Disruption and digital revolution for whom?

Considerations on the use of blockchain and distributed ledger technology in displacement contexts

UNHCR Innovation Service

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Digital Access, Inclusion and Participation

2019 Research briefs - an exploration

The initiative previously called Connectivity for Refugees and supported by Luxembourg is as of 2020 called 'Digital Access, Inclusion and Participation'. 'Connectivity for Refugees' exists as a work stream but will start to operate under the name Digital Access, Inclusion and Participation Programme. In this document we refer to the initiative as Connectivity for Refugees.

Through research and advocacy, capacity building, field experiments, and strategic partnerships, UNHCR's Digital Access, Inclusion and Participation programme works towards a future where all refugees, regardless of age, gender and diversity, have the right and the choice to access Internet connectivity. It seeks to ensure that refugees' voices are heard in humanitarian programming and that they can leverage connectivity to fully participate in the digital space. The Connectivity for Refugees initiative is part of this programme, and specifically focuses on barriers to digital access inclusion and works systematically across the aforementioned pillars

Research serves as a crucial precursor to bring insights into the complexity of digital connectivity, inform and challenge dominant views and narratives around access and inclusion of displaced persons in increasingly digital societies. The objective of Connectivity for Refugees' research stream is to provide a comprehensive outlook on connectivity, from different angles and different perspectives, to understand how connectivity intersects with other domains and fields.

This research is an exploration and aims to support future experimentation; bringing in topics that are on the margins so that UNHCR remains future-focused and at the forefront of developing trends in connectivity. Understanding how displaced communities find gateways to access the Internet, which factors influence and determine their choices, what UNHCR's mandate of protection means in a digital space, or the extent to which specific technologies or tools can reduce or exacerbate inequalities, will inform and shape future efforts in providing connectivity to refugees in a safe, adapted, and dignified manner.

This publication is a part of a research brief series where UNHCR's Innovation Service has collaborated with a range of researchers to explore topics including Internet governance, digital transformation, diversity and inclusion. The briefs are all unique and reflect the author's style and individual voice.

Although the team has been extensively involved in shaping the themes and questions, and provided editorial advice, the views expressed in the publication are the views of each author. It is important to note that space was given to the authors intentionally to express their independent views and that these do not represent UNHCR. We welcome differing views and divergent perspectives and believe in the importance of challenging our own thinking, assumptions and ideas. Research offers us a platform to do this constructively and in a manner that is based on evidence and science, that ultimately helps us advance conversations on topics we identify as critical to a more just access and participation in the digital space.

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List of Acronyms

AI	Artificial Intelligence
BRER	BitNation's Refugee Emergency Response
CII	Community Identifiable Information
DII	Demographically Identifiable Information
DLT	Distributed Ledger Technology
IoT	Internet of Things
IP	Intellectual Property
ICRC	International Committee of the Red Cross
MIT	Massachusetts Institute of Technology
WEF	World Economic Forum

Executive Summary

There has been a lot of hype around blockchain and distributed ledger technology (DLT) in displacement contexts – from creating digital identities to providing cheaper remittances – but the extent to which this hype corresponds to real applications and benefits for refugees is unclear based on the information available at the time of writing. When it comes to vulnerable displaced populations, the exploration of these new technologies raises even more pressing ethical questions and concerns.

This paper sets out to explore the following questions: to what extent is blockchain and DLT in the humanitarian sector being developed and invested in for the sake of disruption, reinforcing or replacing existing power structures? What is the real value of blockchain and DLT to displaced people? Can blockchain and DLT solutions enable true agency and empowerment for displaced populations?

Methodology

This paper is based on desk research of current literature on blockchain and DLT in displacement contexts. It draws from mass media – like news websites, magazines, and blogs - as well as industry and academic sources – such as industry white papers, journal articles, and reports from governments, intergovernmental organizations, non-governmental organizations, nonprofits, aid agencies, think tanks, and universities – to analyze both mainstream and alternative narratives. The research was conducted between August and December 2019.

Introduction

"Disruptive." "Transformational." "Revolutionary." These are some of the terms many have heard being used to describe blockchain and distributed ledger technology (DLT) in recent years. Sinces its conceptualization in 2008, blockchain has been hailed as a transformational solution across various industries, from agriculture and education to renewable energy and digital governance. Perhaps most notoriously, blockchain has challenged the fundamental nature of money itself, serving as the backbone to cryptocurrencies like Bitcoin.

Proponents claim that on an administrative level, blockchain and DLT may enable organizations to move from a centralized system to a decentralized one – cutting down on human error, processing time, and costs. Whereas the typical organization takes about seven months to discover a data breach or misuse, DLT systems have the potential to detect changes instantly ("Estonian Blockchain Technology," 2019). On a systems level, DLT can possibly make voting more secure and transparent, streamline medical supply chains, especially around drug track-and-trace requirements, and democratize access to clean energy. Finally, blockchain-based smart contracts may execute various types of contracts without the involvement of a third party – which while intended to be unbiased, can be vulnerable to corruption like any entity (Santiso, 2018).

For humanitarian actors working in displacement contexts, blockchain and DLT have promised to transform refugee aid, such as creating digital identities, distributing cash aid, and facilitating

health services. But there are many beliefs and assumptions about DLT that we must question, especially when it comes to vulnerable communities who often do not have a say in how this technology is implemented or the process of technology-making itself.

Ultimately, we cannot divorce the discussion of technology from the discussion of social structures and power dynamics; they are one and the same because technology emerges from social contexts. More often than not, technology enforces pre-existing social structures. Just as machine learning can reinforce human bias without proper intervention (Jiang & Nachum, 2019), DLT too can exacerbate discrimination and inequalities without careful stewardship.

