one participant creates the majority of the blocks, and it benefits from a straightforward approach, lacking cryptographic puzzles, and having low power requirements.” (CSRC 2022; Yaga et al. 2018)

In other words, the round robin method can be described as a version of the PoS consensus. But rather than the amount of stake in the network deciding how many transactions a node will verify, round-robin uses an approach in which every node in the network will get an opportunity to verify transactions, thus mitigating risks of some nodes predominantly publishing new blocks on the blockchain. Simplified, nodes are taking turns to verify transactions. Therefore, round robin is typically utilized in permissioned blockchains, as it requires trust in each node to act truthfully, which can be difficult in public networks, while private permissioned networks can utilize the pre-established trust to ensure transaction integrity (Khan et al. 2020). Thus, consensus within the TruBudget network, relies heavily on pre-established trust between donor and recipient.

While TruBudget is set up to be a private and permissioned blockchain, its source code is public in the form of open source, meaning that any developer can pick up a public version of the code that defines TruBudget from e.g. Github and change it according to their respective needs before implementing it into their respective systems. It is important to highlight that this can happen, in complete separation from the KfW, meaning that the KfW is not strictly needed to set up TruBudget. The KfW is regularly contributing to the respective open source solution, under the GNU General Public License v3.0. According to Kleffmann and Zakotnik the motivation behind this design choice was to generate both more transparency and enable anyone with a stake in ODA to work and improve the platform themselves, without the need for one central authority such as the KfW itself, to provide them with the information needed (Kleffmann 2022; Kreditanstalt für Wiederaufbau [2019] 2022).

Thus, even though the base technology of TruBudget has been developed by the KfW in cooperation with the German Finance Ministry, working versions are developed and managed by the recipients of ODA e.g. Burkina Faso and Brazil (Ploen 2022). In this context, since both pilot projects, in Burkina Faso and Brazil, have been set up on utilizing an iteration managed and developed by the respective recipient, it could be argued that donors have to trust the integrity of the platform as well as nodes they are using, managed by the recipient. This is despite common concerns of corruption within developing countries. As typically, recipients of ODA, as previously outlined, also suffer from lower standards in creating secure channels for funds as well as administrative integrity in the context of ODA specifically.

In summary, TruBudget is an open-source solution, meaning that while the KfW offers continuous support to anyone utilizing the blockchain solution, it is open for any stakeholder or interested party to utilize TruBudget for their own purposes, developing it further, forking the blockchain. Hereby once more highlighting the role of trust among stakeholders in this context.

Furthermore, it is important to highlight, that as of writing this thesis there has not been established a detailed formal governance structure of the platform TruBudget. Instead it has yet to be decided how a formal governance structure would look like for the projects utilizing TruBudget. While the general outline of the governance reflects the previous description, details on how permission within the network is distributed, how changes of the network will be handled in a standardized way or similar features related to the governance of TruBudget are not in detail defined (Kleffmann 2022; Zakotnik 2022).

4.2.2 Scalability (Transaction speed Transaction cost energy cost)

In the following the scalability of the blockchain-based solution Trusted Budget expenditure will be analyzed regarding several key factors in this context. However due to the currently relatively low usage of TruBudget, the following indications can be viewed as a starting point for further investigation into the subject. As both pilot projects are still in the early stages, scaling the technology in reality for a large-scale project such as realizing the transition of the entire charity sector and ODA to a blockchain-based alternative, might bring about many unforeseen challenges, going beyond our current understanding of scalability.

In the context of scalability, a common concern regarding blockchain technology pertains to its scalability in terms of energy consumption. Specifically the PoW mechanism in the context of the Bitcoin network is often associated with high energy consumption, with some comparisons showcasing the enormous consumption of energy of the Bitcoin network, similar to the energy consumption of smaller countries such as Finland (Huang, O'Neill, and Tabuchi 2021; Schäffer et al. 2019; Sedlmeir et al. 2020). As previously outlined however, this concern does typically not apply to private blockchain networks, as they do not require the same standard in trust generation as public blockchain networks do. TruBudget is hereby no exception. Instead, Zakotnik and Kleffmann expect the energy consumption connected to managing ODA to even reduce through TruBudget as it reduces the need of several monitory tools, previously consuming energy and time (Kleffmann 2022; Zakotnik 2022).

As previously outlined, TruBudget utilizes round robin as a model for consensus, which is related in concept to PoS mechanisms typically deployed in blockchain networks. However due to the trust reliance of round robin, it is typically only seen in private permissioned blockchains (Khan et al. 2020; Yaga et al. 2018).

Furthermore, round robin also allows for high Transaction processing rates, as block verification does not rely on complex cryptographic puzzles that need to be solved, as is the case for the Bitcoin network or other PoW-based blockchains (Khan et al. 2020; Rauchs et al. 2018). This in turn also affects the cost per transaction positively, as less computational power is required for blocks to be mined and published. In summary, therefore due to the rather low requirements on energy consumption or computational power in general, the project TruBudget is not subject to the common concern regarding blockchain technology: High energy consumption.

Instead concerns for scalability of TruBudget arise from different areas concerning almost all iterations of blockchain technology. Specifically, technical knowledge and lack

thereof among stakeholders and involved personnel poses a challenge for blockchain adoption. As such, the critical role of digital literacy when introducing a new digital tool into a complex environment can be highlighted. Kleffmann and Zakotnik in this context both outline that they don't view technical factors as an issue, but rather the cultural change which from their view to a large extent focuses around a common understanding of the technology, as the main reason for concern. Especially stakeholders which only recently have started their efforts to digitize their services, as is the case with the vast majority of developing countries still, need to leap-frog their public institutions in order to utilize a technology such as blockchain.

Thus, while in theory the technology might be scalable in terms of energy consumption, transaction costs and transaction speed, the reality introduces a human bottleneck to the scalability, in the form of lack qualified personnel, lack of understanding as well as lack of willingness to engage with the blockchain (Kleffmann 2022; Odonera 2022; Zakotnik 2022).

4.2.3 Security (Immutability Collusion)

One of the key features typically mentioned in the context of blockchain technology, is the technology's ability to store records immutably. This is also one of the key value propositions of many scholars when it comes to the application of blockchain or more broadly DLT in the charity sector (Lemieux 2016; Rugeviciute and Mehrpouya 2019; Zwitter and Boisse-Despiaux 2018). The ability to have immutable records which can not be altered after they have been established, is what gives blockchain technology its integral transparent characteristics, as it allows to retrace old records, with certainty that those records have been established in the way they are displayed on the blockchain. In this context two important sidenotes have to be made:

1) While the records themselves might not have been altered after they had been established, this does not mean that the record itself can be considered truthful by default, just because it is to be found on the blockchain, on the contrary incorrect records can still make it onto the blockchain, be it PoW, PoS or Round Robin who create the consensus, none of these methods are free of error. Technology can be exploited, records that are not truthful might get verified and thus, finalized onto the blockchain. In other words looking at the blockchain as an isolated system separate from the external world, records are secure and truthful, however taking into account points of attack such as social engineering, malware on nodes, botnets, trojans among others multiple exploits can be

identified which might endanger the integrity of the network (Firdaus et al. 2018; Yi 2019), which leads to the second point.

2) Immutability, while one of the value propositions of blockchain technology, is tied to the consensus of participants within a network. Consensus which can be exploited through collusion of rogue nodes. Thus, one typical security concern of blockchain networks is the so-called sybil attack, which constitutes an attack in which the majority of participants in a network collude in order to exploit the networks resources. Especially public permissionless blockchains might suffer from a lack of identity management which then in turn allows for unverified nodes to collude in order to verify untruthful transactions on the network. In this context however it is important to highlight, that public permissionless blockchains scale in terms of security with the size of the network. The larger a network and the number of participants is, the more difficult it becomes to collude with a majority of network participants. Furthermore, also private blockchains can suffer from collusion of nodes (Firdaus et al. 2018; Rauchs et al. 2018; Swathi, Modi, and Patel 2019).

TruBudget is set up as a private and permissioned blockchain, thus risks of collusion are mitigated, in theory, as network participants are known and trust each other (Kleffmann 2022; Zakotnik 2022). The round robin consensus model hereby, relies heavily on this pre-established trust in order to create trustworthy records, as nodes are chosen to publish blocks with little security mechanisms in place such as monetary incentives through stake, computational cost or rewards, as is the case in most other blockchain networks (Khan et al. 2020; Rauchs et al. 2018; Yaga et al. 2018). According to Zakotnik, a public blockchain would offer some benefits in terms of security, especially in regards to transparency and resulting accountability for actors. Due to the limited number of actors in the context of a private permissioned blockchain it is feasible that coordinated actors might deliberately alter facts on the blockchain in order to hide fraudulent or corrupt activity. A public blockchain hereby, would be “mightier” according to Zakotnik. As outlined, for a public permissionless blockchain which has a sufficient amount of participants, the added security through the amount of participants involved with the platform would make such collusion near impossible (Zakotnik 2022).

Another key aspect for the security of the blockchain solution is the question of what data is being handled on-chain and off-chain. Due to the sensitivity of specifically personal data in the context of ODA, TruBudget as a private permissioned Blockchain allows for some data to be stored off-chain. Sensitive data, which is handled within the context of ODA, regarding both classified information under national law as well as private personal

information falling under privacy regulations such as the GDPR, is thus not permanently stored on the blockchain itself.

1) Due to the setup of TruBudget as a private and permissioned blockchain network, it can be ensured that only permissioned participants will have access to on-chain data, therefore ensuring that sensitive data that is stored on-chain is protected.

2) Data that is deemed too sensitive to store it on-chain, can be stored off-chain, adding an additional layer of protection for privacy (Kleffmann 2022; Kreditanstalt für Wiederaufbau [2019] 2022; Zakotnik 2022).

This means that the stakeholders involved can make their own decision on what data needs to be stored on- and what data needs to be stored off-chain. While the on-chain data is subject to the security value proposition of blockchain technology, off-chain data can be stored however the respective stakeholder sees fit.

Thus, part of the security setup of TruBudget also includes separate off-chain databases, which might hold critical information for the quality and value of the content stored on-chain. Both on-chain and off-chain data can be therefore seen as complementary. Depending on what information is stored where, some of the information might lack important data points. Odonera outlines in this context, that it is crucial to find a common consensus on what data should be permanently collected and stored on the blockchain, and what data does actually warrant additional privacy (Odonera 2022). Therefore, once again highlighting the relationship of the stakeholders involved prior to establishing TruBudget as a key ingredient for the platform, with the stakeholders required to make an educated decision on the balance between transparency and privacy.

4.2.4 Maturity of TruBudget

Building on the analysis of the governance, scalability and security of TruBudget, while also taking account the current status of the two TruBudget pilot cases, the following section will give a brief overview on the maturity of the Blockchain in the charity sector, as well as the project TruBudget. Thus, generating a common understanding on how to evaluate the findings and discussion in this scientific work.

In the context of maturity, Christie (2020) outlines that the current state of maturity of blockchain-related projects within the charity sector is still developing. Most blockchain projects within the charity sector for now are not yet able to claim maturity as they are not yet complete.

As mentioned previously, projects in the charity sector are typically oriented towards long-term sustainable goals often referred to as Sustainable Development Goals (SDG). Those SDG typically encompass projects which are running for a long period of time, meaning that final results on whether or not a specific SDG has been achieved as well as under which parameters it has been achieved can be difficult to assess before the project has run its term. In other words, the inherent long-term orientation paired with blockchains relatively recent emergence as a potential solution for issues within ODA suggest that it will likely take several years or decades to find conclusive evidence for or against individual use-cases.

As outlined previously, TruBudget has been developed in 2017 and continuously improved upon by the KfW in conjunction with the stakeholders involved in its pilot cases. Its pilot cases Burkina Faso and Brazil have been established in 2018. The pilot case of Burkina Faso implemented the blockchain solution a s a means to manage the workflows of specific projects of development assistance which are still ongoing as of writing this thesis (Kleffmann 2022). In this context, the platform itself is managed by the Finance ministry of Burkina Faso.

It is important to mention that a large part of implementing TruBudget as a platform to manage workflows in ODA focuses around creating a common understanding of the technology itself. Meaning that stakeholders have to be educated on how the blockchain functions, and decisions have to be made on several instances of the design and layout of the platform both from a front-end as well as back-end perspective. Similarly, Zakotnik as well as Kleffmann and Odonera uniformly describe that cultural change is required for Blockchain to prevail as a practicable solution, thus suggesting that this cultural change has not yet taken place.

Additionally, factors such as: Privacy and Transparency, Scalability and Security, Access and Accountability. Due to the incompatibility of some of these factors with each other, compromises have to be made. In other words, all of these factors warrant weighted decisions which need to be made, justified and applied. This, within the context of an innovative technology with little previous evidence to utilize in that decision-making process.

As of writing this thesis, while first pilots of TruBudget are already being used, generating valuable data on how stakeholder trust is affected by blockchain technology, TruBudthese pilot versions cannot be described as final iterations. Currently, no formal governance structure has been established, meaning that changes to the platform are not following a formal standardized procedure. Thus, it can be expected that TruBudget itself will likely

change considerably in the following years, adapting to issues which might arise, suggesting that it is not yet fully mature as a project.

It is important to highlight that this assessment of the maturity of TruBudget is only meant to give some additional perspective on the results as well as the discussion part, and does by no means constitute a formal evaluation. This, however, would exceed the scope of this scientific work, as well as exceed the scope of its core research topic: Trust in the context of Blockchain technology within the charity sector.

4.3 TruBudget at a Glance

The table below summarizes the TruBudgets design in brief bullet points for clarification. Hereby, it highlights the findings, which will be picked up again in the discussion following this section of this work, and therefore incorporate some relevance for answering the research question and the attached hypothesis.

 **Governance**	• Private permissioned Blockchain; read and write access is only granted to approved participants of the network • No formal governance; however, the recipient (Burkina Faso, Brazil) is managing the platform, not the KfW itself • Open source; Anyone can fork the blockchain or utilize the source material to create a separate iteration • Consensus Mechanism Round-Robin Round-Robin as an iteration of a Proof of Stake consensus mechanism
 **Scalability**	• Energy Consumption poses no bottleneck for the scalability of TruBudget • Digital Literacy as a bottleneck to Scalability; as digital education in large parts of the world is still lacking, implementing an innovative technology as such on a larger scale in public administrations requires immense educational efforts to ensure success • Cultural change as a bottleneck to Scalability; beside the technical know-how, a cultural change towards more transparency is necessary for the scalability of TruBudget

 **Security**	• Part of the data is stored on-chain, and part is stored off-chained, e.g., Sensitive data or data involving privacy concerns • Immutability of records relies in part on pre-established trust among stakeholders • Immutability of records on the blockchain does not guarantee valid information is put onto the chain in the first place
 **Maturity**	• Long-term scale of ODA projects and the relative new emergence of Blockchain means that technology is not yet fully mature • TruBudget does not yet contain a formal governance structure • Some uncertainty regarding design choices needs to be taken into account

Table 3: TruBudget at a Glance

4.4 Burkina Faso

In the following the case of Burkina Faso will be outlined. Since 2018, the finance ministry of Burkina Faso, in cooperation the German development bank KfW is implementing TruBudget into the workflow management of development aid projects. Since 2018 selected projects have been utilizing TruBudget as a pilot to manage the workflows of ODA (Kleffmann and Zakotnik 2020).

To grant some additional perspective on the countries current socio-economic situation in the following a brief overview will be given. The topic of trust in public institutions particularly plays a crucial role in Burkina Faso. In the past decade the country has made initiated progress towards more transparent and less corrupt governmental processes, following popular citizen protests in 2014 (Albisu Ardigo 2019). Accordingly, Burkina Faso improved its score on the Corruption perception Index by 8% since 2014, putting it on position 78/180 in 2021 (Transparency International 2021). Thus, placing the implementation of TruBudget in the midst of this political reformation taking place within the country.

However, the current political climate in Burkina Faso can also be described as tense and uncertain, as a recent coup d'etat in late January has put the military of the country in power, thus creating further uncertainty for citizens (BBC News Afrique 2022; Sadaqi 2022). The question of trust into the government and more over the trust of involved participants into a technology such as TruBudget, implemented under a recently abdicated government, might as a side-effect change or decrease. Therefore, it needs to be taken into account when analysing the results, how this recent development might have shaped this research and its conclusions.

4.5 Burkina Faso and TruBudget

The pilot for TruBudget in Burkina Faso has been introduced in 2018. TruBudget was hereby implemented as part of a cooperation of the Finance Ministry of Burkina Faso and the KfW, with the Burkinabe ministry taking the lead role in the further development, management and maintenance of the platform. According to Kleffmann and Zakotnik this division of responsibility and labour is necessary. In order to level the playing field for all stakeholders involved and create an environment in which donor and recipient are able to "see each other on eye level", thus avoiding a donor-dominated system for ODA, which have historically created unsustainable dependencies for recipients, shared responsibility is integral (Kleffmann 2022; Zakotnik 2022).

However, since the platform does not yet contain a formal Governance structure, 'taking the lead' does not constitute a formalized role. Additionally, the platform is based on a sense of equality of the participants involved, thus it can be assumed that in the future, while Burkina Faso might be informally the stakeholder more involved with generating change proposals and maintenance of some aspects of the platform, TruBudget is ultimately meant to be governed by all stakeholders together, on eye level (Kleffmann 2022; Zakotnik 2022).

Thus, the use-case of TruBudget in Burkina Faso, is designed to manage the workflows of ODA in specific projects, done in conjuncture with the KfW and the Burkinabe ministry of finance. The KfW takes an advisory position in this context.

However, in this context, regarding the perception of the technology on the different levels of operations, Ploen outlines, that since the involvement of most employees in contact with TruBudget was only front-end related, the understanding as well as the general knowledge of the technology behind that front-end of TruBudget was limited (Ploen 2022). In other words, while knowledge for the managerial positions of the

underlying blockchain technology might be high, on an operational level, due to the limited exposure knowledge is considerably lower.

4.6 Brazil

In the following the case of Brazil will be outlined. Since 2018, the finance ministry of Brazil, in cooperation the German development bank KfW is implementing TruBudget into the workflow management of development aid projects.

Leading up to the presidential elections in 2018, public institutions in Brazil and its president have been faced with severe allegations of corruption and fraud (Reuters 2016). The Brazilian development bank (BNDES) in this context itself has been the subject of public discontent for some time, as the misappropriation of funds, as well as low efficiency in protecting areas of the rain forest have been criticized by national and international environmental groups (Feliba 2018; Mendes 2018; Odonera 2022). The implementation of TruBudget therefore falls into the midst of a changing political climate, which highlighted the necessity for trustworthy governmental institutions as well as corruption-resistant channels for the management of funds, both national and international.

In recent years the CPI of Brazil has been improving, placing it now as a less corrupt country than 20 years ago (Transparency International 2021). In this context, the effects of prior corruption as well as the radical change in terms of political direction within the country, might impact the perception of new technologies such as TruBudget for participants involved with ODA. Indeed, the decision to halt the amazon fund in 2020 by the current government, which prior had been the main use-case for TruBudget in Brazil, has put the project as a whole on hold. Therefore, it needs to be taken into account when analysing the results, how this recent development might have shaped this research and its conclusions.

4.7 Brazil and TruBudget

As prior introduced, the implementation of TruBudget into the project of the Amazon Fund, had followed a backlash against corrupt public institutions, and a general decrease of public trust into the government. According to Odonera, Blockchain was chosen as a technology not only due to its actual technical capabilities, but rather also due to its brand as a trust generating technology, which could reduce corruption. In this context the

BNDES also pursued different Blockchain projects such as a voucher program, based on the public permissionless Ethereum blockchain, which however did not come to fruition, due to high cost of the Ethereum blockchain specifically (Mendes 2018; Odonera 2022).

The main use case of TruBudget in the project of the BNDES surrounding the Amazon Fund, pertained to the subject of audits. More specifically as a workflow management tool disintermediating parts of the audit infrastructure in the context of ODA in Brazil (Odonera 2022).

TruBudget was hereby implemented completely separate from the KfW, utilizing the open source resources provided, which allow anyone with the technical know-how to implement their own version of TruBudget. Regarding the perception of the technology to the different levels of operations, Odonera outlines, that since the involvement of most employees in contact with TruBudget was only front-end related, the understanding as well as the general knowledge of the technology behind that front-end of TruBudget was limited (Kleffmann 2022; Odonera 2022).

Furthermore, different blockchain projects of the BNDES also followed the approach of using a public and permissionless blockchain network instead of a private permissioned network such as TruBudget. Odonera, in this context corroborates the remarks of Zakotnik, describing that in his views a public Blockchain might offer some additional benefits in terms of immutability and transparency for the management of public funds. However he also acknowledges that scaling especially in terms of economic viability might be difficult using networks such as Ethereum, as prices for transactions typically are too high to sustain the necessary amount of transactions (Odonera 2022; Schäffer et al. 2019; Zakotnik 2022).

Odonera further outlines issue regarding privacy concerns due to the permanence of the data on the Blockchain. In this context, off-chain storing of data was utilized in order to limit the amount of sensitive data both for privacy and confidentiality reasons, would be stored indefinitely on-chain (Odonera 2022).

4.8 Common Concerns regarding the Blockchain

Beside the case specific insights the stakeholders interviewed gave on the blockchain of TruBudget, some common concern with technology were voiced. Common concerns that affect the perception of the blockchain as an innovative technology within the public pertain to various areas, ranging from environmental to privacy concerns. However,

according to Odonera, the largest issue Blockchain technology faces, is not technical, but rather cultural (Odonera 2022).

The limited knowledge of the technology, according to Odonera impairs the implementation, as benefits are not immediately clear for decision-makers, or potentially worse, neither are the risks and pitfalls. Similarly, Kleffmann and Ploen, both outline that the technical side, meaning the creation of a functioning Blockchain does not pose an issue, it can even be done by "a dedicated developer team in a few weeks". However, the governance decisions, which heavily rely on decision makers as well as generating a broad understanding across institutions, including also operational level officers, which might only see a front-end, that is a cultural issue (Kleffmann 2022; Odonera 2022; Ploen 2022).

5 Discussion

5.1 Burkina Faso & Brazil

In the following the case of Burkina Faso as well as Brazil will be discussed, applying the information which has been laid out in previous sections to the hypothesis as well as the research question, which makeup the contents of this thesis. The hypothesis will therefore be utilized as a inductive framework, stemming from both the literature review and the qualitative research.

5.1.1 Distribution of Responsibility

In the following the distribution of responsibility among stakeholders in the case of Burkina Faso will be analysed, building on the first hypothesis, which has been established in a previous section:

H1: *Blockchain Technology encourages all involved stakeholders to share responsibility more equal.*

As previously outlined, the current distribution of responsibility within the charity sector can be largely described as unequal among the involved stakeholders. Typically, donor countries are taking over a large part of the responsibility within projects related to ODA, in order to ensure that the SDG's defined, can be met (Knack 2013). Germany through the KfW, utilizes direct investments methods, in which contractors are paid directly through channels managed by the KfW instead of by the recipient country where the project is based in (Kleffmann 2022). While this on the one hand can ensure that funds are not misappropriated, it is also inefficient, as administrative costs of monitoring, maintaining and managing secure channels for donor countries is often times resource intensive. Furthermore, it is not sustainable, as recipient countries are not encourage to develop their own secure channels to manage development projects, which in turn reduces the capability of developing countries to fund projects separate from donors.

Thus, TruBudget aims to fix this issue, by creating a common platform to manage workflows within ODA and thus create incentives for both recipients and donors to contribute to the creation of common secure methods and channels to manage ODA. In practice, Burkina Faso has taken the lead position in the management and maintenance of the blockchain network used for projects in conjunction with the Finance Ministry of

Burkina Faso and the KfW. Thus, showcasing the willingness of recipient countries to take over more responsibility, given the right incentives.

In this context, the Brazilian BNDES has applied and implemented the blockchain solution of TruBudget to its own use-case. Hereby, acting completely separate from the KfW, who has only taken an advisory role in the project. Odonera in this context explained that Blockchain technology was chosen as an area of investment specifically due to its capability to make responsibility not only shared among stakeholders, but also visible for any non-stakeholder, due to its inherent transparency generating nature (Odonera 2022). Thus, hereby showcasing the pivotal role blockchain has played in order to create incentives for stakeholders in ODA to implement a blockchain solution and thus share the responsibility among each other.

Furthermore, TruBudget has created an incentive for all stakeholder involved to ensure that only verified information is uploaded to the blockchain, as well as that information which already is on the blockchain is subject to monitoring. Through the continuous availability of information in real time among stakeholders, wrong, fraudulent or information with malicious intend are visible to all stakeholders to see. Additionally, stakeholders are inputting data onto the blockchain network of TruBudget, in theory, permanently storing that specific information for all participants of the network to see, which possess the necessary read access. This in turn incentivizes all stakeholders to verify information which will be uploaded onto the blockchain in order to avoid being liable for wrong information in the future. Hereby, playing into the fact that, since the network itself is in large parts based on pre-established trust among the stakeholders, this means that in order to ensure keeping that trust, reputation is a core value.

