Blockchain in the Humanitarian Sector

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Communities of Practice Research Report

Joshua Hallwright

Introduction

RedR Australia created communities of practice to support the contributions, networking opportunities and professional development of roster members who are keen to stay connected to industry good practice and the RedR Australia network. Communities of practice were created that support research, events, online forums, focus groups or other innovative activities spread over different geographic and thematic focus areas.

The Blockchain in the Humanitarian Sector Community of Practice was one such group that looked to explore blockchain technology from the perspective of experienced humanitarian practitioners, drawn from the RedR Australia roster. This was the first time such a group convened in Australia and one of the earliest examples from around the globe of a networked approach to exploring blockchain technology in the broader international development sector.

Purpose

Blockchain technology is being touted as a disruptive technology, with possible impacts across society on a large scale. The impact on the humanitarian sector could also be widespread and lasting. It is imperative that any impacts on the humanitarian sector are steered towards improving the lives of those affected by disasters. Thus, the sector needs to understand the technology, the risks, challenges, and opportunities it presents and to guide its influence in the most positive way possible. As the technology is organisationally agnostic, i.e. its influence does not depend on

the organisation one belongs to, this exploration and testing must be done collaboratively, across the humanitarian sector.

The Blockchain in the Humanitarian Sector Community of Practice had four, interlinked goals:

- Raise awareness and improve understanding of the technology within the sector
- Determine relevance and current use cases within the sector[1]
- Brainstorm possible uses to demonstrate the opportunities the technology presents
- Outline useful next steps for the humanitarian community in exploring blockchains

This Community of Practice involved three steps on the road to achieving the aforementioned goals: an initial discussion paper, a face-to-face workshop, and this summary report. The following sections detail these steps and to what extent the goals were achieved, using participant feedback information[2], within the timeframe of this community of practice project.

Discussion paper[3]

The initial step in this Community of Practice was to publish and distribute a discussion paper that directly addressed the first purpose, to raise awareness of blockchain technology and improve understanding of it within the humanitarian sector. This paper aimed to provide an accessible account of blockchain technology and the possible implications its growth will have on the international humanitarian sector.

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1. This report will not explain blockchain technology and how it works. For a fuller description of thus, please see the Discussion Paper, attached to this report as an Annex.
2. Post-workshop surveys were completed by 16 participants.
3. The following includes excerpts from the Discussion Paper circulated to the RedR roster in 2018. The full Discussion Paper can be found in the Annex to this report.

Current use cases

At the time of writing, only a few humanitarian organisations are actively testing blockchain technology in humanitarian crises, however this is likely to exponentially increase in the coming months. The most high-profile case is that of the World Food Programme's Building Blocks project, using blockchain-based platforms to provide more secure and traceable assistance to registered recipients in Pakistan and Jordan. WFP has recently begun exploring blockchain in cash transfer programming, as have Oxfam with a test project in Vanuatu (amongst other pilots). Oxfam Vanuatu and Australia are piloting the use of blockchain technology in cash transfer programming, using it to provide efficiencies and transparency to all users in the supply of e-vouchers after humanitarian crises.

The UN is exploring multiple different use cases of blockchain technology with various aims, ranging from raising more money, to data management, to ensuring women can verify their identity after disasters. The Red Cross and Red Crescent Movement is doing the same. Recently, a Dutch University has produced a useful decision-tree for humanitarian organisations considering using blockchain technology. Importantly, it's not just humanitarian NGOs and the UN system that are actively pursuing the possibilities of blockchain, much of the social enterprise world and many institutional donors are doing the same.

Large humanitarian institutional donors, such as GiZ and USAID, are actively testing humanitarian use cases of blockchain technology. DfID and the Canadians are doing the same however DFAT and MFAT are broadly still at the conceptual-understanding stage. Interestingly, emerging institutional donors, such as the UAE (specifically, Dubai) and China, are also taking steps to harness blockchain for humanitarian ends.

Implications for the humanitarian sector

Despite these varied pilots, it is unlikely that the international humanitarian sector will become blockchain developers however this does not mean our sector will be untouched by the technology. In the near future, we will likely be incorporating the technology in many aspects of our work without necessarily becoming specialists in the coding required to incorporate it in our organisations.

Thus, it is critical for the humanitarian sector to start to understand the possible ways in which blockchain technology may impact the communities in which we work as well as enabling new and improved methods for assisting the same communities. For example, migrating land titling on to blockchain platforms may provide transparent and incorruptible records of who owns what but the transition to such as platform is likely to be fraught with power dynamics, especially in early recovery phases of disasters that have resulted in significant displacements. Another example might be in enabling rapid and traceable cash transfers, increasing cross-sector and multi-agency coordination through a common cash distribution platform as well as enhancing the power of recipients by enabling them to see exactly where and from whom their cash originates.