This paper falls into the wider scope of UNHCR's Connectivity for Refugees initiative by examining what role DLT can play, if any, in enabling fair, adequate connectivity for refugees. According to UNHCR, connectivity is the right – and choice – to be part of a digitally connected society and have access to technology that enables one to build a better future for oneself. Connectivity is also a critical component in building "connected societies" (Allen, 2018), which are by definition inclusive, open, and secure. Whether blockchain and DLT can serve as conduits for digital or social connectivity, this paper questions the extent to which these technologies are living up to their promise, specifically in the humanitarian sector.

What is blockchain and distributed ledger technology?

Blockchain is a digital system that records information on a public ledger. Each "block" of information is added to the "chain" (or ledger) and validated through a decentralized, peer-to-peer network. The chain falls in a specific sequence, with each block carrying a unique fingerprint (or hash). When information in a block changes, the hash also changes, and the next block becomes mismatched from the previous block. Thus, it is easy to identify when a change has been made, giving the blockchain the sense that it is tamper resistant.

Changes in one ledger will appear in every copy of the ledger. Accordingly, no one entity can own, manage, or manipulate the information. The blockchain is immutable. Potentially, anything of value – including currency, contracts, and assets, like buildings or artwork – can be stored, managed, and transacted on the blockchain in a secure, transparent, and autonomous way.

Blockchain is only one variant of distributed ledger technology (DLT) – though it is perhaps the most well-known, gaining widespread recognition as the backbone technology to Bitcoin. A distributed ledger is essentially any database that is decentralized across various sites (or nodes). Whereas blockchain employs a chain of blocks to provide a set of shared, distributed, and independently validated records, DLT can represent data in different structures and sequences.

Blockchain and DLT can be permissioned or permissionless, public or private, or a hybrid. In a permissionless ledger, anyone can make a change, while in a permissioned ledger, only those with permission can make a change. Public ledgers are viewable to the public, while private ledgers are viewable only to certain entities. Public ledgers may have hundreds or thousands of nodes, while private ledgers may only have one or two.

In short, all blockchain are DLT, but not all DLT are blockchain. In this paper, I use the term DLT to encompass the wide range of blockchain and DLT applications that have been explored and implemented in displacement contexts. Some of these applications include digital identity, digital wallets, cash transfer programs, and smart contracts that help hold up labor agreements.

Literature review

Below, I outline the current mainstream narratives on blockchain and DLT in displacement contexts, which have contributed to the well-known hype, as well as the alternative narratives that caution against rushing into this still nascent technology with closed-eye abandon. I define "mainstream" narratives as those often found in major media outlets, such as television, news websites, blogs, magazines, Internet forums, social media, radio, and other sites of general discussion. I also include the early adopter views of some industry professionals and scholars, off of which mass media has built its initial assumptions.

I define "alternative" narratives as those often found in the technology, international development, and academic sectors, as discussed in industry white papers, journal articles, academic papers, professional blogs, and reports from governments, intergovernmental organizations, non-governmental organizations, non-profits, aid agencies, think tanks, and universities.

Critically, these definitions are not set in stone – nor are they mutually exclusive. Mainstream and alternative narratives often overlap, as in the case of industry professionals who acknowledge blockchain's limitations but nonetheless advocate for blockchain companies. However, for the purposes of this paper – and to understand the narratives that inform and influence our understanding of DLT in displacement contexts – I have chosen to analyze the narratives as two distinct categories.

Mainstream narratives

Techno-optimism: Technological optimism, or techno-optimism for short, is the idea that technology can solve all human issues. The techno-optimist view paints blockchain and DLT as overwhelmingly beneficial, if not revolutionary, technologies that will improve humanitarian systems, processes, and services and provide a "blueprint for a better world" (Van Rijmenam & Ryan, 2018).

Some of the top results that appear on Google when searching for "blockchain for refugees" (retrieved 10 September 2019) include: "Here Are Three Ways Blockchain Can Change Refugees' lives"[1] from the World Economic Forum (Bayram, 2018), "How Blockchain Can Help With The Refugee Crisis"[2] from Forbes (Huang, 2019), and " "Inside the Jordan Refugee Camp That Runs on Blockchain"[3] from MIT Technology Review (Juskalian, 2018). The World Economic Forum article, like many others, proclaims, "Blockchain has the potential to disrupt a large number of industries and change the lives of many." The Forbes article lists the benefits of blockchain solutions and none of the downsides or risks. MIT Technology Review hints at the troubles of implementing

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1 https://www.weforum.org/agenda/2018/06/three-ways-blockchain-change-refugees-lives/
2 https://www.forbes.com/sites/rogerhuang/2019/01/27/how-blockchain-can-help-with-the-refugee-crisis/#293e94886562
3 https://www.technologyreview.com/s/610806/inside-the-jordan-refugee-camp-that-runs-on-blockchain/

blockchain solutions, but still positions blockchain as an admirable, if flawed, project with potential to revolutionize humanitarian aid. No matter where one looks, it is difficult to escape the techno-optimism that has followed the introduction of blockchain and DLT into the field of international development and humanitarian aid.

Techno-optimists emphasize the benefits that DLT has over traditional systems, like greater transparency, accountability, productivity, efficiency, and security in value or information exchange (Ko & Verity, 2016, p. 8). Information is independently validated, automatically replicated, and immutable. There is simultaneously greater control over one's personal information and greater peer-to-peer openness. DLT is far more resistant to tampering and hacking than centralized databases. In taking away control from a central authority figure, DLT also helps create new markets, opportunities for consumers to access the formal economy on equal terms, and a more trustworthy infrastructure for democratic governance (Gupta & Knight, 2017).

Like electricity and the Internet, which changed the fundamental nature of how we work and interact with one another, blockchain and DLT could be "era-defining" technologies that play a role in the Fourth Industrial Revolution – alongside automation, robotics, artificial intelligence, nanotechnology, and the Internet of Things (IoT). The applications are varied and extensive, including financial inclusion, land titling, remittances, donation and aid tracking, fraud reduction, transformation of governance systems, micro-insurance, cross-border transfers, cash programming, grant management, and organizational governance (Mercy Corps, 2017, p. 3).

