Blockchain for Charity: Trust-Related Affordances in the Charity Sector

Nadine Ostern  
Queensland University of Technology, n.ostern@qut.edu.au

Craig Furneaux  
Queensland University of Technology, c.furneaux@qut.edu.au

Michael Rosemann  
Queensland University of Technology, m.rosemann@qut.edu.au

Follow this and additional works at: https://aisel.aisnet.org/ecis2023_rp

Recommended Citation

Ostern, Nadine; Furneaux, Craig; and Rosemann, Michael, "Blockchain for Charity: Trust-Related Affordances in the Charity Sector" (2023). ECIS 2023 Research Papers. 268.  
https://aisel.aisnet.org/ecis2023_rp/268

This material is brought to you by the ECIS 2023 Proceedings at AIS Electronic Library (AISeL). It has been accepted for inclusion in ECIS 2023 Research Papers by an authorized administrator of AIS Electronic Library (AISeL). For more information, please contact elibrary@aisnet.org.
BLOCKCHAIN FOR CHARITY: TRUST-RELATED AFFORDANCES IN THE CHARITY SECTOR

Research Paper

Nadine Ostern, Centre for Future Enterprise, School of Management, Queensland University of Technology, Brisbane, Australia, n.ostern@qut.edu.au

Craig Furneaux, Centre for Future Enterprise, School of Accountancy, Queensland University of Technology, Brisbane, Australia, c.furneaux@qut.edu.au

Michael Rosemann, Centre for Future Enterprise, School of Management, Queensland University of Technology, Brisbane, Australia, m.rosemann@qut.edu.au

Abstract

The charity sector is trust-intensive as its performance depends on people’s willingness to donate and their confidence that donations will be used appropriately. However, recurring scandals continue to erode public trust. Charities are, therefore, increasingly turning to new technologies such as blockchain to increase their accountability and the transparency of donation use and allocation. While studies either develop concepts for the design of blockchain-based donation systems or examine the effects on donors’ behavior, this paper focuses on emerging opportunities for charities. Using a systemic review, three types of blockchain uses, their interplay in the charity sector, and seven affordances are presented that enable charities to build trust through, among others, increased accountability and automated governance. We thereby contribute to a deeper understanding of the impact of blockchain on the charity sector by highlighting the action potential of actors in the sector and its effect on trust on the donors’ side.

Keywords: Trust, Accountability, Transparency, Charity, Donation, Blockchain.

1 Introduction

The New York-based National Children’s Leukemia Foundation appealed to donors across the globe with lifesaving services, such as locating bone marrow donors, conducting cancer research, and even claiming to run a program called “Make a Dream Come True” to fulfill the last wishes of children who have leukemia. In 2015, the charity, which has been active since 2009, was indicted of having paid less than 1% of a total of $9.7 million raised as direct assistance to leukemia patients. Additionally, the founder Zvi Shor was alleged to have awarded himself more than $1.3 million in pay, plus deferred compensation and perks financed through donations (Alroy, 2015). The case resulted in a court-approved settlement that included back pay of about $1 million (directed to charities helping children with leukemia), the forfeiture of claims to a lifetime pension and other benefits, and a ban on Shor from acting as a trustee of a New York charity ever again (New York State Office of the Attorney General, 2015).

Incidents like this are not isolated cases. From ‘creative’ accounting practices to the misuse of donations for other than designated purposes and actual scams, i.e., the outright deception of donors, misleading use, and actual misuse of donated funds, undermine the trust of potential and actual donors in charities and philanthropic foundations. Single incidents of donation misuse contribute to a decrease of trust in the charity sector, which negatively impacts giving behavior (Çarkoglu et al., 2017; Wymer et al., 2021). In particular, previous studies showed that charities that act as fundraisers for beneficiary causes must be trusted to receive donations (Chapman et al., 2021). In addition, trust has been shown to be an important factor in the
likelihood that donors will persistently commit to and support a charity (Sargeant et al., 2006; Sargeant & Lee, 2004).

Given the significance of trust in the charity sector, previous studies not only focused on understanding the relationship between trust and charitable giving (Burnett, 1992; Sargeant et al., 2006; Saxton, 1995) but also investigated antecedents of trust as well as how people form trust in the charity sector (Furneaux & Wymer, 2015; Wymer et al., 2021). Today, however, the role of technology as a mediator of trust is increasingly moving to the forefront of research. One technology that is increasingly important in this context is blockchain technology, which can support charities in fostering trust by providing complete transparency and traceability of donation allocation and use (Farooq et al., 2020; Kuruppu et al., 2022; Lee et al., 2018), thereby allowing for accountability by fulfilling information needs of donors and stakeholders (Yang & Northcott, 2019).

Blockchain technology is a distributed transactional database that provides a record of events. Smart contracts that provide a means to automate transactions run on the blockchain without any risk of downtime, censorship, or fraud, resulting in a reliable and trustworthy distributed record system (Beck et al., 2017). Charities might use blockchain to make donation allocation and transactions publicly visible or by creating smart contracts that allow the use of donations only for prespecified purposes (Farooq et al., 2020; Rangone & Busolli, 2021).

