DeFi to Decolonize Aid:

A cross-country analysis of blockchain pilots in the humanitarian sector

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2. Executive summary

In this report, we investigated how blockchain could contribute to the process of decolonizing humanitarian assistance in the context of the three pilots conducted by Umoja Labs in 2022. Umoja Labs, a social enterprise providing blockchain-based solutions to humanitarian organizations, collaborated with three non-governmental organizations (NGOs) to deliver digital cash assistance (DCA) in Ecuador, Vanuatu, and Haïti respectively. The DCA in these pilots was delivered through a blockchain network based on c-USD stablecoin, giving rise to the potential of a more decolonized humanitarian assistance system.

Through literature review, we identified four major theoretical promises of blockchain to be the decentralization of hierarchical power structures, the enhancement of the agency of the networked participants, an increase in transparency, and the facilitation of social interactions. We then used these four criteria (decentralization, agency, transparency, localization) to evaluate the pilots. We collected both qualitative data through stakeholder interviews and quantitative data pilot transaction databases and evaluation reports. By conducting individual and cross-pilot analyses, we hereby present the main recommendations:

Decentralization
- Engaging one local staff member as the focal point within the NGO as well as securing on-the-ground technical support
- Dedicating more time and resources to testing and adapting the Umoja products to the local NGOs needs before its deployment

Agency
- Guaranteeing the active participation of recipients during the pilot, especially during the vendor selection process

Localization
- Increasing the duration of the training for local staff, the vendors, and recipients so that they are more comfortable in their use of the Umoja products and introduced to the concept of blockchain
- Ensuring a longer pilot timeframe and the engagement of all the members of the local NGO team from the very beginning

Transparency
- Providing recipients of assistance with a way to access their budget and a receipt for their purchases
- Training the local staff and vendors to learn how to leverage the data produced by the Umoja platform
- Assuring a greater transparency with the participants of the pilots in regards to pilot design decisions and their access to the Umoja products

3. Acronyms

ACAPS	Assessment Capacities Project
BPRM	Bureau of Population, Refugee and Migration
BHA	Bureau for Humanitarian Assistance
CVA	Cash and voucher assistance
DCA	Digital cash assistance
DeFi	Decentralized Finance
H4H	Hope for Haiti
ICRC	International Committee of the Red Cross
IO	International organization
INGO	International non-governmental organization
NGO	Non-governmental organization
P2P	Peer-to-peer
SC	Save the Children
UN	United Nations
UNDP	United Nations Development Programme
UNICEF	United Nations International Children's Emergency Fund
UNOCHA	United Nations Office for the Coordination of Humanitarian Affairs
USAID	United States Agency for International Development
WFP	World Food Programme

4. Introduction

Blockchain is remodeling the financial sector while unleashing a transformative power on other sectors, including the humanitarian sector. There is a wide range of blockchain applications within the humanitarian sector, and making use of digital currencies to improve aid delivery is arguably the lowest hanging fruit. The use of blockchain fosters a more transparent and efficient aid delivery as it facilitates transnational transactions to even the most remote places at an exceptionally low cost. This research project focuses on blockchain-enabled digital cash assistance (DCA) to explore the question of how the use of such technology could contribute to the process of decolonizing aid. The current humanitarian system remains rooted in neocolonial legacies, where the actors in the Global North systematically exercise domination over those from the Global South through being in control of program coordination (Rejali, 2020). Today, the humanitarian system consists of bureaucratic structures that are cost-ineffective and sideline local actors from funding and program coordination (ALNPA, 2022, p.230). Experts have criticized the humanitarian and development sector for implementing projects unsustainable in the long-term for local communities.

Given these inadequacies, several actors are leveraging blockchain to ameliorate aid delivery and break down existing power structures. Blockchain solutions are well-suited to rebuild the inefficient, complex, and overly centralized humanitarian system with a lightweight decentralized infrastructure that runs on mobile networks and devices (dGen & Positive Blockchain, 2021). Blockchain provides agile tools to local actors on the ground whilst enabling the financial inclusion of communities in the Global South (dGen & Positive Blockchain, 2021). One of the actors leveraging blockchain solutions in the humanitarian space is Umoja Labs.[1] A social enterprise founded with the purpose of developing a blockchain-based payment suite to empower people's access to digital financial services across the Global South.

This research project examines the use of this blockchain-enabled DCA within the context of three Umoja Labs' pilots in order to explore the benefits and challenges of using this modality. By providing field-focused evidence, we hope to counteract the scarcity of hard evidence that exists on the implementation of this technology. This study can contribute to the work of humanitarian and development communities, academics interested in the nexus of development and technology, blockchain developers, global tech companies, social entrepreneurs, and potential donors.

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[1] Formerly Emerging Impact.

5. Research objectives and questions

5.1. Main research question

> How could blockchain be used to deliver humanitarian assistance to advance the goal of decolonizing aid in an inclusive, community-focused and locally empowering manner?

To avoid generalizing the sociopolitical effects of said technology, we honed in on the specific blockchain application in DCA developed in the pilots of Umoja Labs and partners. We elaborated on whether blockchain truly upholds its promises in empowering the local community receiving assistance. This calls for a literature review on the status-quo of the humanitarian system, its postcolonial critiques and the potential promises of blockchain.

5.2. Sub-question one

> When implemented within a pilot context, how does blockchain perform in terms of decentralizing power, enhancing agency, localizing benefits, and increasing transparency in the delivery of humanitarian assistance in comparison to other modalities?

The appropriateness of using blockchain in humanitarian assistance to subvert the colonialist undertone was evaluated according to four criteria: decentralization, agency, localization, and transparency. Blockchain and its decentralized nature, in theory, can eliminate any central control in a network. This process gives rise to agency for participants in crisis-stricken communities, and increases transparency of activities taking place on the network. How such promises could be delivered in reality depends on how the technology is translated into the Umoja products and how such tools are embedded in the wider sociocultural context of a given project. We gathered interview data from Umoja Labs' pilots to examine how blockchain is implemented on the ground and compared it to a non-exhaustive list of established aid delivery alternatives, such as physical cash and digital cash.

5.3. Sub-question two

> What are the contextual conditions to which stakeholders must address when devising a blockchain-enabled aid delivery project with an aim to decolonize aid?

Drawing from the experiences of Umoja pilots, we delineated some critical conditions that blockchain-assisted aid delivery projects should satisfy. First, this exercise recommends some considerations for stakeholders to benefit from blockchain without perpetuating the colonial shadow. Second, this exercise contributes to studies on how the operating environment, technical infrastructure, and the day-to-day practice of local actors impacts the use of advanced technologies. We concluded this report with recommendations on how humanitarian aid delivery projects and Umoja products could be adapted.

6. Theoretical grounding

6.1. Situation and controversial aspects of humanitarian assistance

There exist at least two types of assistance, namely short-term relief operations and long-term structural projects. Humanitarian assistance is mobilized and distributed in response to disasters in a fast manner with the short-term goal of alleviating immediate hardship (Ridell, 2014). Development assistance involves long-term structural interventions where assistance is delivered by non-governmental organizations (NGOs), government-to-government transfers, or institutions such as the United Nations (UN) agencies (Moyo, 2009). The humanitarian sector has seen a recent growth of the humanitarian-development-nexus approach which seeks to bridge the gap between short-term and long-term assistance (Ridell, 2014). Although the existence of humanitarian and development assistance has saved many lives and livelihoods, it is not without major weaknesses and failures (Ridell, 2014). It remains rooted in the colonial power dynamics traceable to the origin of the humanitarian system where Global North actors oppress those in the Global South (Rejali, 2020). Historians have shown the similarities between the colonial and the international development projects, the latter being a continuation of the European's ancient mission of civilizing the rest of the world (Muschik, 2018). In this reading, the current humanitarian system remains centralized as Global North actors retain control over what's best for those that have not yet developed a Western[2] understanding of quality living.

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[2] In this report, when we use the term 'Western,' we are referring to the Global North. The Global North as a concept encompasses wealthy regions such as North America, Europe, and Australia.

The centralization of the current humanitarian funding scheme is evidenced in the fact that the largest donors who provide over 90% of official humanitarian assistance are all Western (Collinson & Elhawary, 2012). The structure of funding within the humanitarian and development sector is rather top-down, as governments distribute aid either directly to other governments or to the UN and similar institutions instead to grassroots organizations (Donini & Maxwell, 2014). In fact, the six UN agencies, the ICRC, and some federations of international NGOs (INGOs) account for 80% of the humanitarian spending (Els and Carstensen, 2015). By some estimates, only 0.2% of international humanitarian assistance reaches local organizations (Mosslemans, 2016). The predominance of Western funding within the sector has led to the humanitarian system being dominated by Western values and interests. Often, government donors subsidize their own national corporations and promote a liberal agenda that align with Western foreign policy aims (Lagan, 2018; Donni & Maxwell, 2016).

There have been efforts to address this undue centralization. Over fifty of the biggest donors and humanitarian organizations worldwide signed the 'Grand Bargain' commitment in 2015, which included the target of localization; this target is defined by ensuring that 25% of global humanitarian funding is channeled as directly as possible to national and local responders by 2020 (IFRC, 2018). However, the Grand Bargain has majorly failed since, in 2019, only 0.5% of tracked funding was directly financing local NGOs (Global Humanitarian Assistance, 2020). To counter the asymmetry between international and local actors, some NGOs and IOs have adopted the Local Humanitarian Leadership (LHL) approach, which recognises and supports the leadership of humanitarian actors who are as close as possible to the affected communities (Oxfam, 2023). However, this effort still falls short as Sullivan (2022) highlights that the shift to support local organizations fundamentally conflicts with the driving interest among Global North donors and IOs to preserve their global influence; as localization dismantles the hierarchies embedded in today's humanitarian system.

Apart from funding scheme controls, Western actors also tend to devalue local knowledge with how they perceive competency for leadership roles. The humanitarian system continues to be steeped in racism and paternalism as those deemed competent and knowledgeable for leadership are often the Western people who have credentials from accredited institutions in the Global North (The New Humanitarian, 2021; Barnett, 2020). Rejali (2020) further shows how these humanitarian organizations work "for" and not "with" communities; they act in a neo-colonial manner in which the Western elites who are least likely to be affected by their own decisions are making them on behalf of the beneficiaries, taking away the latter's agency (ICRC, 2018). The limited participation of local populations and the deficient amount of attention paid to the local context result in the suboptimal implementation of development projects (Ridell, 2014).