The Discussion Paper was sent to the majority of the RedR Roster with an invite to attend an upcoming workshop. This workshop of interested roster members aimed to further flesh out the relevance of the technology to the humanitarian sector, brainstorm possible use cases and establish next steps.

Workshop

Twenty people attended the workshop in November 2018. Half the participants considered themselves early adopters of technology and 38% felt they had either a fair or better than average understanding of blockchain technology before receiving the Discussion Paper. Workshop participants held expertise and experience from a wide range of disciplines, including humanitarian coordination, WASH, ICT, shelter, communications, livelihoods and agriculture. Participants were asked to reflect on their professional knowledge when reading through the Discussion Paper and when researching the various, existing reports on relevant and current use cases of blockchain technology (e.g. from Stanford, Fordham, https://positiveblockchain.io/).

Workshop participants unanimously agreed that it was pertinent for the humanitarian sector to be exploring this emerging technology. Participants used the following table as a prompt for envisaging possible use cases for the technology within the sector:

support for incremental changes to existing services, processes and products than it is for new, bold re-imaginings of the same. For example, participants identified the following evolutionary use cases of blockchain technology in the humanitarian sector: internal financial transactions across international offices of an organisation, supply chain management, peer-to-peer humanitarian donations, and non-food item registration and tracking.

Workshop participants shifted from a problem-solution frame to a more creative mindset when imagining possible revolutionary use cases within the humanitarian sector. Suggestions included: self-sovereign portable medical records, transparent and immutable land titling, and verifiable yet anonymous real-time community monitoring.

These workshop exercises confirmed the interest and possibilities inherent in the humanitarian sector relating to blockchain technology. This is just one demonstration of the value of this community of practice and

	Evolutionary	Revolutionary
Internal		
External programming		
External advocacy		

Table 1: Categories of blockchain use cases for an organisational audience (Author, 2019)[4]

The workshop highlighted that the evolutionary uses cases are most likely to be advanced first, as they are familiar to many in the humanitarian sector and it is much easier to get organisational

helps justify the continuing investigation of the technology by and for the humanitarian sector.

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4. 'Evolutionary' refers to those uses that are incremental improvements on existing initiatives. 'Revolutionary' refers to those uses that are step-changes from existing use, are re-imaginings that were not possible beforehand. 'Internal' refers to uses that are internal to an organisation. 'External programming' are uses that an organisation undertakes when implementing projects external to itself. 'External advocacy' are uses that an organisation undertakes when influencing the way other organisations work.

Useful next steps

The Discussion Paper and subsequent workshop were considered to have addressed the goals of this community of practice. All workshop participants considered their knowledge of blockchain technology in the humanitarian sector to be either better than before (31%) or significantly better than before (69%). Most participants felt that the technology could be useful to their area of specialisation (50% considered it very useful, 31% useful). Intriguingly, both the workshop and Discussion Paper have raised many more questions for the participating humanitarians.

The workshop raised many important and fundamental questions for humanitarians, technologists, and the communities at risk of and/or affected by conflict and disasters to consider. A selection of questions identified by workshop participants is:

- How to erase personal data once humanitarian intervention ends?
- Who is considered a blockchain expert and thus who should be a trusted advisor for the sector?
- What are the benefits of developing unique blockchains or using existing ones?
- In keeping with humanitarian principles, what are some of the equality and access issues?

These questions and the many more that went unspoken suggest some concrete next steps that should be taken to furthering the purposes of this community of practice and continuing the discussion:

- Develop a paper aimed at humanitarian practitioners outlining the major risks of blockchain technology, including protection concerns, power differentials, limits to implementation in low-fi environments.
- Identify trusted blockchain advisors for the humanitarian sector, especially for those

most proximate to the disaster event.
- Collaborate across the humanitarian sector to pool learnings identified from pilots, including those sourced from community feedback mechanisms.
- Work with the technology community and other relevant stakeholders to ensure open access and open standards so that all can benefit from blockchain technology

Despite some of these suggested next steps already being in train both in Australia and globally, through such initiatives as the Identity Alliance, ACFID Humanitarian Innovation Days and the International Civil Society Centre's Blockchain for Social Good Summit, more support and engagement is required to continue the momentum behind exploring blockchain technology for the humanitarian sector.

Call to action

The Blockchain for the Humanitarian Sector Community of Practice has successfully achieved its goals however there are many more opportunities to further the broader initiative. The top-line call to action is thus:

> For RedR Australia to work in collaboration with relevant humanitarian organisations and interested government and private sector partners to establish, and fund, an advisory service for the humanitarian sector. This service should action the aforementioned useful next steps and be an ongoing source of support for the sector.