Researchers hitherto have looked at the application of blockchain technologies in the charity sector from an engineering and design perspective, e.g., through the design of reliable donation management systems (Z. Li et al., 2021; Singh et al., 2020) or loyalty programs based on blockchain intended to stimulate charitable giving (Daojun et al., 2019). These studies assume that implementing blockchain technology will increase trust (Renat et al., 2021). Others even refer to blockchain as a 'trust machine' (The Economist, 2015). Few researchers, however, have focused on how blockchain technology is actually used by different charities as well as its impact on donors’ and stakeholders’ trust and subsequent willingness to donate and provide support to the sector (Fabian, 2018; Howson, 2021). Therefore, this study aims to answer the following two research questions:

**RQ 1:** How do charities apply blockchain technology?

**RQ 2:** Which affordances emerge from the use of blockchain technology?

Using an affordance lens, we assume affordances to be an antecedent of trust. Previous work has shown the effect of affordances on humans' cognitive and affective behavior, especially on trust (Tuncer, 2021). We, therefore, assume that by using blockchain technology, charities can provide cues and means for donors and stakeholders to assess the trustworthiness of charities. Therefore, this study aims to identify affordances for different ways of exploiting the features of blockchain technology that help the sector to build trust. We investigate the use of blockchain and the perceived affordances of blockchain usage in charities and focus on existing applications of the technology in the sector. Consequently, this study uses a systemic review of secondary data reporting how charities are using blockchain and draws upon the principles of critical realism in identifying blockchain technology’s affordances. It offers an overview on mechanisms on how different usage of blockchain and associated affordances lead to a trustworthy ecosystem.

The remainder of this paper is structured as follows: In the next section, related work is discussed, including the concepts of trust and accountability and the foundations of blockchain technology. Afterward, the research approach and method are explained. Findings are presented subsequently by discussing different types of blockchain technology usage through charities and presenting affordances. We discuss these findings in the following section, highlight limitations of our study and provide an outlook on future research. Finally, this paper provides a conclusion.

## 2 Related Work

We summarize related work in the following, describing the concepts of trust and accountability and their role in the charity sectors. Furthermore, we introduce blockchain as an emerging technology and potential solution to ensure accountability and trust in donation use and allocation.
2.1 Trust and Accountability in the Charity Sector

Trust refers to the willingness to be vulnerable to the actions of others based on positive expectations of the intentions or behaviors of the other party (Rousseau et al., 1998). The need for trust is viewed as particularly important in situations characterized by complexity, uncertainty, or risk and where participants lack knowledge about a relationship (Hyndman et al., 2021; O’Loughlin-Banks & Raciti, 2014). All these features can be found in a relationship between a donor and a charity, where the charity unilaterally decides on the allocation and use of funds (Hyndman et al., 2021).

For charities, trust is an indispensable prerequisite for their existence and growth. Increased trust reveals itself in strengthened external stakeholder engagement, which, in turn, can generate increased donations of time and money to the charity (Hyndman et al., 2021; Liu, 2019). For two reasons, studies have shown that trust is vital to charities, especially charitable giving. First, people who have a general disposition to trust are theorized to be more likely to give. Second, it has been argued that charities or non-profit organizations that serve as fundraisers for particular causes or beneficiary groups must be trusted to receive donations (Chapman et al., 2021).

Over the past years, however, the charity sector has experienced significant challenges in appealing to donors, partially caused by governance and traceability scandals fueling public distrust, donor apathy, and increased regulatory costs (Howson, 2021; Prakash, 2019). Consequently, scholars started to investigate the antecedents of trust to understand how charities can proactively augment trust. Besides factors such as familiarity and institutional trust, accountability mitigated through transparency is one factor that influences trust. In particular, accountability provides donors and other stakeholders with a mechanism to distinguish between trustworthy and untrustworthy organizations (Farwell et al., 2018; Prakash & Gugerty, 2010).

Accountability is defined as a charity’s response to its stakeholders’ and donors’ legitimate information needs. Charities strive to be accountable to various stakeholders such as regulators, funders, beneficiaries, staff, volunteers, and the general public (Connolly & Dhanani, 2009; Yang & Northcott, 2019). Multiple accountabilities of charities can be distinguished in upward and downward accountability, i.e., upward accountability to donors, funders, and governments and downward accountability to communities, beneficiaries, and clients (Kingston et al., 2019). Extant literature emphasizes that charities prioritize upward accountability over that of less powerful stakeholders. This is partly because powerful stakeholders can demand accountability, while less powerful lack mechanisms for holding a charity accountable (Jordan, 2007; Kilby, 2006; Kingston et al., 2019).

Upward accountability requires, among others reporting documents and is well-regulated. However, it provides little power avenue for contributing accountability on beneficiaries’ and less powerful stakeholders’ terms (Cordery & Baskerville, 2011; Kingston et al., 2019). Also, charities struggle to effectively implement up- and downwards accountability simultaneously and operationalize participation and incorporation of less powerful stakeholders (Connolly & Dhanani, 2009; Kingston et al., 2020; Yang & Northcott, 2019).