Thus, due to the expected negative effect of wrong fraudulent and/or information with fraudulent intend on the reputation of the stakeholder within the network, it can be assumed that each stakeholder is incentivized to ensure the credibility of information of the network as a whole. In other words, TruBudget encourages a mechanism of incentivized self-monitoring, which could be argued to be a mechanism of incentivized responsibility for data quality and data in general.

Beside recipients actively aiming at filling a role in taking more responsibility, it is donor countries which have to be willing to share the responsibility with other stakeholders as well. Thus, beside incentives for Recipients to take over responsibility through the utilization of blockchain solutions such as TruBudget, it is critical to have a look as well on the incentives of donors to share responsibility through the utilization of blockchain solutions such as TruBudget.

Historically, intermediaries in ODA which can often times be described as almost directly attached to the donor countries itself have fulfilled the role of managing the workflows of ODA for the stakeholders involved. The blockchain in the form of TruBudget is aiming in a way to replace those intermediaries with a shared platform which would store information saved on it indefinitely, hereby creating transparency for all stakeholders.

The incentive for donor countries such as Germany to utilize TruBudget lies within the reduction of cost due to the decreasing administrative complexity. As outlined, monitoring and managing ODA workflows is costly if done via common methods, the KfW is therefore incentivized for two major reasons to share responsibility with other stakeholders through TruBudget:

1) reduced need for constantly monitoring the workflow management of ODA, by relying more strongly on the self-monitoring incentives of the platform, thus increasing the efficiency of the capital deployed for ODA
2) increased future capabilities of recipients to utilize the common channels and secure methods, encouraged through TruBudget, to fund projects which are separate from the donor itself, thus reducing the need for the donor in the long-term to provide funding in the first place.

Thus, TruBudget and its implementation cases Burkina Faso and Brazil, showcase that in conclusion the first hypothesis can be viewed as plausible.

5.1.2 Information Asymmetries

In the following the effect of blockchain technology in the specific iterations of TruBudget in Burkina Faso and Brazil, on Information asymmetries will be analysed building on the previously established second hypothesis guiding the research question:

H2: *Blockchain Technology reduces information asymmetries in official development assistance.*

Current administrative systems created to manage workflows in the context of ODA, are largely driven by donor countries imposing requirements on recipient countries. This, as prior explained leads to a multitude of different donor driven systems, which recipients need to adapt to, thus increasing administrative complexity and cost. A key characteristic of these systems is the lack of information availability for stakeholders. E.g. donor countries such as Germany in the past have relied on direct investments, in order to avoid

corruption and/or mitigate risks pertaining to disbursements of ODA (Kleffmann 2022; Knack 2013). Direct investments hereby refer to the donor building channels for direct investments in which contractors are paid by the donor instead of the recipient. This means that funds are not disbursed through an official channel of the recipient country, but rather monitoring, managing, and disbursing funds is done largely by the donor country itself via separately created channels. Information is hereby often not shared among stakeholders, leading to information asymmetries. Additionally, even if information is shared, due to non-standardized and a lack of shared information systems among stakeholders within the charity sector, the time which elapses until information reaches the information system of a recipient, after it had been input into the information system of another stakeholder might already delay the efficiency of a project, even if the information asymmetry is only temporary in this context. Donor organizations such as the KfW are currently still acting under the modus operandi of information which is not yet public is secret. This in turn can lead to difficult and tedious processes to make data and information accessible for stakeholders, causing information asymmetries along the way (Kleffmann 2022; Zakotnik 2022).

These information asymmetries in turn can lead to unsustainable dependencies of the recipient country on the donor, as funds can only be disbursed safely through these separate channels. Thus, creating a vicious cycle in which donors created secure channels which they used to disburse funds through direct investments, directly paying contractors, realizing projects separate from the channels of the recipient country, which leads to the channels of the recipient country never developing further, thus creating stronger need for separate channels.

In order to change this status quo, transparency of data and availability of information seem crucial in order to improve these information asymmetries. Indeed, according to Kleffmann and Zakotnik, the KfW is working to change this status-quo of unsustainable information asymmetries among stakeholders in the charity sector, through TruBudget (Kleffmann 2022; Zakotnik 2022). In the case of Burkina Faso the blockchain solution TruBudget is publishing information, visible for each stakeholder. Through the blockchain it is possible to share information in real-time thus decreasing information asymmetries which would otherwise have been created by a delay of information availability. Information, which anyhow should be public and/or available for stakeholders involved.

TruBudget publishes all information which is not deliberately designated as secret, on the blockchain for each stakeholder to see and utilize in real-time. Thus, the blockchain in this context inverts the current dynamic by making available anything that is not designed to be secret. Of course this requires a considerable change in how data is handled by both

recipients and donor information systems. A strong governance structure is required outlining how it can be agreed upon what information can be public and what information should remain private, stored off-chain. Currently, this governance in the case of Burkina Faso does not exist.

While the case of Brazil outlined first concepts of what data and information should be stored on- or off-chain, thus making it public or keeping it private, according to Odonera, this was likely to change, would the project of the amazon fund have continued further (Odonera 2022). Thus, TruBudget's current effect on information asymmetries in this context remains difficult to assess.

Another important aspect pertaining to information asymmetries is the effect on systems which have formed in ODA which currently to a certain extent rely on these asymmetries existing within the charity sector to function. The effects of corruption on the socio-economic status of a country have been investigated by scholars for decades. While scholars agree, some areas of ODA can highlight the necessity for a certain degree corruption, due to existing systems which are only slow to change.

In other words, when faced with a decision to pay a bribe in order to realize a development project, or wait for cultural change to run its course, thus decreasing the need to pay the bribe in the first place, officials might be tempted to chose to `play the game´ by accepting bribes and fulfilling projects now.

The blockchain in this context might be seen as a sort of double-edged sword, as making information public and transparent, it can also create the adverse effect of potentially impeding current development projects. After all, information that is stored permanently on the blockchain can also be traced back to a participant. Thus, charging any situation which is in a grey area with the burden of explanation. In other words, the blockchain might create a binary situation in which actions are either justified by the data on the blockchain or they are not. This however might not do the situation as a whole justice, thus complicating the workflows for participants.

While in the long-term, less corruption due to the fear of being uncovered by the availability of information generated through e.g. TruBudget, in the short-term the new information symmetry might even prolong projects in ODA due to a transitionary period. In other words, while in theory information asymmetries are being reduced, this in itself is not necessarily a desirable outcome in the short-term.

Therefore, while the second hypothesis is plausible in light of the findings of this research, it stands to question, whether Blockchain technology is a desirable solution to achieve a reduction in information asymmetry, due to potential adverse effects in the short term.

These adverse effects might warrant a transitionary technology bridging the time gap from implementation until all systems are up and running as intended.

5.1.3 Monitory Complexity

In the following the effect of blockchain technology on Monitory complexity, in the specific iteration of TruBudget in Burkina Faso, will be analyzed, building on the previously established third hypothesis guiding the research question:

H3: *Blockchain technology reduces monitory complexity of development aid flows.*

Through the mechanisms explained prior, which outlined that stakeholder utilizing TruBudget are incentivized to self-monitor whatever data and information they put on the blockchain, the cost for documentation and monitoring can be reduced considerably. Indeed, according to Odonera the use-case for TruBudget for the BNDES and the project of the amazon fund, was to largely disintermediate the current chain of workflows, by taking over parts of the auditing institutions. Hereby, TruBudget fulfilled the `simple´ role as an authenticator for receival of funds. Each stakeholder in this instance has an inherent interest, in keeping the platform not only up to date, but also free of error, in order to mitigate risk of being liable for wrong information in the future. Thus, TruBudget can be argued to have simplified the oversight on this part of the workflow management chain (Odonera 2022).

Furthermore, since documentation is already provided in real time via storing information on the blockchain itself, a considerable amount of the usual communication e.g. emails, reports, contracts, could be omitted, thus further improving efficiency.

Indeed, in this context Kleffmann and Zakotnik expect further drops in mail correspondence as well as writing of reports. Thus, monitory complexity is reduced, due to the Blockchain automating part of the monitoring. In the future this automation could even be going further, with the blockchain providing a base to apply smart contracts which can automatically generate reports, sign contracts if pre-requisites are met or even connect the blockchain to separate systems. Hereby, Kleffmann and Zakotnik see also one of the advantages towards more sustainable use of technology. While impacts are expected to be small, the solution TruBudget, if applied on a larger scale, would likely reduce energy consumption and thus cost of both monetary nature and emissions, due to less overall need for communication, such as in person, emails, phone calls (Kleffmann 2022; Zakotnik 2022).

Furthermore, monitory complexity can be viewed from multiple perspectives: 1) Availability of information, this in part is what the blockchain solution TruBudget is aiming to provide. By making information accessible for all stakeholders with the necessary read access to the network, it can be ensured that the information is at least available to each stakeholder. 2) Data analysis, this is beyond the original use-case of TruBudget. While availability of information can be seen as a prerequisite of monitoring information, without analysis of the data available, monitoring is ineffective. It is important to highlight in this context that due to the amount of data that can be stored on the blockchain, in combination with additional off-chain data which might be needed to complement whatever data is stored on-chain, analysis of the data as a whole might only be possible via tools such as AI according to Zakotnik (Zakotnik 2022). Similar to how opposing lawyers might hand over as much documentation as they can produce in order to conceal whatever actual incriminating evidence there might be among a cascade of irrelevant information, thus identifying the right connections in the data can be difficult.

Zakotnik further elaborates however, since currently without TruBudget, the issue from his view pertains to the lack of availability of information, fear of overwhelming data sets only to be tamed by AI seem unlikely (Zakotnik 2022).

Additionally, while the blockchain in theory makes information more accessible and transparent, Zakotnik highlights that currently the blockchain itself has no way of verifying beforehand if information which is stored on it is truthful or not. E.g. a participant that is buying a computer for a new build school as part of a development project, could input the cost per computer at 10.000€ without the blockchain itself displaying any problems. The error, fraud or mal-intended behaviour would only become apparent in hindsight, after information has been already uploaded. Hereby, the requirement of pre-established trust once over is highlighted.

Thus, in conclusion, while the blockchain can certainly aid the process of reducing monitory complexity of ODA in some instances, on the other hand, new areas of complexity might be added at the same time. Thus, the hypothesis can be viewed plausible, but not conclusive.

5.1.4 Trust and Accountability

In the following the effect of blockchain technology on stakeholder trust as well as stakeholder accountability within ODA will be analyzed, utilizing the specific iteration of TruBudget in Burkina Faso as a case study. This section builds on the third hypothesis guiding the research question:

H4: *Blockchain Technology increases stakeholder trust and stakeholder accountability in organizations affiliated with official development assistance.*

Indeed, as outlined in the case of Brazil, the blockchain was introduced by several projects within the public sector and specifically development projects with the purpose to generate trust for the public as well as the stakeholders involved. Odonera in this context highlighted the choice to use TruBudget within the Amazon Fund project, due to TruBudget (and the Blockchains) promising potential to improve the perception of the general public towards the utilization of public funds (Odonera 2022).

Similarly, the KfW views TruBudget as an equalizer among stakeholders within the charity sector, that will bring mutual accountability to the stakeholders. At the forefront of this argumentation lies the perception that TruBudget can create an equal footing for the stakeholders involved, due to the transparent distribution of data across the network. Thus, both stakeholders from Brazil and the KfW view TruBudget and therefore the blockchain as an inherently trust generating technology.

When talking about trust within the charity sector, more specifically within the stakeholder organizations within the charity sector, it is important to mention, that trust or a lack there of, at its core is not primarily a technical issues, but rather has a social dimension to it (Berg et al. 2017; Glaeser et al. 2000; Knack 2013). According to Andras et al. (2018) it can be differentiated between trust among humans or between humans and artificial agents. Both the accounts from the KfW as well as Odonera focus on how trust in the technology itself can later translate into trust among stakeholders.

Hereby, the blockchain takes a role as an intermediary of trust with the main purpose of generating a trustworthy perception of transactions for participants. Hereby, this perception could be argued to be at least partially unrelated to the actual trust generating properties of the blockchain technology utilized. The reasoning for this is as follows.

As previously outlined, trust in the information contained in a blockchain network is generated through several mechanisms. Input data has to go through a verification mechanism which determines whether or not the information is trustworthy. Once the information is stored, it is typically visible to all stakeholders, meaning that even a potentially wrong account can be at least determined in hindsight by any stakeholder involved, to take measures accordingly.

The consensus mechanism of a blockchain network can be hereby described as a key factor for generating trust among participants of that network. Proof of Work consensus in large public blockchain networks can be described as one of the most secure ways to generate reliable trustworthy records, as it is “trustless” meaning it does not require any

pre-established trust of participants, but rather trustworthy records are verifiably created by cryptographic algorithms (Khan et al. 2020; Rauchs et al. 2018). As previously outlined, the TruBudget blockchain network utilizes the Round Robin consensus mechanism, a proof of stake consensus, which in turn is heavily reliant on pre-established trust, as each participant is granted equal rights to verify transactions.

Indeed, if the TruBudget network itself is already reliant on pre-established trust to verify transactions, then from the consensus mechanism alone, the question of whether or not the blockchain in this instance might be creating trust for participants seems redundant. As trust already exist before, the technical features might be used to support this trust, but could not be argued to create it in the first place. On the other hand if trust does not exist beforehand, then the integrity of the data verified by this specific consensus mechanism might be put into question.

Now, we have established that there are incentives for stakeholders to be truthful when utilizing TruBudget, pertaining to reputational cost of inputting wrong information, which could be argued to create trust to certain degree for the stakeholders involved. However, additionally there is another phenomenon showcased by the BDNES which might play a role in this context, pertaining to the perception of technology.

In this context, the branding of any technology heavily influences its perception and thus its effects on subjective values such as trust. Blockchain hereby is no exception. As an example the BNDES decision to utilize TruBudget as a means to improve transparency and accountability, according to Onodera has been in part influenced by the distinct branding of blockchain technology as inherently transparent and creating accountability (Odonera 2022). In other words, the public perception of blockchain as a means to generate trustworthy records influenced the decision of the BNDES to implement the technology for this same purpose of creating the trust.

All stakeholders interviewed outline further that building a technical solution that is "foolproof" in generating trustworthy records, is not a challenge. Rather the cultural change, which needs to go hand in hand with technological change and has been touched upon previously, poses the real challenge of innovation. In order to implement a novel technology on a large enough scale, so that it can have an impact, thus requires that whoever signs off on it, must be convinced that benefits outweigh the risks and uncertainty (Kleffmann 2022; Odonera 2022; Ploen 2022; Zakotnik 2022).

Thus, it could be argued that stakeholders of ODA might opt to implement an innovative solution such as blockchain technology as creating a perception of trust first, could be seen as a sort of pre-requisite to even implement later versions of more sophisticated

blockchain technology. Hereby, it has to be made a point that trust in itself while valuable and likely a pre-requisite, does not constitute an end goal in the context of charity. Rather the end-goal, by design are the pre-defined SDG's, such as reducing inequality, poverty, malnutrition among others.

Therefore, for the fourth hypothesis it can be concluded that, while stakeholders in organizations affiliated with ODA might utilize blockchain technology as a means to create a perception of trustworthy workflow management, it is not clear that the blockchain is actually creating trust in a significant manner. Rather, the design of TruBudget specifically has created incentives to build on existing trust of stakeholders, and potentially improve on it. Especially, creating an equal footing for all stakeholders involved, has likely a positive effect on stakeholder trust as a whole within the charity sector.

5.2 Limitations

Naturally, the thesis is subject to several limitations which affect the content and context of the findings depicted. Due to the limitation of time, the scope of this thesis has been narrowed to analyse the case Trusted Budget Expenditure exclusively, thus neglecting potential other cases which might have added valuable perspectives regarding the application of DLT in the charity sector. Furthermore, due to the limited time only four interviews with relevant stakeholders could be conducted. While nevertheless depicting valuable insights, due to the in-depth nature of the interviews, as well as further correspondence with the stakeholders, additional interviews with additional stakeholders, might have delivered a broader picture on the posed research question, thus increasing generalizability.

Beside time-constraints the largest limitation poses the state of blockchain technology applications in the context of ODA itself. Due to the long-term nature of projects within the charity sector, with projects often times running over multiple years or decades, the relatively recent emergence of blockchain technology, increases the difficulty to provide meaningful results in a quantitative form. While this thesis circumvents this shortcoming by providing qualitative insights instead, additional quantitative backing of findings can only add to the credibility of research. This holds especially true for a subject tightly related to corruption within charity. A topic which has notoriously been subject of duality within research, with researchers arguing for both a positive relation of ODA and corruption as well as for a negative relation.

Considering that both sub-cases analyzed in the context of this thesis, the implementation of TruBudget in the context of Burkina Faso as well as the implementation of TruBudget in the context of Brazil, both are not concluded as of writing this thesis, further developments might alter the results considerably. Thus, the current maturity of the projects poses a limitation for this thesis.

6 Conclusion

The research question which formed the core of and guided this research is: *What is the impact of Distributed Ledger Technology on perceived Stakeholder Trust within the Charity Sector, amid monitory and administrative complexity of official development aid management?*

To answer this question, several hypotheses were generated, which support the research question, adding depth to the research. In this context, the hypotheses can be described as plausible. However, each of them contained some constraints, which limited the conclusiveness of the findings.

From a historical perspective, technological advancement is inextricably connected to a change in culture and society. Perez (2010) describes in this context the interplay of what is technologically possible against what is culturally and socially desirable as a key concept in understanding the emergence of innovative technology in widespread use. The realm of what is technologically possible hereby might exceed what is socially desirable and vice versa in some cases. Thus, leading to technologies not being implemented on a large scale as a result of cultural resistance.

This research on the cases of TruBudget in Burkina Faso as well as Brazil showcases this phenomenon of cultural resistance. The common concern of all stakeholders interviewed highlights the importance that cultural change plays for the adoption of the blockchain and, more specifically, for TruBudget. Some of the stakeholders even go as far as calling the actual technical implementation trivial, however highlighting at the same time that a lack of understanding of the technical properties of the blockchain and a general cultural skepticism are what is limiting the potential benefits of blockchain solutions within the charity sector currently and might lead to adverse effects (Kleffmann 2022; Ploen 2022).

Hereby, current incentives might lead to a distortion of what is technologically possible and what is a cultural reality. Blockchain Technology is a trust-generating technology. It does so typically by utilizing transparency and cryptographic algorithms. However, as established, the term blockchain technology does not refer to a specific set of design choices for one specific iteration of technology. Rather blockchain technology in itself is an umbrella term pertaining to a multitude of potential and possible iterations, each incorporating a multitude of potential and possible different design choices. Hereby, each design choice made influences how the technology will ultimately function and, therefore, will influence its effect on its users (Brühl 2017; Polvora et al. 2021; Rauchs et al. 2018).

It is, therefore, the choices we as humans make that determine the effectiveness of, e.g., a blockchain based solution aiming at reducing information asymmetries within the charity sector, decreasing monitory complexity, or improving the trust among stakeholders of ODA. Therefore, it needs to be emphasized that there might be a difference between whatever version of the technology has been implemented against whatever version of technology might be theoretically feasible under different circumstances. This applies to TruBudget as much as to any other technology.

If incentives for decision makers are such that creating more transparent workflows will benefit them, implementing such a solution is rational. However, if transparency and the resulting disintermediated channels for transactions do not benefit decision makers, implementing such a solution is not rational. Hereby, it is important to emphasize that it is decision-makers who need to have an understanding of the implications of the design choices they make in order for this line of argumentation to be true.

What this means, since ODA and corruption seem to be inextricably linked, is that if corrupt decision makers influence the design of such a solution, adverse effects can be expected. With unclear amounts of ODA being lost to corrupt officials, institutions, and governments every year (Asongu 2012; Kenny 2017; Quibria 2017), the question arises whether decision makers are incentivized to implement a technology, in such a way, with the underlying design choices, which might ultimately decrease the potential for personal gain and corruption, they have abused before.

Instead, the argument could be made that since an inefficient system for managing workflows of ODA might benefit anyone with the intention of abusing the system for personal gain, decision-makers might be incentivized to the contrary. Instead of creating actual transparency, decision-makers might be incentivized to rather create a perception of transparency. Applied to the context of Blockchain technology and the case TruBudget specifically, storing part of the data on-chain as well as part of the data off-chain could be argued to be a potential entry door for such abuse. Future choices might change what critical information regarding monitoring the workflows of ODA will be stored off-chain instead of on-chain, thus limiting the actual transparency created through the platform.

This potential misalignment of incentives might not only extend to corrupt stakeholders but rather also extend to stakeholders who have learned to utilize the current corrupt system for the greater good. Greater good in this context refers to the achievement of the SDG's for a respective project of ODA. In the case of TruBudget, as there is no formalized governance structure in place at the moment, this might prove to be a crucial factor regarding the future development and influence of the platform on its stakeholders.

As previously outlined, the concept of trust itself, in the context of ODA and its stakeholders, is not only tied to technological advancement, as trust or lack thereof, is not a technical issue primarily, but a social one (Berg et al. 2017; Glaeser et al. 2000; Knack 2013). According to Andras et al. (2018), it can be differentiated between trust among humans or between humans and artificial agents. The research of this thesis has shown that stakeholders of ODA are focusing on how the trust in technology might also translate into trust among stakeholders. In other words, trust between human actors in a system might come as a result of trust between humans and artificial agents, which in this case would be represented by the Blockchain in the form of TruBudget.

The implication hereby is that a regime, which has built its wealth on coercive and/or corrupt institutions, might utilize blockchain technology in order to generate a perception of trust rather than actual trustworthy ODA management. The trust in the technology might be used as a diversion of the underlying untrustworthy actors using trust into artificial agents as a sort of proxy for trust among humans. Hereby highlighting a core issue which the blockchain or any other record-keeping technology. By shifting the question of "who to trust" towards the question of "what technology to trust", it might therefore only treat a symptom instead of solving the underlying illness of how to ensure that trust is not abused, e.g., by corrupt actors within ODA.

Thus, it seems that the technical implementation, while potentially facing issues regarding technological infrastructure, especially for stakeholders who have underdeveloped digital capabilities, does not pose the biggest challenge to the implementation of TruBudget. Even more so, blockchain technology seems to be viewed as a tool that might be used one way or another. Rather, human error and cultural issues pertaining to education and morality are at the forefront of concerns for the stakeholders of TruBudget.

Furthermore, the validity of records from an internal perspective does not automatically translate into validity of records from an external perspective. What this means is, that even if the integrity of records stored on the blockchain can be ensured, it does not necessarily reflect on the character of the information itself. If all participants of the network agree to insert fraudulent data into the platform, agreeing that it is to be true, even if it might not be, the blockchain only reflects the fraudulent records. In other words, the blockchain might even be used to perpetuate a cycle of corruption, by generating a veil of legitimacy, due to the use of a supposed trustworthy technology. Hereby, finalizing records on an immutable distributed network, to generate a more formal character of supposed truthfulness, which actors can refer to, to justify their actions.

While the blockchain, e.g., in the case of TruBudget, offers a framework in which actors could be potentially incentivized to be truthful, on the other hand, the same framework

might also be subject to abuse of the same actors. The technology itself is ultimately neither good nor bad in itself. Rather, it is determined by the actors involved and how the technology develops and is applied.

Thus, in conclusion, the research question can be answered as follows. While the blockchain, in the case of TruBudget, has shown that it does offer the potential to reduce information asymmetries and create a shared sense of responsibility among stakeholders, it would be an overstatement to conclude that it definitively showcased that blockchain technology is capable of offering long-term benefits to either. However, TruBudget has been chosen by the stakeholders interviewed partially because of the perception it creates in the larger context of blockchain and distributed ledger technology. Blockchain is branded as a trust-generating technology, also portrayed in contemporary literature outlining the blockchain as a technology full of potential for a multitude of sectors, going far beyond the charity sector and ODA. It could be argued that as a transitionary technology, the lack of compatibility with the harsh reality of ODA might limit the functionality of TruBudget and the Blockchain in general.

Therefore, the impact of Distributed Ledger Technology on perceived Stakeholder Trust within the Charity Sector, amid monitory and administrative complexity of official development aid management, can be described as a sort of double-edged sword, neither good nor bad, but rather dependent on: 1) Cultural factors such as moral values, social responsibility and a general willingness to change; 2) Educational factors such as digital literacy and digital infrastructure; 3) The actual technical design of the iteration of DLT in the context of a use-case within the charity sector.

7 Outlook for the Future

The Trust of humans in technology, in artificial agents, to provide services for us can be viewed as one of the perhaps most important contemporary subjects. May it be simple calculations or complex societal issues such as generating trust among a network of stakeholders spread across the globe, trust among actors within the many institutions and organizations of the charity sector, technological advancement makes it seem that what once was unthinkable is now is in the realm of possibility.

How our societies will elect to utilize technologies, how much freedom in how technology will be allowed to shape our environment we will grant emerging technologies such as blockchain might hereby be pivotal for the future of humanity.