It is worth noting that many of these benefits are related to back-end process improvements, such as reducing paperwork, removing intermediaries, and facilitating audits (Coppi & Fast, 2019, p. 1). Building on this, proponents claim that DLT can address many of the common problems of humanitarian organizations, like transparency, efficiency, sustainability, and scale, by holding them accountable to their beneficiaries, employees, partners, and donors.

Others note that "technology optimism and hype around blockchain technology [has] created a common space where UN agencies and tech companies have started to talk and collaborate," thus driving innovation in the humanitarian sector (Skogvang, 2018, p. 92).

"Trustless" technology: Blockchain and DLT are often considered "trustless" technologies. In his 2008 whitepaper, Satoshi Nakamoto, the pseudonym for the anonymous founder of Bitcoin, declared: "We have proposed a system for electronic transactions without relying on trust" (p. 8). Lisk Academy, an online educational platform on blockchain technology, states that blockchain provides "a model that does not require trust to safely interact and transact" ("Why is Blockchain Trustless?", 2019) by replacing third parties with cryptology – a method of encrypting and decrypting information through complex mathematics so that information is only viewable by the intended recipients. Because information is recorded, transparent, and decentralized, it "cannot be disputed or declared to be untrue" ("Why is Blockchain Trustless?", 2019).

Werbach describes blockchain as a system (2019) of "trustless trust" that not only removes the need to rely on a central authority figure, but also corrects system inefficiencies that could be avoided by universal consensus. With private databases, ten individuals could theoretically have

ten different records. With universal consensus, every peer in the network has a commonly shared record of information; thus, there is no risk of duplication, delay, or error. Werbach (2019) surmises that "blockchain could entirely substitute an existing authoritative structure to create trusted interactions in an environment where the rule of law is not adequately functioning" (p. 2).

In this view, DLT serves as an institutional technology that can enhance or compete with "existing economic institutions of capitalism: firms, markets, commons, relational contracting, and governments" (Berg, Davidson, & Potts, 2017, p. 2). DLT is no longer about process improvement, but radical disruption. Blockchain has the ability to "revolutionize the nature of the interface between economic agents" and bring about "promising socio-economic benefits" (Pilkington, 2015, pp. 31–32). Tapscott (2016) argues, "This technology holds huge potential to disrupt [any industry], creating a more prosperous world where people get to participate in the value that they create" (para. 16).

Alternative narratives

Techno-skepticism: If the mainstream discourse can be defined by techno-optimism, then the industry and academic discourse can be defined by techno-skepticism. Most technology professionals, international development professionals, humanitarian aid workers, and scholars express caution in deploying blockchain and DLT in humanitarian contexts (Coppi & Fast, 2019; Pisa, 2018; Pisa & Juden, 2017; Scott, 2016). Some of the key issues raised include data privacy, lack of open systemic development, and lack of widespread understanding and acceptance of the technology. Others go so far as to denounce blockchain as a tool for greater corruption and suggest that the threats greatly outweigh the benefits (as cited in Partz, 2018).

Techno-skeptics posit that blockchain and DLT are extremely complex, costly technologies that require large-scale investment, buy-in, and time (Coppi & Fast, 2019). DLT can require enormous amounts of energy to validate information, which can be harmful to the environment (Deshpande et al., 2017, p. 22). Others note that they are "structural platforms made to reshape information, communication and financing at the deepest level" (Coppi, 2018). Thus, it is not possible to quickly implement a DLT solution as a one-off project without impacting the fundamental structure of a larger organization or system.

Critics point out that technology does not function in a vacuum and emphasize the legal, policy, and regulatory challenges (Spencer, 2017; Pisa, 2018). For instance, the full implications of DLT for data privacy and protection are as yet unclear. Additionally, DLT by itself cannot solve larger socio-economic issues like high unemployment rates, political corruption, or inequality (Korkmaz, 2018). Even if people were assigned a blockchain-based digital identity number to ensure the fair disbursement of paychecks, it would not solve the fact that they may be unemployable in the first place due to discrimination.

Further, there is a lack of systemic consistency, inter-organizational partnerships, and support across the humanitarian ecosystem for DLT solutions, which makes it difficult for such solutions to be scalable. Many DLT projects do not extend beyond their existing family of organizations and

run on private platforms (Coppi & Fast, 2019, p. 23). This lack of public access or visibility creates a "black box" in which there is little accountability about how the technology is implemented.

Finally, critics note that blockchain and DLT are complex technologies that are difficult to understand, hampering their implementation in displacement contexts. Widespread misconceptions have hindered productive discussion on the policy level. Not many organizations currently use or accept the technology, which impacts the scalability and success of existing solutions (Pisa, 2018, pp. 4–5). Digital identities, for example, are only successful insofar as how many organizations accept them. Overwhelmingly, DLT solutions are still in their infancy and require significant development – especially around "last mile delivery" (i.e. the final stretch before a service or product reaches the end user) – due to challenges like weak mobile or broadband connectivity, poor energy infrastructure, and technological illiteracy (Zwitter & Herman, 2018).

Challenging "trustlessness": Critics argue that the term "trustless," as applied to blockchain and DLT, cannot be equated to human trust. While a larger philosophical discussion about the notion of trust lays outside the bounds of this paper, social scientists and theorists have long noted that trust is a complex, multifaceted concept that is deeply rooted in social factors.

Coppi and Fast (2019) argue that the "underlying notion of trust in the humanitarian sector is typically based on shared humanitarian principles, collaborations over time and across emergencies, relationships between individuals working for an organization, or in the nature of the giver-receiver transaction" (p. 25). This is fundamentally different from the notion of trust that characterizes DLT, which is "rooted in a shared trust in its underlying code, despite trust being absent among those developing or using the technology" (Coppi & Fast, 2019, p. 25).