To make matters worse, there is barely sufficient data and unclear baselines that could be used to evaluate the success of humanitarian projects (Ridell, 2014). This makes it challenging to measure the long-term impact of projects on a community-level and renders sustainability of projects often neglected (Jayawickrama, 2018). Many humanitarian actors have criticized that the fast-paced, top-down, and resource-heavy program cycle is not conducive to long-term projects (Jayawickrama, 2018). Instead, IOs establish new crisis response structures that are often foreign to locals and with little accountability mechanisms that answer to affected populations and elected local officials.

Ultimately, the current humanitarian system has on several occasions failed to serve those who are most vulnerable in a sustainable and dignified manner. It seems that the system could benefit from an overhaul to deconstruct the neo-colonial legacies embedded in its modus operandi. The section that follows outlines the potential pathways for change.

6.2. Responses to the critiques

A change in the humanitarian system first and foremost requires localization, which refers to giving major agency to local actors including NGOs, civil society groups, governments, and community leaders (The New Humanitarian, 2019). These actors usually possess more contextual knowledge and could respond to local crises in a faster, less costly, more community-specific, and legitimate manner (the New Humanitarian, 2019; Slim, 2020).

Localization is also related to power. To localize means that international and western-based actors must delegate some degree of decision-making power to local parties. While in the humanitarian sector, participatory programs and localization are relatively recent topics, the concept of people power was already developed by many experts working in poverty reduction and development (Chambers 1983; Cernea 1992; Slim 2020). A people-centered approach involves identifying who and where the most marginalized and affected people are before working with these individuals and communities in the formulation and implementation of assistance (Rejali, 2020). Humanitarian workers must acknowledge the heterogeneity of the community composition and beware of the political nature of people-centered approaches (Slim, 2020).

The next step is to act equitably and take a proactive approach to tackle systemic racism. Humanitarian organizations must adopt such an approach within its own organizational structure to remove systematic forms of privilege and discrimination that might perverse into its operations. An equity-driven approach must respond to multiple intersections of inequalities, on the basis of an intersectional perspective that

humanitarian organizations should collect and analyse racially, sexually, age-wise, and disability-disaggregated data (Rejali, 2020).

Thirdly, inclusivity is essential. Local organizations should have direct access to program management and delivery tools and systems. Local staff should be trained, equipped with skills and expertise on the ground. This helps lower capacity barriers, support management, and program quality at the point of delivery.

Finally, the corruption in the humanitarian sector and misappropriation of funds must be addressed. More transparency in the delivery of assistance would give donors more security in donating. Transparency is also crucial in terms of information provision, especially on how data can be used to report impact and results.

The next section will turn to blockchain and examine its theoretical implications within the humanitarian sector.

6.3. History of Blockchain and Web3

Blockchain refers to a fully distributed system for cryptographically capturing and storing a consistent, immutable, linear event log of transactions between network-linked actors (Gupta, 2022) . The result is similar to a distributed ledger that is consensually kept, updated, and validated by the parties involved in all the transactions within a network. In such a network, blockchain enforces transparency and guarantees eventual and system-wide consensus on the validity of an entire history of transactions (Risius & Spohrer, 2017). The first practical use of such technology came in 2008, when a white paper published by an anonymous developer under the pseudonym of Satoshi Nakamoto theorized the concept of Bitcoin and cryptocurrencies running on a blockchain infrastructure (Nakamoto, 2008). 2014 was an important year for blockchain. Among other landmark developments, the first stablecoin, a type of cryptocurrencies that maintain a stable value against a pegged external class, minimizing price volatility (Gondek, 2020), was released on the market. This paved the way for the current use of blockchain in humanitarian aid delivery through DCA projects such as Umoja's pilots. Nowadays, blockchain and its multiple applications make up the foundation of the so-called Web3: a fully decentralized and transparent system which operates using incentives and economic mechanisms instead of relying on third parties to ensure trust (Ethereum.org, 2014).

6.4. Blockchain in humanitarian aid delivery

6.4.1. Applications

Blockchain, characterized by immutability, transparency, and the absence of a central node in the network, can be employed for multiple purposes, ranging from cross border payments, trusted digital identities, supply chain management and aid delivery. Multiple UN agencies have active blockchain projects as of 2020 (Dumitriu, 2020). One of the most notable ones is 'Building Blocks', which started as a pilot led by WFP in 2017 and has now grown to the world's largest implementation of blockchain for humanitarian assistance (WFP, 2022). In 2017, WFP began the pilot in the UNHCR refugee camp of Azraq, Syria. Under the pilot, featuring 10000 participants, transactions to food merchants were processed as a debit from a virtual wallet held on a decentralized blockchain which worked as a digital ledger. Transactions were validated through an iris-scanning technology that was already employed in the camp, removing the need for cash, vouchers, debit cards or smartphones, thus reducing the risk of theft. By 2018, Building Blocks provided more than $ 1 million through 100,000 transactions, reducing local banking fees by more than 90%. Blockchain has been used in other pilots for DCA, which will be the focus of this paper in its use in the pilots of Umoja Labs. Similar programs have also been set up by Oxfam in its 'Unblocked Cash project' (UBC), which has so far been a success, serving more than 35000 beneficiaries in five countries and delivering more than two million dollars through blockchain-based solutions involving more than 15 regional NGOs (Oxfam International, 2022).

6.4.2. Implications

It is noteworthy that the application of blockchain in the humanitarian aid sector has transformative implications, both negative and positive.

First, the most critical feature of blockchain, **decentralization**, takes place across at least three axes: the financial, political, and social (Anderson, 2019). Each will give rise to a different benefit. Financially, Web2, or the Internet as we know of, relies on a client-server architecture whereby the companies offering hosting services on servers leverage the financial value within the stored data of the users. This leaves us in a world where a few big tech companies control the Internet and profits from centralisation. Blockchain, instead, stores data in each node within the P2P network, allowing each participant to gain ownership of data and opening the possibility for a new internet architecture (Anderson, 2019). This is what Satoshi imagined when he developed the concept of cryptocurrencies, serving as the bedrock of decentralized finance (DeFi). The latter refers to a type of financial system where financial

instruments are offered without a broker or an intermediary. Extending from this, there will be an unprecedented degree of **transparency** with regard to data and how resources are allocated.

Politically, the traditional client-server model renders control and intervention relatively easy. With blockchain, as there exists no central point that regulates which information gets to be recorded in the network, the latter is more resistant to censorship (Anderson, 2019). Stemming from this, all participants of the network would enjoy more **agency** in deciding how they act within the network.

Socially, blockchain revolutionizes social interaction through the decentralization of actors. Any individual could access this network and interact with other network users at a high level of trust. Blockchain is a "trustless" network since no financial institutions or central authorities are needed to imbue the system with "trust"; the system itself is so secure that no one could tamper with a made transaction (Amler et al., 2021). Blockchain has the potential to facilitate large-scale collaboration by making it close to costless for strangers to coordinate without insecurity (Anderson, 2019), essentially reducing transaction costs (e.g. time or resources in establishing trusts) compared to the traditional method. This community-driven aspect of blockchain will permit the **localization** of benefits, which we will elaborate further later.

Decentralization, **agency**, **localization**, and **transparency** become the four ways in which blockchain could affect humanitarian assistance and, potentially, decolonizing it. However, its implementation in reality paints a more nuanced picture.

Decentralization means that there is no central authority controlling and hindering aid delivery processes. A donation in a conventional humanitarian aid delivery journey starts from donors and goes through INGOs, local NGOs, smaller community partners, etc. before reaching the final recipients (Bulanda, 2021). Funds being transferred through many hands creates many entry points for a myriad of actors to influence fund allocation; each organization might have different agendas and mandates, and, therefore, direct funds accordingly. In the meantime, aid transfers going through international financial and banking systems might incur both costs for aid delivery and exclusion of the most marginalized (Kshetri, 2017). For instance, in crisis-stricken countries, many underprivileged citizens might not have access to bank accounts (Oxfam International, 2022). This gives much more financial control to international finance and banking systems, only allowing those more privileged beneficiaries playing by the system rules to benefit from aid. With blockchain, aid could go directly from donors to recipients, eschewing the problem of multiple actors making opaque decisions (Bulanda, 2021).

Nevertheless, this advantage might be discounted by how a specific blockchain application is constructed and used. Scholars have identified a few applications that

embody the concept of "colored coins," which means that moral principles and ethics can be embedded in the design of a blockchain application (Zwitter & Boisse-Despiaux, 2018). One empirical example will be the CarbonCoin, which is designed to engage with environmentally-conscious communities, promoting transactions between customers and vendors who have met strict ethical criteria (*Carboncoin*, n.d.). So, relying upon blockchain alone to decolonise aid overlooks the fact that technology without careful design and deliberation often "reproduces current political situations" (Zwitter & Boisse-Despiaux, 2018).

The second advantage of blockchain would be the **transparency** of the network which could expose any corruption. As discussed, blockchain already reduces the number of actors involved in the aid delivery process, thereby decreasing the chances of misusing funds. Tracking the flow of humanitarian aid and spotting fraud or corruption is made possible (Kenny, 2017). However, the flip side of such transparency will be the concerns of privacy and data protection, particularly when personally identifiable information is processed (Zwitter & Boisse-Despiaux, 2018). Extra efforts, such as anonymisation of recipients' identities, must be put in place (Chen, 2018; Zwitter & Boisse-Despiaux, 2018).

Third, participants theoretically have the full range of flexibility in determining the usage of their aid. Blockchain-supported cryptocurrency does not discriminate by the content, value, sender or recipient of the transaction; rather, it needs no authorisation from anyone and is immutable once recorded (Antonopoulos, 2016). Recipients and collaborating vendors in any given project potentially have the **agency** to engage in transactional activities without the interference of the project manager. Blockchain-enabled projects could circumvent the colonial legacy by removing a higher figure that enforces their own ideals on how aid should be spent. Nevertheless, there are limits to the extent recipients could exercise their agency depending on how blockchain is implemented. On the surface level, the access to digital tools and digital literacy of participants might bar out those who do possess neither, defeating the purpose of giving agency to even the most vulnerable. Furthermore, experimenting new technologies on the most vulnerable communities in the name of digitalisation would only strengthen the colonial paradigm, as if the now technologically capable developed world knows best.