When investigating trust, social factors are necessarily an important part of the equation. While discussions on blockchain technology seem to center around the technological feasibility of the implementation of specific solutions, little attention seems to be paid to the social feasibility of implementing a technologically practical solution. A utopia, while desirable in theory, might suffer from practical impossibilities. Similarly, incentives for installing a blockchain-based solution designed to be an inherently neutral intermediary might suffer from the system's own moral magnitude. While potentially not optimal from a moral or ethical standpoint, the reason power imbalances have persisted in the charity sector over decades might be rooted in the desirability of the very same imbalances from the perspective of those who are benefitting from them. Perhaps instead of focusing on implemented solutions, or the conceptualization of a solution, blockchain technology in the context of the charity sector offers a unique opportunity for scholars interested in the area of DLT to realign their focus away from utopia, toward practical realities.

After all, the long-term scale of projects in ODA poses a considerable challenge for the implementation of Blockchain based solutions such as TruBudget, as projects in ODA are typically only completed within a relatively long timeframe. In other words, blockchain technology is still being implemented as opposed to already having been implemented. A difference that becomes apparent when investigating the maturity of blockchain solutions within the charity sector. TruBudget hereby is no exception, as displayed earlier.

Future research might therefore want to focus not necessarily only on the technical or the social factors which make an implemented technology such as the blockchain successful but rather also focus on how such a state of implementation can be reached without losing the underlying values in the process. How can it be ensured that technology is implemented in a moral and ethical way? What would that mean for a technology such as

blockchain? How can it be ensured that any technology, however noble its intention, is not abused by whoever holds the figurative keys to the machine? Especially when technology is complex, it seems to be a human obligation to ensure that complexity is not abused as a veil to conceal whatever immoral reality might be created in the process.

Thus, this research could function as a demonstration case for future researchers and practitioners. Future research could hereby potentially utilize the findings of this thesis as a first building block towards a framework for analysis of Blockchain projects within the charity sector and/or build the basis for design principles for what the transition towards the implementation of a blockchain solution entails and could look like.

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Appendix

A Transcripts

The following sub-sections show the transcript of the interviews with the stakeholders in the original language in which they have been conducted. The abbreviations LV (Lucas Volkmer); MO (Marcio Odonera); PK (Piet Kleffmann); JZ (Jure Zakotnik) have been used to identify the speakers.

B Transcript Marcio Odonera 21.02.2022 (Original language: English)

LV:
So before I start, maybe I quickly introduce again like what my subject is, what what I'm doing here for my master thesis. So you know roughly. See what I'm talking about. Basically I'm writing on development aid and more specifically how distributed Ledger technology can support development aid and the focus of my thesis is on the trust between the different stakeholders involved in official development assistance. I want to do a case study for that on a use case and in this case it's Trusted budget expenditure and, wait, give me a second so I can read to you my official research question here it is: what is the impact of distributed Ledger technology on perceived stakeholder trust within the charity sector amid monetary and administrative complexity of official development aid management?
And for this I have also created three different hypothesis first that distributed Ledger technology can help reduce informational symmetries. Second that it can increase accountability for the different stakeholders and 3rd that it can help reduce corruption and improve the quality of development aid in general, and then for my last interview because I've already done an interview with the developers of True budget.
They have basically gave me the advice that I should also include another hypothesis which is basically to include that trusted budget expenditure helps the different stakeholders to see eye to eye. So it's not a power imbalance anymore between donor to recipient, that the recipient has To basically follow whatever guidelines the donor country gives, but rather it's now there's a neutral intermediary in the middle. In this case, the blockchain, so this is roughly what I'm doing, and I would like to have an interview with you right now, which I would Like to record if that is OK.
MO:
No, that's OK.
LV:
Perfect and I will ask you basically some questions in general about Trusted Budget Expenditure and the official development assistance.
MO:
No problem.
LV:
We will later have some questions on the blockchain as well as Trusted budget expenditure even though we have already been talking a couple minutes beforehand. You only had limited exposure to that technology if I'm correct, right?
MO:

Well, actually I was Very involved when we made the pilot, First, a proof of concept and then a final project, Uh, using agile for Trubudget as one of the approaches and the other one is using tokenized, Uh, using tokens for transferring money. But what happened is that, The Amazon Fund, which is the use case that we worked on with true budget, it's halted. The operation of the Amazon fund it is still operating, but it's not operating for new projects only the ones that Got verified and approved. And, I mean, there's been not so many initiatives, new initiatives, for the amazon fund.
Well, I'm why I'm talking, just to say again with what I said to you in email. I mean, I'm we're talking in a personal level. I'm not representing here the BNDES. At the end, yes, so this is what I'm going to tell. I mean, I cannot talk about the Amazon fund or the blockchain initiative on behalf of the BNDES. I can tell you about the experience I had with the the team which i was involved within the past. But nowadays I'm not part, not even from the Amazon fund team, which I was until 2018, and then the watching initiative that I was a member until last year.
OK, so we had the experience. Very interesting experiencing all of approaches. The true budget approach and the other one is a Public watching this material experienced improvising our disbursements. But, In the Amazon fund, specifically, 2019, We had no more, Uh, we were not able to scale the experience because of the halting of new initiatives with the Amazon fund so, Uh, we had an MOU to develop this experience, but it's also now, It's not, uh. Uh, how can I say it's not?
It's already. I forgot the word English, but it was valid until the end of 2020, But anyways, I think there's The those good legacy from the month experiences.
LV:
Alright then then maybe let's start, maybe let's start at the beginning because, OK. First, can you quickly quickly give me your like current position or your expertise in the area you kind of already did, but like in one or two sentences, what is your expertise in the area of official development assistance? What have you done before? What are you currently doing?
I am a Public administrator in the BNDES. I currently work with the digital innovation Management here in the IT division. Before that I was Part of the Blockchain team Who developed the blockchain experiences at BNDES. Which started with a innovation, open innovation contest in 2017 While I was woking on the amazon fund
So in this contest that was for employees. In this, employees, We presented the idea of using blockchain technology To improve transparency and trust on BNDES' expenditures, because BNDES is alsoPublic. A development bank, public banks state owned bank, federal government. And at that time We were facing a Lot of challenges regarding our reputation We were facing corruption accusations Uh, so it was very important to us first to be as transparent as possible and it was a, uh, a policy that the bank was improving a lot since 2015 but when we faced the Blockchain technology we had the hypothesis that that could be a very strong tool to Make the society believe not what we were talking about. It's not about we show Me, our numbers and Operations and information.
Actually, we're talking about the blockchain Being a part of our processes and that everyone every citizen could be able to look and track our expenditures Uh, directly on the blockchain, so that was our hypothesis at that moment. So in this contest We presented our idea and the Amazon fund was one of the use cases we wanted to experiment these hypothesis.
We always had a great relationship with the KfW and their partners for decades. The Amazon Fund is funded by KfW also, so there is one of its main donors. And KfW at

that time was preparing developing Trubudget, so it was a great opportunity for us, Uh, to experiment on.
It was a Little different from the initial approach we had. Our initial approach was to use Ethereum. Which is a Public blockchain to process Part of our operations, but because of trubudget, we also adopted an Additional approach which was the notarization let's say notarization approach, so we studied both approaches like Tracking budget.
LV:
Yes, so quickly. If I'm understanding you correctly, then the motivation behind trying to utilize the blockchain technology in your management processes was mostly because their were issues with corruption in the administration and also like the perception of the public of how funds were being used. And blockchain technology was a solution to kind Of give a sense of security for or assist or create trust for the stakeholders involved That funds were used appropriately. Am I understanding that correctly?
MO:
I I just there, uh, I didn't understand everything you said because it cut in the beginning.
LV:
I can repeat basically, if I understand you correctly, the motivation for using the blockchain technology was that you had basically issues that you faced within the organization with corruption or with funds which were not being used efficiently and the blockchain was kind of a solution. To at least give the perception of funds being used more securely, the perception for the stakeholders, I mean. And for the general public that in general just Funds were being used, however, supposed to be used is it. Is it correct?
MO
Yeah, actually it was a perception of. We were we were.Accused of corruption but actually We had faced a lot of investigations. From a lot of control Bodies and the Congress also, but until now We had not only at a, I mean, all of these accusations were proved Until now, we need a no no, They were no, they had no consistency, but I Think on the Other hand, the things that the bank
Then this is very conservative. So then the understanding was that we had a lot of confidential information about our clients and then with The time and The pressure from society For more transparency, I think I guess that today BNDES Is one of the most transparent banks in the world because all the information of all projects, a lot of information about the contracts are on the Internet for anyone to consult so The the change was when the Supreme Court in Brazil allowed the bank to expose some level of information because the bank wasn't feeling comfortable to, expose this information before because the understanding was: This was confidential information.
But as we also manage public funds, The Supreme Court understood that when we are talking about public funds, The bank should Had a different level of of data exposure about the operations than a commercial bank. so when the Supreme Court changed this understanding, the bank had The law, Uh, how Can I say the, I mean the juridical Sustentation to expose more Data about their Operations, so now I mean interest rates, The size of the, Uh, each operation, Who is the client or what the project was, the project where the money should be invested on, how long is the Periods for payment and everything it's, It's all on Internet.
LV:
Do you think there's this? Do you think this follows a larger trend that there's also a different expectation nowadays that stakeholders have that they think that information should or needs to be available all the time, and that there's no room anymore for, let's

say, Uh, having to just trust or rely on a stakeholder or a partner that they will do the right thing. But rather, you want to be able to control it for yourself or check it for yourself.
MO:
Well, first one approaches transparency, taking that's the bank its as I mean, it creates a lot improvement. And then there's certain kids. It's changed a lot in the sense, but another approach is they're only talking about it, People should not have to trust what we are saying, but also should have the means to be able to trust the information because other Agents are Verifying and. Given the necessary triggers for you to understand for you to believe in what we said. So in that sense, I think blockchain can make a big difference. First, because I think it's an instrument for how, How can I say? Sharing information, sharing credible information uh is a problem that blockchain can solve Yeah, yeah, and also because I think, It's not valid for all the cases.I mean for Instance trubudget is A private permissioned blockchain But in our initial Hypothesis we thought about Ethereuem, I mean it's a public Blockchain. All the information is there and also permissionless, Also, so the level of trust is different but also the level of cost is different. So and we got to put it on balance, but what as a hypothesis, I think Blockchain can be a changing paradigm for people to have to have access to information without, uh. We know without having. That without having to worry about trust so.
LV:
Yeah, because because the blockchain is kind of a neutral intermediary which will create the trust for them, right?
MO:
Perfect. Especially the public ones.
LV:
OK, then I have a question in in that context you already mentioned a couple of challenges which official development assistance is kind of facing. There's this trust issue with corruption, but what do you think are like the the most defining challenges that official development assistance is facing nowadays, and what are the trends to solve them? Is there is a big movement towards changing all these issues or what do you Think about that?
MO:
I Think that well Some other challenges, uh can cost. I mean, a lot of organizations that also are known to be transparent and Have good reputation They also have this, but has a lot of costs involved In maintaining this reputation and make these controls And competitiveness and accountability Very expensive so. Not only because of the technology you have to invest, but also because of the third parties that you need to attest what you're Doing what you're saying And everything so very Expensive structure, so launching Blockchain technology I think that In the future we will also be able to diminish very considerable Uh, level the cost of this trust. Uh, so this one.
LV:
When you say when you say the cost of this trust, do you refer to, for example, monitoring something manually by flying over and checking the progress of projects? Sending documentation from place A to place B, etc? Or what are you referring to specifically?
MO:
Well, there is this because I think you can use blockchain technology technology rather pathologists drones and and digital Photograph, satellite or photographs so you can, You can make a match between the money flow and the implementation progress on the

projects I think that Blockchain affect ones that if. When it gets integrated with new technologies IoT, Drone satellite images, I think they've really proven, The cost of accountability in the sense of the physical evolution of the projects, But also in the sense of the technology itself, Uh, being a more, uh, cheaper technology at the end, to process the transactions involved with these, Uh, the Charity sector or or charity relations Value chain I think That the technology will also represent Less costs in the future,
Uh, especially, I think that when we talk about possible tokenization approach. So maybe you're not only Not necessarily Giving She had money and then having opposed accountability process, well probably with The money digitalization of organization You have a process that calls at the same time, online with the purposes of the projects and we can have a collection of information.
LV:
So you could envision donations being paid out in some form of cryptocurrency, which could be directly traced basically from donor to contractor Whoever is providing a Service that is Achieving a goal.
MO:
I agree So for example in this second approach I told you we were talking about the creation of teh BDNES Token. So the idea is That we will not disburse the Fiat money as we do today, which first disburse money in trenches. So we already take care of progress, implementation progress. And we only disburse the next Trench when we will check for the how teh progress of teh projects is to Be implemented, but this is all made anything... Its just said so we go to the Projects and we visit and everything so. One different approach will be not to release the disbursement and then check all the accountability we will make, the idea was to have a closed environment which would include from the dollar to the first Level of the, Uh, vendors of products and services. So instead of the BNDES These players get money to our clients and then our clients buy goods and services for the project and then it will do the accountability for us What would they would previously was the token, Uh, it was told it should Have the same value as one Brazilian peso and then. And then the client will be able To use these tokens to buy goods And services from pre registered Vendors in this ecosystem And then, and only then these vendors Will be able to exchange the token. Both of them can ask for exchange their tokens to fiat money again. So all these money transfer process will be made by using tokens. Totally traceable, approved I mean and using the blockchain.
LV:
Alright, so the the token in this context is basically kind Of like a Voucher right, but I can release for actual Fiat currency, but as long as I have it everything can be traced so I can check OK the funds are being used appropriately and afterwards I can disburse so I can make the voucher to actual money again, alright?
MO:
Yes, it's a Voucher approach. So I mean then Depending on the ecosystem we're working at, with the third sector or charged money, this could be possible and also some projects, maybe actually could just surpassed some difficulties here for Example the Amazon fund.
So difficulties are including our access to The financial system. So I mean we could have some small people systems learning watching systems Actually, Amazon is not a good example because we have an infrastructure Problem on Internet. But I mean Depending on the infrastructure You have, This could be an interesting approach for total transparency, Uh, for donated funds.

LV:
We've talked a lot about the positives now of of blockchain technology, What it could do, but maybe also, especially in the context of trubudget expenditure, right, What do you think are the shortcomings of the project? Where does it need to improve or what is not working In your mind With distributed Ledger technology in this application.
MO:
Or are expensive to budget, which is a a private permissioned blockchain I think that it can be used When we have a problem of which integration of data between different institutions is important is crucial, So these institutions could be joining a private blockchain and then exchange this information on the secure way online, uh, tamper proof And then change this information. In in the case of trubudget the information we were exchanging was the declaration of our last mile recipients that they were actually receiving the money that we were disbursing.
So it was very simple. It was kind of a I don't know if you are familiar with audits, but in the audit procedure we have the Portuguese, They are called like circularisation letters. I don't know the Term in English but It's when the auditor It talks directly to A third party That is involved in the transactions and then checks with this third party directly If the information is correct on your books. So what we intended to do is kind of a digital circularisation letter. For our Finance so that they could test that the mining that the then are sent to the BNDES and amazon Fund was indeed Received by them to run the program so it was very simple.
It didn't involve how the money was being spent exactly in in the sense of what the organization was doing With the money But it attested to our donors that The organization received the money So it was part of the process. So was replacing the old intermediary, which was the audit company or the audit institution which was conducting or verifying whether or not funds were correctly expressed. It would be and too much to say that it replaced the audit role, But yes, part of it, I think yes. And probably while we. If we invested more and sophisticated the tool to give support to other parts of the process that I guess that it could be able to reduce the need for an audit to check all the information. Because in terms of Money accountability it I mean it does the same role because in the BNDES we not only have the financial audit, but we had also the physical implementation audit, so this was not part of the trip.
LV:
OK, fair enough.
MO:
So what we had was this localization of the correlation of the clients that you see the money from which came from the Amazon fund, Very simple.
LV:
I have another question in regards to the governance of the blockchain. You've already mentioned a couple of Times Now that there was also the idea of using maybe a public blockchain something like Ethereum. What do you think Is it a potential problem that the governance of such a platform such as trubudget right is essentially again kind of a, Bilateral agreement between two countries, the donor and the recipient? Like do you think it is better that it would be a public blockchain basically or a private blockchain? What do you think are benefits and pitfalls of each each version in this context?
MO:
Well, this notarization approach would say it was very interesting for This use case of exchanging reliable information between a set of Stakeholders.
And Then we can talk About the private, permissioned blockchain because the cost is I mean, ist a low cost. Trubudget this is, It's an interesting approach to solve this kind of

problem, and it increases trust, but we're not talking about how the money is actually being spent at the last mile, Uh, it's sucking up it's, About real time sharing of reliable information between A group of stakeholdrrs.
The other Approach, I mean this is simple technologically simple Tool, I think That's more the problem, We faced, As I can recall now was about the GDPR, Uh issues. So we were collecting some information And making it, permanent in the blockchain so. What kind of information should we be Able to collect And save on the blockchain or not?
Uh, I think I I have No, not the details right now, But I think we, what We did was that they were on the blockchain and We only saved part of the data so the institutional and the Logging and the credentials were corporate and then the association between the corporate Uh, figure on the Trubudget system the credentials corporate, but the association with who in the organization had the credentials to Log in TruBudget, was Off chain so.
LV:
Ok, so It was still stored somewhere internally, so you could still retrace who did what?
MO:
Yes, and we keep records of that, So that is yeah non digital part of it. So there was some kind of documentation of institution that indicated, that person to be able to represent, Uh, their institution for Trubudget purposes, so that they Pretty soon receiveed a Logging in And then they would be able to make the password box. This was very non digital, let's say. So so basically some some data was stored on the blockchain and some data was stored off the blockchain.
But that was also let's see what they say. There's a proof of concept and pilot so. Probably we would have. Other ways to solve these this challenge if We would progress on the Pilot, but at that time, That was how we started And we didn't save operating personal information on the blockchain.
LV:
And from your perspective with the stakeholders that were involved in the project, was their perception that the blockchain increases the trust that was, for example, in this notarization that you were mentioning and in in the process of Knowing where that funds Actually were disbursed, was The blockchain seen as something Let's say positive in that aspect or How was it viewed by the other Stakeholders that are involved?
MO:
Thinking about truBudget when we're talking about how the money is Being spent on the Last mile. then i think that trubudget would be very expensive and you wouldn't be able to scale this approach if you want to get To the last mile, Because you will have the cost For each agent in this ecosystem, the small little vendor that I don't know if they don't possibly don't even have access to the Internet. In the case of The Amazon Fund will have to access truBudget and we had to have a, Uh, credential management process to get to each one of these actors , I mean that would be In our view At that time impossible, the cost of managing all these credentials I mean wouldn't be. It Wouldn't have a good cost benefit relationship, so, And I think That for getting into not necessary to last mile, I'm talking about last mile in the dream, but To the money we spent at least At the first level, to the first level of vendors, I think that the token approach the voucher approach is More flexible.
LV:
Ah, OK.
MO:

Then you would use any whole System in this case was Ethereum Which already has a lot of tools and a Framework and everything. So you have it all it's you have The keys you have you have an infrastructure that could be used for the actors during interaction with the blockchain. So this of course these tools until now, and we were talking about 3-4 Years ago, but until Now they are not Very accessible or easy to use tools and Everything there's a Lot of things For people to learn, but the cost of learning is still very high.
But I mean there is this ecosystem so there are These tools being developed and they Are getting better each day and the Learning curve is happening in the crypto world, but we would use all these infrastructure to integrate the actors in this ecosystem. So I think that the point of view, A larger, Uh, ecosystem, and then you have to go to the tokeization approach the voucher approach, to involve to get closer to The last mile.
LV:
But if I'm understanding you correctly, then what you're saying is also that one of the big issues for distributed Ledger technology In the context of ODA specifically is that there's not yet the digital infrastructure in place, and that there is not necessarily the digital literacy, possibly also of all the institutions, to implement such a system, so it's not necessarily the technology itself, but it's rather the people who are handling the technology that are potentially an issue.
MO:
Perfect. Yes, trubudget had a, uh, it was very simple. All the feedback we had was that it was very simple. We used the tool to use because actually you can't see the Blockchain behind it. It was the the system as the Front back as normal as any other, Front end. And OK, so I mean first as a system I would get into with my credentials and then I would make a, uh, a declaration that I've received because I actually there's something interesting that we did. We we use the SAP here at the BNDES, or as our one of our ERP systems. So whenever we had a disbursement to a Amazon fund Project there was these connector integration between 2 project and the SCP financial Module I don't know exactly what it was. So that Trubudget would recognize that there was a disbursement, and then he Would send an Email to our client was registered in the system,saying, oh, you received the disbursement of this payment and this day, please Click here and your Credentials and the test that you have received. So for the person Who was managing the information it was Very easy to use. The perspective of the client was he Didn't see the blockchain. On the Ethereum Approach the public blockchain, It was totally different because it would Change a lot of the It should we change the paradigm Of how we're paying for something. So in this sense, It's much more complex, so I believe that there's A, it's it would be necessary a Lot of the launching technology will have to mature a lot before we can make it accessible for I mean mainstream, but also now you have any from three years from now. And now people are buying NFT's no. So these things are changing.
LV:
Oh yeah, for sure.
MO:
Of course there is a Lot of scams Too, but I mean It's part, it's gonna be part of history but I believe that this all have to happen, so when you're talking about CBDC and everything, there will be a time that people will will not see blockchain in this. In this other approach, so they will be only using applications that start Mobile applications that have blockchain behind but for them it would be as simple as it is to make a transaction on their traditional Banking applications, so I think That this is not. But anyways, I don't know how much time this will take.