Hawlitschek, Notheisen, and Teubner (2018) demonstrate that there is a tension between the concept of trust in the sharing economy and trust in blockchain technology; the former relies on multiple stakeholders, targets, and dimensions, while the latter leads to the replacement of trusted third parties. Ultimately, blockchain technology "in and by itself is not able to provide an environment that renders trust-building outside the closed blockchain ecosystem obsolete" (Hawlitschek et al., 2018, p. 59).

Cooper (n.d.) builds on this argument, arguing that the "trustless" nature of blockchain presupposes a fundamental trust in the Internet, which may result in discrepancies in levels of trust by those able to design blockchain solutions and those unfamiliar with the technology (p. 6). Much of the trust in blockchain's transactional integrity may require first "sufficiently explaining the technology to the user to encourage them to engage in the process and empirically measuring the trusting relationship throughout the stages of the transaction" (Cooper, n.d., p. 6).

Ultimately, the "trustless" aspect of DLT can paradoxically create greater distrust among users, as well as greater distrust and opacity in the humanitarian system. Most DLT projects in displacement contexts are back-end systems that run on private, permissioned platforms, of which the end users and local communities are unaware (Coppi & Fast, 2019, p. 24). This raises fundamental questions about the nature of meaningful consent and humanitarian experimentation.

Finally, critics point out there will always be a need for some sort of human intermediary. For example, a blockchain-based identity system does not remove the need for there to be a person to upload the identity number. If someone inputs wrong information, then the immutability of the blockchain may become its own obstacle; while incorrect information may be superseded by new information, it cannot be erased, and transactions cannot be reversed. End users may find themselves with no simple avenue for recourse. The need for human trust therefore remains because like all databases, "blockchain does nothing to improve the reliability of inputs" (Pisa, 2018, p. 82). Similarly, while blockchain and DLT are theoretically unhackable, the reality is that digital wallets can be hacked, smart contracts can be bugged, and users might forget their log-in information and lose all their associated information.

Marketization: Critics note that DLT solutions can be situated within a highly competitive, marketized environment, in which the success of the solution itself may take precedence over the experiences of end users. Who truly benefits from the technology: the corporate decision-makers and investors of the companies who profit from its commercialization, or the displaced people who may be the unwitting end users?

Feedback about humanitarian technology solutions is often interpreted through investment metrics or audit metrics for donors. Madianou (2019) calls this the marketization of humanitarianism, in which "funding exacerbates the reliance on metrics and 'impact data' as agencies need to constantly justify how many people they have reached" (p. 5). In such a scenario, the focus shifts from qualitative aspects – like user experience and satisfaction – to efficiency. Technology is seen as an opportunity to "enhance the efficiency and transparency of humanitarian operations" and thus ensure the continuation of funding (Madianou, 2019, pp. 5 & 8).

This mindset of solutionism has given rise to hackathons that are more focused on technological disruption rather than the nuanced understanding of refugee issues. In analyzing the criteria of displacement-focused hackathons, Madianou (2019) notes that very few criteria are about the actual problem of displacement (p. 6). Most of the criteria are based on business metrics like business model, level of innovation, and the commercial viability of solutions.

Techno-colonialism: An even more skeptical view posits that blockchain and DLT fall into the scope of techno-colonialism – the idea that technology can entrench inequalities between aid givers (e.g. international aid agencies, governments, and nonprofits) and aid receivers (e.g. displaced people) (Madianou, 2019, p. 6).

Technology can become extractive when it leads to the irresponsible datafication of users. Datafication is the process in which personal information is collected and transformed into value for companies, whether for marketing, product design, or other purposes (Mai, 2016). In the case of a blockchain-based identity management platform, the platform can be marketed to banks, companies, and nonprofits, who collect users' data through a digital wallet app. The platform can then improve its product and service based on users' data. This process can create an "instrumental relationship between agencies and beneficiaries which instead of reversing power inequalities serves to sustain them" (Madianou, 2019, p. 5).

There are also ethical concerns over the idea of choice and meaningful consent. If a refugee must register for a digital biometric identity or face more complicated access to critical services, is it truly a choice at all? Such scenarios may be considered inherently coercive. While organizations may aim to inform refugees of their personal data rights, those policies are not always followed (Bogle, 2019). A study by Kaurin (2019a) based on interviews with asylum-seekers arriving in Europe found that asylum-seekers were "rarely fully informed of their data rights by UN agencies or local border control and law enforcement staff tasked with obtaining and processing their personal information" (p. 1). Even if displaced people are informed, meaningful consent is predicated on some level of technological literacy, which is difficult to ensure in emergency contexts.

Critics further question the involvement of private technology companies in humanitarian projects, as they may wield unequal leverage in how projects are implemented, or use projects more as public relations and profit-making opportunities than actual humanitarian missions (Madianou, 2019, p. 5). Facebook's Libra project – a blockchain-based cryptocurrency that promises to enable financial inclusion for the world's poor, unbanked, and undocumented – has faced extensive backlash. Some critics argue that it is an opportunity for Facebook to create a monopoly over the global financial services infrastructure – as evidenced by its exclusionary discourse (Parsons, 2019) – while others note that the company is more interested in diffusing legal responsibility and bypassing financial regulations than creating a more equal world (Kaurin, 2019b).

The involvement of private companies may also expose refugees to greater risk, especially when it comes to sensitive data like biometric information. If a private company owns the software or hardware used to collect and process data, does the company have access to the data? How will the company use or share the data? Many critics have denounced the public-private partnerships where proprietary technology has been used to allegedly carry out human rights abuses in national intelligence and immigration enforcement activities (Parker, 2019). The fear is that refugees' data could be used for involuntary repatriation, surveillance, and other anti-humanitarian activities. The threats are even more pronounced for displaced people who face persecution and/or come from places where there are no stringent data protection laws or regulations.