Lastly, the community-driven and **localization** aspect comes from blockchain's P2P nature. In humanitarian assistance, donations could then reach even the marginalized recipients that are typically excluded from economic and financial activities. Especially in vulnerable environments, local actors do not always have access to ATMs, and holding a huge amount of cash may be unsafe. Blockchain will enable marginalized people to participate in the economy, foster a trusting community, and even retain knowledge of emerging digital tools.

These are all decolonial promises that blockchain is said to bring to humanitarian aid delivery; nevertheless, the theoretical prospect must be balanced with empirical evidence. Our study builds on top of the expert expectations of blockchain and examines if such a technology achieves the decolonisation goal of humanitarian aid.

7. Methodology

7.1. Research design

The research design comprised a mixed-method approach of qualitative and quantitative evidence as this is considered best practice in assessing humanitarian programs, thus increasing the relevance of the outcome of this research project (ACAPS, 2012; UNOCHA, 2022). The qualitative data collection consists of interviews with three different stakeholders: 1) recipients and vendors involved in the pilot, 2) the Umoja Labs staff, and 3) the NGO staff on the ground managing the project. The quantitative data used is the anonymized transaction information from the pilots. It served as a support to the qualitative analysis as transaction data was explored with the aim of finding relevant statistical trends that could help answering the previously defined sub questions.
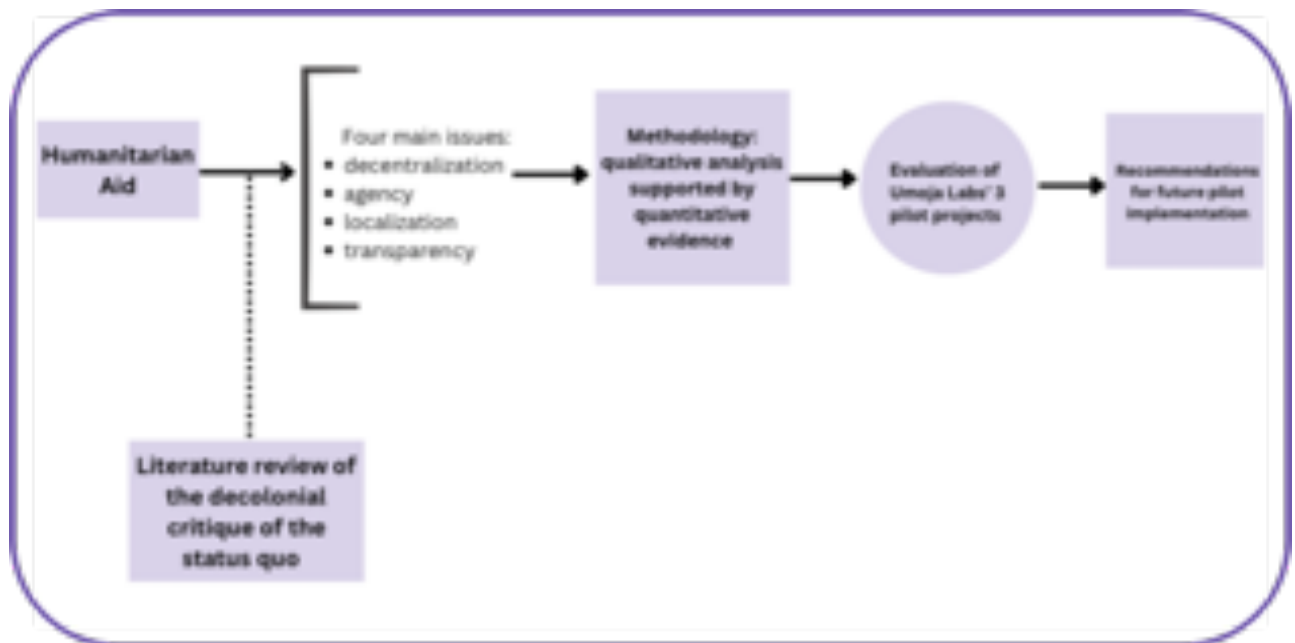
The sampling method adopted by this research study was a mix between convenience and purposive sampling (Etikan et al., 2016; Campbell et al., 2020). Subjects were selected by both close proximity to the researchers as well as their knowledge or lived experience in the pilots. These two sampling methods were deemed appropriate given the limited available resources and the time constraints for conducting interviews. However, as mentioned by Etikan et al. (2016), purposive and convenience sampling methods are non-probable and thus are not free from bias, which may lead to the exclusion of appropriate subjects or the overrepresentation of certain others. The first and third group outlined above were selected as they hold important insights on the lived experience of the implementation of the pilot. The second group covered expert informants on the ability of blockchain to operate within the humanitarian context.

The qualitative data collection took an iterative approach of sampling and re-sampling as the methodology and interview questions were adapted over the course of the research. Our data comes from interviews that we attended or conducted, transcribed and coded for a total number of twenty interviews. At the beginning, our team supported the Umoja staff in their interview process for the CARE Ecuador and SC Vanuatu pilots. This consisted of participating and transcribing the interviews and analyzing the quantitative data obtained from the Umoja platform. Afterwards, our team developed our own methodology, based on the four identified criteria. We formulated guiding questions that operationalized the four criteria based on what they

mean for the three stakeholder groups (see *Table 1.*). These guiding questions were further turned into a set of interview questions for each group. The last step involved establishing coding categories that were used to organize and systematically analyze the interviews conducted by the team, as well as the interviews conducted by the Umoja staff. The codebook was developed in an abductive manner where codes evolved from the data as well as from a theoretical standpoint that defined the parameters of what the researchers were looking for (Thompson, 2022). The codebook and the interview questions can be found in the appendix. Ultimately, it was the insights gained from the qualitative data that drove the individual pilot analysis and the cross pilot analysis.

7.2. Rationale and evaluation criteria utilized

Graph 1. shows the conceptualization process behind our research design: after a careful literature review, the team has extracted four main issues related to the current state of affairs in the humanitarian sector—namely **transparency**, **agency**, **localisation** and **decentralization**, which will become the main criteria for evaluating the pilots. Due to the fact that the H4H Haïti pilot was still ongoing during our data collection stage, we will only conduct thorough evaluations on the CARE Ecuador and the SC Vanuatu pilots. *Table 1.* shows the operationalized questions based on the four criteria for each stakeholder group.

Graph 1. Methodology design process.
(Source: Our research team.)

Unit of Analysis	Criteria				
	Decentralization	Agency	Localization	Transparency (data)	Transparency (resources)
Implementing partner (local NGO)	1. Did the use of blockchain enable the local NGO to deliver aid independent of nonessential third parties that are common within the hierarchy of the traditional humanitarian system and within the financial system such as banks?	2. How did the local NGO balance between giving recipients enough agency in deciding the form and usage of aid and fulfilling its programmatic objectives? 2a. How much agency did the local NGO have in the decision-making process vis à vis Umoja Labs?	3. Was the pilot designed with the aim of engaging and stimulating the local economy?	4. In the collection and processing of data, did the local NGO ensure the protection of personal data and remain transparent about their methodology?	5. Has the local NGO been transparent on the source of funding and resource allocation for the pilot?
Intermediary (Umoja)	6. Did the use of blockchain decrease organizational inertia in centralized institutions and increase efficiency in the management of the pilot (low administrative and transaction costs)? 6a. To what extent were the decision-making processes within the pilot decentralized and driven by the end user of the aid?	7. What was the degree of involvement of local people in the pilot? 7a. Did the intermediary provide the local NGO and recipients with sufficient knowledge of the technology being used in the pilot? 7b. How has the intermediary worked to develop a relationship with the local NGO based on equality?	8. What was the rationale behind participants' and vendors' selection in the specific contextual conditions of each pilot?	9. Did the use of blockchain enable the collection of anonymized and granular data through real-time transaction monitoring?	10. Has the intermediary been transparent on the source and allocation (including choice of pilot participants and donors) of funding through the pilot management?
Aid recipients & vendors	11. Did the use of blockchain enable participants and vendors to exchange money in an agile, secure and efficient way?	12. What degree of freedom do recipients have in spending the digital voucher?	13. Did the knowledge provided on blockchain help foster the use and culture of blockchain and De-Fi? 13a. What were the impacts of using the Umoja platform on the local economy?	14. To what degree were recipients able to see how much they were spending and how their data was treated?	15. To what degree were recipients aware of the resource allocation and selection procedure in the respective pilots?

Table 1. Operationalized questions based on four criteria for each stakeholder group.
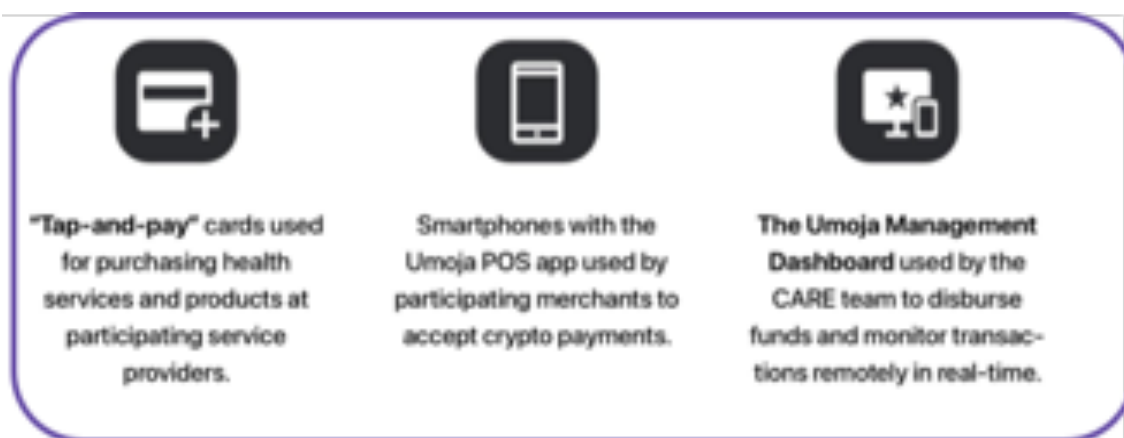*(Source: Our research team.)*

8. Contextualizing the pilots

8.1. General overview

This research project focuses on three DCA pilot projects carried out between January and September 2022 in Ecuador and Vanuatu, in addition to an ongoing pilot in Haiti, ending in November 2022. In spite of the pilots possessing different characteristics dictated by the context, all of them share **three core elements:**

1. They were all designed as DCA projects, meaning that aid recipients received either a lump sum or a recurrent transfer of digital money they could spend on certain products or services.