2.2 Blockchain Technology

Besides traditional accountability work, such as the provision of annual reports (Flack, 2007), emerging technologies are increasingly seen as a means to create upward and downward transparency, accountability, and trust (Baharmand et al., 2021; Pilkington, 2016). An up-and-coming technology is blockchain, a distributed database technology that offers a publicly visible, digitally-secured record of transactions without the need for a central authority (Beck et al., 2017). Through consensus mechanisms and encryption methods, the history of transactions is immutable, meaning that illegal access and change of records are not possible (Beck & Müller-Bloch, 2017; Dinh et al., 2018). Blockchain technology thus comes with the potential to be a valuable tool for increasing the transparency and traceability of donations allocation and use, thereby fostering overall accountability (Christie, 2020).

Using an example, we illustrate the transparency of transactions (e.g., the allocation or use of funds or donations) and resulting accountability. First, a payer initiates a transaction on the blockchain. The transaction information is recorded by a block broadcasted to all the nodes (Du et al., 2019). Assuming a
Blockchain for Charity: Trust-Related Affordances

public blockchain, a node could be everyone that provides computing power for validating a transaction and that is part of a peer-to-peer network (Crosby et al., 2016; Nakamoto, 2008). In particular, nodes validate the block by authenticating the payer and the receiver and verifying that the payer has sufficient credit for the transaction. After validation, a confirmation message is broadcast to all the nodes, and the confirmed block is added to the chain of every node. Finally, credits are deducted from the payer and credited to the receiver. The transaction cannot be repudiated because it has been recorded by all nodes (Du et al., 2019).

Besides transparency and immutability of transactions, blockchain technology allows adding business logic to transactions by defining smart contracts. Smart contracts are programs stored on the blockchain that run as implemented without any risk of downtime, censorship, or fraud (Beck et al., 2017). For donors, this allows binding donations to conditions, i.e., linking the issuance of donations to a receiving charity to certain conditions, i.e., prespecified charitable outcomes. Smart contracts for charities offering such mechanisms allow for trust signals demonstrating that charities want to hold themselves accountable to their goals and visions (Shin et al., 2020).

2.3 Blockchain Technologies for Charity

The application and use of blockchain technology have found resonance in previous literature in the field of information systems, computer science, and the broader management literature. The existing literature can be summarized in three main strands: studies developing concepts and prototypes of blockchain-based systems that support charitable purposes, research focusing on the quantification of the effects of blockchain technology, typically for specific blockchain-based applications, and, investigations of blockchain’s effect on the behavior of charities and donors. Table 1 summarizes these literature strands and provides exemplary studies.

The first strand focuses on developing concepts and prototypes for applications and systems ranging from transparent collection and use of donations to complete systems offering crypto wallets, cryptocurrency for charitable purposes, and smart contracts for the convenient creation of fundraising campaigns as comprehensive solutions for charitable organizations. These studies are mainly from the computer science discipline and focus on the design of the architecture and components of the envisaged blockchain application or solution (Demir et al., 2020; Esmaeilian et al., 2020; W. Y. Lee et al., 2021). Due to the novelty of these applications and systems, an implementation or real-world evaluation of the effects of such systems is rarely discussed.

Second, papers also theorize about the quantifiability of the effects of blockchain-based solutions. These papers either discuss economic effects along a supply chain or theorize about the magnitude of potential effects of blockchain-based solutions in specific cases, e.g., disaster or poverty management (Kumar et al., 2021).

Third, we observe a third strand, which concentrates on the behavioral effects, mainly discussed in the IS and broader management literature. In this strand, literature either covers the effects of higher accountability towards donors and beneficiaries on charities’ actions or the willingness of people to donate money if donations’ use is more transparent and traceable (Almaghrabi & Alhogail, 2022).

<table>
<thead>
<tr>
<th>Focus area</th>
<th>References</th>
<th>Exemplary study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Development of concepts and prototypes for blockchain-based systems supporting charitable purposes</td>
<td>(Farooq et al., 2020; Li et al., 2021; Saraswat et al., 2022; Sirisha et al., 2019)</td>
<td>Development of a blockchain-based charity management platform aimed at providing a transparent and auditable system that covers charity collection processes, calls for donations, and donation allocation (Farooq et al., 2020).</td>
</tr>
<tr>
<td>Quantification of effects of blockchain technology use for charitable purposes</td>
<td>(Esmaeilian et al., 2020; Kaal, 2020; Kumar et al., 2021)</td>
<td>Investigation of the use of RFID and blockchain in the Indian Targeted Public Distribution Systems to eliminate inefficiencies in the</td>
</tr>
</tbody>
</table>
Blockchain for Charity: Trust-Related Affordances

| Investigation of the impact of blockchain technology’s use for charitable purposes on charities’ and donors’ behavior (Almaghribi & Alhogail, 2022; Demir et al., 2020; Howson, 2021; W. Y. Lee et al., 2021; J. Li et al., 2018) | Theorizing on the impact of blockchain technology use as crypto-giving platform on charities’ and donors’ behavior, such as new forms of donor engagement and fundraising or surveillance of charities through donors and project beneficiaries (Howson, 2021). |

Table 1. Main research strands on blockchain in charities

Literature in these strands operates under the assumption that blockchain technology will lead to greater accountability and trust. Instead of annual reports used to discharge accountability, blockchain technology allows the individual outcomes of a donation to be tracked. With the accompanying transparency of the deployment of donated funds, it is also assumed that charities will be forced to act more responsibly. While these assumptions are plausible, there is a lack of knowledge about which mechanism of blockchain’s technological features (e.g., transparency, auditability, immutability) leads to effects on the side of charities and donors. This study aims to fill this gap by investigating how blockchain is used in the charity sector rather than looking at single cases. We also gather knowledge about affordances that provide insight into the mechanisms that lead to the expected effects of increased accountability and trust, thereby contributing to building theory about blockchain’s use and usability for charitable organizations.