Thank to you all involved in making this community of practice a success, including all the workshop participants and RedR Australia.

Annex

Blockchain in the Humanitarian Sector – An Overview

This paper aims to provide an accessible account of blockchain technology and the possible implications its growth will have on the international humanitarian sector. It aims to be an introduction to the technology and to trigger further discussion within the sector.

What is already happening in the humanitarian sector?

At the time of writing, only a few humanitarian organisations are actively testing blockchain technology in humanitarian crises, however this is likely to exponentially increase in the coming months. The most high-profile case is that of the World Food Program's Building Blocks project, using blockchain-based platforms to provide more secure and traceable assistance to registered recipients in Pakistan and Jordan. WFP has recently begun exploring blockchain in cash transfer programming, as have Oxfam with a test project in Vanuatu (amongst other pilots). Oxfam Vanuatu and Australia are piloting the use of blockchain technology in cash transfer programming, using it to provide efficiencies and transparency to all users in the supply of e-vouchers after humanitarian crises.

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actively pursuing the possibilities of blockchain, much of the social enterprise world and many institutional donors are doing the same.

Large humanitarian institutional donors, such as GiZ and USAID, are actively testing humanitarian use cases of blockchain technology. DfID and the Canadians are doing the same however DFAT and MFAT are still at the conceptual-understanding stage. Interestingly, emerging institutional donors, such as the UAE (specifically, Dubai) and China, are also taking steps to harness blockchain for humanitarian ends.

In what context is blockchain emerging?

The world is undergoing continuous change with peaks of dramatic leaps. Ignoring for a moment significant trends in political populism, demographic changes, and environmental risks, these changes may best be summarised under the heading of a 'distributed political economy'. The distributed nature is due to traditional industries and organisations becoming much less centralised, with individuals and communities having much greater access to and control of the means of production and participation. Examples of this distributed political economy include 3D printing, the Web 3.0, machine learning and artificial intelligence, renewable energy production, ride sharing, and accommodation.

The rapid uptake of blockchain technology is having an impact on almost all of the above global trends, among others, and has profound consequences for our global society. Its impact is already being felt in supply chains (Traseable), ride-sharing (Arcade City), energy distribution and management (PowerLedger), stock markets (ASX), finance and banking (OmiseGO), land titling (ChromaWay), and many others. Furthermore, it is being used to give people back control over their identity data through the emerging self-sovereignty movement.

So, what is blockchain?

Blockchain (or, more broadly, distributed ledger) technology is an emerging governance technology that has the potential to dramatically re-shape how we relate to each other.

Simply put, blockchain is a new way of recording transaction data. What's different is that these transaction data, let's call them a ledger, are not held in just one place but distributed across hundreds or thousands of computers. Hence, blockchain is referred to as a type of Distributed Ledger Technology (DLT). The rules governing how this data is recorded and distributed means that the records are impossible to change, transparent, and traceable.

This simple idea – of distributing ledgers of transaction records – has profound implications for how we relate to institutions and each other. As almost any type of analogue data can be digitised, this technology promises to disrupt many existing industries, create new ones and shift how we understand power and governance. The impact of the technology is beginning to be felt in many sectors as its uptake progresses faster than any previous technology, including the internet. Although its initial use as the technology that underpins cryptocurrencies, such as Bitcoin, has started to disrupt the financial and banking sector, the use of blockchain technology extends much further and reaches many more sectors. Why? Because of what it enables.

What does it enable?

Blockchain enables transaction data to be completely transparent, secure, and unable to be altered. Furthermore, the technology enables data to be easily traceable as it moves around the globe. This means that we do not need trusted institutions, such as banks or land registries, to keep a centralised database of this information. The data is securely stored on the blockchain and hundreds or thousands of people have exactly the same ledger, updated in near real-time, so any unauthorised changes to the records are obvious to all (thus can be rejected).

How does it work?

One way to conceptualise how blockchain technology works is to imagine a computer database of other databases (here are some other ways to conceptualise blockchain). This supercharged database (i.e. a blockchain) is duplicated many hundreds or thousands of times on various computers around the world. Those people (more specifically, computers) who have these duplicates have agreed to a decision-making process that clarifies how changes to the database are made. Once a change is made to the database, or more specifically, to the data that the overarching database refers to, it cannot be un-made and is visible to everyone with a duplicate of the database. This change is then propagated through all the duplicates of the database in near real-time, ensuring everyone has the latest updated version of the database.

A further development of blockchain technology is smart-contracts. These are collections of computer code that describe a set of actions that will automatically occur given a set of criteria are met. Distributed autonomous organisations are digital organisations that function independently of people. Specifically, they use blockchain technology and smart contracts to perform certain sets of actions given the right conditions.