2. They were all conducted in fragile contexts and selected aid recipients belonged to vulnerable groups of the population.

3. The three pilots were run on the Umoja platform, a blockchain-based environment running on stable coins (a type of cryptocurrencies) which allowed for different functions relying on different products as shown in the infographic below.

"Tap-and-pay" cards used for purchasing health services and products at participating service providers.

Smartphones with the Umoja POS app used by participating merchants to accept crypto payments.

The Umoja Management Dashboard used by the CARE team to disburse funds and monitor transactions remotely in real-time.

Graph 2. Overview of Umoja product.
(Source: Leveraging the Power of Cryptocurrency to Improve Humanitarian Outcomes in Ecuador. Umoja, 2022.)

8.2. Ecuador pilot

From January to March 2022, CARE Ecuador[3] ran a DCA program to improve the access to health services and products to 250 vulnerable persons, most of whom female. The program served as an operational proof that a blockchain-based strategy could improve the efficacy of humanitarian systems. The pilot primarily targeted migrant Venezuelans in Ecuador.[4] Several pilot participants had made long journeys and crossed borders illegally to avoid strict border lockdowns and visa restrictions. These groups–women and children in particular–are exposed to high risks of exploitation, trafficking, and sexual abuse. CARE Ecuador thus sought to assist those who had little to no access to the country's healthcare system.

CARE Ecuador distributed cryptocurrency allowances to each recipient using the Umoja platform, with NFC cards pre-loaded with a balance between US$100 and US$150. Recipients, after training on the use of the cards, could spend the allowances at small local businesses that participated.
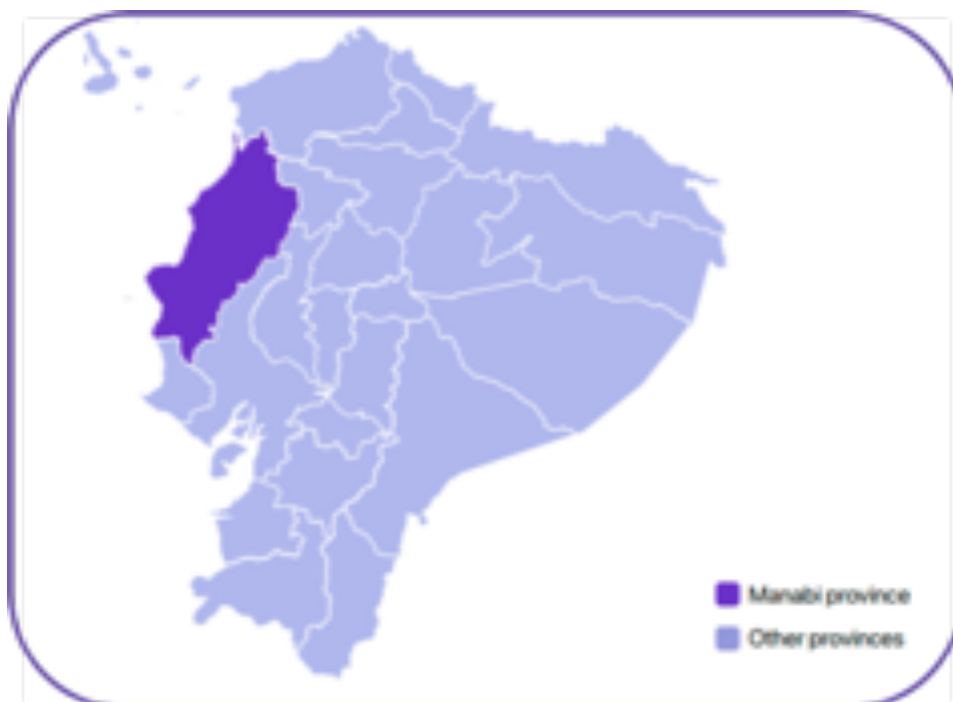

Image 1. Location of Manabí Province in Ecuador.
(Source: Aid Delivery: Digital Cash Assistance with CARE Ecuador. Case Study.
Umoja, 2022.)

Pilot design

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[3] See Appendix section 11.1.1 for more information on their NGO structure.
[4] See Appendix section 11.1.1 for more information on the operational context of this pilot.

CARE chose Ecuador as a pilot country on two primary criteria. First, during the past few years, the CARE office in Ecuador has provided cash distributions to assist with the humanitarian response in Ecuador. In fact, CARE's response in Ecuador has made providing monetary assistance one of its primary programmatic focuses. Second, the Venezuelan Crisis has turned into one of the neglected crises during the past few years, garnering significantly less funds for humanitarian relief. The CARE office in Ecuador has been vigorously working to diversify funding sources as financing from regular governmental contributors has been rapidly declining.

As far as the aim of the pilot is concerned, strategically, the three pilot partners' main objective was to add to the body of knowledge on the application of DCA in order to encourage wider adoption of this technical innovation within the humanitarian sector. In addition, CARE sought to demonstrate its operational readiness to efficiently handle blockchain-based solutions as part of its strategy for program innovation.

Funding flow

The project financing for this pilot is summarized in *Graph 3.*
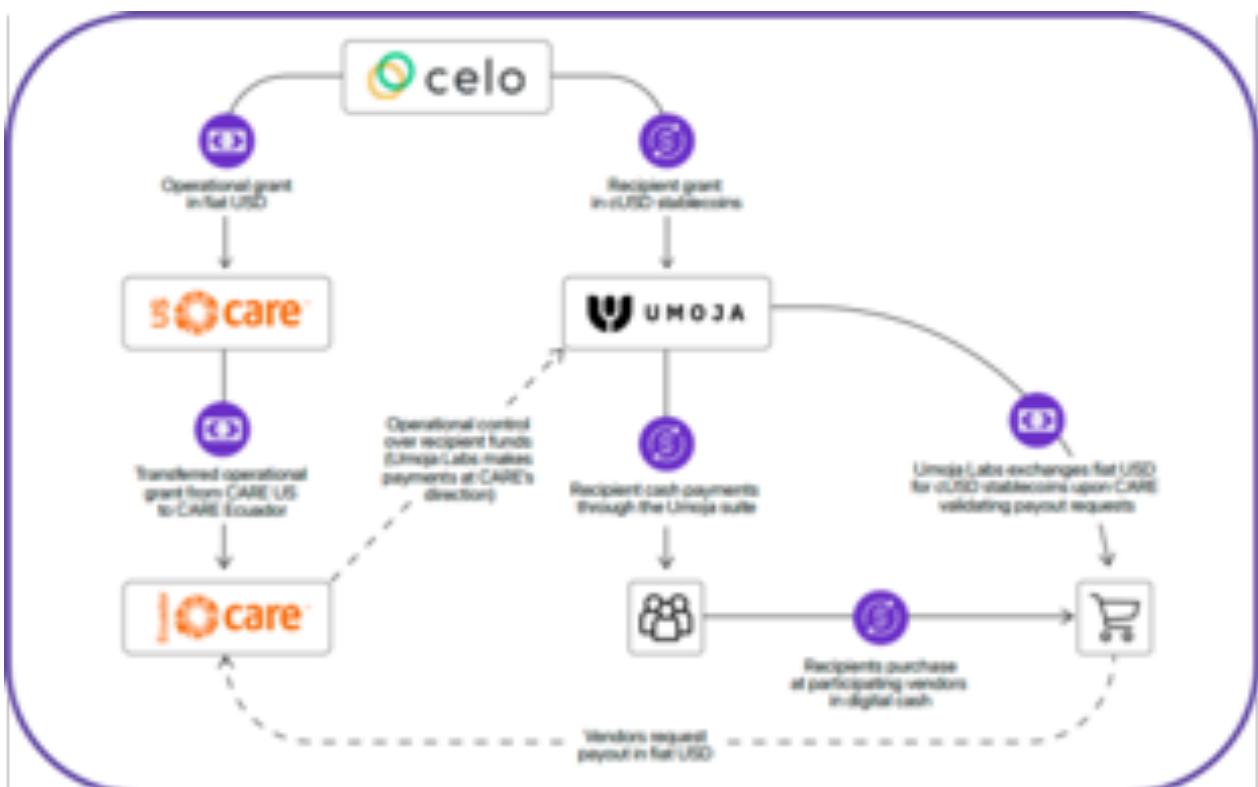
Graph 3. Pilot funds flow scheme.
(Source: Aid Delivery: Digital Cash Assistance with CARE Ecuador. Case Study.
Umoja, 2022.)

8.3. Vanuatu pilot

The DCA pilot project in the Pacific archipelago of Vanuatu was carried out between March - April 2022 and saw the collaboration between Umoja Labs and the NGO Save The Children Vanuatu (SC)[5]. The project was aimed at helping SC understand the feasibility of Cash Transfer Programmes (specifically DCA) in Vanuatu, as well as to help the incomes of vulnerable households affected by Covid-19 (Umoja Labs, 2022). Vanuatu is a small country situated in the South Pacific Ocean made up of roughly 80 islands.. In 2019, 16% of the population was living under the national poverty line (ADB, 2019). The COVID-19 pandemic saw the situation worsening because of strict border controls and movement limitations.

Image 2. Map of Vanuatu.
(Source: The Economist Intelligence Unit.)

Pilot design

The project was crafted as a month-long pilot where recipients could spend a one-off fixed amount of 20000 Vatu (approximately 240 Australian dollars) at 4 different big market chains. Recipients were able to use a value voucher, which means they could

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[5] See Appendix section 11.1.2 for the NGO structure of Save the Children

decide which items to buy, with the exception of alcohol and cigarettes. Five municipalities with high socioeconomic vulnerability in Port Vila were designated to participate.   The COVID-19 restrictions hampered the selection procedure of beneficiaries, and instead recipients were selected from a past Vanuatu SC roster list according to the following vulnerability criteria:

- Recipient household must be female headed
- Household must have a high dependency ratio
- Household must not have tenure on its land
- Households must be situated within the selected vulnerable areas.