3 Method

The theoretical foundation of this study is affordance theory. Subsequently, the research approach and data collection process are described. The identification of affordances is explained, for which we build upon the principles of critical realism.

3.1 Theoretical Lens: Affordance Theory

Affordances are the potential for behavior stemming from the relationship between an actor(s) and an object (Strong et al., 2014; Volkoff & Strong, 2018). The concept originated in ecological psychology and was initially used to describe how animals perceive and use their environment. Information systems (IS) research borrowed the concept of affordances to explain the relationship between an actor and an IT artifact and the immediate outcomes thereof (Bygstad et al., 2015; Volkoff & Strong, 2018).

In IS research, affordances have gained prominence as a concept supporting studies on how technology is selected and used by individuals or groups of organizational actors, and the resulting change in organizational processes and structures. Affordances thereby allow the acknowledgment of the materiality of technology while avoiding technological determinism as well as social constructivism. In particular, affordances take a socio-technical perspective that allows being specific about technology while simultaneously incorporating social and contextual elements (Volkoff & Strong, 2018).

Consequently, previous studies have used affordances to examine the relationship between technological artifacts and interactions in organizations to show how the materiality of a tool or technology affords different modes of interaction (Fayard & Weeks, 2014; Leonardi, 2011b; Markus & Silver, 2008; Zammuto et al., 2007). Researchers adopted a relational approach to affordances, where affordances exist between people and technologies or IT artifacts materiality, leading to myriad ways and multiple effects on the organizations and the organizing of work (Leonardi, 2011b, 2011a).

In this study, affordances help to capture the relational property between blockchain technology and charitable organizations, donors, and aid recipients. This is important as blockchain-based solutions are complex and socio-technical in nature (Du et al., 2019), which can afford the diverse action potential for diverse parties and stakeholders involved in charitable purposes. Thus, key properties of the affordance lens are (1) the focus on actions, (2) the concern with how blockchain facilitates actions, (3) the idea that action potentials emerge between actors and objects, and (4) the role of the actor’s goals. Given the focus on
actions, the fundamental tenet of the affordance lens is to focus on what an actor could do with a blockchain solution, such as communicating or coordinating activities more effectively that creates trust, while keeping in mind the various interest of parties involved in charitable purposes (Krancher et al., 2018).

In doing so, this study draws upon critical realism, which understands reality as stratified in three domains: the real, the actual, and the emprical. This study focuses on the real, which includes structures and objects with capacities for behavior, called generative mechanisms (Bygstad & Munkvold, 2011; Henfridsson & Bygstad, 2013). These mechanisms may or may not trigger events in the domain of the actual. In the empirical domain, these events may or may not be observed. Therefore, structures and their inherent mechanisms are not deterministic; they have the potential to enable and constrain behavior that may leads to trust. Affordances provide a concrete tool for analyzing those mechanisms (Bygstad et al., 2015).

While there are critical realist approaches to studying all three domains (e.g., Archer’s (1995) morphogenetic model), this paper focuses on affordances as one building block of a more complex critical realist analysis (Bygstad et al., 2015; Bygstad & Munkvold, 2011). Although the identified affordances are not the endpoint of generative mechanism identification and analysis, they help us to conceptualize the relationship between social actors such as charities and donors and blockchain technology as a meeting between a need and a capability for creating more accountability and trust in the charity sector.

3.2 Data Collection and Analysis

The application of blockchain technologies in charities is new and not widely adopted amongst charities. Consequently, extant cases of blockchain were sought for in order to inform the identification of affordances. While traditionally, searches in academic databases would have been the first choice, the novelty of the technology and its application in charities precluded such an approach as relatively few real-world cases exist. To craft a list of real world blockchain applications, the first step in the search process drew on some of the author’s interest in the area, through which several examples of blockchain applications by charities had been collected over several years. This served as an initial starting set including ten charities actually making use of blockchain technology. In a second step, this set was supplemented by a search in Google and Google scholar for charities using blockchain leading to a list of possible cases for further investigation. Charities were added to a list until no new cases on blockchain in charities could be found that claim to apply blockchain technology. Third, the list was sent to an eminent professor interested in blockchain technologies in charities as a completeness check. Cases that the authors knew of but for which there was no publicly available information were not included in the final set of cases.