Finally, critics note that we must be careful not to prioritize technological disruption and innovation over refugee needs. Innovation by nature requires experimentation and risk-taking, but we should not be recklessly experimenting with displaced communities, whose situations are often precarious and/or life-threatening (Madianou, 2019). The prevailing innovation mindset to "fail fast, fail often" and "move fast and break things" can have catastrophic ramifications if applied in a humanitarian context.

We must also ask: innovation for and by whom? Are we imposing our own ideas and beliefs about innovation (in the way of blockchain and DLT) when local communities may have their own vision? Innovation can be understood as "a highly politicized construct taken up by specific actors and made to work in particular ways" (Suchman & Bishop, 2010, p. 331). Initiatives launched in the name of innovation can often "work in practice to conserve existing institutional orders" and even "create incentives to keep local innovations hidden" (Suchman & Bishop, 2010, p. 331).

Hype-without-evidence: Critics note that few blockchain and DLT ventures have scaled into sustainable, large-scale projects or produced measurable impact. The International Telecommunication Union (2019) – the UN agency for information and communication technology – analyzed about 60 use cases of DLT and found that more than half were in the "proof of concept" phase. Similarly, Galen et al. (2018) examined 193 organizations, initiatives, and projects using blockchain for social impact and found that the overwhelming majority (74%) were still in their pilot or idea stage. Only 55% of the projects were estimated to have an impact on their beneficiaries by early 2019.

Burg, Murphy, and Pétraud (2018) documented 43 blockchain use cases through Internet searches, but found no evidence of the results supposedly achieved or any lessons learned. In a field driven by data, this lack of evidence is alarming. Blockchain and DLT projects are often shrouded in mystery and feature opaque language on their websites, with no clear case studies or documentation about their impact on end users.

The World Food Programme Building Blocks project remains one of the largest, most established blockchain projects for refugees, yet is still a pilot itself. To date, it has not been implemented anywhere else beyond the Azraq and Za'atari refugee camps in Jordan – with plans to expand to Bangladesh and Palestine in 2020. The actual advantages of DLT therefore remain unproven at scale.

Discussion

Perhaps because of the opacity and complexity of the technology – as well as its implications of creating a "trustless" world divorced from human impact – discussion about applying blockchain and distributed ledger technology (DLT) to displacement contexts has sparked strong reactions from all sides of the debate.

Mainstream narratives of blockchain and DLT in displacement contexts generally take a techno-optimist stance, contributing to the idea of "technology as savior" and giving rise to headlines like "Blockchain at the United Nations Leading Solutions to the Global Crisis" (Wintermeyer, 2019) and "Why Bitcoin Matters for Freedom" (Gladstein, 2018). The danger of this discourse is that it fails to acknowledge the particular nuances of each situation, let alone the sensitivities that displaced populations face. The idea of "technology as savior" essentially puts technology at the forefront of the conversation, when we should be focusing on the people.

Meanwhile, industry and academic narratives generally fall on some point of the techno-skeptic spectrum, from expressing serious reservations to absolute distrust. Even Joseph Lubin, co-founder of the Ethereum blockchain, cautions against implementing blockchain technology too quickly and carelessly, as discussed in his paper, "Blockchain for Global Development." Among his concerns, Lubin (2018) warns that the assumptions guiding initial blockchain projects can be problematic "as the problems an enterprise is trying to solve are very different from those faced by vulnerable populations, where access and inclusion usually are far from guaranteed, information asymmetry is rampant, and power dynamics are uneven" (p. 12). He further warns that failing to address the digital divide early on can exacerbate an already existing gap (Lubin, 2018).

Ultimately, all technologies bring with them inherent benefits and risks. They can be life-saving and threatening, clarifying and distorting, and empowering and oppressive. Take the Internet, for instance, which has paved the way for greater connectivity and the democratization of information, while also enabling authoritarian governments to better track and crack down on political dissidents. Meanwhile, self-driving cars are more effective at predicting and navigating traffic than humans, yet can still tragically fail.

Technology is not a neutral or panacean solution. Accordingly, humanitarian actors should carefully steward how new technologies like blockchain and DLT are developed and implemented in displacement contexts, as they can have far-flung implications for their end users, who are often vulnerable and excluded from the conversation and technology-making process. We should be focusing on the ethical considerations in tandem with the technical challenges. Namely, can blockchain and DLT enable true agency and empowerment for displaced populations? What steps can we take to ensure that displaced populations are not only protected, but also treated fairly and equally during the development of new technologies?

Projects using blockchain or DLT must uphold the basic humanitarian principle of "do no harm" and have the wellbeing of displaced people in mind at every stage of the design and implementation process. Variations of this methodology are known as "human-centered design" (IDEO.org, n.d.) and "human rights by design" (Penney, McKune, Gill, & Deibert, 2018). At its foundation, it is about letting go of preconceived notions, motives, and control, and truly listening and responding to the needs of end users. Harm includes not just active harm, but also the avoidance of potential negative effects, such as the degradation of local capacity. UNHCR has found that projects that include ownership and buy-in from the local community are generally more successful (Balestra, 2019a; UNHCR Innovation Service, 2018).

DLT projects should also be considered within their social and political context to better assess their relevance and potential impact. Companies often describe refugees as "unbanked" or "underbanked" – terms with a distinctly commercial undertone that send the message that refugees are a population off of which companies have not yet profited. On the one hand, approaching refugees as customers rather than beneficiaries can grant them a powerful consumer voice, with the right to choose what services they want and seek redress if they are not satisfied with those services (Khan, 2015). On the other hand, this type of mindset threatens to reduce complex displacement issues – such as the conditions around refugees' lack of access to financial services – into simple, solvable business problems.

Below, I discuss the areas of blockchain and DLT on which humanitarian actors must refocus attention to enable true agency and empowerment for displaced populations: inclusion, openness, privacy, and trust-enablement.

Inclusion

The emphasis of blockchain and DLT has been on decentralization – moving control away from centralized systems to decentralized systems – but this diffusion of power does not get at the heart of the issue, which is the inclusion and empowerment of refugees. Inclusion means the systematic,

informed, and meaningful participation and consultation of a community to ensure that its views are reflected in all aspects of a project, from design and delivery to monitoring and evaluation ("Five Steps to Inclusion," n.d.). Empowerment means supporting and enabling a community to make its own decisions about its future.