The selection outcome led 82 mothers to take part in the pilot (Umoja Labs, 2022).

Funding flow

The project was funded by Australian Aid, which is part of the Australian Department of Foreign Affairs and Trade. The pilot was divided in two sub-pilots, one using standard CVA, with money being provided to recipients through the Bank of the South Pacific (SC, 2022) and the DCA one, in which the whole funds where received by SC from the donor and where subsequently transferred to the beneficiaries' digital wallets— i.e. NFC cards— through the Umoja platform (Umoja Labs, 2022).

Graph 4. Funding flow for Vanuatu pilot.
(Source: Umoja Labs, 2022.)

8.4. Haïti Pilot

The pilot project in Haiti[6] lasted from April to November 2022. It features a collaboration between Umoja Labs and the NGO Hope For Haiti (H4H)[7]. To note, Hope for Haiti is one of the few NGOs currently operating in Haiti that accepts donations in cryptocurrency. The project is aimed at supporting the income of a number Haitian families (Umoja Labs, 2022), as well to test the use of blockchain-based DCA in humanitarian assistance and train the NGO staff in this modality.

Pilot design

The current pilot project distributed a total of $90,000 to target food-insecure households led by mothers that were also part of the NGO's nutritional program. Recipients received the sum of USD 50 per month on their Umoja card to be spent on any kind of good besides tobacco and alcohol. 32 vendors were selected for the pilot after a focus group where recipients expressed their preferences and the following selection criteria were adopted:

- Shops near to healthcare facilities
- Size: small and mid size stores (86%), big stores (3%), street vendors (11%)
- Sells a variety of products: 72% sell nutrition products, 68% food, 65% hygiene items, 34% school supplies, 66% pharmaceuticals, 3% are wholesale, 2% shoes/clothes.

The vendors benefitted from an integration between the Umoja suite and the local online banking app "MonCash", which allowed them to receive the money in the local currency from the pilot's sales directly. The selection process led to approximately 300 mothers participating in the pilot in the designated area area of intervention comprising Route Brefete, Derriere Fort, Wharf Masse, La Savanne, Grand Rue, Around the Foyer Saint-Etienne, The Boulevard and Vernet (Umoja Labs, 2022).

Funding flow

The project had two donors: one was Celo foundation, a US-based NGO whose mission is to build a financial system based on decentralized finance that creates conditions for prosperity for everyone (Celo, 2021). Celo foundation contributed an amount worth 3 months of pilot duration. The second being Coinbase, which funded a

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[6] See Appendix 11.1.3 for more information on the operational context of this pilot.
[7] See Appendix 11.1.3 for more information on the structure of this NGO.

further 3 months, thus extending the pilot's duration to 6 months in total. Program funds were loaded into Umoja´s Management Dashboard Master Wallet. HFH disbursed funds to 300 recipients, sending $50 (5300HTG) to their digital wallets each month. Recipients went to the stores enrolled in the program with their NFC cards, whereas merchants had the Umoja Commerce App installed in their mobile phones to use as a Point of Sale device (PoS). Once a week, vendors could submit a cash out request in their local currency through the Umoja Commerce app to their preferred payment method (Umoja Labs, 2022).

9. Analysis

	Pilot figure	Spending patterns
CARE Ecuador	Number of recipients: 250 Number of vendors: 8 Spending window: 17/1/2022 - 10/3/2022 Total disbursement: US$30,000 Distribution per recipient: US$100 or US$150 (over 1 installment)	Total spending (percentage): US$29,755 (99%) Total transactions: 1107 Average spending per recipient per transaction: US$27.95 Most purchased product categories: 1. Other medicines 2. Hygiene and cleaning products
SC Vanuatu	Number of recipients: 82 Number of vendors: 4 Spending window: 20/6/2022 - 29/6/2022 Total disbursement: 1,806,640 VT (AU$21,983.93) Distribution per recipient: 20,010 VT	Total spending (percentage): 1,629,308 VT (AU$19,824.48, 90%) Total transactions: 203 Average spending per recipient per transaction: N/A Most purchased product categories: N/A (categories of products were not set)
H4H Haiti	Number of recipients: 300 Number of vendors: 32 Spending window: 5/5/2022 - 17/10/2022 Total disbursement: US$90,000 Distribution per recipient: US$300 (over 6 installments)	Total spending (percentage): 8,510,641 HTG (US$80,289.06, 89%) Total Transactions: 3386 Average spending per recipient per transaction: 4,953.66 HTG (US$46.73) Most purchased product categories: 1. Long-life food 2. Hygiene products 3. Dairy and milk

Table 2. Pilot summaries.
(Source: Umoja Labs, 2022.)

9.1. Individual pilot analysis

9.1.1. CARE Ecuador

Decentralization

What comes with decentralization is, as promised by blockchain, an increase in efficiency as there is no central control that takes time to approve any action taken by the participants. Umoja's blockchain-assisted payment systems should supposedly enhance the efficiency between recipients' and vendors' interactions. However, this

was not always the case during the pilot. Many interviewed participants mentioned a rather long waiting time during transactions for various technical reasons. Firstly, the Umoja system broke down multiple times at the same pharmacy. In addition, vendors were only given one phone to conduct the transactions, limiting them to serve one customer at a time. Thirdly, the system was rather inflexible as vendors could not easily make changes to the transaction without reentering the whole bill.

> "Many people came and wanted to spend all their credit at once. This always took a lot of time, because we had to enter each product one by one into the application. Now imagine, after an hour of servicing a customer we get an error message at the end of the whole process. That's a whole hour lost for nothing."
>
> Vendor

These technicalities do not reflect the merits of blockchain in increasing efficiency or decentralization but rather the capabilities of the Umoja products. Unlike cash which is accepted everywhere, card payments increased the degree of control the vendors have as they could turn down card payments. Some recipients also felt like they had less control over price. Since the pilot had only a few pre-selected collaborating vendors that accepted Umoja cards, recipients did not have any alternatives. They were then subjected to limited products and higher prices. On the bright side, participants did mention efficiency improvements. The blockchain-based transactions got rid of the financial institutions as the middlemen. The payment method was considered more practical and faster as there was no need for the bank to approve transactions. For the vendors, as payment verification was done securely and automatically, they could cash out their income way quicker and more frequently. For the recipients, they didn't have to travel all the way to an ATM and withdraw cash either.

For CARE Ecuador, the efficiency gains from decentralization were even more pronounced. As aforementioned, running all transactions on the Umoja Management dashboard allowed the real-time collection of information and automatic payment verification. This reduced the need for manual verification, time spent on paperwork, the costs of sending people to collect invoices, and the number of actors needed in the middle of transactions. As a result, CARE Ecuador could distribute cash to the recipients with a few keystrokes and allow vendors to receive their income by cashing out at the beginning of every week instead of every 15 days, hugely increasing the efficiency of the overall pilot. Nevertheless, the above form of decentralization only happened across one axis that involved financial actors.

A further inspection into how decisions were made before the inception of the pilot showed that there was still a high degree of centralization of decision-making power

in the hands of other third parties. Most importantly, the decision of taking on a blockchain-assisted pilot was not one that was made by CARE Ecuador, instead it was CARE USA (the global headquarters) who wished to test out using the lure of cryptocurrency in humanitarian assistance to attract new donors. Once the collaboration between CARE USA and Umoja was confirmed, CARE Ecuador was handed this pilot amongst many other ongoing projects. The local team was not consulted about whether it had the capacity or interest in carrying out the blockchain pilot. Moreover, CARE Ecuador was also not given the same weight during budget allocation. Its request for an extra staff member was not approved. This spoke to the fact that the usage of blockchain does not guarantee the decentralization of humanitarian aid delivery; how the technology is embedded in the overall program and organizational structure can also determine what is decentralized and what is not.

Agency

One of the core promises of blockchain is to grant its users a greater degree of agency. We first consider how the design of CARE Ecuador's pilot exposed recipients to a series of constraints in terms of freedom of choice. Recipients were limited in spending their money only on medical products and services due to the predefined purpose of this pilot, which was embedded as a part of CARE's ongoing Sexual Reproductive Health program. Some chosen pharmacies had a smaller range of items and higher prices compared to the ones which the recipients normally use.

> "Freedom may have been influenced by the low number of suppliers able to accept our card. Of the ten selected suppliers, eight were able to process payments and accept purchases. Many of them did not have the same variety and product offering as the big chains, so this also became a limitation of freedom: recipients were sometimes unable to find the products they wanted to buy."
>
> **CARE Ecuador Staff**

On a more positive note, recipients did report a greater sense of independence with the card as they didn't have to go through the logistics associated with cash withdrawals. Such pilot designs are external influences on the recipients' exercise of agency. On the other hand, how participants exercised agency could be affected by how they internalized the technological knowledge of the products, or in other words, how much they understood the products that they were using. Before the pilot began, participants were given training on the Umoja products, and most people found the training satisfactory.

We now turn to analyze how CARE Ecuador balances achieving its programmatic objectives and giving participants agency. The dilemma is that CARE Ecuador has two objectives, one humanitarian and the other technological, and these two objectives

have differing impacts on the participants' agency. From the previous analysis, it is apparent that the immediate humanitarian objective, to fill the gap in health services for the most vulnerable, limited the agency recipients and vendors could exercise with regard to aid. We then look at the technological objective of CARE Ecuador, which is to conduct technologically innovative programs through blockchain for both funding and operational purposes.. To begin with, the usage of blockchain already creates barricades for people who lack access to mobile phones, services, and internet connections. Those who were given access due to this pilot still did not possess sufficient knowledge in using digital tools, which reduced participants' level of trust in them. Some recipients expressed distrust in DCA, leading them to spending it all at once.

However, other recipients expressed that blockchain-enabled DCA made it safer for them to transact, which enhanced their agency. In the context of Ecuador, carrying a huge amount of cash or withdrawing from an ATM can generate security risks, especially given that the majority of pilot participants were female. In cases of domestic abuse, the abuser could also steal cash from participants. The Umoja products run on blockchain removing the need to carry cash. If the Umoja cards were stolen, participants could immediately report to CARE Ecuador and have the cards blocked. On another note, blockchain DCA also reduces the risks of fraud by vendors, as the latter could not alter transaction records and CARE staff could monitor all transactions in real-time.