LV:
I think it's a cultural change that you're talking about there which I think is already happening I do agree but I also have no idea how long it will take before blockchain technology will be properly in the mainstream. I think still a lot of people are confused by the technology. But I suppose that is that is always how it was back when innovation came along so.
MO:
So that I think that's important to say that this is this approach, the public. What we faced as challenges Etehreums cost is. I mean I tend to think that the ecosystem is developing and when we have the tools so we can use this infrastructure and everything so OK. So the costs are going to be resolved, but what we have Now until now, I mean blockchain transactions Are very expensive, so, This was another problem we faced, so developing the this proof of concept of this approach, that in this we understood that we could not use the Ethereum blockchain as we first intended to because of its cost because of the Difficulties of buying Ethersto run the transactions and then, especially for us as a public bank. I mean it's very hard to explain why we should buy Ethereum to operate.
So I mean because until now I think this will be very Very easy to explain, So what we Did is to Discuss with other public institutions from Federal, state, and local levels. Because we believe that it is important to create a blockchain for government services. So that this blockchain would not be, uh A permissionless and the public blockchain is Ethereum. But it would be a permissioned blockchain with public assets access to its information. It's a public private blockchain. But I don't know how I.
LV:
So so publicly available is the information you can read everything basically, but like the accessing it exactly the governance It's private?
MO:
Governance is private exactly, so it will have To have a Governance from public bodies that are enough or sufficient To give the Trust necessary for the information that is there, so we have executive power and legislative power and the other bodies togteher. So that one can watch the other one on this blockchain.
They would be all signing the transactions, validating the transactions in the data, but it wouldn't have the cost of a public blockchain cost. And I mean the instability institutional instability of the.
Not instability, I think that's Not the word, but I mean it Wouldn't be a. We could have more control about the governance of these Blockchain, so we do have the advantages of these both worlds. I would have enough trust for the data that's needs there to form. The society Can trust this information, but I wouldn't have the cost Of maintaining and sustaining this infrastructure because it's made Of servers that Are already running on the government Levels so, Uh, at the time I left the project, what we had was a we stopped the meeting This token Proof of concepts and pilots education development. And we were investing in this institutional infrastructure for a blockchain for public and governmental services, and that was when I left.
The project, I mean. Yeah, private blockchain approach more than public Blockchain approach at that time seemed to be Feasible for what we had. The whole thing about this We called the Brazilian blockchain network, Uh, this brazilian blockchain network that we were dedicated to develop the application for budget tracking. other Organizations from government have other needs, so they Have their own projects So although I mean The Ministry of Education or want to put on Blockchain all the diplomas, The Ministry of Health would want to put all the vaccination records on the Blockchain. No, I mean

To have a governmental infrastructure a Blockchain infrastructure would be, the probably the...
LV:
What you're referring to is like the problem of you have isolated systems and you have to have like like if it's different blockchains and they don't work interoperably and all that or.
MO:
Thats one problem that would be there, But also because well, especially in the government, I mean there's a cost for innovating, So if you make this cost if you make in any restriction that the law or the This innovation costs because you won't have to study everything and will have to choose a technology that actually could not, but Maybe it's not compatible with the technology That the other organizations Features of the government are using
All of these that Have a lot of uncertainty And explanation cost. So if you provide An infrastructure for that Then all these actors from government can think about their problems and needs from this step
So also I think because BNDES is A Development Bank and When we were talking about physical infrastructure in the 50s and 60s and 70s, maybe the parallel of it was Well, maybe there's a digital infrastructure that BNDES can help to build, so I think that this is What we are Seeing at at the moment, it's important to Provide an infrastructure a blockchain infrastructure so that the government can go from this to there to think about to think about their problems, not necessarily about infrastructure That will may then solve their Problems possible.
LV:
So when we're talking about, uh, blockchain, what you're referring to is like have a base layer on which then applications can be built, kind of. Probably this was also, if I'm assuming one of the motivations why the Ethereum network was chosen, Because it allows for applications to build be built on top of it.
MO:
Perfect. So and then we're talking about any budget tracking for charity sector. I mean, that's Your focus. To us, uh, you manage the some charity funds, but this is not our main business. What we can bring I think there's a complication for the brazilian society and the weaknesses of our institutions is to have some kind of application that could be used from other instances of government on budget tracking. From our experience, I mean it's easy for us To us to talk about our experiences on budget tracking. But we believe that this approach could be used to all government expenditures and that would be a revolution in the sense so.
LV:
So so you don't see it. You don't see it isolated only to the charity sector over as a uh, as a very much bigger thing.
MO
No, charity sector, to us, It's almost like a good use case A small proof of concept because Our dreams is That all the citizens taxes from the citizen tax recollection to any or each vendor The government pays for its products can be traced without a doubt so this would be a good use case.
LV:
So so would it be fair to characterize kind of the charity sector as a, low hanging fruit, like an easier use case, and also easier to market? Probably because it's a.
MO:

Yeah, maybe easier to market because It wouldn't be fair to Say that it is an easier case I Mean there's a Lot of challenges and everything. But to us It's a way to book the discussion on so I had the duty As I have a charity, I have the duty to be as transparent and transaprent as possible, and when I'm talking about public Money spending expenditures.
So we In our case, at the end, yes. We experimented with the Amazon Fund and other Non-refundable programs. Because actually and then Maybe I didn't Tell you at the beginning, but because the Amazon phone, then the other are no refundable use cases that we manage the disbursements, There is no question about the need to be totally transparent,
so nobody will push No, you can put this expose this day that expose this information no, this question was already surpassed, so when we are talking about the regular operations of the Bank as a bank then you have All the discussions that as well so you Can expose the contract information No this you can, but this is really this is doing that, but when you're talking about the charity aid information
We don't have these worries These discussions, everybody Uh agrees that all information Should be public, so it's just Because, uh, she was the best use case to to start this.
LV:
To implement it or to.
MO:
Yes, this experimentation brought to you. But I mean I Know that charity is. Of course, there is a lot of challenges and yes, forward since you believe that both approaches, that they can bring trust to the charity Ecosystem and to be charity stakeholders.
LV:
Alright, thank you so much already for all this information. I think I will have probably some some follow up questions later on, Once I revisited the interview, so can I contact you also after the interview, Maybe if I have some follow up questions per mail, essentially perfect.
MO:
Yeah, sure, I'm so sorry if I didn't focus onto budget, but because the part of of our experimentation with what. And actually it was part of It was very important, but it was the first one that Yeah, stalled, so we had that.
LV:
Since my focus is anyway on the stakeholders and how they perceive distributed Ledger technology. Trubudget is kind of just the means to understand how the stakeholders perceive it, so a different use case or your reflections on their different, different different approach, let's say is still just as valuable, so they're very helpful. Don't worry, do you have anything else that you would like to like to talk about in the context of distributed Ledger technology and ODA? Anything that we haven't talked about yet?
MO:
Let's see. I think the Adoption of all of these. We'll think about that. But I mean, I think that the adoption Is gonna really happen only when We won't see blockchain anymore, Because, uh, Well Our experience with the stakeholders while We were doing the pilots and That the process is that they don't have any.I
t's hard to make it tangible, You can talk about the advantages of the Blockchain, but while you were experimenting that as a user, what people want is that this is more Fluid and easy A transparent in the sense of: I don't need to see the working, I don't even understand how it works. If You're telling me That this is trustworthy or that's OK, but.

But to me, Yeah, it's it's that simple. It's so easy and everything, so I believe that in this sense, not only to the final users or the clients, it happens also with the donors, and it has to be accessible, And I believe the Blockchain has, As as some steps to get to that point where where everybody can actually use it.
LV:
Yeah, I actually strongly agree with that, especially in I always think about it. This way that When I'm using WhatsApp or some other technology, I've not once thought about how What's that actually delivers my messages too Uh, to to another person, like maybe very like superficially, but not really deeply, but with the blockchain there is always a very technical discussion that comes along with why should it be implemented Why should it be used etc. Which of course is good that it's being discussed at all, but I think sometimes it takes away from What we actually should focus on in this in this space, which is exactly what you're saying Accessibility and making it usable for the normal people, let's say, and not just the people that know technology inside out and Probably wouldn't Need the extra security anyway, in most use cases, but yeah, so I do agree strongly.
MO:
So I mean when people will know That both if this uses blockchain technology so I have I Don't know more information, I can make it But the I can have an integrated system and I don't know I just thought of tamper proof and I can Uh, have a single Source of of truth and everything. But for the people who are, I mean the feeling or all the system probably it shouldn't matter.

C Transcript Jure Zakotnik

LV: Piet kannst du dich einmal kurz vortsellen wer du bist und was deine position in der KfW ist:
PK: Piet kleffmann, ich bin in der KfW of digitalization in der Entwicklungsbank also im geschäftsbereichEntwicklungsbank. Habe mir den Use case TruBudget ausgedacht vor 5 jahren undzusammen mit dem digital office der kfw weiterentwickelt. Da kann Jure auch was zu sagen das Digital Office hat dann sozusagen auf der IT seite die Architektur angefangen und dann weiterentwickelt mit dem vertragspartner. Ich kümmer mich in meiner funktion jetzt aber auch um alle strategischen fragen zur digitalsierung mit unserem auftragsgeber und usnerem Partner und peers der entwicklungsbank
Ok verstehe
JZ: Kurz zu mir, ich bin Jure Zakotnik ich bin inofrmatiker vom haus aus, war dann ziemlich lange bei It consultancies unterwegs und habe mir gedacht vor fünf jahren als das innovation lab der KfW dann aufgemacht hat, angesiedelt in der Konzernentwicklung. Habe dort dann angefangen. Dann kam piet durch die tür mit seiner Idee zur blockchain und hat gefragt ob wir da nichtw as machen können. Was wir im innovation lab versuchen und ich auch speziell, wen jemand eine idee hat, kann zum thema KI blockchain etc sein, dann versuchen wir das umzusetzen im sinne eines laborversuchs. Im prinzip die software zu bauen um zu schauen lohnt es sich von unserer seite das zu skalieren oder eben nicht. Das ist sozusagen mein Job heir von der technischen Seite.
Das heisst ihr seid auch beide Länger schon im bereich Entwicklunsghilfe tätig, du zumindest Piet bist dann länger schon bei der KfW?

PK: Ich bin seit über 20 Jahren in der Entwicklunsgzusammenarbeit
JZ: Ich hab damit tatsächlich gar nichts am Hut . Also ich hab meinen ersten kontakt zur entwicklungszusammenarbeit mit dem Piet tatsächlich gehabt dann. Also ich war vorher bei Banken unterwegs, aber nicht bei der KfW

Ja, ok verstehe also
PK: Dazu muss ich auch sagen, ich hatte auch im Vorfeld auch. Ich meine TruBudget soll ein gewisses entwicklungspolitisches Problem lösen und ich hatte im Vorfeld auch Ideen wie man das schon analoge Ansätze die auch ausgearbeitet wurden aber keine weitere Anwendung fanden
ja wahrscheinlich hast du den Zeit jetzt auch schon mehrere Technologien erlebt die aufgestiegenen oder einen Hype hatten und dann doch nicht so geklappt haben wie sie ursprünglich mal angedacht waren?
PK: Das eigentlich weniger aber ich will nur sagen dass blockchain sozusagen hier Lösungsmöglichkeiten anbietet die es vorher nicht gab. Auch wenn es versuche gab dieses problem auch ohne große technologien anders anzugehen.
Ok alles kalr. Du hast es gerade schon angesprochen das TruBudget ein Problem lösen soll, was sind denn aus deiner Sicht die entscheidenden Probleme bzw die es zu lösen gilt im Bereich der Entwicklunsghilfe, stand 2022?
PK:Ja da würde ich sagen zwei dinge das eine steht schon in der paris deklaration zur aid effectiveness 2005 da steht die problematik dirn die einem imgrunde genommen sagt die jetzigen ansaetze der finanzierung sind nicht nahhaltig wir sollten viel mehr übver die partner systeme gehen und das haben wir seit 2005 in der internationalen entwicklunsgzusammenarbeit nicht hingekriegt. Ja also da kannst du gern nochmal nachlesen. Da guibts ja einige punkte. Es gab dann nachfolge konferenzen in Busan in Accra, wo man letzlich gesagt hat. Da ist jetzt nicht weiterverfolgt worden weil man eben eigentlic, und das ist jetzt meine interpretation, man kommt da nicht weiter. Und so jetzt macht jeder weiter sein ding.
PK: Die zweite herausforderung ist in der tat die gestaltung der digitalen transformation in unseren partnerlaendern also nicht nur bei uns. Deutschland ist natürlich auch da entwicklungsland. Nicht unser mandat. Also zumindest nicht von der KfW. Dazu brauch es neue intstrumente neue wege wie wir projekte umsetzen das kann man nicht so machen wie so eine klassische bauinvestiuon oder wasserversorgung die sollen ja auch digitaler werden aber dann brauch man neue ansaetze die schneller sind.
JZ: Vielleicht eine sache die ich hier hinzufügen würde ist das thema monitoring und management gerade in ländern in die man nicht hinfahren kann und eben vorort helfen kann , die noch besser mit digitalen hilfsmitteln die effektivität von der entwicklungszusammenarbeit sozuisagen steuern kann oder unterstützen kann obwohl man ebne beispielsweise nicht in afghanistan vorot sein kann um die schule vorort mit zu bauen
Darauf würde ich später auch nochmal zurückkommen. Vorher einmal, woher glaubt ihr kommen diese Probleme gibt es da akutell auch trends die in die eine oder andere richtung gehen, werden diese Probleme bsp die fragmentierung auf administrativer ebene in form der Parallelstrukturen weniger, also das bsp projekte wie TruBudget diese probleme technisch lösen? Gibt es aktuell positive entwicklungen die man beobachten kann, bsp dass es zu einer art standardisierung kommt in der Entwicklungshilfe?
PK: also bemühungen gab es immer schon und wirds immer geben, aber ich würde mal sagen der trend ist eher gegenläufig, es wird eher schwieiriger weil es immer mehr geber organisationen oder formmodelle oder private geber wie die bill und melinda gatesfoundation gibt. Es gibt immer mehr partner immer mehr player, für partnerländer

für entwicklunsgländer es wird eigentlich immernoch unüberschaubarer immernoch komplexer, es wird nicht einfacher. Dazu kommen ebn noch unglöste fragen des digitalen einsatzes also die länder die sagen wir mal auch überlegen wie soll ich mich IT mässig überhaupt aufstellen auch um sowas zu bewältugen und die sind teilweise auch ein bisschen blockiert weil sie nicht sicher sind welche strateie sie welche tehcnologie sie einsetzen wollen. Also es ist eher schwieriger geworden für ein nehmerland mittel vernünftig umzusetzen.
JZ: Zu ergänzen dazu, also ne hgypothese, dass die Erwartungshaltung jetzt auch eine neue ist. Also wenn ich vor zwanzig jahren sowieso mit fax oder post kommuniziert habe dann wwar ja die turnaround zeit entsprechend lang. Kommunikation war langsamer auch in bezug auf daten erhaltung und solche dinge. Jetzt ist ja jeder irgendiw egewohnt das daten üübverall sofort verfügbar sind dass sie irgendwo bei google oder amazon verfügbar sind. Dass jeder zugang dazu hat dass man jederzeit die information die man benötigt auch sofort bekommt also dass ist die erwartungshaltung. Beispielsweise auch im Parlament. Also die Erwartungshaltung iust da und ich glaube dadurch wird ein gap zwischen erwartungshaltung und das was man beobachtet entseht dann auch nochmal mehr druck als beispielsweise vor zehn Jahren.
Das Thema Erwartungshaltung ist spannedn, da passt die nächste frage ganz gut dazu. In meinem Literature review habe ich festgestellt dass viele researcher davon reden dass vertrauen innerhalb der Stakeholder in ODA eher sinkt und reduziert wird. Genau dadurch dass eben die verschiedenen Stakehodler eben verschiedene Erwartungshaltungen haben und zum beispiel eher nicht vertrauen möchten sonder eben die kontrolle haben möchten ich muss wissen wann wo wie was ausgezahlt wird. Dass heisst wenn ich dich richtig verstehe teilst du da auch die wahrnehmung dass heute stakehodler auch erwarten dass sie kontrolle haben und eher kein vertrauen mehr gegenüber solchen prozessen gegenüber bringen falls sie keine kontrolle habendarüber ob tatsächlich passiert was angeblich passiert?
PK: Ja also es ist glaube ich schwierig jetzt empririsch hier abzuschaetzen ob dieser mangel an vertrauen gröser geworden ist oder nicht . Ich würds mal andersrum formulieren. Dadurch dass es eben mehr player gibt, die den punkt den Jure genannt hat mit dieser ständigkeit von informationsbereitstellung erwarten. Aber auch den zusätzlichen druck vieler laender die jetzt sagen wir mal steuergelder einsetzen sich rechtfertigen zu müssen. Es ist bestimmt schwierieger geworden. Es gibt natürlich andere geber die da raus wollen und zb hilfe anbieten wo der deal eben mal ein anderer ist da muessen reform konzepte umgesetzt werden, aber dass macht die sache auch nicht unbedingt einfacher. Da habe ich teilweise noch höhere risiken weil es kann ja sein dass diese Reform konzepte eben nicht kommen oder nicht wie cih das erwarte und dann habe ich das geld da auch eigentlich in den sand gesetzt. Also insgesamt würde ich sagen ist es für beide seiten schwieriger geworden.
Wie hoch ist denn die aktuelle Verantwortlichkeit oder Rechenschaftspflicht von stakehodlern? Ist es möglich gut nachzuvollziehen wofür ein empfängeland das geld dann ausgegeben hat oder ist es eher schwierig nachzuvollziehen wie gelder geflossen sind?
PK: Also das haengt davon ab wie ich die gelder eisnetze ja. Also die meisten geber jaben ja eins ystenmin die welt gesetzt die KfW auch, wo wir die gelder direkt an die Dienstleister unserer Mandate rüberschicken. Wir nennen das Direktzahlungen. Das Geld kriegt also nicht unser Partner sondern es wird noch prjektfortschiritt als noach erbrachter leistung ausgezahtl.
So stellen wir natürlich sicher dass die Gelder korrelt eingezahlt werden. Und Jure hat auch noch erwähnt wir haben ja auch remote monitoring instrumenet weiterentwickelt

um eben sicher zustellen wenn ein bauunternehmer der im auftrag eines ministerium irgendow untergwegs is was leistet wir auch sicherstellen können wir zahlen dem erst wenn er die erbrachte leistung qualitätsmaessig zufriedenstellen erbracht hat. Und dazu gibt es eben unterschiedloche instrumente das vorort zu prüfen. Entweder wir schicken jemanden hin, wir nennen das örtliche vortschrittskontrolle. Oder wir haben remote über satelliten möglichkeiten oder dritte die sich beteilligen um für uns dann zu prüfen dass da tatsäch,ich die leistung erbracht wurde. Und so würde ich mal sagen ist unser heutiges System relativ sicher. Nur ist es sehr aufwendig und es kostet eben auch viel
JZ: Und vielleicht ergänzend ich glaube schondass die erwartungshaltung der öffentlichkeit ist dass mehr daten offen publiziert werden zb hat der chef der weltbank ab jetzt sind alle daten öffentlich die nicht geheim sind. Das ist bei uns zb noch nicht der fall
PK: Bei uns sind alle daten geheim
JZ: Aber wir publizieren natürllich auch detailierte Information über das Portal zb. Open data initiativen die eben mit ermöglichen die digitale zur verfügungsstellung von daten zu gewährleisten, führen dazu dass eben auch erwartet wird dass diese daten zur verfügung gestellt werden. In einem detailniveau was oft aus unserer sicht eher zunimmt und ich glaube nicht dass sich jetzt eine entwicklungszusammenarbeits organisation erlauben kann irgendwas zu amchen und nciht und einemal im jahr nur zwanzig seiten zu produzieren. Das ist nicht mehr stand der dinge sondern die erwartungshaltung ist dass solche daten regelmässig oder sogar in real time lesbar sind, mit drill down funktion publiziert werden. Und so mehr, aus meiner sicht, mehr offenheit da ist.
LV: Wenn ich euch richtig verstehe dann seht ihr das Hauptproblem nicht im Bereich Korruption selbst bei der entwicklungshilfe
PK: Natürlich
LV: Gerade die administrativen kosten dass zu übersehen sind auch relativ hoch und die komplexität die damit einhergeht sind ausschlaggebend?
PK:Also meien these ist egal wo subvention bereitgestellt werden hat man korruptionsgefahr das ist nicht nur auf entwicklungshilfe beschränkt sondern das gilt genauso für EU subventionen. Auch da gibt es korruption und korruptionsfälle. Also das ist jetzt keine spezialität der entwicklungsländer. Aber es ist natürlich eine tatsache und man kann eben auf solche korruptionsrisiken reagieren. Aber diese risikomitigierung ist eben teuer, das ist das eine problem, das andere problem ist sie führt zu strukturen die eben entwicklungspolitishc nicht nachhaltig sind, weil man dadurch funktionen übernimmt die eigentlich das partnerland übernehmen sollte. Das führt zu abhaengigkeiten wir fördern ja ind er entwicklunsgzusammenarbeit öffentliche investitionen. Und wenn ich sozusagen das partnerland aus der verantwortung öffentlicher investitionen rausnehme, weil i8ch alle risiken absicher über meine strukturen und dadurch dass ich subsidiär in der taetig bin sondern viele aktionen als meine dann äbernehme dann entmündige ich sozusagen meinen partner und mache es ihm nicht mehr möglich dass er diese investitionen die über unseren kanal laufen in gleicher qualität er auch über siene eigen systeme darstellen kann. Das lernt er ja gar nicht, das kann er gar nicht.
Es hat dann natürlcih auch keine wirkung auf die korruption sicheren prozesse in dem partnerland. Die laufen dann ja gesund weiter. Also ich find das total kritisch, man kann dann sagen die geber finnazierten schulen,m grundschulen in mali sind toll, aber die grundshculen die über den eigenen malischen haushalt finanziert werden die sind nicht toll. Was ist denn das für eine Entwicklunsgpolitische Nachhaltigkeit? Gar keine.

LV: Du beschriebts da einen souveränitats verlust. Wenns bsp über die KfW direkt läuft dann klappts, aber sobalds über die eigenen kanäle läuft dann klappts nicht mehr, weil es nie gelernt wurde sichere kanäle zu bauen.
PK: es gibt einen unterschied zwischen entwicklungshilfe und Nothilfe. Nothilfe kann kurzfristig so natürlich laufen um akute problkeme und bedarfe abzudecken. Aber eine langfristige nachhaltige entwicklungszusammenarbeit muss strukturell wirkung zeigen. Und da ist es eben nicht getan dass man einige schöne schulen gebaut hat sodnern man muss dafür sorgen dass der schulbau an sich in dem land nachhaltig besser wird
JZ: Wobei ergänzend, ich glaube was wir hier diskutieren, ist ja finanzielle hilfe. Es ist vielleicht vorstellbar, und dann kommen wir vielleicht doch nochmal zur blockchain, das eine bank eben nicht hur geldmittel zur verfügung stellt und nicht nur finanziell fördert obs jetzt digitale lösungen sind oder mit irgendwelchen anderen dingen so fördert dass das im land selbst gemacht werden kann. Also angenommen wir würden eine software zur verfügung stellen die dem land hilft gewisse risk zu mtigieren also bsp bestechung als eins davon. Dann wäre es natürlcih schon nachhaltig und auch entwicklunsgpolitisch sinnvoll glaube ich. Aber das ist eben nicht mit geld lösbar sondern mit software einfach gesagt. Deshlab muss man sehen dass mand en scope der eigenen zusammenarbeit nicht erweitert.
PK: Ich muss ein bisschen korrigieren, die KfW leistet nicht nur finanzielle hilfe sondern wir machen natürlich auch beratung wir finanzieren consultants die beratend tätig sind. Also es gibt keine finnazierung ohne beratung. Aber yJrue hat natürlich völlig recht es ist quasi eine neue art und weise förderung darzustellen ist die bereitstellung von open source software für bestimmte probleme. Und da ist trubudget natürlich ein beispiel.
LV: Vielleicht nehmen wir das als überleitung um zu TruBudget zu kommen. Vielleicht könnt ihr einmal kurz in ein paar setzen erklären was TruBudget eigentlich ist.
JZ: Jetzt bin ich mal gespannt, jubiläum haben wir
PK: Ich denk jedes mal neu nach wenn ich die frage kriege, ja. Trubudget ist eine blockchain baiserte anwendung die dazu führen soll das sma die risiken bei der mittelvergabe für bestimmte projekte so runterregulieren kann dass ich eben meine finanzierung nicht über paralelesysteme abwickel wie ich sie vorher dargestellt habe sondern über die poartnersystem. Und von der geberseite her kann ich über dieses tool eben nachvollziehen wie der empfänger die mittel die ich bereit gestellt habe als geber für den verinbarten zweck eingestezt hat. Aus partnersichtsseite, erlaubt diese intsrument eben zu gucken was machen eiegntlich meine vielen geber, wie viel finanzieren die eigentlich und ich kann sie überreden ok hört auf mit euren spezificschen parallelen konditionen die ihr habt, sondern gebt mir das geld wir können jetzt gemeinsam sozusagen dieses Geld umsetzen damit ihr auch seht was wird damit gemacht. Und das hat viele aspekte die dann vorteilhaft sind für beide parteien, weil man hat echtzeit kommunikation, man hat ein gemeinsames workflow tool. Man kann die berichterstattung quasi gegen null regeln, weil man alle relevanten informationen als workflow tool auf der trubudget platform abbilden kann. Zb vergabe prozesse die auch immer korruptionsanfällig sind und zwar nicht nur geber partner sondern auch im partner land selbst also der einzelne mitarbeiter steht ja auch unter stress unter rechtfertigung dass er bei einer vergabe alles richtig macht. Also der kriegt auch ein mittel in die hand um zu sgaen hier ich hab alles richtig gemacht bei der vergabe das hat mit dem geber gar nichts mehr zu tun. Also diese instrument schafft eine transparenz zwischen den verscheidenen stakeholdern die einerseits alle in der tat accountable macht, jeder eintrag ist ja nicht mehr löschbar und sichtbar für alle. Aber zweitens eben auch die sicherheit für jeden gibt dass er alles richtig gemacht hat.