We collected data on the identified cases using a systemized review of published cases of blockchain in charity. The systemized review thereby aims at pulling together the available data as a baseline with the goal of providing a summary and overview of how blockchain has been used and the affordances it provides for charities. In doing so, we collect secondary data on charities via an Internet search, where we screen the web for information on the charities’ purpose and actions as well as their use of blockchain technology for charitable means. This includes screening web pages of charities and third-party materials such as reports or news articles. Using Google Scholar, we also look up scholarly sources, such as case studies for each charity. In particular, we are looking for cases that met the inclusion criteria of describing examples of charities and demonstrate affordances of blockchain technology. Additionally scholarly articles were expected to have undergone peer-review. Exclusion criteria are when an organization using blockchain is not a charity or information is too sparse to understand the case and affordances of the technology clearly. In total, this yields 20 final cases of charities using blockchain technology. Information on these cases was collected until no new information emerged (Saunders et al., 2018). The information collected was transferred to a separate database for analysis. The information collected represents a balance set of which in total 46.7% were non peer-reviewed and 53.3% were peer-reviewed sources.

Coding was conducted in two rounds. The first round of open, axial, and selective coding focused on identifying how organizations use and apply blockchain technology for their purposes. In the second coding round, affordances were used as a theoretical lens to identify action potential. In particular, we conduct open coding by concentrating on actions facilitated by blockchain technology rather than focusing on outcomes that would materialize irrespective of those actions (Krancher et al., 2018). We screened the
extracted information in the database and conducted in-vivo coding. Table 2 provides examples of open codes and extracts from the collected data.

<table>
<thead>
<tr>
<th>Extract and open codes (in-vivo, underlined)</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>“St. Mungo’s, a UK charity is working with social tech start-up alice.si using smart contracts on the Ethereum public blockchain to give donors visibility of the impact of their donations. St. Mungo’s is using the technology for an innovative trial appeal helping 15 homeless people rebuild their lives. Using blockchain, donations are in effect frozen until St. Mungo’s can demonstrate that they achieved their aim. The technology makes the performance of the projects public and auditable.”</td>
<td>(Longley &amp; Nordström, 2018)</td>
</tr>
<tr>
<td>Alice works by freezing donations until charities can evidence social goals set out at the start of an appeal. Donors to the appeal can track when goals are met and when their gift is paid to St Mungo’s. Donors will know when individuals find and maintain a tenancy, when they are receiving help with moving in and also taking steps to address mental health or substance use issue. The charity sector is currently going through a crisis of public trust. We want to address that by helping trailblazing organisations like St Mungo’s, who are committed to transparency, to raise more funds for the amazing work they do. We’re excited to be launching this first pilot with an appeal that will make a really positive difference to the lives of 15 people.”</td>
<td>(Cohen, 2017)</td>
</tr>
</tbody>
</table>

Table 2. Extracts and open codes

After open coding, axial coding was conducted, where we made connections between open codes, utilizing a coding paradigm involving conditions, context, and consequences. For instance, the in-vivo open codes “transparent yet anonymous financing linked to outcomes” and “Funds are disbursed according to the completion of pre-set goals. If the goals are not achieved, the donors get their money back” were merged into an axial code called “conditional giving”. This axial code was grouped with other axial codes such as “donor control” and “goal-setting,” eventually leading to the selective code “designation.” Open and axial coding was conducted hermeneutically, i.e., codes emerged and continued to be refined over the whole coding process (Sarker et al., 2001). Eventually, selective codes, which are core categories, were identified and compared to raw data for validation (Alhassan et al., 2019). Selective codes of the first coding round, i.e., the application and usage of blockchain technology, were then linked to the affordances, or donors otherwise. In particular, the analysis revealed that specific affordances relate to specific ways of how blockchain is employed for a charitable purpose. Figure 1 illustrates the coding process and the number of identified codes per stage.

![Figure 1. Coding process to identify blockchain use and affordances in the charity sector](image-url)
4 Findings

The application and use of blockchain are explained in the following by presenting three types of how organizations use the technology for charitable purposes. Afterward, affordances are presented that relate to each of these types of blockchain usage that lead to increased accountability and trust.

4.1 Purpose and Application of Blockchain Technology by Charities

Three types of applications were found in our analysis showing how charities use and apply blockchain technology for their purposes. Table 3 summarizes these types, charities' role in the sector and provides illustrative examples. We explain each type in the following.

<table>
<thead>
<tr>
<th>Type of Blockchain Application</th>
<th>Role &amp; Activities in Charitable Purposes</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blockchain offered as infrastructure</td>
<td>Provision and maintenance of a blockchain infrastructure used by other charities, creation of a blockchain ecosystem</td>
<td>Algorand Foundation (Singapore): - Provide an open-source blockchain to organizations that address income equality, poverty, and other social issues. - Envision an inclusive ecosystem used for charitable purposes.</td>
</tr>
<tr>
<td>Blockchain employed as platform</td>
<td>Blockchain used as a platform to act as intermediary in collecting and allocating funds and donations to other charities</td>
<td>Binance Charity (US): - Offer a blockchain-enabled transparent donation platform where donation allocation and use are completely transparent and trackable for donors. - Immutability of transaction ensures accountability for donation allocation and use.</td>
</tr>
<tr>
<td>Blockchain used as a service</td>
<td>Blockchain used as a tool to collect and allocate funds and donations for a specific charitable purposes</td>
<td>St. Mungo’s (U.K.): - Allow donors to track and trace the allocation and use of donations. - Allow donors to bind donation to conditions (e.g., success metrics).</td>
</tr>
</tbody>
</table>

Table 3. Purpose and application of blockchain technology by charities

Blockchain offered as infrastructure: The first type of application refers to blockchain technology being offered as infrastructure by a non-profit organization to be used by other charities and charity sector more generally. Activities of the blockchain-offering organization include the provision, development, and maintenance of a blockchain and its desirable features. For instance, the non-profit organization Algorand Foundation offers a blockchain infrastructure that other charities can access. Beyond that, Algorand is dedicated to offering blockchain solutions that solve current issues with high energy consumption in developing a carbon-neutral blockchain infrastructure. In addition, non-profit organizations offering blockchain infrastructures are taking on the role of orchestrators and facilitators of blockchain networks. For example, Algorand supports access of charities to its infrastructure only if they work in accordance with Algorand's mission, which is to promote economic inclusion and equal opportunity globally.