We also considered the agency CARE Ecuador could exercise vis-à-vis Umoja. In general, many CARE Ecuador staff members pointed out the difficulties in communicating with Umoja due to language barriers, planning issues, and time constraints. Another problem raised was the difficulty in agreeing on the features to be implemented. Some staff members felt that the implementation of the pilot project added a bigger burden on the local team. On top of that, the initial design of Umoja platforms did not correspond perfectly with the usual needs of CARE Ecuador. One staff cited the difficulties to go back and forth with the Umoja team on adapting the platforms to the logic of humanitarian assistance. This showed that CARE Ecuador was not able to exercise much agency over the design of technical products. Nevertheless, the collaboration improved over time, and the tech team of the NGO also developed new skills.

Localization

The localization of the pilot hinges on whether all the benefits generated by the intervention return to the community. In terms of economic benefits, vendors, mostly regional providers, indicated that their income increased by participating in this pilot. In terms of the digital inclusion of participants, the results were more nuanced. On one hand, the participants who were usually barred from digital means of transaction are

now familiarized with it. With the training that CARE Ecuador gave, the participants became comfortable with operationalizing cards for making all sorts of purchases. This could be a critical foundation for them to further partake in digital economies. On the other hand, it seemed that participants were not particularly trained on the theoretical knowledge of blockchain. Many said that they have never heard of blockchain before and still don't know the link between Umoja and this technology. During the training phase, only the vendors were informed briefly about how Umoja products were based on blockchain, not the recipients. While this might be a minor missed opportunity, it overall neither impeded the participants' experiences nor their capabilities to utilize digital tools for their own benefits.

CARE Ecuador chose local pharmacies instead of big chains as vendors in the pilot in order to dynamize the local economy. Another objective of the pilot project aimed at digital inclusion. CARE Ecuador stated that its technical team developed new skills with respect to the technological aspect of humanitarian assistance. In addition, some individuals within the program team have done their own research on cryptocurrency and the entire technology behind it, recognizing the added value of this technology. The pilot project attracted many providers who therefore showed less suspicion of digital payment and cryptocurrency. Some of the limitations, however, to technology education were as follows. Firstly, there was a lack of explanation of what cryptocurrency is and how it works despite the fact that there was a general interest in knowing more. Secondly, the selection process suffered from the so-called self-selection bias, i.e. only those who were already predisposed to working with technology were selected as vendors.

Successful localization is also reflected by the vision of long-term sustainability. Despite the need to make the platform more accessible, there is an optimistic view of the use of the product in the future. Among the main reasons is the possibility of replicating this type of delivery in Ecuador, CARE Ecuador has in fact confirmed its intention to use Umoja at scale at least for its women's health program. Some CARE Ecuador staff members also favored the use of the platform in other sectors such as shelter and accommodation. Furthermore, as far as the digitization of the humanitarian sector is concerned, blockchain appears to be the most cost-effective to facilitate real-time data collection without third-party intervention and to reduce finance-service-related fees, such as bank fees. Equally important for the long-term sustainability of the project is the interest of traditional US donors (BPRM, USAID, BHA) in funding larger interventions based on DCA.

Transparency around data collection and usage

A major selling point of the Umoja products is that they allow real-time recording of transaction data and hence, increasing the transparency of the pilot. For the participants, if they get to view the data of their own economic activities, they have

the possibility to make informed decisions and better allocate their own resources. During the interviews, vendors confessed that they didn't use many functions the Umoja products provided. In fact, they mentioned several inflexible designs that came with the products. For one, vendors cannot view disaggregated data down to the unit of the products; the application only showed how many types of products were transacted, not how many items were within each type. Further, when vendors processed transactions, they had the choice to catalog items according to categories. The predefined categories listed on the Umoja app were not exhaustive, and some vendors complained that it took more time to manually add new categories to fit their needs. While vendors got to export activity reports to review all their transactions, the inflexibility of Umoja products at this stage seemed to have limited the degree to which they could control how they want transaction data to be collected, accessed, and presented.

The recipients, on the other hand, were not given the functionality to view their own budget at all. All interviewees said that they had to check with the vendors because, after each transaction, the amount left in their Umoja wallet would be shown on the Umoja POS of the vendors. While recipients were comfortable asking the vendors about such information, they felt it troublesome when the vendors were busy. Moreover, if they wished to know how much they had spent on individual items or whether they were charged the correct prices, they had to resort to bookkeeping by themselves as the vendors could only view the total sum. This injected uncertainty for some recipients when budgeting and showed that, at this stage, the Umoja products didn't allow much data transparency for both recipients and vendors.

While the recipients and vendors seemed not to have a clear picture of the data that they generated, the local NGO had full access to all the transaction data on the Umoja platform. CARE Ecuador staff clarified that all participants were informed about the data treatment during this pilot and gave their consent accordingly. While this seemed to have fulfilled the local NGOs' responsibility to remain transparent to their beneficiaries, there was one caveat. One staff member mentioned that Umoja also had access to the transaction data, and it wasn't explained clearly to CARE how Umoja would be using such data. As far as CARE Ecuador staff and their internal operations were concerned, the Umoja platform fared far better than recipients' and vendors' with regard to data-enabled transparency. Many CARE staff stressed the great benefit of being able to monitor in real-time all the transactions, as it reduced unnecessary bureaucratic time. Not only did the staff no longer have to ask each vendor about their sales to see how recipients were using their allocated aid, but the staff could also reconcile payments and allow vendors to cash out far quicker than before.

The speed and accessibility of transaction data helped CARE Ecuador better evaluate the effectiveness and efficiency of its operations and provided information for future improvements. The staff could also study more about the spending behaviors of the participants in real time, examining how they handled financial responsibilities. The Umoja platform still had several inadequacies. One staff mentioned that CARE Ecuador has its own tradition when it comes to tracking of variables and metrics. The needed data management functionalities that would help CARE Ecuador were not incorporated at first into the Umoja platform. When the staff requested some adjustments to the platform later, they were not carried out. The Umoja staff explained that the team over-promised the type and amount of data that the platform could capture, corroborating with the CARE staff's complaint.

Transparency around resource allocation

On the participants' side, when it comes to the transparency of resource allocation and decision-making around such matters, there seems to be a degree of ambiguity. Most of the recipients believed that the selection criteria for those in need of support included medical needs, vulnerabilities (gender and age), or refugee statuses of individuals. At the same time, recipients also felt that there were more who fit the criteria but were left out. They often pointed to someone from their community that also needed assistance but weren't selected. Vendors also expressed some doubts about the selection criteria for vendors as some other interested vendors were not able to participate. In one interview, a vendor explained that CARE's rationale was to support small pharmacies as well as local people in need. This harkens back to CARE's efforts in localizing the economic benefits that came with this blockchain-enabled pilot.

> "I was a little bit suspicious at the beginning as it was the first time I worked with CARE. I asked myself why they did not choose big pharmacy chains. They told me it was to "Killing two birds with one stone": help small pharmacies and people in need."
>
> Vendor

CARE Ecuador's staff corroborated the suspicion of the participants. Especially in choosing health service and product providers, CARE Ecuador prioritized regional providers and, in specific, those who had the mindset to learn and work with new technology. Such decisions were linked with the humanitarian and technological objectives of CARE Ecuador in designing the pilot. In terms of how the project was funded, it was not clear whether participants were informed about it. CARE Ecuador staff explained that the region that they worked with was usually least considered by

traditional donors. One staff suggested that adopting new technologies such as blockchain was one way to diversify funding sources. This shows that the funding decision might have affected CARE Ecuador's overall technological objective to some extent. Staff members confirmed that they knew the money came from Celo Foundation, but no one was sure where Celo's money came from.

9.1.2. SC Vanuatu

Decentralization

The promise of blockchain in regards to decentralization for the recipients and vendors is the efficiency gain as these actors are able to exchange money in an agile and secure manner without third party oversight. This efficiency gain was predominantly experienced by the vendors as the payments were processed quickly and did not require a currency change. However, many interviewees reported issues with the cards not working, especially due to faulty internet connection that would disrupt the payment process. Additionally, a few recipients complained about the fact that one week to spend the received funds was too short. This was emphasized given the aforementioned card failures and the restricted mobility of the recipients, as most were elderly women. On a brighter note, recipients valued the increased security and safety afforded by the cards. The safety and security of the DCA according to the local NGOs is coupled with the ease of use of disbursing money to the beneficiaries.

For the local NGO, the use of blockchain has the potential to enable the delivery of aid to be more efficient as they interact with fewer third parties within the traditional financial system and the humanitarian system. In the case of Save the Children, staff members mentioned that the use of the Umoja platform made the reconciliation process simpler and faster. It meant there was less paperwork involved and a more streamlined process when it came to paying the vendors. However, given the shortened pilot timeline there was only one distribution cycle of aid, which meant the staff was not able to appreciate the cost efficiency of disbursing via the Umoja platform. Instead, many interviewees described that utilizing the Umoja platform required a big investment in terms of time and resources as they had to learn how to use the dashboard.

The functionality of the dashboard that would enable detailed transaction data was not possible during this pilot. Therefore, the staff members did not get a breakdown of the beneficiaries' spending patterns, as this functionality required a full inventory of the vendors' stock. This step was not possible given that a wholesaler vendor was selected due to their past experience with digital cash programs. The selection of the vendors was facilitated by the Vanuatu Business Reliance Council (VBRC), which contributed to the decentralization of the decision making process as this is a local

actor with expertise on supporting vendors across the country. However, the fact that vendors were pre-selected and the beneficiaries were limited to these three branches of the wholesaler meant they had less agency. This is an example of the fact that pilot design needs to align with product features, otherwise the negative consequences are felt by recipients. Indeed, a SC staff member indicated that beneficiaries lamented the lack of access to local fruits and vegetables, contrasting it with the cheque modality where individuals had total freedom in spending the received money. Moreover, the fact that the Oxfam 'Unblocked Cash' project did include small fruit and vegetable vendors in open markets might have influenced this feedback as participants were aware of this possibility.