JZ: Darf ich auch nochmal? Etwas technischer vielleicht nochmal, also es ähnlichwas du gesgat hast. TruBudget ist ein blockchain basiertes collaboration tool wo die informationen sicher nachvollziehbar und auf augenhöhe gespecihert werden und allen beteilligten auch gehören. Und mit diesem tool kann man alles machenw as Piet gesagt hat aber im einfachsten fall sagen die leute warum nehmt ihr nicht sharepoint. Also das ist so eine art sharepoint, mit dem unterschied dass die daten eben auf augenhöhe bei allen beteilligten vorhanden sind und auch nicht gelöscht werden köbnnen also nachvollziehbar sicher sind und nicht bei einem cloudprovider oder einem geber oder nur beim partner liegen.Also durch ausschlussverfahren kann man sagen alle nachteile die man haette wenn man diese informationen nur an einem ort speichert, sei es jetzt google, partner oder geber, werden da sozusagen wegfallen durch die blockchain.
LV: Das heisst was du da gerade angesprochen hast ist so eine gewisse neutralität der platform
JZ: Genau also dies augenhöhe die piet da auch eben gennat hat die ist enorm wichtig weil daten sozuagen das neue öl sind. Wer die datenhat der hat die macht und da bei der blockchain ist es eben so dass alle die daten haben und die keiner verändern kann. Das macht viel aus.
PK: Auf der tehcnischen seite. Für mich ist es eben ein instrument geschäftsparner zusammen zu kriegen die jeweils ein isoliertes it system fahren, wo die kommunikation eben fast ausschliesslich über email läuft und damit ist TruBudget natürlich ein perfektes kommunikationstool um den aufwand von kommunikation und abgleich von daten zu verbessern. Ich sag immer jeder bericht der geschrieben wird ist überflüssig weile r bereits veraltete informationen enthält und einfach nur arbeit macht. Arbeit für den der den bericht erstellen muss, für den der den bericht ablegt und für den der ihn liest. Also man muss die infos erstellen evrschikcen ablegen lesen bewerten nochmal ablegen, alles völlig überflüssig wenn man eine gemeinsame kommunikationsplatform benutzt. Also ich sehe einen extremen gewinn bei der effizienz bei der kommnunikation durch das getilte wissen aber auch durch die echtzeit kommunikation. Das wird glaube ich immer ien bisschen unterschätzt.
LV: Wenn ihr von geteilten wissen bzw augenhöhe rededt, was heisst das konkret, wem gehören die daten , sind die daten öffentlich einsehbar oder nur für die teilnehmer, wie funktioniert das im konkreten beispiel von trubudget?
PK: Grundlegend hat der jure natürlich recht es ist super demokratisch alle sind auf augenhöhe, in der konkreten umstezung sagen wir bislang, es gibt auch nterschiedliche modelle dass man sagt diese plattform gehört in anführungsstrichen den partnerland. Also es ist eine anwendung die das partnerland verantwortet und gemeinsam dannb etreibt mit anderen geberländern die dann eben auch einen knoten haben. Also es sit ne verinbarungssache zwischen den partnern wer da welche rolle hat und wir haben für jeden fall auch ein governance system. Wer darf was sehen, also auch da ist nicht immer vollständige transparenz es gibt ja auch daten , gerade bei vergabe prozessen die nicht öffentlich sein dürfen. Es gibt dann ein governance system, aber die oberste regel ist schon möglichst alle infromationen so transparent wie möglich zu gestalten.
JZ: Genau, man darf glaube ich hier nicht durcheinander werfen die technische augenhöhe also wir haben ja ein blockchainsystem sagen wir mal aus fünf knoten und alle haben immer die gleichen informationen also die verbinden sich quasi permanent, und das auch so dass niemand einzelnes irgendwie daten verändern kann die schon akzeptiert worden sind vom netzwerk. Das hat aber nichts damit zu tun wie bsp die governance funktioniert also wenn ich an trubudget beispielsweise selbst was veränderern würde also an der software selbst und das wäre nur in der macht der KfW beispielsweise, dann wäre es ja wieder kein verteltes system. Dann hätte ja doch wieder

eine partie mehr macht als die anderen. Alsoi man muss auseinanderhalten die governance das operating modell und die technische umsetzung wenn es läuft. Auf diesen ebenen muss man das getrennt anschauen und das ist tatsächlich dass erste mal dass wir bei der KfW was open source gestellt haben weil wir gesagt haben das bringt hier gar keinen sinn dass wir auf augenhöhe sind aber die weiterentwicklung der plattform liegt nur ind er hand des gebers. Dh dieser open soruce situation kreirt mehr augenhöhe weil es nicht die frage gibt wer darf mitkommunizieren. Es ist näher an einer art von foundation die gemeinsam dann entscheidet welche features hineinkommen oder welche nicht.
PK: Man muss aber auch sagen, die Weltbank denkt da anders, die Weltbank will diese technologie um quasi eine art weltbank software durchzsuetzen also die dann der wletbank gehört gesteuert und betrieben wird von selbiger und wenn dann jemand geld haben will von der weltbank dann muss er eben das schlucken dass er da diese software benutzen will die unter der kontrolle der weltbank ist. Also soclhe modelle gibt es natürlich auch und das ist dann auch ne blockchain.
JZ: Der punkt ist schon wichtig ob es public oder private blockchain ist, es gab einen apporach in der vergangenheit von dem government of canada, wo eine public blockchain verwendet wurde. Wo alle tender die die behörden von canada durchgeführt ahben auf ethereum also auf der public blockchain abgespecihert wurde mit summe mit gps koordinaten und wer hat das geld bekommen. Das ist natürlich schon nochmal ne stufe mächtiger weil das kann dann nicht mal kanada selbst löschen. Während wir in einer private blockchain, also angenommen als beispiel wir sind fünf knoten wenn ishc da alle fünf zusammen tun würden dann und alle löschen würden dann wären die daten weg. Das geht mit einer public blockchain so einfach dann nicht.
PK: davon würde die welt aber auch nicht untergehen Jure
LV: Das ziel ist dann am ende des Tages auch das Geber und Empfänger laender beide gleich viel stimmrecht haben um das system zu ändern aber auch die gleichen berechtigungen haben alles einzusehen, mit ausnahme von spezifischen geheimen daten.
JZ: Also die software selbst, da kann man natürlcih schon sagen wenn man nicht einverstanden ist mit der weiterentwicklung es hindert einen auch niemand die dann zu forken also sozusagen eine kopie zu erzeugen, also das hat Burkina Faso zum Beispiel gemacht. Also das quasi anders zu hand haben, das ist auch völlig ok. Also diese wahl hat man immer man ist ja nicht gezwungen sich am hauptentwicklungszweig weiter zu hangeln wie bei sap oder sharepoint. Das ist auch noch ein vorteil der open source geschichte. Aber natürlich auch mit allen nachteilen die dann eben dazukommen dass man eben auch selber dann verantwortlich ist bsp security patches.
PK: Die Frage ging glaub ich eher dahin wie quasi das abstimmungssystem läuft.
JZ: Also noch gar nicht, ich glaube nicht dass wir eine sehr formale Governance struktur haben
PK: also der konsensus mechanismus spielt heir eine untergordnete rolle würde ich mal behaupten, wir reden ja hier nicht von bitcoin, also von irgendwelchen werten. Sondern wir reden von inofrmationen die sozusagen über die Peers die einbezogen sind auf echtheit validiert werden. Also wenn wir jetzt zB eine information sagen wir aml ne vergabe entscheidung oder einen vertrag teile oder sage die KfW hat den vertrag unterschrieben also workflow dann kann natürlich die parteien die sonst noch beteilligt sind, können dann sagend as stimmt oder nicht. Aber es ist natürlich auch möglich dass zwei parteien zusammenfinden und einen workflow der beide betrifft dann falsch darstellen, das ist natürlich möglich. Aber für uns ist das ja nicht ein tool was absolut safe sein muss sondern ein sehr pragmatisches arbeitstool um prozesse abzubilden und eben auch nachvollzoiehen zu können dh wenn irgendwann mal fragen über dritte

aufkommen dann kann man jederzeit nachkontorllieren was haben die partner eigentlich damals dokumentiert. Und wenns falshc ist dannj kann man sie eben festnageln.
JZ: Also vielleicht ist das ein wichtiger punkt aus meiner sicht den ich mental auch noch nicht gelöst habe, lucas. Wie unser ex innenminister mal gesagt hat: Teile der Wahrheit könnten sie verunsichern. Manchmal kommt es ja auch ganz gelegen dass man nicht alle informationen hat. Hypothetisch jetzt wenn ich mit entwicklungszusammenarbeitsgeldern irgendwo sagen wir mal im urwald etwas finanzieren würde um den wald zu schuetzen. Da kann es situationen geben wo es vielleicht gar nicht so schlecht ust wenn man gar nicht weiss sondern vielleicht vllt nach einem jahr taucht dass dann in einem report auf aber dann kann man dann nichts mehr dagegegn machen. In dem moment wo ich informationen ion real time und höchter detailtiefe ja habe hab ich auch ne gewisse verantwortung die ich auf mich nehme ich kann nicht sagen ich ahbe die daten nicht gehabt. Das kann ich dann nicht mehr machen. Obwohl es auch passieren kann dass man dann soviele informationen hat dass man die ohne KI gar nicht verstehen kann. Dh es geht hier eine verantwortung einher die vielleicht so nicht vorher nicht hatte, es kann daher durchaus auch belastend sein plus man muss wirklich diskutieren ob die wahrheit immer zielführend ist. Und das ist für mich noch mental so ein Dilemma.
PK: Das ist ja schon fast eine philosophische frage die aber durchaus wichtig ist. Das ist wie bei the circle. Ob eine vollständige transparenz jetzt eine gesellschaft voranbringt oder nicht, da würde ich sagen nein. Aber wie gesagt wir sehen das als pragmatisches tool und man muss eben vorher überlegen welche informationen möchte ich darauf bearbeiten und welche eben nicht. Und wir haben nie den anspruch dass es ein vollständiges abbild sein muss von irgendwas. Sondern die stakehodler die da teil sind die müssen sich einigen was sie damit machen wollen.
LV: Dh fokus liegt also darauf dass zumindest dass was abgebildet wird der wahrheit entspricht aber auch dass nicht zu viel abgebildet wird was im zweifel auch schaden könnte?
JZ: Also wir haben schon auch die diskussion gehabt das jemand gesagt hat wenn ich jetzt eingebe ich habe in der shcule laptops für zehntausend dollar das stück gekauft, wo ja jeder weiss, das ist zu teuer, da stimmt irgendwas nicht. Das würde die blockchain ja nicht verhindern, also klar kann man das da eingeben. Die idee ist die lücke zwischen der analogen welt und der digitalen welt so gering wie möglcih zu halten. Und wir glauben dass die lücke immer kleiner wird. Also bsp dass der laptop irgendwann maln automatisch selber sagt wie teuer er ist, also je weniger manuelle interaktion es gibt desto kleiner wird diese lücke zwischen der analogen und der digitalen welt. Und deston mehr bildet die blockchain digitale welt die analoge welt auch ab. So dass das immer mehr quasi verschmilzt. Aber solange da immernoch eine lücke da ist kann man noch entscheiden oder etwas eingeben auch wenn es in der echten welt so nicht ist.
LV: Das ist ein interessanter punkt den du da gesagt hast, dass diese lücke gegebenenfalls in teilen sogar notwendig oder hilfreich ist für die Entwicklungshilfe.
LV: Dann kommen wir zur naechsten frage, welche auswirkungen hat den trubudget auf die probleme die wir vorhin bereits angesprochen haben? Spezifisch auf das Problem von vertrauen zwischen den stakeholdern und der erwartungshaltung die sich hier geändert hat?
PK: Ja das ist glaube ich ein bisschen spekulation, weil wir noch keine fundierten erfahrungswerte haben wie sich das auswirkt. Von daher treffen wir hier annahmen dessen grunbdlagen dann auch hypothesen sind wie sich das wuswirken könnte. Ich muss sagen wir lernen auch immer dzau, mir war bsp vorher der aspekt sehr donor driven in der kontrolle wichtig und konnte nachvollziehen dass jemand der einen eintrag

macht sich davor scheut weil er sich eben accountable macht und da verantwortung übernimmt die er vorher nicht hatte. Und dann kam aber dieser völlig neue aspekt an den ich gar nicht gedacht hatte das leute das eben wollen weil sie sich dann eben sicher fühlen. Also dass sozusagen darstellen können ich hab alles richtig gemacht. Und was ich eigentlich sagen will es gibt bestimmt effekte an die wir heute noch gar nicht denken können. Weil im grunde genommen wird ja die arbeit, alle prozuesse die wir auf trubudget darstellen bekommen so eine art vertraglichen charakter. Als ob ich jedesmal bei allem was ich mache jedesmal meine unterschrift drunter setze.
LV: Eine gewissen Finalisierung quasi
PK: Ja es kriegt eben so eine besondere bedeutung als ob ich jetzt. Ich mach da einen klick und mit diesem klick habe ich eigentlich einen vertrag unterschrieben.
JZ: Literally mach ich dasselbe quasi so mit dem private key sozusagen. Ich signiere ja sogar digital meine transaction.
PK: So, und das erzeugt natürlich sagen wir mal eine völlig neue verantwortung gegen über meinen ich nenne es mal geschäftspartnern oder partnern und wie sich das auswirkt das wäre mal eine interessante studie wenn man das mal längerfristig praktisch anwendet was für auswirkungen dass tatsächlich hat. Wir mutmassen, dass durch diese sichtbarkeit und die transparenz accountability die dadruch entsteht natürlich betsimmte risiken in der tat ausgeschaltet werden.
JZ: Darf ich noch was philosophisches sagen. Also ein beispiel. Piet und ich als wir in bali waren hat da der permament secretary gesagt aha wenn ich also das hab dann hab ich weniger papierstapel auf meinem tisch . Meine hypothese wäre dass genau das umgekehrte passiert also dadurhc dass sich ja jeder fünf mal versichern muss bevor er da was unterzeichnet, wird er eher mehr papier auf dem tisch haben als weniger weil ich dann lieber nachfrage bevor ich was falshces mache. Und folgendes ist eine hypothese die ich habe. Da komme ich schnell zu conways gesetz von 1968. Der gesagt hat dass digitale systeme oder technishce systeme die kommunikation von organisationen abbilden und umgekehrt. Man kann nicht was technisch neues einführen neue systeme einführen aber gleichzeitig die organisation und die kommunikation in dieser organisation gleich bleiben. Also beides muss sich gleichzeitig verändern. Also wenn ich jetzt nur trubudget einführ aber die organisation gleich lass dann wird das nicht funktionieren. Umgekehrt wird es sehr schwer sein die organisation zu verändern zu einem neuen zustand ohne die system dahinter zu verändern. Und ich finde das sieht man quasi im real life, nicht nur dort sondern auch bei uns in der KfW. Also wenn die organisation so arbeitet wie sie arbeitet kann man nicht einfach ein neues system hineinpushen man muss dann auch die art zu arbeiten verändern und die art wie man kommuniziert.
PK: Wie gesagt ich find da ist sehr viel spekulation dabei, man kann natürlich auch sagen die leute werden sich daran gewöhnen dass sie die sichtbarkeit ihrer Entscheidungen haben.
JZ: Dann hat sich aber die organisation verändert
PK: Point taken, natürlich brauch es immer auch einen Culture change. Und das sehen wir ja auch bei unserer eigenen bank die digitalisierung führt dazu dass wir unsere orga strukutr anpassen und ändern müssen und agile arbeit führt eben auch dazu dass die hierarchien abgebaut werden und socleh dinge. Das fängt sogar an in unseren ministerien und gut ich würd sagen in einem ministerium im Niger ists nochmal ne größere herausforderung. Aber irgendwann wirds da auch ankommen Und weil eben die umwelt sich eben ändert. Obs jemals bei der fifa soweit kommen wird weiss ich nicht, ich gluab das ist die haerteste nuss. Wenn die luete sich daran gewöhnen dann werden sie auch anders damit umgehen. Und man kanns noch weiter treiben, ich könnte schon

behaupten, dass trubudget mit ein tool ist um das mal on the positive side zu sagen, ok es erlaubt eine wesnetlich demkratischere weise zu entscheidungen zu kommen. Ich denke man kann solche systeme auch intern anwenden und dann führt das automatisch dazu dass eben mehr mitreden aber auch vorher gedanken drüber machen wo ist dnen meine psoition bevor sie da was machen.
Anstatt irgendiwe leichtferttig aus einer machtposition herausirgendwelche entscheidungen zu fällen die hinterher niemand mehr in frage stellen kann weil sie einer person nicht mehr zuzuordnen sind oder sonst was. Aber ich denke wie bei jeder innovation gibt es positive und negative seiten, man muss immer schauen wie sich das entwickelt
LV: In bezug auf die beiden Pilotcases Burkina Faso und Brasilien in den TruBudget engesetzt wird bzw eingesetzt wurde, wie hat sich da bisher dieser culture change irgendwie manifestiert oder gibt es da bereits erste auskünfte die man treffen kann.
PK: Aktuell gibt es noch keine auskünfte die man treffen kann. Also Burkina Faso hat das ausgebaut es ist aber noch nicht so live das man sagen könnte ok jetzt hat das wirklich konsequenz und wir gucken man. Es ist bislang auch noch so konzipiert, es ist wie der Jure das gesagt hat, dass es die bestehenden prozesse abbildet. Und wir haben noch kein Pilot wo wir soweit sind dass wir die bestehenden prozesse optimieren durch die eigenschaften die TruBudget erzeugt. Soweit sind wir noch nihct. Auch die brasilianische Entwicklungsland hat das noch nicht gemacht, da ist das ganze programm auch on hold weil es für den amazon fund genutzt wurde und der ist wegen bolsonaro nun on hold. Anderes programm haben sie es noch nicht eingesetzt. Da sind wir leider noch nicht so weit.
LV: Aber nach deiner Einschätzung würdest du denken dass die technologische komponente ist quasi schon da, aber die mesnchliche komponente ist das was quasi fehlt, oder diese organisatorische komponente anders gesagt. Was ist denn am ende des tages das schwieriegere projekt, die technologie fehlerfrei zu programmieren oder die menschen davon zu überzeugen sie adequat zu nutzen also dieser Culture change?
PK: Das ist ungefähr so eine frage als ob du steve jobs bei der vorstellung des smartphones gefragt haettest wie sich das auf die gesellschaft asuwirkt in zukunft. Hätte steve wahrscheinlich auch nicht vorhergesehen was es dann mit bsp social media dann irgendwann mal gibt, glaube ich nicht. Also ich glaube keiner kann wirklich absehen wie der cultural change der durch innovation erzeugt wird tatsächlich aussieht. Ich glaube da fehlt usn manchmal die fanatasie. Sehr schwierig vorherzusagen. Aber das interessante eigentliuch für mich ist dass es hier eine technologie gibt die dieses potential hat, dass ist doch für mich das eigentlich spannende. Ich würd mal sagen ja, wenn solche dinge wie trubudget in der abwicklung von geschäften von kommunikation tatsaechlich irgendwie mal auf breiter ebene eins tandard wird, erst dann wird es diese auswirkung wirklich haben. Und dann wird sich denke ich culture maessig garantiert was aendern, aber in welche richtung, schwierig zu sagen.
LV: Wenn es irgendwann breit angewendet wird, wie siehst du denn persönlich die nachhaltigkeit des projekts in bezug auf skalierbarkeit bezüglich energieeffizienz etc. Bei blockchsain in bezug auf bitcoin wird ja davon geredet dass es keine besodners gruene technologie ist. Allerdings schaetze ich mal bei einer privaten blockchain ist das eher nebensächlich?
JZ: Kurz zum technischen aspekt. Also diesen energiekonsum des bitcoin den haben wir bei Trubudget nicht, einfach weil das consens verfahren nicht proof of work ist. Also dass sehe ich unter nachhaltigkeitsgesichtspunkten unproblematisch. Spannend fidne ich ob aus nachhaltigkeitsgesichtspunkten ob quasi ein verteiltes system in seiner komplexität in seiner entscheidungsfindung, alle müssen zusammen arbeiten,

durchsetzt, gegenüber systemen wo man sagt ok es liegt bei google. Die blockchain eliminiert ja einen intermediär. Aber man muss sgaen wenn sich alle einigen würden dass die daten dann bei google oder amazon liegen dann wäre das natürlich schon erstmal einfacher als ein verteiltes system wie die Blockchain. Ob nachher ein verteiltes system mit seiner komplexität also nicht der technischen komplexität sondern der organisationskomplexität, jeder muss seinen eigenen knoten hosten und so weiter, sich durchsetzt gegenbüber einem centralized system, sei es ein cloud provider, muss ja nicht mal geber oder partner sein, das würde ich sagen is noch offen.
PK: ja das ist ja wie bei der google brille. Da sieht amn vorteile aber durchgesetzt hat sie sich aus anderen gründen trotzdem nicht, das kann ja bei DLT genauso sein, das sehe ich genauso. Aber vielleicht nochmal zur ökologischen Nachhaltikeit. Also wir kriegen ja fördergelder von der Bundesrepublik, und da gelten strenge USVP regeln also Umwelt Sozial verträglichkeits regeln, und da haben wir natürlich auch eine prüfung gemacht. Auch das ist natürlich immernoch ein bisschen spekulativ, aber wir vergleichen sozusagen den energiebedarf eines eintrages auf truebudget mit einer email. Also ungefäht, vielleicht ne email mit anhang. Wir gehen aber eben davon aus auch das ist natürlich noch, spekulativ, dass dadurch ja jede menge emails und kommunikation eingespart werden. Und was ich mal so ein bisschen vermisse bei der DLT ökologischen diskussion, es wird immer nur der technische aspekt gesehen und nicht der konzeptionelle. Dh man muss doch wenn man ein system einführt nicht nur auf die technik gucken, sondern die gesamtbilanz angucken. Welche wirkung führt bei der einführung des systems, was für wirkungen hab ich auch auf die bisherigen analogen ökologischen probleme oder verbräuche. Und da würde ich mal sagen, gut jetzt bin ich hier wieder im digitalne, gut aber ich würde mal sagen da gehen wir davon aus dass die einführungen von plattformen wie Trubudget eher eine positive bilanz hat auf die umwelt als eine negative. Auch wenn der strombedarf bei bestimmten ecken steigt, sinkt er deutlich bei anderen. Durch bsp weniger email.
LV: Eine Nachfrage zur governance struktur. Weil trubudget ja im optimal fall von allen empfänger und geber ländern genutzt werden soll, wie sähe da eine governance struktur eigentlich aus, wie ist die skalierbarkeit in bezug auf mehr stakeholder? Haben dann ale die möglichkeit abzustimmen ob bsp technologie verändert werden soll oder nicht? Ich stelle mir in dezentralen system oft vor dass die auch immer gewissermassen behebig sind.
JZ: Ich würde auf jedenfall auseinanderziehen run and change. Also wie das im run funktioniert können wir nochmal drüber diskutieren. Tatsächlich in der weiterentwicklung wenn ich hundert länder habe und da sagt einer oh das neue feature das passt aber nicht zu uns, und die anderen achtzig sagen wir wollen das aber. Ich gkaube da kann man sich schon was abgucken aus systemen die quellcode offen also die open source foundation bsp, wo es schon zehntausend leute gibt die an open source systemen mitarbeiten , und sich irgendwie einigen können. Aber es gibt dann meistens schon starke staekholder die aber dann irgendwie unabhängig sind die dann aber weder für den einen noch den anderen partei haben. Ich find in der governacne ist das noch komplizierter zu lösen als das technische.
PK: Auch da wird es sich da irgendiwe entwicklen, schwierig vorherzusagen, aber wir streben schon irgendwie an, das muss dann aber jeder nutzer selbst entscheiden wie er die open source dann einsetzt, aber streben schon an, dass wir langfristige stammlösungen hinkriegen die dann benutzt werden kann. Aber letztlich entscheidte das derjenige der so eine platform initiiert irgendwo mit seinen stakeholdern. Das wird eigentlich nie eine gruppe sein die sowas initiiert sondern ein partner und das kann eben ein geber sien oder es kann eben ein partnerland sein. Unsere politik ist wir unterstützen

partnerländer die das wollen das selbst zu machen . Burkina Faso ist eben ein Beispiel unser bestes Beispiel, wo die auch sagen wir wollen das perspektivisch für alle geber nutzen . Dann ist aber burkina faso im lead. Und natürlich werden die auch irgendwann mal auf die weltbank stossen und sagen, schön dass ihr das wollt aber da machen wir nicht mit. Ist ne Machtfrage schon klar. Aber zumindest können sie dann einen großteil der geber die dann da zusagen darüber abbilden und vielleicht entwickelt sich dass dann doch da so zu einem standard dass andere dann auch mitmachen wollen weil sie eben mehr vorteile als nachteile haben. Ist aber schwer vorherzusehen
JZ: Ich bin mir ziemlich sicher was nicht passieren wird, dass es quasi eine Blockchain die die ganze welt umspannt gibt. Sondern es wird eher ganz viele kleine plattformen geben die jeweils unterieinadner kommunizieren und potentiell auch mit der uassenwelt kommunizieren aber nicht ein so ein Biotcoin für entwikclungshilfe, das wird nicht sein.
PK: man kann sich sogar gut vorstellen, dass in burkina faso eine burkinische plattform gibt, die wir fördern oder gefördert haben dann und dann die weltbank kommt mit ihrer eigenen version und dass die irgendwie dann via api verbunden werden sollten. Das ist auch denkbar.