Blockchain employed as a platform: Non-profit organizations in the charity sector might use existing blockchain solutions that ensure transparent and traceable allocation and use of donations and their distribution to beneficiaries. In this way, organizations that use blockchain as a platform promote the willingness to donate and create confidence in the appropriate use of these. Their role in the charity sector is to collect and manage donations (i.e., acting as an intermediary) and decide how they are used (e.g., giving to other charities or giving directly to those in need). For instance, the non-profit organization Binance charity uses a platform solution to allocate and track donations, their use, and consequent actions by donation-receiving parties.
Blockchain used as a service: When blockchain is used as a service, charities use certain features of blockchain, such as smart contracts, to support their regular activities or increase the trustworthiness of donations. For example, blockchain charities allow their donors to tie their donations to conditions, such as supporting a specific individual or achieving set performance metrics, as in the case of St. Mungo’s. Thus, when blockchain is used as a service, a non-profit organization can exploit specific features of the blockchain to offer trust-building mechanisms or provide trust signals, such as the ability of donors to trace their donations.

Figure 2 shows how these different types of blockchain technology uses interact to support the charity sector. Starting on the left side of the Figure, donors can transfer cryptocurrency through a platform solution, i.e., a charity pool (1a), or using smart contracts directly to an organization that either offers or uses a blockchain infrastructure to enable direct donations (1b). In the first case, the platform provider or charity pool has an interface to a blockchain infrastructure through which it processes donations (2). The processing of donations via the blockchain infrastructure creates a transparent log through which all incoming and outgoing payments can be transparently tracked. Recipients of donations then receive a donation through three potential ways. First, recipients may own a digital wallet in which they receive cryptocurrency directly, make purchases with it, or trade it, in order to convert cryptocurrency into fiat money (4a). Second, money can be transferred through an infrastructure provider to network participants, such as other charities (3b), or directly to a recipient. In the latter case, this requires converting money into fiat money beforehand (3a) to provide receivers of donations with either fiat money or physical goods (4b). In the first case, a charity receives donations after help has been provided to receivers, i.e., a transaction via the blockchain is triggered if pre-specified goals have been met.

Figure 2. The use of blockchain technology in the charity sector

4.2 Affordances of Blockchain for Trust in Charities

Based on the above-described uses of blockchain and the interaction of charities through the technology, we identified seven affordances evoking trust on the donor’s side. Table 4 summarizes these affordances in relation to actors, provides short descriptions and shows the expected immediate outcome. Note that the clustering of affordances to actors reflects their primary activation through a charity (or actor more generally), as observed in the analysis. In general, however, we assume that the affordances can also be recognized by others, which means that they are neither exclusive to a specific use of blockchain nor a charity or actor. Eventually, given that the extraction of affordances draws upon non-empirical, partially non peer-reviewed information, we interpret affordances as perceived rather than actualized (Bernhard et al., 2013).

Assortment is the affordance describing a non-profit organization’s ability to build a network by restricting or granting access to a blockchain-based infrastructure that enables the offering organization to leverage
Blockchain for Charity: Trust-Related Affordances

Network capabilities for a predefined charitable purpose. **Alignment** is the ability of these infrastructure providers, through the inclusion of certain network participants and their selection, to align the activities in the network and to arrange them in such a way that they work together towards a charitable goal desired by the organization being offered. Overall, this action potential is being used primarily to improve efficiency in achieving philanthropic purposes. For instance, Unicef promotes the development of open-source, blockchain-based solutions toward greater financial inclusion by offering infrastructure and selecting a cohort of communities that build and engage with a blockchain-based financial system in novel ways, thereby exploring and creating new financing models. These new financing models include blockchain-based saving circles in Mexico, blockchain-based emergency response and recovery platforms with community access to digital payments in Kenya and Nepal, and digital banks for refugees and vulnerable populations for storage and transfer of assets across borders in Rwanda (Chapiro & Bedi, 2021). In this project, activities and forces are joined together in developing open-source and network capabilities in the form of knowledge and intellectual property are accessed and further built throughout this program.