Motivations for adopting DLT are often shaped more by programmatic and organizational considerations than end user needs (Coppi & Fast, 2019, p. 1). Many DLT solutions also do not include refugees in the technical implementation. Take, for instance, the coding process. Who is writing the code for DLT projects? Are they members of or in communication with the end-user community, or are they outsiders who do not understand the social, cultural, and political contexts of that community? If refugees are excluded at every step of the way, then decentralization is arguably only happening within a very limited scope (insofar as one is technologically enabled to participate in the process).

Ultimately, decentralization may increase transparency, but does not guarantee the inclusion of displaced people. The focus should not be on moving from centralization to decentralization, so much as exclusion to inclusion – i.e. designing and implementing DLT as an inclusive, participatory technology for displaced populations. We must diffuse technologies and skills from established technology implementers (e.g. private companies, aid agencies, and non-governmental organizations) to on-the-ground users and groups. The end goal is for technology implementers to take a supportive function, leveraging global partnerships and expertise for the benefit of local communities, while local communities take ownership over projects, resources, and networks (Balestra, 2019b).

Additionally, inclusion must stretch across gender, race, ethnicity, religion, age, sexuality, disability, and other lines of diversity. DLT can exacerbate the marginalization of women and girls, for instance, if it is not introduced in a gender-responsive manner (Thylin & Duarte, 2019). To avoid this imbalance of power, organizations can engage in robust vulnerability analysis, creating purposeful opportunities for marginalized groups to participate in the design and implementation of projects, as well as supporting the role of local actors – such as representatives of women's groups – in facilitating that participation ("Five Steps to Inclusion in Humanitarian Response," n.d.).

More research should be done on participatory processes and incorporate lessons from the field, like "Involving Syrian Refugees in Design Research: Lessons Learnt from the Field" (Talhouk et al., 2019), a study that engaged in community-based research with Syrian women in informal settlements in Lebanon. The study highlighted the value of creating empathetic participant-researcher relationships through experienced-based dialogue and allowing participants to configure the design space and process themselves.

Participation is key the moment a technology is introduced into a community and that community's information is extracted and commodified as part of a product or service. We must recognize that displaced people are not simply beneficiaries, but active agents in their environment. Technology, as such, should not be regarded as solely for the advantage of humanitarian actors; it can serve as a critical resource for displaced people, "upon which the delivery of all other aid and their well-being is contingent and connected" (Campo, Howarth, Raymond, & Scarnecchia, 2018).

The persistent misapplication of a crisis mentality to displacement contexts by aid workers has "resulted in the creation of cycles of dependency and the false categorization of refugees as threats to political stability and to economic well-being" (Ashkar, Auerswald, Samra, & Schoop, 2016, p. 4). When one approaches the refugee crisis as a crisis of resources, the inclination is to resort to aid distribution and other top-down solutions (Ashkar et al., 2016). While such solutions may be necessary in emergency situations, this linear thinking is unsustainable and even debilitating in the long term. Refugees constitute a hard-working, self-reliant, and creative population that has the ability to drive and ideate their own solutions. Rather than creating dependencies, humanitarian actors should therefore empower and partner with refugees to create inclusive solutions that address their unique challenges and needs.

Openness

Openness is separate from, but complementary to, inclusion. Openness connotes transparency, accountability, and the sharing of information, ideally leading to cross-functional, public-private partnerships.[4] The Principles for Digital Development – a set of guidelines established by the international development community – highlight open standards, open data, open source, and open innovation as the key to more effective international development ("Principles," n.d.).

Many blockchain and DLT projects occur in silos, which significantly limits the interoperability of systems and opportunities for public scrutiny over strategy and code (Coppi & Fast, 2019, p. 20). Siloed solutions may be necessary in some contexts to ensure speedier development and greater privacy for end users. However, if humanitarian action can be understood as a "shared moral imperative of preventing crises and sustainably reducing people's levels of humanitarian need," then siloed solutions simply do not make sense in the long term (UN Office for the Coordination of Humanitarian Affairs, 2017). Likewise, if the aim of DLT is to decentralize control across various stakeholders and create greater transparency, then siloed solutions defeat this point. In a private, permissioned DLT system controlled by one organization, the organization still retains full control and could theoretically change information at will.

As a whole, the technology sector is moving towards open source – a movement in which computer software is openly shared, allowing anyone to use, change, and distribute the code. In this vein, technology serves as a public good. Whereas proprietary technology is predicated on intellectual property (IP) and the idea that knowledge can be owned and capitalized upon in a private manner, open source aims to create common knowledge and partnerships, from which all parts of society can benefit. The interests of companies developing proprietary technology thus often clash with the interests of organizations striving for open collaboration, since the latter calls for open source technology (Coppi & Fast, 2019, p. 20).

Additionally, DLT projects are often discussed in vague, abstract terms, with little data or evidence to support their claims. Whether this obfuscation is in part to protect IP or because projects are still in their proof-of-concept phase, this abstraction creates a smoke screen that inhibits public understanding and adoption of the technology. Openness about the technology design process

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4 Collaboration between the humanitarian, public, and private sectors is commonly understood as the best approach to addressing global challenges because it can overcome individual limitations like market failure. For a more detailed discussion, see Kolk (2014).

– including the challenges faced, lessons learned, and best practices – is critical to creating a common knowledge base from which humanitarian actors can learn, iterate, and avoid duplication of work. Redundancy in itself can be understood as a form of harm, insofar as it inhibits humanitarian activities.