D Transcript Piet Kleffmann

Piet kannst du dich einmal kurz vortsellen wer du bist und was deine position in der KfW ist:
PK: Piet kleffmann, ich bin in der KfW of digitalization in der Entwicklungsbank also im geschäftsbereichEntwicklungsbank. Habe mir den Use case TruBudget ausgedacht vor 5 jahren undzusammen mit dem digital office der kfw weiterentwickelt. Da kann Jure auch was zu sagen das Digital Office hat dann sozusagen auf der IT seite die Architektur angefangen und dann weiterentwickelt mit dem vertragspartner. Ich kümmer mich in meiner funktion jetzt aber auch um alle strategischen fragen zur digitalsierung mit unserem auftragsgeber und usnerem Partner und peers der entwicklungsbank
Ok verstehe
JZ: Kurz zu mir, ich bin Jure Zakotnik ich bin inofrmatiker vom haus aus, war dann ziemlich lange bei It consultancies unterwegs und habe mir gedacht vor fünf jahren als das innovation lab der KfW dann aufgemacht hat, angesiedelt in der Konzernentwicklung. Habe dort dann angefangen. Dann kam piet durch die tür mit seiner Idee zur blockchain und hat gefragt ob wir da nichtw as machen können. Was wir im innovation lab versuchen und ich auch speziell, wen jemand eine idee hat, kann zum thema KI blockchain etc sein, dann versuchen wir das umzusetzen im sinne eines laborversuchs. Im prinzip die software zu bauen um zu schauen lohnt es sich von unserer seite das zu skalieren oder eben nicht. Das ist sozusagen mein Job heir von der technischen Seite.
Das heisst ihr seid auch beide Länger schon im bereich Entwicklunsghilfe tätig, du zumindest Piet bist dann länger schon bei der KfW?
PK: Ich bin seit über 20 Jahren in der Entwicklunsgzusammenarbeit
JZ: Ich hab damit tatsächlich gar nichts am Hut . Also ich hab meinen ersten kontakt zur entwicklungszusammenarbeit mit dem Piet tatsächlich gehabt dann. Also ich war vorher bei Banken unterwegs, aber nicht bei der KfW

Ja, ok verstehe also

PK: Dazu muss ich auch sagen, ich hatte auch im Vorfeld auch. Ich meine TruBudget soll ein gewisses entwicklungspolitisches Problem lösen und ich hatte im Vorfeld auch Ideen wie man das schon analoge Ansätze die auch ausgearbeitet wurden aber keine weitere Anwendung fanden
ja wahrscheinlich hast du den Zeit jetzt auch schon mehrere Technologien erlebt die aufgestiegenen oder einen Hype hatten und dann doch nicht so geklappt haben wie sie ursprünglich mal angedacht waren?
PK: Das eigentlich weniger aber ich will nur sagen dass blockchain sozusagen hier Lösungsmöglichkeiten anbietet die es vorher nicht gab. Auch wenn es versuche gab dieses problem auch ohne große technologien anders anzugehen.
Ok alles kalr. Du hast es gerade schon angesprochen das TruBudget ein Problem lösen soll, was sind denn aus deiner Sicht die entscheidenden Probleme bzw die es zu lösen gilt im Bereich der Entwicklunsghilfe, stand 2022?
PK:Ja da würde ich sagen zwei dinge das eine steht schon in der paris deklaration zur aid effectiveness 2005 da steht die problematik dirn die einem imgrunde genommen sagt die jetzigen ansaetze der finanzierung sind nicht nahhaltig wir sollten viel mehr übver die partner systeme gehen und das haben wir seit 2005 in der internationalen entwicklunsgzusammenarbeit nicht hingekriegt. Ja also da kannst du gern nochmal nachlesen. Da guibts ja einige punkte. Es gab dann nachfolge konferenzen in Busan in Accra, wo man letzlich gesagt hat. Da ist jetzt nicht weiterverfolgt worden weil man eben eigentlic, und das ist jetzt meine interpretation, man kommt da nicht weiter. Und so jetzt macht jeder weiter sein ding.
PK: Die zweite herausforderung ist in der tat die gestaltung der digitalen transformation in unseren partnerlaendern also nicht nur bei uns. Deutschland ist natürlich auch da entwicklungsland. Nicht unser mandat. Also zumindest nicht von der KfW. Dazu brauch es neue intstrumente neue wege wie wir projekte umsetzen das kann man nicht so machen wie so eine klassische bauinvestiuon oder wasserversorgung die sollen ja auch digitaler werden aber dann brauch man neue ansaetze die schneller sind.
JZ: Vielleicht eine sache die ich hier hinzufügen würde ist das thema monitoring und management gerade in ländern in die man nicht hinfahren kann und eben vorort helfen kann , die noch besser mit digitalen hilfsmitteln die effektivität von der entwicklungszusammenarbeit sozuisagen steuern kann oder unterstützen kann obwohl man ebne beispielsweise nicht in afghanistan vorot sein kann um die schule vorort mit zu bauen
Darauf würde ich später auch nochmal zurückkommen. Vorher einmal, woher glaubt ihr kommen diese Probleme gibt es da akutell auch trends die in die eine oder andere richtung gehen, werden diese Probleme bsp die fragmentierung auf administrativer ebene in form der Parallelstrukturen weniger, also das bsp projekte wie TruBudget diese probleme technisch lösen? Gibt es aktuell positive entwicklungen die man beobachten kann, bsp dass es zu einer art standardisierung kommt in der Entwicklungshilfe?
PK: also bemühungen gab es immer schon und wirds immer geben, aber ich würde mal sagen der trend ist eher gegenläufig, es wird eher schwieiriger weil es immer mehr geber organisationen oder formmodelle oder private geber wie die bill und melinda gatesfoundation gibt. Es gibt immer mehr partner immer mehr player, für partnerländer für entwicklunsgländer es wird eigentlich immernoch unüberschaubarer immernoch komplexer, es wird nicht einfacher. Dazu kommen ebn noch unglöste fragen des digitalen einsatzes also die länder die sagen wir mal auch überlegen wie soll ich mich IT mässig überhaupt aufstellen auch um sowas zu bewältugen und die sind teilweise auch ein bisschen blockiert weil sie nicht sicher sind welche strateie sie welche tehcnologie

sie einsetzen wollen. Also es ist eher schwieriger geworden für ein nehmerland mittel vernünftig umzusetzen.
JZ: Zu ergänzen dazu, also ne hgypothese, dass die Erwartungshaltung jetzt auch eine neue ist. Also wenn ich vor zwanzig jahren sowieso mit fax oder post kommuniziert habe dann wwar ja die turnaround zeit entsprechend lang. Kommunikation war langsamer auch in bezug auf daten erhaltung und solche dinge. Jetzt ist ja jeder irgendiw egewohnt das daten üübverall sofort verfügbar sind dass sie irgendwo bei google oder amazon verfügbar sind. Dass jeder zugang dazu hat dass man jederzeit die information die man benötigt auch sofort bekommt also dass ist die erwartungshaltung. Beispielsweise auch im Parlament. Also die Erwartungshaltung iust da und ich glaube dadurch wird ein gap zwischen erwartungshaltung und das was man beobachtet entseht dann auch nochmal mehr druck als beispielsweise vor zehn Jahren.
Das Thema Erwartungshaltung ist spannedn, da passt die nächste frage ganz gut dazu. In meinem Literature review habe ich festgestellt dass viele researcher davon reden dass vertrauen innerhalb der Stakeholder in ODA eher sinkt und reduziert wird. Genau dadurch dass eben die verschiedenen Stakehodler eben verschiedene Erwartungshaltungen haben und zum beispiel eher nicht vertrauen möchten sonder eben die kontrolle haben möchten ich muss wissen wann wo wie was ausgezahlt wird. Dass heisst wenn ich dich richtig verstehe teilst du da auch die wahrnehmung dass heute stakehodler auch erwarten dass sie kontrolle haben und eher kein vertrauen mehr gegenüber solchen prozessen gegenüber bringen falls sie keine kontrolle habendarüber ob tatsächlich passiert was angeblich passiert?
PK: Ja also es ist glaube ich schwierig jetzt empririsch hier abzuschaetzen ob dieser mangel an vertrauen gröser geworden ist oder nicht . Ich würds mal andersrum formulieren. Dadurch dass es eben mehr player gibt, die den punkt den Jure genannt hat mit dieser ständigkeit von informationsbereitstellung erwarten. Aber auch den zusätzlichen druck vieler laender die jetzt sagen wir mal steuergelder einsetzen sich rechtfertigen zu müssen. Es ist bestimmt schwierieger geworden. Es gibt natürlich andere geber die da raus wollen und zb hilfe anbieten wo der deal eben mal ein anderer ist da muessen reform konzepte umgesetzt werden, aber dass macht die sache auch nicht unbedingt einfacher. Da habe ich teilweise noch höhere risiken weil es kann ja sein dass diese Reform konzepte eben nicht kommen oder nicht wie cih das erwarte und dann habe ich das geld da auch eigentlich in den sand gesetzt. Also insgesamt würde ich sagen ist es für beide seiten schwieriger geworden.
Wie hoch ist denn die aktuelle Verantwortlichkeit oder Rechenschaftspflicht von stakehodlern? Ist es möglich gut nachzuvollziehen wofür ein empfängeland das geld dann ausgegeben hat oder ist es eher schwierig nachzuvollziehen wie gelder geflossen sind?
PK: Also das haengt davon ab wie ich die gelder eisnetze ja. Also die meisten geber jaben ja eins ystenmin die welt gesetzt die KfW auch, wo wir die gelder direkt an die Dienstleister unserer Mandate rüberschicken. Wir nennen das Direktzahlungen. Das Geld kriegt also nicht unser Partner sondern es wird noch prjektfortschiritt als noach erbrachter leistung ausgezahtl.
So stellen wir natürlich sicher dass die Gelder korrelt eingezahlt werden. Und Jure hat auch noch erwähnt wir haben ja auch remote monitoring instrumenet weiterentwickelt um eben sicher zustellen wenn ein bauunternehmer der im auftrag eines ministerium irgendow untergwegs is was leistet wir auch sicherstellen können wir zahlen dem erst wenn er die erbrachte leistung qualitätsmaessig zufriedenstellen erbracht hat. Und dazu gibt es eben unterschiedloche instrumente das vorort zu prüfen. Entweder wir schicken jemanden hin, wir nennen das örtliche vortschrittskontrolle. Oder wir haben remote über

satelliten möglichkeiten oder dritte die sich beteilligen um für uns dann zu prüfen dass da tatsäch,ich die leistung erbracht wurde. Und so würde ich mal sagen ist unser heutiges System relativ sicher. Nur ist es sehr aufwendig und es kostet eben auch viel
JZ: Und vielleicht ergänzend ich glaube schondass die erwartungshaltung der öffentlichkeit ist dass mehr daten offen publiziert werden zb hat der chef der weltbank ab jetzt sind alle daten öffentlich die nicht geheim sind. Das ist bei uns zb noch nicht der fall
PK: Bei uns sind alle daten geheim
JZ: Aber wir publizieren natürllich auch detailierte Information über das Portal zb. Open data initiativen die eben mit ermöglichen die digitale zur verfügungsstellung von daten zu gewährleisten, führen dazu dass eben auch erwartet wird dass diese daten zur verfügung gestellt werden. In einem detailniveau was oft aus unserer sicht eher zunimmt und ich glaube nicht dass sich jetzt eine entwicklungszusammenarbeits organisation erlauben kann irgendwas zu amchen und nciht und einemal im jahr nur zwanzig seiten zu produzieren. Das ist nicht mehr stand der dinge sondern die erwartungshaltung ist dass solche daten regelmässig oder sogar in real time lesbar sind, mit drill down funktion publiziert werden. Und so mehr, aus meiner sicht, mehr offenheit da ist.
LV: Wenn ich euch richtig verstehe dann seht ihr das Hauptproblem nicht im Bereich Korruption selbst bei der entwicklungshilfe
PK: Natürlich
LV: Gerade die administrativen kosten dass zu übersehen sind auch relativ hoch und die komplexität die damit einhergeht sind ausschlaggebend?
PK:Also meien these ist egal wo subvention bereitgestellt werden hat man korruptionsgefahr das ist nicht nur auf entwicklungshilfe beschränkt sondern das gilt genauso für EU subventionen. Auch da gibt es korruption und korruptionsfälle. Also das ist jetzt keine spezialität der entwicklungsländer. Aber es ist natürlich eine tatsache und man kann eben auf solche korruptionsrisiken reagieren. Aber diese risikomitigierung ist eben teuer, das ist das eine problem, das andere problem ist sie führt zu strukturen die eben entwicklungspolitishc nicht nachhaltig sind, weil man dadurch funktionen übernimmt die eigentlich das partnerland übernehmen sollte. Das führt zu abhaengigkeiten wir fördern ja ind er entwicklunsgzusammenarbeit öffentliche investitionen. Und wenn ich sozusagen das partnerland aus der verantwortung öffentlicher investitionen rausnehme, weil i8ch alle risiken absicher über meine strukturen und dadurch dass ich subsidiär in der taetig bin sondern viele aktionen als meine dann äbernehme dann entmündige ich sozusagen meinen partner und mache es ihm nicht mehr möglich dass er diese investitionen die über unseren kanal laufen in gleicher qualität er auch über siene eigen systeme darstellen kann. Das lernt er ja gar nicht, das kann er gar nicht.
Es hat dann natürlcih auch keine wirkung auf die korruption sicheren prozesse in dem partnerland. Die laufen dann ja gesund weiter. Also ich find das total kritisch, man kann dann sagen die geber finnazierten schulen,m grundschulen in mali sind toll, aber die grundshculen die über den eigenen malischen haushalt finanziert werden die sind nicht toll. Was ist denn das für eine Entwicklunsgpolitische Nachhaltigkeit? Gar keine.
LV: Du beschriebts da einen souveränitats verlust. Wenns bsp über die KfW direkt läuft dann klappts, aber sobalds über die eigenen kanäle läuft dann klappts nicht mehr, weil es nie gelernt wurde sichere kanäle zu bauen.
PK: es gibt einen unterschied zwischen entwicklungshilfe und Nothilfe. Nothilfe kann kurzfristig so natürlich laufen um akute problkeme und bedarfe abzudecken. Aber eine langfristige nachhaltige entwicklungszusammenarbeit muss strukturell wirkung zeigen.

Und da ist es eben nicht getan dass man einige schöne schulen gebaut hat sodnern man muss dafür sorgen dass der schulbau an sich in dem land nachhaltig besser wird
JZ: Wobei ergänzend, ich glaube was wir hier diskutieren, ist ja finanzielle hilfe. Es ist vielleicht vorstellbar, und dann kommen wir vielleicht doch nochmal zur blockchain, das eine bank eben nicht hur geldmittel zur verfügung stellt und nicht nur finanziell fördert obs jetzt digitale lösungen sind oder mit irgendwelchen anderen dingen so fördert dass das im land selbst gemacht werden kann. Also angenommen wir würden eine software zur verfügung stellen die dem land hilft gewisse risk zu mtigieren also bsp bestechung als eins davon. Dann wäre es natürlcih schon nachhaltig und auch entwicklunsgpolitisch sinnvoll glaube ich. Aber das ist eben nicht mit geld lösbar sondern mit software einfach gesagt. Deshlab muss man sehen dass mand en scope der eigenen zusammenarbeit nicht erweitert.
PK: Ich muss ein bisschen korrigieren, die KfW leistet nicht nur finanzielle hilfe sondern wir machen natürlich auch beratung wir finanzieren consultants die beratend tätig sind. Also es gibt keine finnazierung ohne beratung. Aber yJrue hat natürlich völlig recht es ist quasi eine neue art und weise förderung darzustellen ist die bereitstellung von open source software für bestimmte probleme. Und da ist trubudget natürlich ein beispiel.
LV: Vielleicht nehmen wir das als überleitung um zu TruBudget zu kommen. Vielleicht könnt ihr einmal kurz in ein paar setzen erklären was TruBudget eigentlich ist.
JZ: Jetzt bin ich mal gespannt, jubiläum haben wir
PK: Ich denk jedes mal neu nach wenn ich die frage kriege, ja. Trubudget ist eine blockchain baiserte anwendung die dazu führen soll das sma die risiken bei der mittelvergabe für bestimmte projekte so runterregulieren kann dass ich eben meine finanzierung nicht über paralelesysteme abwickel wie ich sie vorher dargestellt habe sondern über die poartnersystem. Und von der geberseite her kann ich über dieses tool eben nachvollziehen wie der empfänger die mittel die ich bereit gestellt habe als geber für den verinbarten zweck eingestezt hat. Aus partnersichtsseite, erlaubt diese intsrument eben zu gucken was machen eiegntlich meine vielen geber, wie viel finanzieren die eigentlich und ich kann sie überreden ok hört auf mit euren spezificschen parallelen konditionen die ihr habt, sondern gebt mir das geld wir können jetzt gemeinsam sozusagen dieses Geld umsetzen damit ihr auch seht was wird damit gemacht. Und das hat viele aspekte die dann vorteilhaft sind für beide parteien, weil man hat echtzeit kommunikation, man hat ein gemeinsames workflow tool. Man kann die berichterstattung quasi gegen null regeln, weil man alle relevanten informationen als workflow tool auf der trubudget platform abbilden kann. Zb vergabe prozesse die auch immer korruptionsanfällig sind und zwar nicht nur geber partner sondern auch im partner land selbst also der einzelne mitarbeiter steht ja auch unter stress unter rechtfertigung dass er bei einer vergabe alles richtig macht. Also der kriegt auch ein mittel in die hand um zu sgaen hier ich hab alles richtig gemacht bei der vergabe das hat mit dem geber gar nichts mehr zu tun. Also diese instrument schafft eine transparenz zwischen den verscheidenen stakeholdern die einerseits alle in der tat accountable macht, jeder eintrag ist ja nicht mehr löschbar und sichtbar für alle. Aber zweitens eben auch die sicherheit für jeden gibt dass er alles richtig gemacht hat.
JZ: Darf ich auch nochmal? Etwas technischer vielleicht nochmal, also es ähnlichwas du gesgat hast. TruBudget ist ein blockchain basiertes collaboration tool wo die informationen sicher nachvollziehbar und auf augenhöhe gespecihert werden und allen beteilligten auch gehören. Und mit diesem tool kann man alles machenw as Piet gesagt hat aber im einfachsten fall sagen die leute warum nehmt ihr nicht sharepoint. Also das ist so eine art sharepoint, mit dem unterschied dass die daten eben auf augenhöhe bei

allen beteilligten vorhanden sind und auch nicht gelöscht werden köbnnen also nachvollziehbar sicher sind und nicht bei einem cloudprovider oder einem geber oder nur beim partner liegen.Also durch ausschlussverfahren kann man sagen alle nachteile die man haette wenn man diese informationen nur an einem ort speichert, sei es jetzt google, partner oder geber, werden da sozusagen wegfallen durch die blockchain.
LV: Das heisst was du da gerade angesprochen hast ist so eine gewisse neutralität der platform
JZ: Genau also dies augenhöhe die piet da auch eben gennat hat die ist enorm wichtig weil daten sozuagen das neue öl sind. Wer die datenhat der hat die macht und da bei der blockchain ist es eben so dass alle die daten haben und die keiner verändern kann. Das macht viel aus.
PK: Auf der tehcnischen seite. Für mich ist es eben ein instrument geschäftsparner zusammen zu kriegen die jeweils ein isoliertes it system fahren, wo die kommunikation eben fast ausschliesslich über email läuft und damit ist TruBudget natürlich ein perfektes kommunikationstool um den aufwand von kommunikation und abgleich von daten zu verbessern. Ich sag immer jeder bericht der geschrieben wird ist überflüssig weile r bereits veraltete informationen enthält und einfach nur arbeit macht. Arbeit für den der den bericht erstellen muss, für den der den bericht ablegt und für den der ihn liest. Also man muss die infos erstellen evrschikcen ablegen lesen bewerten nochmal ablegen, alles völlig überflüssig wenn man eine gemeinsame kommunikationsplatform benutzt. Also ich sehe einen extremen gewinn bei der effizienz bei der kommnunikation durch das getilte wissen aber auch durch die echtzeit kommunikation. Das wird glaube ich immer ien bisschen unterschätzt.
LV: Wenn ihr von geteilten wissen bzw augenhöhe rededt, was heisst das konkret, wem gehören die daten , sind die daten öffentlich einsehbar oder nur für die teilnehmer, wie funktioniert das im konkreten beispiel von trubudget?
PK: Grundlegend hat der jure natürlich recht es ist super demokratisch alle sind auf augenhöhe, in der konkreten umstezung sagen wir bislang, es gibt auch nterschiedliche modelle dass man sagt diese plattform gehört in anführungsstrichen den partnerland. Also es ist eine anwendung die das partnerland verantwortet und gemeinsam dannb etreibt mit anderen geberländern die dann eben auch einen knoten haben. Also es sit ne verinbarungssache zwischen den partnern wer da welche rolle hat und wir haben für jeden fall auch ein governance system. Wer darf was sehen, also auch da ist nicht immer vollständige transparenz es gibt ja auch daten , gerade bei vergabe prozessen die nicht öffentlich sein dürfen. Es gibt dann ein governance system, aber die oberste regel ist schon möglichst alle infromationen so transparent wie möglich zu gestalten.
JZ: Genau, man darf glaube ich hier nicht durcheinander werfen die technische augenhöhe also wir haben ja ein blockchainsystem sagen wir mal aus fünf knoten und alle haben immer die gleichen informationen also die verbinden sich quasi permanent, und das auch so dass niemand einzelnes irgendwie daten verändern kann die schon akzeptiert worden sind vom netzwerk. Das hat aber nichts damit zu tun wie bsp die governance funktioniert also wenn ich an trubudget beispielsweise selbst was veränderern würde also an der software selbst und das wäre nur in der macht der KfW beispielsweise, dann wäre es ja wieder kein verteltes system. Dann hätte ja doch wieder eine partie mehr macht als die anderen. Alsoi man muss auseinanderhalten die governance das operating modell und die technische umsetzung wenn es läuft. Auf diesen ebenen muss man das getrennt anschauen und das ist tatsächlich dass erste mal dass wir bei der KfW was open source gestellt haben weil wir gesagt haben das bringt hier gar keinen sinn dass wir auf augenhöhe sind aber die weiterentwicklung der plattform liegt nur ind er hand des gebers. Dh dieser open soruce situation kreirt mehr

augenhöhe weil es nicht die frage gibt wer darf mitkommunizieren. Es ist näher an einer art von foundation die gemeinsam dann entscheidet welche features hineinkommen oder welche nicht.
PK: Man muss aber auch sagen, die Weltbank denkt da anders, die Weltbank will diese technologie um quasi eine art weltbank software durchzsuetzen also die dann der wletbank gehört gesteuert und betrieben wird von selbiger und wenn dann jemand geld haben will von der weltbank dann muss er eben das schlucken dass er da diese software benutzen will die unter der kontrolle der weltbank ist. Also soclhe modelle gibt es natürlich auch und das ist dann auch ne blockchain.
JZ: Der punkt ist schon wichtig ob es public oder private blockchain ist, es gab einen apporach in der vergangenheit von dem government of canada, wo eine public blockchain verwendet wurde. Wo alle tender die die behörden von canada durchgeführt ahben auf ethereum also auf der public blockchain abgespecihert wurde mit summe mit gps koordinaten und wer hat das geld bekommen. Das ist natürlich schon nochmal ne stufe mächtiger weil das kann dann nicht mal kanada selbst löschen. Während wir in einer private blockchain, also angenommen als beispiel wir sind fünf knoten wenn ishc da alle fünf zusammen tun würden dann und alle löschen würden dann wären die daten weg. Das geht mit einer public blockchain so einfach dann nicht.
PK: davon würde die welt aber auch nicht untergehen Jure
LV: Das ziel ist dann am ende des Tages auch das Geber und Empfänger laender beide gleich viel stimmrecht haben um das system zu ändern aber auch die gleichen berechtigungen haben alles einzusehen, mit ausnahme von spezifischen geheimen daten.
JZ: Also die software selbst, da kann man natürlcih schon sagen wenn man nicht einverstanden ist mit der weiterentwicklung es hindert einen auch niemand die dann zu forken also sozusagen eine kopie zu erzeugen, also das hat Burkina Faso zum Beispiel gemacht. Also das quasi anders zu hand haben, das ist auch völlig ok. Also diese wahl hat man immer man ist ja nicht gezwungen sich am hauptentwicklungszweig weiter zu hangeln wie bei sap oder sharepoint. Das ist auch noch ein vorteil der open source geschichte. Aber natürlich auch mit allen nachteilen die dann eben dazukommen dass man eben auch selber dann verantwortlich ist bsp security patches.
PK: Die Frage ging glaub ich eher dahin wie quasi das abstimmungssystem läuft.
JZ: Also noch gar nicht, ich glaube nicht dass wir eine sehr formale Governance struktur haben
PK: also der konsensus mechanismus spielt heir eine untergordnete rolle würde ich mal behaupten, wir reden ja hier nicht von bitcoin, also von irgendwelchen werten. Sondern wir reden von inofrmationen die sozusagen über die Peers die einbezogen sind auf echtheit validiert werden. Also wenn wir jetzt zB eine information sagen wir aml ne vergabe entscheidung oder einen vertrag teile oder sage die KfW hat den vertrag unterschrieben also workflow dann kann natürlich die parteien die sonst noch beteilligt sind, können dann sagend as stimmt oder nicht. Aber es ist natürlich auch möglich dass zwei parteien zusammenfinden und einen workflow der beide betrifft dann falsch darstellen, das ist natürlich möglich. Aber für uns ist das ja nicht ein tool was absolut safe sein muss sondern ein sehr pragmatisches arbeitstool um prozesse abzubilden und eben auch nachvollzoiehen zu können dh wenn irgendwann mal fragen über dritte aufkommen dann kann man jederzeit nachkontorllieren was haben die partner eigentlich damals dokumentiert. Und wenns falshc ist dannj kann man sie eben festnageln.
JZ: Also vielleicht ist das ein wichtiger punkt aus meiner sicht den ich mental auch noch nicht gelöst habe, lucas. Wie unser ex innenminister mal gesagt hat: Teile der Wahrheit könnten sie verunsichern. Manchmal kommt es ja auch ganz gelegen dass man nicht alle informationen hat. Hypothetisch jetzt wenn ich mit