<table>
<thead>
<tr>
<th>Actor</th>
<th>Affordances</th>
<th>Description</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Charity (offering BC as an infrastructure)</td>
<td>Assortment</td>
<td>The ability to build a network that allows infrastructure providers to leverage network capabilities in pursuing a predefined charitable goal</td>
<td>Efficiency</td>
</tr>
<tr>
<td></td>
<td>Alignment</td>
<td>The ability to align activities in the network through the targeted inclusion of companies to effectively achieve a charitable goal</td>
<td></td>
</tr>
<tr>
<td>Charity (employing BC as a platform)</td>
<td>Non-repudiation</td>
<td>The ability to invest raised funds with decreased reporting requirements as payments are irrefutable and traceable for donors.</td>
<td>Accountability</td>
</tr>
<tr>
<td></td>
<td>Requirement</td>
<td>The ability of requiring charities that receive money to use the donated money for specific purposes and bind them to standards</td>
<td></td>
</tr>
<tr>
<td>Charity (using BC as a service)</td>
<td>Self-commitment</td>
<td>The ability to voluntarily commit to a specific cause or goal by making access to donations contingent on goal achievement</td>
<td>Automated governance</td>
</tr>
<tr>
<td>Donors</td>
<td>Designation</td>
<td>The ability of linking the transfer of donations to the achievement of a self-selected condition or goal</td>
<td>Trust</td>
</tr>
<tr>
<td></td>
<td>Oversight</td>
<td>The ability of having oversight on donation allocation and use due to increased transparency and traceability</td>
<td></td>
</tr>
</tbody>
</table>

Table 4. **Affordances of blockchain (BC) technology for charities and donors**

Employed as a platform, blockchain technology opens up the affordances non-repudiation and requirement. **Non-repudiation** refers to a non-profit organization’s ability to invest funds collected flexibly with decreased reporting requirements. This is because collecting and processing payments via a charity pool and a blockchain infrastructure allows donors to read a publicly accessible ledger that keeps track of all payments made to beneficiaries or other charities supported by a charity pool. As payments, once verified on the blockchain, are difficult to revert (depending on the consensus mechanisms employed), donors can trust that the payments tracked reflect actual payments to beneficiaries or other charities. In their function as a pool that allocates funds to not only beneficiaries directly but also to other charities, the platform offering organization can require certain standards from recipient organizations. For instance, this might refer to the ratio between donations used for administrative costs versus donations used to support receivers either through direct money transfers or physical goods. Others may offer mechanisms dedicated to a payment-for-success scheme that binds donations to the success of charities and the effectiveness of their actions (Bartoletti et al., 2018). This ability is called **requirement** and reflects the ability to require certain standards from money-receiving charities. Through the affordances non-repudiation and requirement,
increased accountability for the use of donations, their allocation to beneficiaries and charities, as well as the receiving charities' use and allocation of donations, can be achieved.

Self-commitment is an affordance emerging when blockchain is used as a service by charities that exploit the technology in order to be able to bind the disposal of funds to the achievement of certain key performance indicators, e.g., the number of people helped or of meals financed. By this, a form of automated governance and rule adherence is achieved where charities limit their access to novel funds to their own performance and actions undertaken to achieve a goal specified by a donor and the charity. For instance, the non-profit organization St. Mungo’s freezes donations until they prove they were effective in helping homeless people build their lives, which can be tracked by a transparent collection of appeals that are publicly listed on their homepage (Weakley, 2017). Others use smart contracts that allow charities to run crowdfunding campaigns that enable money raised only to be spent on tendered projects (Shin et al., 2020).

The above-described affordances for charities and their different uses of blockchain lead to action potential emerging on the donors' side: designation and oversight. Designation refers to donors' ability to link their donations to a specific project or performance indicators, which restrict the use of donations upon their fulfillment. This is also designated giving, i.e., donors can channel their funds and usage to specific causes or events. For instance, the non-profit organization AIDcoin allows donors to specify in which project or upon which event their donation should be used, whereby the actual use of money can be traced via a registered address visible throughout the whole process, from donating cryptocurrency to exchanging it into fiat money and giving it to beneficiaries (Trotter et al., 2020). Oversight refers to donors' changing role and responsibilities resulting from increased transparency and traceability of donation allocation and use through affordances realized by charities. In particular, donors are challenged to take on a monitoring role and to track and verify the correct use and allocation of donations. Together, these affordances lead to trust, which is achieved on the one hand through greater traceability and accountability of the use and allocation of donations, and on the other hand, through tying donations to specific purposes and goals.

5 Discussion

Charities face unique challenges in gaining the trust of donors and society at large, especially in terms of transparency and accountability in how donations are allocated and used. However, traditional financial systems can present barriers to catering for those expectations. For instance, although traditional financial systems require disclosure of financial information through annual reports and statements, they may not satisfy donor expectations. This is because the financial reporting provides summary information for an entire year of operations, grouped at a very high level (e.g. donations). This does not provide any information about individual donations. While, financial reporting provides some level of transparency through transaction records, these systems might be opaque and difficult for non-experts to interpret, as evidenced by the need to provide systemic financial literacy training to the sector. Further, beneficiaries may not be specifically mentioned in financial reporting, or only at a very high level, as non-financial information, such as program impact or operational efficiency, is not always reported.

Affordances that emerge for donors can help to overcome some of these barriers by allowing donors to track their donations and tie them to specific performance outcomes. This shifts the responsibility of due diligence from the donor to the charity, as the charity must provide sufficient information to enable donors to assess whether the outcome criteria have been met. In addition to verifying the use of their donations, the ability to track donations also enables donors to measure their individual impact, which can increase satisfaction and the sense of contributing to a larger cause (Koschatz-Fischer et al., 2012).