Finally, openness paves the way toward standardization, which is required to some degree for there to be fair governance and scalability. Standardization not only ensures interoperability, but also provides the conditions to avoid anti-competitive behaviors (International Telecommunication Union, 2019, p. 34). If every organization were to issue its own brand of digital identity, there may be unhealthy competition to monopolize the market, which runs counter to the humanitarian mission. Standardization further helps establish shared specifications, methods, and terminology, enabling governments to create a legal and regulatory framework, as well as enforce data privacy and security requirements across the industry – which in turn supports the scalability of projects.

Privacy

By and large, we must put data protection and privacy laws at the forefront of the conversation, not at the side, where they have primarily resided. The European Union General Data Protection Regulation (GDPR) of 2016 defines personal data as any information relating to an identified or identifiable person – which includes information that can not only directly identify a person, like name, address, and financial information, but also indirectly identify a person, like IP address, geographic location, video footage, and social media activity (GDPR.eu, 2019).

Humanitarian organizations should provide displaced people with information about their data rights at the site of data collection – including the right to access, edit, and erase their personal data and the right to file a complaint anonymously (Kaurin, 2019a). Organizations must ensure that there is easy access to do all those things. Having a safe, clear avenue for redress is critical so that refugees can hold organizations accountable for negligence or sharing their information without consent. Organizations should also limit how much personal data they collect and process if it is not critical to the service, delete any information that becomes redundant or irrelevant, and ensure that their partners and service providers are subject to the same privacy policies.

Beyond standard personal data protections, organizations should be cautious of how they process data more generally for communities. Displaced populations often face collective threats, like political persecution or genocide. Community identifiable information (CII) or demographically identifiable information (DII) can therefore be just as sensitive as personal data, especially when linked to other information that reveals clues about the identity or location of displaced individuals and communities. Organizations should implement robust risk assessments and engage in regular security audits to reduce any such data hazards.

Similarly, organizations should be cautious of the metadata they collect and generate through communications activities, cash transfer programs, and monitoring and evaluation systems. Metadata is "the data behind the data" – information that is inevitably generated through the use of digital or telecommunication services. Privacy International and the International Committee of the Red Cross (ICRC) (2018) recommend that organizations systematically map out who has access to what data, for how long, and under which jurisdiction to anticipate how users might be profiled or discriminated against, and negotiate "no sharing" agreements with partners and service providers where appropriate (pp. 12 & 16).

On a policy level, the international arena must agree on a common set of standards and establish a framework for legal and regulatory compliance to ensure the privacy of displaced people in blockchain and DLT projects. This is especially pertinent, as international organizations are often not subject to national legislation and receive certain privileges and immunities in the communities in which they work.

While general alliances on humanitarian blockchain and DLT exist, a multi-stakeholder alliance that is focused on advocating for refugee privacy in blockchain and DLT projects should be formed. Such an alliance could draw from the strength of its network and size to push organizations to engage in regular security audits, monitor and report on evolving security threats, pressure donors to include data protection among their funding eligibility and reporting requirements, host regular forums in which stakeholders can convene, and establish standardized guidelines and procedures for DLT practitioners (Kaurin, 2019a).

International actors like the United Nations can play a major role in this regard, though it is critical that larger, more established organizations do not overpower smaller organizations or non-traditional actors. A borderless, nationless, decentralized technology by definition demands cooperation from not just governments and state actors, but also companies, non-profits, universities, aid agencies, grassroots organizations, and stakeholders from across all sectors and levels of society. A framework for DLT privacy cannot be decided on by any central authority; it must be stewarded with respect, care, and as much openness and access as the technology demands.

Trust-enablement

The term "trustless" is frequently overused in discussions on blockchain and DLT. When it comes to displaced populations, the term detracts from the nuances and complexities of each situation – as each community and individual may have varying levels of trust toward aid workers, technology implementers, host communities, and even different types of technology.

Ultimately, the focus should not be on "trustless" technology but trust-enabling cooperatives – i.e. projects that actively promote interpersonal and interorganizational bonds. In other words, it is not enough to focus on the process of trusting blockchain and DLT. We must also focus on the output of creating trustworthiness if the end goal is to deliver more effective aid and create peaceful relations. Trust-enablement encompasses community building in its various forms: trust among refugees, trust between refugees and host communities, trust between refugees and aid workers, and trust within the global humanitarian ecosystem itself.

The language is geared toward efficiency and costs-savings, as in the case of World Food Programme Building Blocks project, which reported a 98% reduction in banking fees and estimated that there could be savings of around $150,000 per month if the project were expanded to 500,000 Syrian refugees ("Case Study: Blockchain in a Refugee Camp," 2018).

While business metrics are important to measure the scalability and sustainability of projects, other metrics are needed to tell the full story – especially when analyzing things like quality of service or end user satisfaction. Do refugees feel safer, more trusting, and more confident in their communities because of DLT solutions? Do they have the resources to succeed? Are they empowered to make decisions of their own?

Based on desk research, few DLT projects seem to include data straight from the source, such as feedback surveys, focus groups, one-on-one interviews, and in-depth case studies about refugees' experiences. While unsurprising, given that there is frequently a language barrier and/or mistrust between aid workers and aid receivers, this is problematic (Hynes, 2003).

Campfire Innovation, a non-governmental organization that helps grassroots groups create dignified aid for displaced people, recommends doing this by proactively offering information on organizational activities to refugees, hosting regular face-to-face meetings, and creating a supportive environment in which people feel comfortable speaking up – as well as offering multiple feedback opportunities ("How-to: Refugee Feedback Mechanisms and Inclusion in Decision-Making," 2019).

Trust-enablement also encompasses setting up realistic, sustainable solutions that have long-term impact. Poorly executed solutions that collapse may create a bigger gap in services than there was before, thus causing harm and a loss of faith in organizational activities. Organizations should clearly define the project requirements and goals, acknowledge what resources are available and unavailable, and avoid overpromising. Wherever possible, solutions should support local capacity, including engaging with the appropriate stakeholders, such as local governments and grassroots groups. For the best success, technology projects should be explored in conjunction with anthropological and sociological research and not divorced from their social context so as to enrich and validate refugee experiences.