entwicklungszusammenarbeitsgeldern irgendwo sagen wir mal im urwald etwas finanzieren würde um den wald zu schuetzen. Da kann es situationen geben wo es vielleicht gar nicht so schlecht ust wenn man gar nicht weiss sondern vielleicht vllt nach einem jahr taucht dass dann in einem report auf aber dann kann man dann nichts mehr dagegegn machen. In dem moment wo ich informationen ion real time und höchter detailtiefe ja habe hab ich auch ne gewisse verantwortung die ich auf mich nehme ich kann nicht sagen ich ahbe die daten nicht gehabt. Das kann ich dann nicht mehr machen. Obwohl es auch passieren kann dass man dann soviele informationen hat dass man die ohne KI gar nicht verstehen kann. Dh es geht hier eine verantwortung einher die vielleicht so nicht vorher nicht hatte, es kann daher durchaus auch belastend sein plus man muss wirklich diskutieren ob die wahrheit immer zielführend ist. Und das ist für mich noch mental so ein Dilemma.
PK: Das ist ja schon fast eine philosophische frage die aber durchaus wichtig ist. Das ist wie bei the circle. Ob eine vollständige transparenz jetzt eine gesellschaft voranbringt oder nicht, da würde ich sagen nein. Aber wie gesagt wir sehen das als pragmatisches tool und man muss eben vorher überlegen welche informationen möchte ich darauf bearbeiten und welche eben nicht. Und wir haben nie den anspruch dass es ein vollständiges abbild sein muss von irgendwas. Sondern die stakehodler die da teil sind die müssen sich einigen was sie damit machen wollen.
LV: Dh fokus liegt also darauf dass zumindest dass was abgebildet wird der wahrheit entspricht aber auch dass nicht zu viel abgebildet wird was im zweifel auch schaden könnte?
JZ: Also wir haben schon auch die diskussion gehabt das jemand gesagt hat wenn ich jetzt eingebe ich habe in der shcule laptops für zehntausend dollar das stück gekauft, wo ja jeder weiss, das ist zu teuer, da stimmt irgendwas nicht. Das würde die blockchain ja nicht verhindern, also klar kann man das da eingeben. Die idee ist die lücke zwischen der analogen welt und der digitalen welt so gering wie möglcih zu halten. Und wir glauben dass die lücke immer kleiner wird. Also bsp dass der laptop irgendwann maln automatisch selber sagt wie teuer er ist, also je weniger manuelle interaktion es gibt desto kleiner wird diese lücke zwischen der analogen und der digitalen welt. Und deston mehr bildet die blockchain digitale welt die analoge welt auch ab. So dass das immer mehr quasi verschmilzt. Aber solange da immernoch eine lücke da ist kann man noch entscheiden oder etwas eingeben auch wenn es in der echten welt so nicht ist.
LV: Das ist ein interessanter punkt den du da gesagt hast, dass diese lücke gegebenenfalls in teilen sogar notwendig oder hilfreich ist für die Entwicklungshilfe.
LV: Dann kommen wir zur naechsten frage, welche auswirkungen hat den trubudget auf die probleme die wir vorhin bereits angesprochen haben? Spezifisch auf das Problem von vertrauen zwischen den stakeholdern und der erwartungshaltung die sich hier geändert hat?
PK: Ja das ist glaube ich ein bisschen spekulation, weil wir noch keine fundierten erfahrungswerte haben wie sich das auswirkt. Von daher treffen wir hier annahmen dessen grunbdlagen dann auch hypothesen sind wie sich das wuswirken könnte. Ich muss sagen wir lernen auch immer dzau, mir war bsp vorher der aspekt sehr donor driven in der kontrolle wichtig und konnte nachvollziehen dass jemand der einen eintrag macht sich davor scheut weil er sich eben accountable macht und da verantwortung übernimmt die er vorher nicht hatte. Und dann kam aber dieser völlig neue aspekt an den ich gar nicht gedacht hatte das leute das eben wollen weil sie sich dann eben sicher fühlen. Also dass sozusagen darstellen können ich hab alles richtig gemacht. Und was ich eigentlich sagen will es gibt bestimmt effekte an die wir heute noch gar nicht denken können. Weil im grunde genommen wird ja die arbeit, alle prozuesse die wir auf

trubudget darstellen bekommen so eine art vertraglichen charakter. Als ob ich jedesmal bei allem was ich mache jedesmal meine unterschrift drunter setze.
LV: Eine gewissen Finalisierung quasi
PK: Ja es kriegt eben so eine besondere bedeutung als ob ich jetzt. Ich mach da einen klick und mit diesem klick habe ich eigentlich einen vertrag unterschrieben.
JZ: Literally mach ich dasselbe quasi so mit dem private key sozusagen. Ich signiere ja sogar digital meine transaction.
PK: So, und das erzeugt natürlich sagen wir mal eine völlig neue verantwortung gegen über meinen ich nenne es mal geschäftspartnern oder partnern und wie sich das auswirkt das wäre mal eine interessante studie wenn man das mal längerfristig praktisch anwendet was für auswirkungen dass tatsächlich hat. Wir mutmassen, dass durch diese sichtbarkeit und die transparenz accountability die dadruch entsteht natürlich betsimmte risiken in der tat ausgeschaltet werden.
JZ: Darf ich noch was philosophisches sagen. Also ein beispiel. Piet und ich als wir in bali waren hat da der permament secretary gesagt aha wenn ich also das hab dann hab ich weniger papierstapel auf meinem tisch . Meine hypothese wäre dass genau das umgekehrte passiert also dadurhc dass sich ja jeder fünf mal versichern muss bevor er da was unterzeichnet, wird er eher mehr papier auf dem tisch haben als weniger weil ich dann lieber nachfrage bevor ich was falshces mache. Und folgendes ist eine hypothese die ich habe. Da komme ich schnell zu conways gesetz von 1968. Der gesagt hat dass digitale systeme oder technishce systeme die kommunikation von organisationen abbilden und umgekehrt. Man kann nicht was technisch neues einführen neue systeme einführen aber gleichzeitig die organisation und die kommunikation in dieser organisation gleich bleiben. Also beides muss sich gleichzeitig verändern. Also wenn ich jetzt nur trubudget einführ aber die organisation gleich lass dann wird das nicht funktionieren. Umgekehrt wird es sehr schwer sein die organisation zu verändern zu einem neuen zustand ohne die system dahinter zu verändern. Und ich finde das sieht man quasi im real life, nicht nur dort sondern auch bei uns in der KfW. Also wenn die organisation so arbeitet wie sie arbeitet kann man nicht einfach ein neues system hineinpushen man muss dann auch die art zu arbeiten verändern und die art wie man kommuniziert.
PK: Wie gesagt ich find da ist sehr viel spekulation dabei, man kann natürlich auch sagen die leute werden sich daran gewöhnen dass sie die sichtbarkeit ihrer Entscheidungen haben.
JZ: Dann hat sich aber die organisation verändert
PK: Point taken, natürlich brauch es immer auch einen Culture change. Und das sehen wir ja auch bei unserer eigenen bank die digitalisierung führt dazu dass wir unsere orga strukutr anpassen und ändern müssen und agile arbeit führt eben auch dazu dass die hierarchien abgebaut werden und socleh dinge. Das fängt sogar an in unseren ministerien und gut ich würd sagen in einem ministerium im Niger ists nochmal ne größere herausforderung. Aber irgendwann wirds da auch ankommen Und weil eben die umwelt sich eben ändert. Obs jemals bei der fifa soweit kommen wird weiss ich nicht, ich gluab das ist die haerteste nuss. Wenn die luete sich daran gewöhnen dann werden sie auch anders damit umgehen. Und man kanns noch weiter treiben, ich könnte schon behaupten, dass trubudget mit ein tool ist um das mal on the positive side zu sagen, ok es erlaubt eine wesnetlich demkratischere weise zu entscheidungen zu kommen. Ich denke man kann solche systeme auch intern anwenden und dann führt das automatisch dazu dass eben mehr mitreden aber auch vorher gedanken drüber machen wo ist dnen meine psoition bevor sie da was machen.

Anstatt irgendiwe leichtferttig aus einer machtposition herausirgendwelche entscheidungen zu fällen die hinterher niemand mehr in frage stellen kann weil sie einer person nicht mehr zuzuordnen sind oder sonst was. Aber ich denke wie bei jeder innovation gibt es positive und negative seiten, man muss immer schauen wie sich das entwickelt
LV: In bezug auf die beiden Pilotcases Burkina Faso und Brasilien in den TruBudget engesetzt wird bzw eingesetzt wurde, wie hat sich da bisher dieser culture change irgendwie manifestiert oder gibt es da bereits erste auskünfte die man treffen kann.
PK: Aktuell gibt es noch keine auskünfte die man treffen kann. Also Burkina Faso hat das ausgebaut es ist aber noch nicht so live das man sagen könnte ok jetzt hat das wirklich konsequenz und wir gucken man. Es ist bislang auch noch so konzipiert, es ist wie der Jure das gesagt hat, dass es die bestehenden prozesse abbildet. Und wir haben noch kein Pilot wo wir soweit sind dass wir die bestehenden prozesse optimieren durch die eigenschaften die TruBudget erzeugt. Soweit sind wir noch nihct. Auch die brasilianische Entwicklungsland hat das noch nicht gemacht, da ist das ganze programm auch on hold weil es für den amazon fund genutzt wurde und der ist wegen bolsonaro nun on hold. Anderes programm haben sie es noch nicht eingesetzt. Da sind wir leider noch nicht so weit.
LV: Aber nach deiner Einschätzung würdest du denken dass die technologische komponente ist quasi schon da, aber die mesnchliche komponente ist das was quasi fehlt, oder diese organisatorische komponente anders gesagt. Was ist denn am ende des tages das schwieriegere projekt, die technologie fehlerfrei zu programmieren oder die menschen davon zu überzeugen sie adequat zu nutzen also dieser Culture change?
PK: Das ist ungefähr so eine frage als ob du steve jobs bei der vorstellung des smartphones gefragt haettest wie sich das auf die gesellschaft asuwirkt in zukunft. Hätte steve wahrscheinlich auch nicht vorhergesehen was es dann mit bsp social media dann irgendwann mal gibt, glaube ich nicht. Also ich glaube keiner kann wirklich absehen wie der cultural change der durch innovation erzeugt wird tatsächlich aussieht. Ich glaube da fehlt usn manchmal die fanatasie. Sehr schwierig vorherzusagen. Aber das interessante eigentliuch für mich ist dass es hier eine technologie gibt die dieses potential hat, dass ist doch für mich das eigentlich spannende. Ich würd mal sagen ja, wenn solche dinge wie trubudget in der abwicklung von geschäften von kommunikation tatsaechlich irgendwie mal auf breiter ebene eins tandard wird, erst dann wird es diese auswirkung wirklich haben. Und dann wird sich denke ich culture maessig garantiert was aendern, aber in welche richtung, schwierig zu sagen.
LV: Wenn es irgendwann breit angewendet wird, wie siehst du denn persönlich die nachhaltigkeit des projekts in bezug auf skalierbarkeit bezüglich energieeffizienz etc. Bei blockchsain in bezug auf bitcoin wird ja davon geredet dass es keine besodners gruene technologie ist. Allerdings schaetze ich mal bei einer privaten blockchain ist das eher nebensächlich?
JZ: Kurz zum technischen aspekt. Also diesen energiekonsum des bitcoin den haben wir bei Trubudget nicht, einfach weil das consens verfahren nicht proof of work ist. Also dass sehe ich unter nachhaltigkeitsgesichtspunkten unproblematisch. Spannend fidne ich ob aus nachhaltigkeitsgesichtspunkten ob quasi ein verteiltes system in seiner komplexität in seiner entscheidungsfindung, alle müssen zusammen arbeiten, durchsetzt, gegenüber systemen wo man sagt ok es liegt bei google. Die blockchain eliminiert ja einen intermediär. Aber man muss sgaen wenn sich alle einigen würden dass die daten dann bei google oder amazon liegen dann wäre das natürlich schon erstmal einfacher als ein verteiltes system wie die Blockchain. Ob nachher ein verteiltes system mit seiner komplexität also nicht der technischen komplexität sondern der

organisationskomplexität, jeder muss seinen eigenen knoten hosten und so weiter, sich durchsetzt gegenbüber einem centralized system, sei es ein cloud provider, muss ja nicht mal geber oder partner sein, das würde ich sagen is noch offen.
PK: ja das ist ja wie bei der google brille. Da sieht amn vorteile aber durchgesetzt hat sie sich aus anderen gründen trotzdem nicht, das kann ja bei DLT genauso sein, das sehe ich genauso. Aber vielleicht nochmal zur ökologischen Nachhaltikeit. Also wir kriegen ja fördergelder von der Bundesrepublik, und da gelten strenge USVP regeln also Umwelt Sozial verträglichkeits regeln, und da haben wir natürlich auch eine prüfung gemacht. Auch das ist natürlich immernoch ein bisschen spekulativ, aber wir vergleichen sozusagen den energiebedarf eines eintrages auf truebudget mit einer email. Also ungefäht, vielleicht ne email mit anhang. Wir gehen aber eben davon aus auch das ist natürlich noch, spekulativ, dass dadurch ja jede menge emails und kommunikation eingespart werden. Und was ich mal so ein bisschen vermisse bei der DLT ökologischen diskussion, es wird immer nur der technische aspekt gesehen und nicht der konzeptionelle. Dh man muss doch wenn man ein system einführt nicht nur auf die technik gucken, sondern die gesamtbilanz angucken. Welche wirkung führt bei der einführung des systems, was für wirkungen hab ich auch auf die bisherigen analogen ökologischen probleme oder verbräuche. Und da würde ich mal sagen, gut jetzt bin ich hier wieder im digitalne, gut aber ich würde mal sagen da gehen wir davon aus dass die einführungen von plattformen wie Trubudget eher eine positive bilanz hat auf die umwelt als eine negative. Auch wenn der strombedarf bei bestimmten ecken steigt, sinkt er deutlich bei anderen. Durch bsp weniger email.
LV: Eine Nachfrage zur governance struktur. Weil trubudget ja im optimal fall von allen empfänger und geber ländern genutzt werden soll, wie sähe da eine governance struktur eigentlich aus, wie ist die skalierbarkeit in bezug auf mehr stakeholder? Haben dann ale die möglichkeit abzustimmen ob bsp technologie verändert werden soll oder nicht? Ich stelle mir in dezentralen system oft vor dass die auch immer gewissermassen behebig sind.
JZ: Ich würde auf jedenfall auseinanderziehen run and change. Also wie das im run funktioniert können wir nochmal drüber diskutieren. Tatsächlich in der weiterentwicklung wenn ich hundert länder habe und da sagt einer oh das neue feature das passt aber nicht zu uns, und die anderen achtzig sagen wir wollen das aber. Ich gkaube da kann man sich schon was abgucken aus systemen die quellcode offen also die open source foundation bsp, wo es schon zehntausend leute gibt die an open source systemen mitarbeiten , und sich irgendwie einigen können. Aber es gibt dann meistens schon starke staekholder die aber dann irgendwie unabhängig sind die dann aber weder für den einen noch den anderen partei haben. Ich find in der governacne ist das noch komplizierter zu lösen als das technische.
PK: Auch da wird es sich da irgendiwe entwicklen, schwierig vorherzusagen, aber wir streben schon irgendwie an, das muss dann aber jeder nutzer selbst entscheiden wie er die open source dann einsetzt, aber streben schon an, dass wir langfristige stammlösungen hinkriegen die dann benutzt werden kann. Aber letztlich entscheidte das derjenige der so eine platform initiiert irgendwo mit seinen stakeholdern. Das wird eigentlich nie eine gruppe sein die sowas initiiert sondern ein partner und das kann eben ein geber sien oder es kann eben ein partnerland sein. Unsere politik ist wir unterstützen partnerländer die das wollen das selbst zu machen . Burkina Faso ist eben ein Beispiel unser bestes Beispiel, wo die auch sagen wir wollen das perspektivisch für alle geber nutzen . Dann ist aber burkina faso im lead. Und natürlich werden die auch irgendwann mal auf die weltbank stossen und sagen, schön dass ihr das wollt aber da machen wir nicht mit. Ist ne Machtfrage schon klar. Aber zumindest können sie dann einen großteil

der geber die dann da zusagen darüber abbilden und vielleicht entwickelt sich dass dann doch da so zu einem standard dass andere dann auch mitmachen wollen weil sie eben mehr vorteile als nachteile haben. Ist aber schwer vorherzusehen
JZ: Ich bin mir ziemlich sicher was nicht passieren wird, dass es quasi eine Blockchain die die ganze welt umspannt gibt. Sondern es wird eher ganz viele kleine plattformen geben die jeweils unterieinadner kommunizieren und potentiell auch mit der uassenwelt kommunizieren aber nicht ein so ein Biotcoin für entwikclungshilfe, das wird nicht sein.
PK: man kann sich sogar gut vorstellen, dass in burkina faso eine burkinische plattform gibt, die wir fördern oder gefördert haben dann und dann die weltbank kommt mit ihrer eigenen version und dass die irgendwie dann via api verbunden werden sollten. Das ist auch denkbar.

E Transcript Interview Lennart Ploen 25.02.2022 (Original Language: German)

LV:
Ielleicht kannst du einmal sagen wer du bist und was ist deine Connections zu Trusted Budget Expenditure?
LP:
Lennart Plöhn, bei Bearing Point seit 4 Jahren bearing point in Frankreich in Paris, in dem Afrika International Element Team. Wir machen vor allem Projekte in Afrika zu Themen Digitalisierung, Digital Transformation, viel öffentlicher Sektor aber auch privater Sektor. Ich persönlich eben im Bereich öffentliche Finanzen, aber auch Landwirtschaft in verschiednene Ländern Burkina Faso, Marokko, Madagaskar, Niger und unter anderem arbeiten wir seit mittlerweile 3 Jahren mit der KFW zusammen im Rahmen der Implementierung von TruBudget in Burkina Faso, Äthiopien und Georgien, wobei Burkina Faso deutlich, dass am weitesten vorangeschrittene Land ist.
LV:
Alles klar, dann vielleicht als kleiner Recap zu mir, also was meine Aufgabe war, das ich. Schreib meine Masterarbeit. Und die Research Frage ist: what is the Impact of Distributed Ledger Technology and perceived stakeholder trust within the Charity Sector amid Monitory and administrative Complexity of Official Development Aid Management?
Ja, dazu habe ich jetzt 4 Hypothesen aufgestellt, eine davon habe ich in Zusammenarbeit mit Pete Kleffmann und Jure Zakotnik aufgestellt. Basically, einfach das Blockchain Technology Informations asymmetrien reduziert. Blockchain Technology reduziert Monitory complexity und Blockchain Technology increased, das Vertrauen der verschiedenen Stakeholder in den Charity Sektor und in Official Development Assistance generell. Und die Vierte, die dazu gekommen ist. Das war das, was Jure Zakotnik und Piet kleffmann vorgeschlagen hat.
Durch Blockhcain Tehcnology werden die verschiedenen Stakeholder auf eine gemeinsame Ebene gezogen, dass heißt, es gibt nicht mehr dieses Gefälle von von Geber zu Empfängerland, sondern da ist jetzt ein neutraler Intermediär in der Mitte und beide sind auf einer Wellenlänge quasi auf einer Augenhöhe.
Im Kontext von Offical development assistance sind erstmal vorab vielleicht die Frage was sind aus deiner Sicht gerade die entscheidenden Probleme in official Development Assistance? Was gibt es zu lösen und woher kommen diese Probleme dann einfach?
LP:

Das hat mir sehr weite Frage.
LV:
Ja, du kannst erstmal anfangen was ist für dich das größte Problem aktuell, was du siehst in ODA?
LP:
Langfristiger langfristige Abhängigkeiten.
Der Bedarfs. Die Entwicklungsarbeit, so zu strukturieren, dass sie langfristige, langfristiger erfolgreich ist, ja also wenn wir auf ich weiß nicht wie viele Jahrzehnte, wir halt zurückgucken: Was sind die erreichten Ziele und was sind die gefailten Ziele? Dann ist da der eimer mit den gefailten Ziele zielen viel größer. Woran liegt das? Liegt das an fehlendem Knowledge Transfer ist das, liegt es an zu starken Donor driven Agendas die ihre eigene politische Agenda haben? Liegt es daran, dass es grundsätzlich ein riesiger Apparat ist der administrativ viel Geld verschluckt, aber wenig lokal, schafft. Sind es vielleicht die falschen Ziele, die gepusht werden, liegt es an den Ownern vor Ort, die nicht sich die Projekte nicht genug aneignen, ja es gibt natürlich unzählige Faktoren, aber es gibt auf jeden Fall mal eine Bilanz der wirklich erreichten ziele aus den letzten Jahrzehnten, dann ist es doch eher, ernüchternd die Resultate, das würde ich schon sagen und grundsätzlich das Problem, sobald ein Projekt abgeschlossen ist. Selbst wenn das Projekt ein Erfolg war. In den Jahren darauf verschleißt der Erfolg und ist versandet. Ja, weil es nicht genug lokale Ressourcen gibt, die das Projekt weiterführen oder oder sich dafür einsetzen, dass die die erzielten Ergebnisse auch weiterentwickelt oder beibehalten werden.
LV:
Dass heißt ernüchternd hauptsächlich, weil es keine Nachhaltigkeit gibt, quasi in den Bereich also das es halt so ist, dass wie due gerade gesagt hast halt die eigenen Ressourcen nicht aufgebaut werden in den Ländern. Das heißt, wenn es darum geht, ein neues Projekt aufzusetzen und Vergleichbares ohne Geberland, dass das dann schwierig ist, dass ist eines der Hauptprobleme wenn ich dich da richtig verstehe.
LP:
Finanzierung ist nach wie vor, seit immer, völlig abhängig von Gebern.
LV:
Mhm, okay, gibt es da irgendwelche Trends, dass es beispielsweise sich jetzt ändert. Trusted Budget Expenditure wäre beispielsweise ein Fall, wo jetzt die KfW zumindest versucht, dass zu ändern. Ist das was was du global auch beobachtest oder ist das nur etwas was ist die KfW isoliert versucht?
LP:
Das, was ich sage jetzt keine kein Geheimnis, das weiß jeder ja, da muss man sich ja mal angucken, was wo finanziert wird seit wie lange schon und warum wird's immer noch finanziert, wenn man sagt, jetzt die Hilfe zur Selbsthilfe und Autonomität und Knowledge Transfer und sonst was, weil das weiß jeder und gerade die Entwicklungs Organisation wissen es auch ja, und vielleicht wird nicht genug nachgeforscht worden. Und vielleicht wurde nicht genug selbstkritisch evaluiert. So vielleicht müssen wir strukturell irgendwas verändern, damit sich da etwas mal etwas tun. Und mehr impact passiert. Trubudget, Trusted Budget Expenditure, Blockchain? Es ist natürlich eine von vielen Möglichkeiten, möglichen Ansätzen, sozusagen ein technischer Ansatz wie Blockchain, könnte vielleicht dazu beitragen, bestimmte Strukturen zu verändern. In der Entwicklungsarbeit ja beispielsweise: Wie auch eine von ihren Hypothesen ja gesagt. Daten liegen nicht nur beim Geber und nicht nur beim Partnerland, sondern Daten liegen überall. Ja, vielleicht können wir auch bestimmte Entscheidungsprozesse auf Augenhöhe einfach abschließen, wenn wir alle auf einer selben Plattformen

Entscheidungen treffen können, ja, vielleicht das sind Hypothesen, die man on the Field testen sollte das lohnt sich, und das machen wir.
LV:
Ok verstehe du hast gerade gesagt, das sind Sachen das das weiß jeder. Vielleicht in dem Bezug: Wie siehst oder wie schätzt Du ein wie das Vertrauen der verschiedenen Stakeholder ist zueinander und zu sowas wie Entwicklungshilfe generell also wie es beispielsweise, wie ist die Vertrauensfrage von Geberländern und Empfängerländern gegenüber Entwicklungshilfe? Ist da noch die Meinung, dass, ok das wird uns langfristig helfen oder sind eigentlich alle so desillusioniert, dass sie glauben, dass sie schon wissen, na ja, das ist jetzt ein nettes Projekt, Wir bauen da jetzt eine Schule oder bauen da jetzt einen Brunnen aber eigentlich langfristig müssen wir mal was anderes machen, damit hier was vorankommt? Oder wie schätzt du da die die eigene Stimmungslage ein?
LP:
Ich glaube, das wissen alle, das ist aber kein Geheimnis, man guckt es sich an, ich mein man sieht ja die Resultate, das heißt aber nicht, dass es überflüssiger Sektor ist, das heißt es noch gar nicht. Es gibt natürlich bestimmte Abhängigkeiten, die sind zu hinterfragen und bestimmte mangelnde, ja lets call it, Hilfe zur Selbsthilfe und unabhängige oder oder Autonomität. Und dennoch sind natürlich die Projekte teilweise extrem wichtig, ja, also keine Ahnung, sich für Frauenrechte einzusetzen in dem Land, wo, Ja, keine Ahnung Frauen 0 repräsentiert sind, ist natürlich extrem wichtig und auch wenn man merkt, dass das nicht mit nachhaltigen Resultaten erzielt wird, ist es natürlich dennoch wichtig das halt am Laufen zu halten. Also deswegen würde ich nicht, ich unterstelle nicht der gesamten Entwicklunsgarbeit, dass sie überflüssig ist. Ich sag nur, dass die langfristigen Resultate leider auf sich auf sich zu wünschen lassen und ich nehme an, dass viele Menschen eben zu ähnlichen Conclusions kommen sollten, gerade die lange in den Sektoren arbeiten.
LV:
Okay, verstehe dann auch wieder die Frage siehst du da einen Trend, dass ich sowas verschlimmert verbessert? Also ist die Vertrauens Lage eher das Menschen glauben, okay, jetzt in Zukunft mit neuer Technologie können wir da definitiv was machen, oder es ist im Prinzip keine Veränderungen zu vorher?
LP:
Ich glaube man muss differenzieren zwischen Technologie und grundsätzlicher, Sensibilisierung oder Bewußtseinsbildung oder allgemeine strukturelle Veränderungen. Mein Eindruck ist aber, dass, da bin ich biased, weil ich mit dir KfW zusammenarbeite, dass es durchaus immer mal wieder und vielleicht auch im Moment, Ideen gibt, wie man ja oder selbst kritische Hinterfragungen gibt. Und Menschen die seit langem in der Entwicklungsindustrie arbeiten auch durchaus desillusioniert sind, oder zumindest irgendwann sagen, ja gut, jetzt nach 50 Jahren hier bin ich als Country Head von was weiß ich, Der KfW in der Zentralafrikanischen Republik. Gut, wir sind immer noch da, wo wir vorher waren. Ich glaube ja, vielleicht gibt es einen Trend zur Bewusstseinsbildung. Bewusstseinsbildung und inwieweit Technologie dazu beitragen kann? Also Technologie, ist und bleibt nur ein Mittel zum Zweck also man muss den Zweck erstmal definieren wo will man denn überhaupt hin, was will man denn verändern, was will man denn machen? Und dann kann man gucken, ob bestimmte Technologien dazu beitragen können.
LV:
Quasi auch nach dem Motto je nachdem, wer die Technologie auch einsetzt, so hilfreich ist sie dann auch. In die Richtung vielleicht auch, oder?