Agency

We also explored the level of agency that SC Vanuatu could exercise vis-à-vis Umoja staff in terms of decision making and their general relationship with Umoja. The SC staff reported difficulties with their engagement with Umoja Staff as they felt treated like test subjects and that on occasion, they would've appreciated a higher level of support from the Umoja team. Additionally, several individuals mentioned the importance of having an in-person support point as there was a need of having one key project manager for the pilot. The level of support and responsiveness desired was also hindered by timezone difficulties given how geographically dispersed the Umoja team was, as well as the turnover that took place internally during the SC pilot. However, the SC staff reported the training delivered by the Umoja team was satisfactory and felt that they were overall responsive to the technical issues that they faced on ground.

In terms of how SC Vanuatu balanced achieving its programmatic objectives and giving participants agency, there wasn't much conflict as the goal of the intervention was to supplement marginalized households' income without any specific guidelines on how participants could spend this money. On the other hand, SC had a secondary aim of building the NGO's capacity to implement Cash and Voucher Assistance (CVA) in Vanuatu. The fact that this objective of increasing capacity was decided upon by the HQ of SC negated the agency of the local team as they had to scramble to ensure the implementation of this pilot whilst simultaneously learning a new process of cash programs.

> "One of the good sides is it comes with security, I only go to one shop to do shopping which is good. The only thing that I see as a disadvantage is there is very short time to do shopping, I feel like I need more time to do shopping and finding transport to go to the shop is hard for me."
>
> Recipient

With regards to the recipients, they were free to purchase any goods at the local vendors with a restriction on the purchase of alcohol and tobacco. Additionally, recipients mentioned the increased feeling of safety and security from the use of a card as you were only able to access the card if you knew the pin. The injection of aid through this pilot enabled recipients to purchase the basic goods that they and their families required during a difficult period economically. Nevertheless, SC reported anecdotal evidence that some recipients would've appreciated a longer list of vendors as they were unable to access island fruits and vegetables. On top of this, a few individuals mentioned that the time period to spend the money was too short thus decreasing their overall agency as they could not fully decide when they wanted to spend their money. The cashiers' ability to exercise agency is linked to their ability to understand the products they were using and their familiarity with the Umoja products. On this note, the vendors reported the training conducted by VBRC was good and clear and that this pilot offered them an opportunity to increase their digital skills.

Localization

The above remark connects to the localization criteria as it answers the question of whether the pilot was designed with the aim of engaging and stimulating the local economy. From the interviews, SC described a positive spillover effect related to the technology employed: by learning how the Umoja suite worked, they also accumulated knowledge over digital payments, NFC cards and DCA. This will be beneficial for their future activities, as this pilot enabled all participants, including vendors and recipients, to become more comfortable with digital technologies. At the same time, the lack of technical knowledge specifically on Umoja products was one of the leading causes of complaints from both recipients and vendors. Indeed, whenever a technical issue arose over transactions, on-the-ground staff could not act quickly and had no choice but to contact Umoja technicians and wait for online assistance. This situation hindered the selling process, which hurt both the vendors—who faced increased waiting times in their shops—and recipients, who could not complete their purchases. These connectivity issues impacted the SC staff's willingness to implement another DCA pilot in the future, as some staff mentioned that they would use Umoja products again but only if transactions could be conducted offline.

Beyond connectivity issues, other factors influenced the staff's inclination to work with DCA such as the strict timeline for the pilot rollout which impacted the training done by Umoja staff as well as their overall experience with this modality. This short timeline arose due to staff turnover, followed by project delays and shipping issues connected with the COVID-19 lockdown in the country. Many staff members indicated that the Umoja platform still had many bugs when the training was carried out, and due to the short timeline they were not able to pilot the technology beforehand. This meant the pilot design did not stimulate the localization of the necessary digital knowledge for the SC staff as many were not fully convinced of the benefits of utilizing blockchain.   On a more positive note, the recipients did experience an increase in their knowledge on how to make online payments as well as a significant increase in their savings. This finding is significant as for many recipients, this was the first time they had made card payments and had access to electronic funds. Although, there was a generational divide among participants: younger mothers had no trouble using the NFC card, whereas older ones struggled with what was a disruptive and previously unseen technology to them (noting that the use of bank cards for retail payments remains relatively rare in Vanuatu, especially among economically disadvantaged groups). Additionally, the minor fluctuations in the balance of the recipients led to slight discomfort and mistrust in the card and digital payments, as described by the report published by SC. In terms of the vendors, there was only a slight increase in digital knowledge as the cashiers involved were selected due to their previous experience in the Oxfam Unblocked Cash project.

> "We have a lot of gratitude for our supermarket partner since they were so patient and persevered even if it meant holding up a queue or closing a cash register while they sorted out a problem. The support that they gave for this pilot was great. The young women [cashiers] were very literate about the technology"
>
> Save the Children Staff

The vendors were ten cashiers from four different branches of the same wholesaler supermarket who were trained in using blockchain-based payment systems. According to the published report by SC, the cashiers said they found paying with the Umoja system more comfortable than receiving payments with cash. It seems the vendors had a positive experience, which serves to foster their future use of digital forms of payment such as blockchain. Given the hastened timeline of the pilot, the planned inclusion of informal vendors in rural communities was not possible in a context where the market is dominated by informal vendors. This fact links to the complaint made by recipients about the lack of fruits and vegetables. However, the inclusion of these types of vendors is the biggest advantage of blockchain as it enables recipients to transact in a digital form of their local currency with their usual

shops thus further stimulating the local economy. This advantage is especially pertinent when comparing to cash assistance as it does not require interaction with financial providers since the majority of recipients in this context are unfamiliar with the banking system. Overall, the pilot did prove successful for the local economy due to the injection of 1,629,308 VT (19,824.48 AUD) for the wholesaler supermarket chain and enabled recipients to set money aside whilst meeting their basic needs.

Transparency around data collection and usage

The biggest advantage of utilizing the Umoja products is the real-time recording of transaction data and hence, increasing the transparency of the pilot. However, the pilot in Vanuatu was unable to deliver in this respect. This functionality was not implemented as it required an inventory of vendors' products which was not conducted. Since the selected vendor was one big supermarket chain offering a multitude of products, Save the Children was not able to categorize the items, which is a requirement for said functionality. When interviewed, Save the Children staff who was also involved in the Oxfam's Unblocked Cash project declared that the Sempo application[8] was a more flexible and user friendly platform with respect to Umoja when it came to item categorization for vendors. However, the Umoja platform was still performing two relevant functions after payment processing. Firstly, it allowed NGO staff to see who among recipients had spent the money and who had not. Secondly, it enabled them to check for possible frauds given that any purchase was registered both in the Umoja suite and in the vendors' cash register. In terms of transparency for the recipients, there were issues as they were not able to see how much money they had left on their card, thus resulting in a reduced agency when making purchases. Sometimes vendors were helping them by showing them their residual balance, but this was not always possible as vendors had to give attention to other customers.

> "The biggest selling-point for the UMOJA cards was that you would get a breakdown of what was purchased. But that doesn't actually work when you work with a big supermarket. There is no way we will ever get all the inventory onto the [UMOJA commerce] app. What was still good is that we could see who had spent and who hadn't"
>
> Save the Children Staff

Transparency around resource allocation

Additionally, the recipients that were interviewed by Umoja mentioned that they had no knowledge of the selection process and voiced that other vulnerable people should have been included. The recipients were selected based on their proximity to

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[8] Sempo is another digital blockchain payment company, see here https://withsempo.com/

the SC office and due to meeting certain vulnerability criteria. This resulted in targeting several exclusively female vulnerability groups, e.g., women-headed households, pregnant and lactating women and '20 Vatu Mamas', as described in the SC report. ' 20 Vatu Mamas' are road vendors selling food portions at 20VT a piece, who had to cease their activities almost completely due to the pandemic. The selection process was initially designed to be facilitated by community focal points, but the SC staff did not have a strong relationship with these individuals and thus had to dedicate time and resources to visit communities in order to identify eligible recipients. In general, transparency was not always present in the Vanuatu pilot, especially with respect to recipients. The main impression is that time constraints led both Umoja and Save The Children to sacrifice and undermine important aspects of the pilot design and platform development.

9.2 Cross pilot comparison

The cross-pilot analysis aims to extract from the individual pilots the most critical aspects that answer our research question, especially subquestion one. In other words, how did blockchain perform according to the four criteria we devised to evaluate the decolonization of humanitarian aid delivery—decentralization, agency, localization, and transparency—in the context of Umoja Labs' pilots. Blockchain is the underlying technology that was used to build Umoja products, which were then embedded in the pilots. When attempting to answer our first subquestion, we then need to examine how the four criteria perform and interlink with each other across the following three layers: blockchain as a technology, Umoja products as the medium, and the pilot design as the context.

9.2.1. First layer: Blockchain as a technology

The first layer focuses on blockchain itself and its operation in the context of humanitarian aid delivery. The potential or limitations of the blockchain can be seen in relation to other modes of aid delivery, such as traditional cash assistance or bank-issued card-based DCA. First, we look at the varying degree of agency that each mode of aid delivery gives participants in terms of aid spending. It seems that in a pilot disbursing cash, participants will have the greatest degree of agency in terms of dignity and choice. The universal acceptance of cash means that the recipients could decide which items to buy from whichever vendors without any form of time limits. In contrast, DCA through debit or credit cards has more limitations. Although participants could decide which items to buy, they are limited in terms of when they could use cards as card-reading machines might not always be functional or available. Most importantly, if a recipient doesn't have a bank account, he or she will not be able to use cards. For vendors, it is also key to note that debit and credit card transactions

and the use of card readers come with additional costs, which may not always be beneficial or affordable for the vendor.