The next, final section explores questions for future research that researchers, practitioners, and policymakers alike should consider when exploring blockchain and DLT applications in displacement contexts.

Margin space

Research on blockchain and DLT in displacement contexts is still vastly underdeveloped – in part due to the newness of the technology and early implementation stage of many DLT projects. This paper was limited to desk research, but touched on many areas of research that could be strengthened by data collection, surveys and interviews, and observational studies. Below, I outline the areas that could benefit from greater research and reveal deeper insights into how DLT – as well as other emerging technologies – can be leveraged to serve and empower displaced populations.

Data and evidence from blockchain and DLT projects

Most importantly, we need data and evidence from organizations and companies implementing blockchain and DLT projects in displacement contexts. Questions that each project should address include:

- How many people have projects reached (differentiating between beneficiaries, end users, customers, clients, and partners where applicable)?
- What are the friction points, lessons learned, and end users' feedback?
- What are the benefits of using DLT for refugees? What are the downsides and costs?
- How are refugees informed of their data rights (e.g. ability to opt in and out of the product or service; view, change, and delete their personal information; and anonymously submit a complaint)?
- What systems and procedures are in place to prevent and address security breaches?
- How have projects meaningfully affected refugees' lives and the quality of humanitarian service? How have projects affected local communities' capacity?[5]
- How do these effects differ in one, five, and ten years' time?

Data and evidence can be defined as: robust case studies, surveys and interviews with end users, photographs, videos, and other types of documentation of a project's impact (or lack thereof). Ideally, this information would be openly shared with the public, so that future projects could draw from this data to develop more effective evidence-based solutions.

Organizations that change or shut down their DLT projects often do so quietly. For instance, the Finnish Immigration Service stopped partnering with MONI, a blockchain-based payment solution for refugees, in April 2019, but shared no details about the reason for the end of the partnership. BitNation's widely praised Refugee Emergency Response (BRER) solution – which sought to provide blockchain-based digital identities and Bitcoin debit cards to refugees – is now defunct. Knowing why projects fail is just as important as knowing why and how they succeed.

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5 Local capacity is a community's ability to manage its own affairs effectively. For a more detailed discussion on local capacity development, see USAID (2017).

Technology diffusion and entrepreneurship for refugees

More research is needed on effective methods and strategies of technology diffusion to refugees, especially as it pertains to issues of differential access and choice. Questions include:

- How can we diffuse technology knowledge and skills in a way that does not reinforce unequal power dynamics or create new dependencies?
- How can we build inclusive technology processes, products, and services and meaningfully engage displaced communities in all phases of a DLT project?
- How can we enable technology access for marginalized and at-risk groups (including, but not limited to, women, youth, and people with disabilities), making sure there is meaningful consent?

A particular focus on community innovation centres, startup accelerators, coworking spaces, and other technology initiatives in conflict-affected communities – like Re:Coded House[6] in Erbil, Kurdistan Region of Iraq and Karam House[7] in Istanbul, Turkey – could be helpful, analyzing the impact of such programs on individuals and communities. For instance:

- How do such programs affect refugees' life chances and social mobility?
- How do they affect relationships between refugees and host communities?
- How can we create and support self-sustaining networks of refugee innovators, technologists, and entrepreneurs that do not rely on external actors?

These questions are all related to the field of inclusive business and social entrepreneurship. Accordingly, we could also benefit from further research into how to foster and attain funding for refugee businesses and initiatives – being careful not to divert focus from the human-centered component.

Public-private partnerships on blockchain and DLT solutions

The most effective humanitarian solutions are often the ones that incorporate partnership at multiple levels and cross-sections of society, pulling from the strength of governments, universities, private companies, non-governmental organizations, nonprofits, and grassroots organizations. A detailed examination of existing DLT partnerships could shed light on best practices. Questions include:

- What are the strengths and limitations of different stakeholders (e.g. governments, universities, and private companies)? What role should they play in DLT projects?
- What are the barriers to effective cooperation between different stakeholders and the strategies to navigate those barriers?

Special focus should be paid to the legal, regulatory, and political aspects. For instance:

- What are the existing local, national, and international policies around emerging technologies? What constitutes effective legislation and regulation of DLT?
- How can we promote understanding and cooperation between regulators, humanitarian actors, and the private sector?

These questions are closely related to the field of organizational studies and business anthropology. Accordingly, research into organizational practices and cultures – especially across the public and private sectors – could be valuable to understanding how multi-stakeholder DLT projects are best managed.

Sociological and anthropological studies on refugee experiences with DLT

Finally, this space could benefit from sociological and anthropological studies on how refugees use and navigate technology, honing in on specific communities and groups. Questions include:

- How do refugees currently interact with blockchain and DLT?
- What types of DLT solutions do refugees use, avoid, or want to have access to? What solutions are they aware or not aware of? What solutions do they trust or not trust?
- How do DLT solutions impact different refugee communities in terms of life chances, social capital, network ties, collective efficacy, and resilience?

These are all critical questions that involve a deeper understanding of not just the socio-cultural context of refugee communities, but also the experiences of individuals and the extent to which these experiences may or may not differ from the larger community. For instance, are women excluded from certain technologies because of gendered expectations and norms? What role do refugee youth see themselves playing in the current (and future) technological revolution? Business case studies are not enough – we need an informed understanding of the varied social forces and processes that impact individual experiences.

Conclusion

Humanitarian action is (or should be) fundamentally people-centered, not technology-centered. It is therefore crucial to bring the focus back to the people the technology purportedly benefits. This includes making sure there is meaningful consent, data protection and privacy, and support for local capacity building. This also means taking the necessary steps to ensure that business or political interests do not outweigh refugee interests by evaluating the motives behind blockchain and DLT projects. Blockchain and DLT may be transcendiary technologies, but they should not transcend humanitarian principles.

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7 https://www.karamfoundation.org/karam-house

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