LP:
Ja, und was für Use Cases gibt es von der Technologie also man muss erstmal gucken was wollen wir denn überhaupt machen, bevor man sagt also wir wollen nicht Technologie um Technologie zu machen, sondern wir wollen Technologie, um irgendwas anderes: mehr Transparenz, mehr Vertrauen zu schaffen, das sind ja Use Cases, sag ich mal, die vielleicht in die Entwicklungsarbeit umstrukturieren könnten und um das zu schaffen, kann man sich vielleicht bestimmte Technologien aneignen, ja, so zum Beispiel der Versuch, mit der Blockchain von TruBudget.
LV:
Ich frage deswegen danach, weil ich mir vorstellen kann, dass auch die Erwartungshaltung sich bei den verschiedenen Stakeholdern wahrscheinlich verändert hat in den letzten 20 Jahren aufgrund dessen einfach, weil wir jetzt neue technologische Möglichkeiten haben, beispielsweise besser nachzuvollziehen, wo Gelder wie geflossen sind etc. Blockchain ist ja genau das im Prinzip nachvollziehbar machen: Was ist passiert im Workflow oder was ist passiert mit den Geldern? Glaubst du, dass sich diese Erwartungshaltung bei den Stakeholdern verändert hat, dass Informationen einfach mehr verfügbar sein müssen oder dass in Zukunft Informationen mehr verfügbar sein müssen, für die Stakeholder zumindest also, dass die Stakeholder das erwarten, so eine Bereitstellung von Informationen?
LP:
Vielleicht ja, es ist eine komplexe Fragen, weil da viel dahinter ist also. Geber, jedes Land, nicht jedes, viele Länder haben einen Entwicklungstopf ja, meinetwegen commiten sich sogar in bestimmten internationalen Abkommen dazu, was weiß ich, wie viel Prozent ihres Haushalts für Entwicklungsarbeit auszugeben? Und das müssen Sie ausgeben ja, da können Sie jetzt noch so viel den Partnerländern erzählen: Wir geben aber nur wenn ihr auch Transparenz seid, am Ende sitzt, irgendwo der Chef und sagt: Wir müssen aber ausgeben, also jetzt finanziert mal eure Projekte, weil, sonst kommen wir nicht weiter. Das heißt, die Geber haben einerseits Druck und natürlich haben die Partnerländer auch Druck. Also die die vielleicht auch denken mehr Transparenz, wäre auch für uns gut und internen und was weiss ich. Letztendlich, wenn mir jemand sagt, hey willst du die 1000000 oder nicht, unter den Konditionen, dann nimmst du wahrscheinlich dann doch lieber die 1000000 auch mit diesen Konditionen als gar nix zu nehmen. Das heißt, auch da, Erwartungshaltungen, da sind verschiedene treibende Kräfte hinter, die noch viel größer sind als die Erwartungshaltung glaub ich.
LV:
Aber spannend was du sagst, das heißt also du siehst auch die Drucksituation für die Geber vor allem, dass sie auch Gelder ausgeben müssen, wenn sie sich dazu verpflichtet haben.
LP:
Ja vollkommen naja, absolut ja. Okay, also gerade ja zum Ablauf des jedes jeden Jahres im November Dezember, da musst du mal raus geballert werden.
LV:
okay verstehe das heißt würdest du sagen, dass dann im Zweifelsfall auch Projekte teilweise gefördert werden, die vielleicht nicht unbedingt die Standards erfüllen, die sie erfüllen sollten, in Bezug auf Sicherstellung, Nachvollziehbarkeit etc.?
LP:
Auch da wieder kommts darauf an, also natürlich grundsätzlich auch diese Anforderungen werden auf höchster Ebene definiert, ja, also da werden nicht am Ende dann noch mal schnell hier nochmal irgendwas rausgehauen, oder da sind schon ganz klare Strukturen. Aber wenn jetzt mal eine kleine Initiative nehmen, ja also auch

beispielsweise TruBudget halt, das ist ja eine kleine Initiative in einem riesigen Apparat der KfW, wo es unglaublich viele Ziele Konditionen und Richtlinien gibt. Und wenn da bestimmte Erwartungen auch innerhalb der Geberorganisationen nicht komplett aligned sind dann, ja dann dann wird halt, werden halt Projekte gefördert, die bestimmten Richtlinien entsprechen, die vor allem in der Hierarchie abgesegnet sind, aber vielleicht nicht jetzt dem konkreten Ziel, von dem Projekt irgendwo.
LV:
Okay verstehe. Denn um zu Trusted Budget Expenditure speziell zu kommen, vielleicht kannst du mal kurz erzählen was ist denn TruBudget eigentlich genau also in Bezug auf Burkina Faso was macht TruBudget Budget in Burkina Faso beispielsweise?
LP:
TruBudget ist ein Tool, was ursprünglich dazu konzipiert und entwickelt wurde um Projekt Abwicklung und vor allem die finanzielle Projekt Abwicklung transparenter darzustellen und nachverfolgen zu können. Basierend auf der Blockchain. Der Use Case, der Nachverfolgung der Finanzen ist nur einer, also es können auch andere Sachen andere Prozesse abgebildet werden, Ja, TruBudget kann auch für irgendwas anderes genutzt werden theoretisch für andere Prozesse. Das innovative kommt durch die Blockchain mit dem Anspruch, die Daten werden eben nicht nur in einem Land nicht nur vor allem im Partnerland oder nicht nur beim Geber gespeichert, sondern dezentral, bei den verschiedenen Stakeholdern. Und dadurch, dass alle Stakeholder eine Kopie der Daten haben, die sich permanent synchronisieren auf ihren Servern, die verschiedenen Blockchain, Knoten, Datenmanipulation oder Datenverlust deutlich reduziert sind, können alle Stakeholder diesen Daten vertrauen und die Hoffnung oder das Ziel ist, dass Datenqualität sich dadurch verbessert, daten availability ja, und Daten Zugang sich verbessert. Durch diese bessere Daten Qualität vom Ablauf der Projekte und dem finanziellen Ablauf der Projekte spezifisch ist das langfristige Ziel, verschiedene Prozesse schlanker gestalten zu können, weniger non objections, weniger Kontrollmechanismen und vielleicht auch andere Finanzierungsmodalitäten durchführen zu können, als die die es heute gibt. Also wenn heute die Geber Organisationen direkt die Projekte finanzieren und direkt die verschiedenen Unternehmen beauftragen und bezahlen um es durchzuführen, als mit weniger oder mangelnder Implizierung oder Involvierung des Partnerlandes. Kann morgen vielleicht dank besserer Transparenz und Nachverfolgbarkeit der Nutzung der Gelder, das Partnerland die Gelder selbst verwalten, selbst bezahlen, aber regelmäßig transparent darstellen: Wie werden die Gelder benutzt? Dank der Plattform. Und den Daten auf der Plattform kann man vertrauen, weil wir auch eine Kopie haben und weil die Daten schwer manipulierbar sind. Das istd as Ziel von Burkina Faso, beispielsweise in Burkina Faso oder Äthiopien.
LV:
Okay, verstehe das heißt wie du gerade schon gesagt hast, die verschiedenen Stakeholder auf Augenhöhe sind, dass beide alle Daten zur Verfügung haben, dass für beide die Transparenz der Daten gewährleistet ist für alle Stakeholder. Was bedeutet, dass speziell jetzt im Fall von Burkina Faso, also wie ist das beispielsweise?
Du hast Manipulierbarkeit von Daten angesprochen. Sind die beiden Stakeholder auch in der Governance der Plattform gleichberechtigt oder ist das so, dass beispielsweise das Geber Land, die Plattform designed und eigentlich nur dass das Empfängerland beispielsweise auch darauf zugreift oder sind die beiden gleichberechtigt, in Bezug darauf welche Daten und wie die Daten gespeichert werden, wo sie gespeichert werden etc. Haben beide eine eigene Server structure, wo quasi eine Node drauf läuft oder wie wie funktioniert das im Fall von Burkina Faso?
LP:

Im Fall von Burkina Faso gehört die Plattform in Anführungsstrichen Burkina Faso. Ja, die kann dann letztendlich entwickeln und machen, was sie wollen. TruBudget ist sowieso eine Open Source solution, das heißt, jeder kann damit machen, was er will, ja. Die genaue Governance der Weiterentwicklung der Plattform ist noch nicht ganz klar definiert. Ja also wer da wie welche Gabelung wieder in den eigentlichen Source Code rein mergen kann oder nicht ist glaube ich eine offene Frage im Moment heißt es die Entwickler Community aber wie das genau funktioniert und welche Regeln da oder welche Guidelines vielleicht auch die Interoperabilität von verschiedenen forks der Lösung steuern sollte, ist glaube ich noch nicht ganz klar definiert. Ansonsten, wie bei jeder Blockchain, installiert natürlich jeder Stakeholder auf seinen eigenen Servern einen Knoten. Völlig unabhängig und ist dann auch für die für die Pflege oder Maintenance und selbst die Kreirung der User auf seinem Knoten selbst verantwortlich ja.
Wer aber beispielsweise der Blockchain beitreten kann, also hier ist es eine private Blockchain, es gibt ja Public oder private Blockchain also.
LV:
Ja, das wäre jetzt meine nächste Frage gewesen.
LP:
Ja genau, also, TruBudget ist eine private Blockchain, das ist nicht jemand, der eben da kann nicht irgendwer einen Knoten installieren und mitmachen, sondern dass wird entschieden von denen, die bereits mitmachen und dort im Rahmen von Burkina Faso, wird es Burkina Faso noch konkreter entscheiden, wer auf die Burkina Faso Blockchain dann.
LV:
Das heißt dann nicht wie beispielsweise bei Ethereum oder irgendeiner anderen öffentlichen Blockchain, wo wirklich jeder einfach theoretischen mitmachen kann, sondern wirklich nur Leute, die autorisiert sind, dazu das.
LP:
Ja, genau ja. Na gut, na ja, bei TruBudget nochmal es ist ja Open Source, dass heißt jeder kann sich einen Knoten installieren, aber um sich dann zu der Blockchain zu verbinden, die irgendwo aufgezogen werden, da müssen dann die anderen Knoten zustimmen.
LV:
Ok verstehe, und wie schätzt du ein wie sich so ein Projekt wie TruBudget auf die Vertrauenslage der verschiedenen Stakeholder auswirkt? Glaubst du, das schafft Vertrauen für Geber und Empfängerländer, glaubst du, da gibt es Unterschiede zwischen Geber und Empfänger Land wie sich das auswirkt?
LP:
Also letztendlich ist der Stake natürlich auf Geber Seite, im Sinne von heute ist das Mißtrauen vor allen Dingen von Gebern gegenüber den Partnerländern. Also die Geber vertrauen, nicht den Daten, die von den Partnern kommen, weil eben auch gerechtfertigter Maßen die Daten Qualität extrem mangelhaft ist. Keiner pflegt da ständig die Daten ein, die It Systeme sind völlig obsolet also was da rauskommt, dem kann man auch in der Tat nicht wirklich vertrauen, sag ich mal, plus natürlich Angst vor Korruption, Veruntreuung und diese ganzen Geschichten. Das heißt der Stake ist eher auf Geberseite: kann der Geber mit TruBudget langfristig den Daten vertrauen?
Da würde ich sagen, ist das Ziel valide, ja, also kann durch eine dezentrale Datenspeicherung permanente Daten Kontrolle durch Algorithmen auf der Blockchain, das Vertrauen verbessert werden? Ich glaube das Ziel ist valide das kann sein ja in der Tat das Ziel ist gut.

Die Sensibilisierung des Verständnis dazu ist und das den Menschen beizubringen, ist allerdings einer der größten Challenges. Gerade in so großen und komplexen Organisationen wie in der Entwicklungsarbeit. Selbst wenn man das jetzt den operationellen Mitarbeitern vor Ort erklärt hat und die es auch verstehen und alle unterschreiben das Ziel, Transparenz und die finden das alle gut dann kann man ja auch schon was sagen. Aber dann zu verstehen wo im Hintergrund, welche Daten gespeichert werden, was überhaupt eine Blockchain ist und wie Bitcoin damit zusammenhängt, nämlich gar nicht. Das verstehen, wird man erstmal nicht direkt und bis dann in der Hierarchie überall angekommen ist und das die dann auch irgendwann validieren, dass wir jetzt ja aufgrund dieser besseren Transparenz dank einer Technologie dahinter auch Prozesse verändern können. Das ist ein sehr, sehr langer Prozess, also ein Veränderungsmanagements und Sensibilisierung, was Jahre noch dauern wird.
Und das und das wiederum ist natürlich Herausforderungen für eine Projekt Finanzierung seitens der kfw beispielsweise die natürlich ein Budget für einen bestimmten Zeitraum hat, aber leider damit konfrontiert ist, dass dieses Veränderungsmanagement diese kulturelle Veränderungen zu verstehen was ist blockchain wofür kann es genutzt werden und dass das dann auch einen greifbaren Impact auf Prozess Veränderungen hat, einfach viel, viel länger dauert als anfänglich vielleicht gehofft.
LV:
Das heißt so wie du es beschreibst das Problem ist gar nicht unbedingt die Technologie selber zu produzieren, sondern eher, dass man die Menschen dazu kriegt, das zu verstehen, was sie da überhaupt haben und überhaupt die Menschen dazu zu kriegen, dass sie das auch benutzen können.
LP:
Komplett komplett. Komplett also eine Blockchain zu entwickeln, eine simple einfache Blockchainzu entwickeln, das kann der Entwickler in ein paar Tagen machen, ja. Dann den functional Scope eines operativen Tools weiterzuentwickeln, was soll denn genau da gemacht werden? Was ist der use case? Wie müssen, welche Daten wie strukturiert werden, welche Felder das ist dann auch ne Weiterentwicklung, das dauert Zeit, das ist auch ein richtiges Projekt, wo man dann die verschiedenen funktionalen und technischen Anforderungen studieren muss, aber das ist dann nicht mehr eine Blockchain Frage, sondern eine funktionelle Frage letztendlich. Das dauert schon länger und dann diese ganze Begleitung des Veränderungsmanagements und so, das ist die langfristige, würde ich sagen, mindestens der Hauptteil, ja der Arbeit.
LV:
Ok spannend, das heißt neben Beispiel dieser kulturellen Frage was glaubst du sind so die die größten Schwierigkeiten, die Blockchain Technologie aktuelle noch hat? Also das ist das ist das Hauptthema wirklich, oder gibt es da noch andere Probleme? Die Blockchain Technologie, oder Distributed Ledger Technologie hat, um funktional besser genutzt werden zu können für solche Use Cases?
LP:
Ja ist Sensibilisierung, Verständnis von Blockchain ist durchaus ein Problem. Ja.
LV:
Ich spiel da zum Beispiel auch auf sowas wie Skalierbarkeit beispielsweise in Bezug auf Energieeffizienz an, also wenn es eine private Blockchain ist, dann spielt das wahrscheinlich keine große Rolle mit der Energieeffizienz aber.
LP:
Also ich sage mal Sensibilisierung für die Vorteile, die Nachteile sind ja jetzt bekannt, also Energie, Konsum, di ja aber auch behoben worden sind mit einer privaten

Blockchain beispielsweise durch Proof of stake. Genau also die durch technologische Innovationen behoben worden sind.
Ja, Sensibilisierung auf der Ebene, ist vielleicht eine Herausforderung und dann aber und das ist eigentlich keine Herausforderung, sondern einfach eine Realität, dass Blockchain einfach nicht immer die beste Technologie ist. Ganz einfach. Blockchain hat Vorteile Datensicherheit teilweise das Überflüssigwerden von Intermediaries zwischen Organisationen. Also man kennt es natürlich am besten aus dem Bitcoin Geschäft, wo man den Banken vielleicht oder Zentralbanken langfristig nicht mehr braucht, weil das ein Algorithmus gesteuerter selbst regulierender Markt oder Software ist.
Das ist natürlich wirklich ein riesiges Potential, wenn man dafür den richtigen Use Case findet, dann ist das eine super Idee. Aber dennoch und das merken wir auch bei der Implementierung von TruBudget zum Beispiel in Afrika. Und nicht nur in Afrika sondern auch bei Geber Organisationen. Da muss der Use Case wirklich sehr schlagkräftig sein, so dass die Vorteile die Nachteile überwiegen. Und die Nachteile sind nicht nur Energieeffizienz, das kann man schnell abtun, weil es einfach kein Thema ist bei einer privaten Blockchain und proof of stake der genutzt wird, aber beispielsweise, wenn eine Organisation plötzlich seine IT-Systeme nach außen dann öffnen soll Weil per Definition ein Knoten mit einem anderen Knoten in einer permanenten Kommunikation steht, ja, plötzlich muss man halt seine System öffnen, damit es mit anderen IT-Systemen permanent synchronisiert und kommuniziert.
LV:
Dass heißt Interoperabilität ist da wahrscheinlich ein riesiges Thema Bescheid also.
LP:
Wenn man auf derselben Blockchain ist, ist das ja kein Problem, also wenn alle dieselben Knoten benutzen, ist das kein Problem. Aber IT Security und da die Normen zu verändern und da auch wieder bis in die höchsten Abteilungen dafür Verständnis zu bekommen, ja, das ist jetzt wirklich so wichtig ist, dass wir einen Knoten installieren von der Blockchain, weil wir wirklich Blockchain für diesen Use Case brauchen und dann die ganzen Regeln zu verändern und dann die Firewall da abzubauen und sagen, was für Informationen daraus und wo werden überhaupt welche Dokumente von mir gespeichert. Sind dann plötzlich meine sensiblen Dokumente auf allen möglichen Servern überall auf der Welt? Solche Fragen schrecken die meisten schon ab und sagen dann eher: Ach komm, lass. Es ist wirklich ein riesiger und so ein langer Entscheidungsprozess. Mit so vielen Akteuren dabei also da muss schon der Use Case und der Mehrwert von Blockchain ganz, ganz klar herausgearbeitet und verständlich für alle sein, damit es auch funktioniert.
LV:
Okay verstehe. Spannend wir haben nicht mehr so viel Zeit, deswegen würde ich vielleicht einmal kurz fragen hast du noch irgendwas hier, was dir ganz arg auf dem Herzen liegt, was du noch gerne loswerden möchtest in dem Kontext?
LP:
Ja, also noch mal ich würde Blockchain nicht overraten, ja also Blockchain wie jede andere Technologie auch hat ganz klar sein Potential und seinen Mehrwert für bestimmte Use Cases. Und auch ganz klar seine Nachteile und seine limits. Man muss nicht innovativ sein, um innovativ zu sein, sondern muss innovativ sein, wenn es dafür einen Case gibt. Ja, wenn man, wenn es sinnvoll nutzen möchte und kann. Und bestimmte Fälle wie zum Beispiel ich glaube Währung, oder der Geldmarkt da kann das in der Tat einen riesen Vorteil bringen.
Ja, ich will jetzt nicht von Bitcoin reden, da sieht man natürlich das ist keine Währung, das ist ein spekulatives Asset und mehr nicht, aber wenn ich sag ich mal da die

Kursschwankungen regulieren kann durch bestimmtes pegging an irgendwelche anderen waren Körbe oder meinetwegen Gold. Ich weiß nicht irgendwas, was Sinn macht, sag ich mal, dann kann das unglaublich viel Mehrwert bringen, daran glaub ich schon bei der Blockchain und ich glaube auch, das es unglaublich viel Sinn macht andere Use Cases zu testen und zu gucken kann das für was anderes auch sinn machen? Aber man muss nicht, man muss jetzt nicht sagen lass uns Blockchain machen, weil warum eigentlich nicht?
Das ist nicht genug Grund, um eine Blockchain zu machen, weil dafür gibt es dann doch zu viel Komplikationen für eine Blockchain, wie zum Beispiel das Überzeugen von verschiedene Organisationen einen Knoten zu installieren, in denen deren IT-System sich dann öffnen kann.
LV:
Okay, verstehe dann vielen Dank für das.
Letzte Frage nochmal hast du irgendwelche Ansprechpartner, die ich zu dich Kontakt aufnehmen könnte? Vielleicht aus Burkina Faso aus dem Projekt Äthiopien oder Georgien, damit ich deren Perspektive auf das Projekt auch nochmal einfangen könnte, gibt es da welche oder?
LP:
Ich kann dir unseren Projektpartner in Burkina Faso geben, ja. Du wirst wahrscheinlich schnell. Merken, dass bei Technik, Gespräch, französisch.
LV:
Bisschen ja, aber also ich habe ich, ich kann Englisch sprechen, nicht französisch, wenn ich vorbereite ja.
LP:
Kannst du ja mal probieren? Ich kann Ihnen geben, ich weiß nicht, ob sie antworten wird und und du wirst du so schnell merken. Und das ist eine Herausforderung, obwohl wir seit 23 Jahren zusammenarbeiten werden bei technischen Blockchain Fragen, wie schnell das Verständnis auch aufhört. Aber als User eines Tools hast du eine völlig andere Perspektive als ein Architekt, der die Technologie dahinter versteht. Deswegen ist daher auch die Schwierigkeit, die Akteure zu überzeugen von der Wichtigkeit oder dem Sinn von Blockchain, weil die sehen keine Blockchain, ja, die sehen nur ein User Interface, wo sie was drinnen machen können und dann haben diese Userinterface und können dir sagen ob es ein gutes tool ist oder nicht, ja wo dahinter die Daten gespeichert werden das interessiert die allerwenigsten. Daher auch mangelndes Verständnis oder auch Interesse an Blockchain.
LV:
Ja, aber es passt eigentlich ganz gut zu meiner Frage, wie sich das Vertrauen der verschiedenen Stakeholder entwickelt und wenn das natürlich, wenn es, wenn es im Prinzip die Leute, die es benutzen, gar nicht interessiert das es eine Blockchain ist.
Ist die Frage im Prinzip schon beantwortet schafft Blockchain Vertrauen wahrscheinlich nein, weil kein interessierten Produkt des Jahres.
LP:
Nein, nicht auf operativer Ebene, also der Projektleiter dem ist das egal aber vielleicht in der Tat. Also nochmal die Idee ist schon relevant, zu sagen, weil es gibt, weiterhin Misstrauen von Geberländern. Unter anderem in Sachen: die Daten, die geliefert werden, aus den dortigen System. Wenn man also die Daten, die Idee die macht schon durchaus Sinn.
Man muss nur den richtigen Positionen diese Frage stellen, um dann auch ich sag mal die Leute dafür gewinnen zu können aber die User ja, die die tatsächlich nur die Nutzer der Plattform die sehen es halt nicht und wenn man mal mit denen arbeitet und mit

denen die Plattform testet, dann werden sie dir sagen, wie man das Userinterface verbessern kann? Aber die haben überhaupt kein Verständnis von Blockchain und das interessiert sie auch nicht, dass ist die Schwierigkeit bei der Konzeption so einer Platform das du das User Feedback für die Entwicklung der Plattform wichtig ist, aber nicht für die Blockchain selbst, also die Nutzung der Blockchain dahinter ist für die User egal.