Blockchain technology can enable charities to create ecosystems that operate with minimal frictions. For example, if all beneficiaries have access to digital wallets, end-to-end transaction tracking becomes possible for both donors and charities, and can even be extended to track the use of the funds by the beneficiaries. This not only increases transparency and accountability, but also improves the efficiency of the money transfer system. Efficiency gains can be realized by avoiding overhead costs and improving control over money flows, as well as by increasing the speed of transfers, especially in an international context where traditional financial systems can be slow and costly.
Charities that provide blockchain as a platform can leverage blockchain applications and the affordances of non-repudiation and requirement as an expectation management tool in regards to their donors and thereby raise accountability. For instance, without overspecifying the use and allocation of money, charities that use blockchain as a platform can set standards or high level expectation on the intent to use, which raises accountability of their actions. Eventually by using blockchain as a service, charities can offer smart contract as a signal of confidence in achieving predefined goals, which automates governance.

The findings of this paper contribute to the existing literature by providing a foundation for future work examining the use and utility of blockchain for charities. In particular, the initial step for any theory-building exercise is analyzing a number of cases and identifying common themes, in this case, affordances. This study thus contributes to theory building by offering baseline knowledge on the affordances of blockchain in charities and their role in increasing accountability and trust. Although the limited availability of data poses barriers to conducting a full critical realist analysis in this study and for analyzing more complex mechanisms that emerge from the interplay of agency (e.g., charities, donors, beneficiaries) and structures (i.e., blockchain), the identified affordances provide an important foundation for future studies.

The results of this study need to be discussed in light of their limitations. First, the limited real-world use of blockchain in charities led to a sample of 20 cases that were investigated. Although the data collection approach yielded rich information on the cases, further identification of examples of blockchain use and the associated emergence of affordances for charities is necessary. We especially consider the identified affordances exhaustive for our sample but not for blockchain’s affordances for charities in general. As mentioned earlier, qualitative research approaches can be applied for taxonomy development and to further characterize blockchain’s usage, as well as quantitative research to validate blockchain affordances for charitable purposes. Second, in analyzing the information published by charities, we did not distinguish between concepts, prototypes, and actual blockchain applications. Thus, affordances may arise from blockchain applications for charities that are planned or implemented in test environments. Future research, therefore, needs to assess the progress and implementation of blockchain use in charities to distinguish between conceptually different dimensions of affordances (i.e., affordance perception vs. actualization).

Third, the information used to extract affordances includes both peer-reviewed and non-peer-reviewed sources, such as white papers, third-party material, and press releases. Although the balance between these sources is equal in the sample, this may not be the case for individual charities or blockchain-based charity projects, due to the limited availability of scholarly studies and the newness of blockchain applications. It is important to note that the identified affordances should be considered as perceived rather than actualized, and further research is necessary to determine whether and how they are implemented by charities.

It is important to acknowledge that non-peer-reviewed material may have overstated the impact of blockchain technology on the emergence of accountability and trust or presented an overly optimistic view of its potential benefits, whether intentionally or unintentionally, for marketing purposes or other reasons. While this is a potential risk, our focus on affordances helps us to avoid falling into the trap of overstating the possible outcomes of blockchain technology. We are reporting on the mechanisms at work, rather than the size of the effect that blockchain has on charities. This approach allows us to provide a more nuanced and realistic assessment of the potential benefits and limitations of blockchain technology in the charitable sector. At the same time, this underscores the need for more rigorous and empirical investigations in this field.

Fourth, our study's focus is on affordances as a foundational element of more intricate structures that foster trust within the charity sector. This lays the groundwork for a comprehensive critical realist investigation that considers the interplay between complex structures, agency, and behavioral potentials, examining how they contribute to building trust and accountability in the charity sector.

6 Conclusion

As the charity sector increasingly suffers from a loss of trust due to scandals involving the misuse and wasteful handling of donations, an increasing number of charities are turning to new technological possibilities to regain the general public's trust through increased accountability and transparency.
Blockchain technology is one technology that holds particular promise in this context. Blockchain allows donations to be tracked transparently on a publicly accessible and almost immutable ledger of transactions. While studies increasingly build prototypes for blockchain-based donation systems or theorize changes in donation behavior under the assumption of full traceability and transparency of donations, there is hardly any research that deals with the actual effects of blockchain use and resulting action potentials for charities. Therefore, this study focuses on using blockchain through charities and emerging affordances. Through a systematic review and investigation of the affordances of 20 cases of blockchain use by charities, we identify three different types of blockchain use and corresponding affordances. The potential for action on the part of charity organizations, including automated governance by tying donations to target indicators or the possibility for designated giving, leads to donors' trust.

This exploratory study thus fills a theoretical gap and provides an overview of the use and usefulness of blockchain for charities. We consider the findings of this study as a first step toward theory building regarding the action potential of blockchain for charitable organizations and uses. For practitioners, these findings provide a reference point for the technology's application and consequent action potentials when used for charitable purposes.

References


Blockchain for Charity: Trust-Related Affordances


Flack, E. D. (2007). The role of annual reports in a system of accountability for public fundraising. Queensland University of Technology.


Blockchain for Charity: Trust-Related Affordances