Common issues of concern?

Common concerns regarding blockchain technology and its use generally fall in to four groups: the energy use required, issues of privacy and security of the data, the digital divide and access to the technology, and finally concerns about the storage capacity of blockchains.

The most common concern centres on the energy use required to update and maintain these distributed databases. The argument says that the decision-making process that clarifies how changes to the blockchain are made is incredibly resource intensive, i.e. it uses so much computing power, and thus energy, that it is a significant contributor to climate change. This argument has its history in the specific decision-making process used in many early cryptocurrencies: proof-of-work. Proof-of-work is indeed resource intensive as the way in which authorised changes are made to the blockchain involves computers solving very difficult mathematical problems, using a lot of computing power. Whichever computer solves the problem first gets to change the blockchain. Many blockchains are in the process of transitioning to other, much less resource intensive decision-making protocols, such as proof-of-work, that will dramatically mitigate the concern regarding the energy use of blockchain.

Concerns regarding the privacy and security of data stored on a blockchain usually centre on the risks of having personally-identifiable data on a blockchain that, by its nature, is visible to anyone and thus exposed to nefarious ends. This is a legitimate concern that many are working towards addressing by developing such cryptographic tools as zero-proof concepts (impossible to hack) and, most interestingly, by the self-sovereign movement. This latter idea is that one could store all her personally identifiable data, encrypted, on a blockchain and then be able to control exactly who has access to which part of her data and she would be able to see where that data goes, controlling who has access to it at every stage. Whilst these concepts are being developed, privacy and security concerns are often addressed through advanced encryption and limiting the personally identifiable data referenced by blocks on the chain. These measures ensure that, although not yet completely so, risks identified under the privacy and security umbrellas are equal to, if not less than, those for more traditional forms of storing and transferring data.

The digital divide is another major concern raised by many when considering the impact of blockchain technologies – will its widespread update result in further disempowerment for those still without access to the internet? This is significant not just for the impact of blockchain but for the broader uses of the internet. Many large internet corporations are trying to expand the pool of people with internet access and some countries have codified internet access as a human right, creating the obligation to expand telecommunications infrastructure to remove the digital divide. In the meantime, more attention needs to be given to the issue of creating more disempowerment through greater use of internet-enabled technologies, such as blockhcain.

Finally, a smaller concern raised by some is the storage capacity of blockchains. This issue stems from blockchains (and some other distributed ledger technologies, although by no means all) being additive, i.e. each new

transaction is added on to previous transactions. As the technology becomes more widespread, the concern is that the number of transactions dramatically increases to such a point to make blockchains unwieldly and unable to efficiently store more data. This is a misnomer as blockchains only store a simple hash of data, i.e. the hash points to the underlying data rather than being of the data itself. This hash is a fixed size, usually in the order of 20 bytes and thus is an incredibly small amount of data (0.02 kb or 0.00002 mb). Clearly, data storage and computing power can easily accommodate many billions of these hashes.

What it means for the humanitarian sector?

It is unlikely that the international humanitarian sector will become blockchain developers however this does not mean our sector will be untouched by the technology. In the near future, we will likely be incorporating the technology in many aspects of our work without necessarily becoming specialists in the coding required to incorporate it in our organisations.

Importantly, the unprecedented rapid spread of blockchain technology means that the humanitarian sector has to understand what it enables (and for what it creates barriers and risks) within the sector and within broader society.

It is critical for the humanitarian sector to start to understand the possible ways in which blockchain technology may impact the communities in which we work as well as enabling new and improved methods for assisting the same communities. For example, migrating land titling on to blockchain platforms may provide transparent and incorruptible records of who owns what but the transition to such as platform is likely to be fraught with power dynamics,

especially in early recovery phases of disasters that have resulted in significant displacements. Another example might be in enabling rapid and traceable cash transfers, increasing cross-sector and multi-agency coordination through a common cash distribution platform as well as enhancing the power of recipients by enabling them to see exactly where and from whom their cash originates.

The staff, volunteers, and community members comprising the international humanitarian sector would do well to improve their understanding of blockchain technology. Blockchain will have dramatic impacts on our global society in the coming years and a lack of relevant understanding will reduce the efficacy of our humanitarian responses. Most importantly, the sector will be able to support communities affected by crises in the very near future if it has both a strong foundational understanding of the technology, what it enables and what impacts it may have on communities and the whole international humanitarian system.

Opportunities for further discussions

This paper is designed to prompt further discussion within the humanitarian, hopefully not providing answers but only raising further questions. Please continue the discussion with your colleagues and look out for future correspondence regarding upcoming discussion fora and workshops.

Joshua Hallwright   May 2019