When we look at blockchain-enabled cards, one major advantage is that anyone could use them without owning a bank account. This is particularly relevant in the CARE Ecuador pilot, as many migrant recipients were not able to obtain a bank account in the new county of arrival. This aspect is especially pertinent in Haiti as a lot of banks were closed due to the ongoing conflict in the country. In both Haiti and Vanuatu, rates of financial exclusion are high, resulting in account ownership levels below 40% in both countries (AFI, 2018, p.16; Demirgüç-Kunt et al., 2022). Therefore, the use of blockchain enables for business continuity during times of disaster. Nevertheless, certain blockchain-based applications can also restrict the autonomy of recipients. For instance, blockchain-enabled cards present the same set of issues as bank-issued cards since the smartphones with the Umoja POS app and the NFC cards might malfunction, which happened a few times during the pilots. Moreover, some vendors may not accept cryptocurrencies. The pilot in Haiti exemplifies a way around this as the vendors could access their money in the local currency as the cryptocurrency was directly transferred into their 'Moncash' wallet, a mobile money service app. Another restriction comes from pilot design, as recipients in the pilots could only transact with selected vendors who must possess the smartphone. This limitation on the agency of recipients shifts more power into the hands of vendors, who could now refuse card payments for their own reasons (too many customers, nationality bias, etc.). This creates an imbalance of power between network participants, defying the blockchain's promise of decentralization.

Second, when we look at the contexts in which blockchain is applied, we could see the well-acknowledged security that blockchain provides. The recipients in the pilots are predominantly women in vulnerable environments. For them, blockchain-enabled cards are more secure than physical cash. The latter could be stolen, robbed, or given out under coercion in cases of domestic abuse or burglaries. Blockchain-enabled cards spared the recipients the security risks associated with receiving, storing, and spending aid, allowing them to exercise agency without fear. This dimension of increased security was especially significant in the unstable context of Haiti as the NGO could complete multiple disbursements to individuals in remote locations without needing to travel to them. Furthermore, this increased security is also related to the stability of the c-USD which meant that the beneficiaries' aid wasn't vulnerable to the volatility of the Haitian currency.

The difference between transacting with bank-issued cards and blockchain-enabled cards is especially important for NGOs, as blockchain gets rid of a middleman (bank system) that not only incurs transaction costs but also increases bureaucratic procedures. More importantly, blockchain and blockchain-based Umoja products

enable the NGOs to gain access to transaction data, which would've been lost to the banks. This data access allows NGOs to detect fraudulent behaviors by vendors more quickly and spot other security-related issues. The increased transparency can also benefit NGOs in the process of raising funds from donors. It allows them to follow the chain of funds, offering them a way to expose and prevent any corruption, thus curbing donor fatigue and mistrust. This fits the prospect of decentralization in the relationship between NGOs and the financial system and an increase in transparency. This decentralization dimension is something that Hope for Haiti aims to leverage in future projects as blockchain could enable families to receive remittances in a cheaper and more efficient way, as it would bypass the need for actors like Western Union (a financial service company that enables people to send money internationally at a cost).

9.2.2. Second layer: Umoja products as the medium

The second layer is the Umoja products, which include Umoja tap-and-pay cards, the Umoja POS app for vendors to receive payments, and the Umoja platform for NGOs to distribute aid and view transaction data. The Umoja products are the actual interface through which NGOs and participants interact with blockchain. The specific designs for Umoja products and Umoja Labs' role in designing them then generate different effects than blockchain itself on the four criteria we use.

From the interviews, we could see how different groups of actors interact with Umoja products varyingly. There is one key convergence amongst these interactions. Umoja products are more technologically advanced than the medium of aid the partnering NGOs and participants are used to, and this fact centralizes more power to the hands of Umoja Labs and affects the agency of NGOs and participants. The technical knowledge imbalance is manifested in that NGO staff and participants cannot freely redesign the very medium on which they interact; instead, this is controlled by Umoja Labs. This does not necessarily speak negatively of Umoja Labs, as knowledge asymmetry is natural in the introduction of new technologies by a third party. However, when the Umoja system malfunctioned, the participants and NGOs found transaction activities grinding to a halt completely. The degree of agency they could exercise with regard to aid decreased. While Umoja Labs was overall helpful, some NGO staff cited communication issues with the company due to language barriers, planning, scheduling, etc. It is also noteworthy that NGOs reflected on how they were not able to incorporate certain features within the Umoja suite that would fit their operations.

This centralization of technical knowledge also affects the degree of transparency the pilot could exhibit. The Umoja products were designed in a way that only those with access to the Umoja platform would be able to see the transaction data. The local

NGOs that could access the Umoja platform enjoyed the transparency of data brought by the products. There are a few implications. First, being able to see the transaction data in real-time means that the NGOs could increase the efficiency of operations, better handle the needs of participants, and generate insights for future operations. This greatly enhances their agency and ability in ensuring the quality and effectiveness of humanitarian aid delivery, as compared to using traditional CVA when they have no way of tracking the participants' usage of aid and had to rely on asking the vendors how much the latter had earned. Second, the fact that NGOs could view and use the data while participants couldn't centralized the power that comes with data analytics in the former's hands. The power asymmetry dictates that the NGOs could act on behalf of the participants using participants' data, but the latter could not better their own situations with the same resource. This potentially also raises related concerns around the data rights of these individuals, who should be entitled to access information about them.

It was noted that the participants were not given access to the Umoja platform, excluding them from accessing and profiting from the very transaction data they generated. In fact, many of the recipients were not aware of how much they had left in their Umoja wallets; they had to ask the vendors after each transaction. This lack of transparency concentrated more power into the hands of vendors since they could illegitimately charge more of negligent customers if they wished. This also reduced the agency of recipients in spending aid as they could not conduct detailed financial planning according to their own spending patterns. Furthermore, as vendors were not able to access the platform, either, they could not make use of transaction data to improve their sales. Reportedly, they were not able to view how many items have been purchased and how much has been spent on item categories, which might be crucial information for their future economic activities. However, the Hope for Haiti team is looking to carry out workshops with the vendors in order to improve their financial literacy capabilities with the help of the data generated by the Umoja platform.

9.2.3. Third layer: Pilot designs & Country Context

The final and arguably the most important layer is then the pilot design and the country contexts in which blockchain and Umoja products are embedded. The performance of blockchain and Umoja products with regard to the four criteria might not transfer to this third layer due to restrictions or enhancements that the wider context places on them. One example pertains to the supposed increase in efficiency that blockchain and Umoja products could bring forth. Although participants reported expeditious transactions, the NGO staff experienced quite some hurdles at the beginning of each pilot, distributing the physical cards, phones, etc. The poor technology infrastructure and connectivity in these pilot regions also affects user

experience frequently. This shows that the high-tech promise of blockchain could be countered when the pilots are designed for more low-tech environments.

Other instances further show that, beyond the promises of blockchain, the decision-making process about pilot design and selection heavily affects how decentralized humanitarian aid delivery is. In both pilots, the selection and design were decided on the headquarters level; the local NGO staff reported that they were neither involved in the initial meetings when the pilot designs were finalized nor in the final decision-making on budget allocation. From a Umoja staff member, we learned that the pilot selection and design came from a bargaining process between Umoja Labs, Celo Foundation, and the headquarters of partnering NGOs. Afterward, the pilot specifics were handed down to the local teams. This showed a lesser degree of decentralization in the relationship between the more international actors (Celo, headquarters of the NGOs, etc.) and local actors (the local staff members with the most knowledge of the local contexts, needs, and capacity for undertaking pilots). On the other hand, the Haiti pilot showcases a higher degree of decentralization of decision-making as all of the members of the NGO were included in the pilot design and implementation process according to their positions. Lastly, as mentioned in individual pilot analyses, there exist some limitations on how decentralized decision-making is between the NGOs and participants as well, since the NGOs are the ones who define the programmatic objectives of the pilots (such as focusing on female needs in the health sector). Overall, these trends appear to reflect the criticisms of the humanitarian and development sectors as being overly centralized with regards to decision making and control, especially for local staff and communities.

The training component of the pilot concerns more criteria. With regard to localization, good training enables NGO staff to accumulate knowledge about digital payment methods, DCA programs, NFC cards, etc. This enables local NGOs to engage in a wider range of projects in the future and to gain confidence in working with new technologies. However, as mentioned, the training did not delve into blockchain. Instead, the training focused more on the latter's functioning in the context of the specific pilot project. The inability to organize more significant training sessions was due to some scheduling problems. As far as concerned participants, the localized benefit of training relates to the fact that those who were conventionally excluded from digital means of the transaction were then, thanks to the pilot, included in their use and equipped with operational knowledge. The digital inclusion of even the most vulnerable was observed through the pilot projects. Learning and understanding digital technology is indeed an important first step toward understanding blockchain. However, more could have been done to make vendors understand what blockchain was. Many reported knowing nothing about the underlying technology (the blockchain) that supports the Umoja products they use. This shows that not only is the

knowledge of the high-end technology not localized, but also centralized in the hands of the intermediary (Umoja). This takes away the participants' ability (or agency) to fully utilize blockchain to their own advantage, and they must instead rely on a black box (the Umoja products) controlled and designed by someone else (this power is centralized in the hands of Umoja).

Lastly, in the pilot design, the long-term sustainability aspect became a deciding factor on how to better localize the benefits gained through blockchain and Umoja products. One obvious difference between the CARE Ecuador pilot and the SC Vanuatu pilot was the duration of pilots, the former being almost two months with multiple distribution cycles and the latter 9 days. In the SC Vanuatu pilot, the staff did see the merits of using Umoja products, but the training and logistics before the start of the pilot incurred such heavy costs on the team that the members felt like the efforts didn't pay off. In other words, associated with Umoja products and blockchain were the high implementation costs at the beginning. The Hope for Haiti team experienced the biggest payoff to their efforts as the pilot was extended to six months due to the second wave of funding from Coinbase. This extended pilot duration enabled for multiple distribution cycles, which meant the team was able to experience the ease and transparency of disbursing cash through the Umoja platform. Therefore, making the H4H team more eager to implement this technology across in other future programs.

10. Conclusion

This report has evaluated the use of Umoja products across different pilots against the four criteria of decentralization, agency, localization and transparency. It is important to recognize that these three use cases were pilots and thus do not speak for the full potential of the Umoja products or blockchain. Instead, these pilots should be understood as departure points where Umoja Labs first tested its products. Umoja Labs could now instrumentalize the key learnings from these pilots in order to ensure its future adaptability in the humanitarian context. The analysis undertaken in this report has highlighted the main strengths and weaknesses across the three pilots, which provide the basis for a series of recommendations that could be implemented by Umoja Labs going forward. One crucial caveat is that the relevance of these recommendations depends on how Umoja Labs positions itself as a company, exclusively as a technology provider to humanitarian organizations or as an active advocate for the decolonizing of humanitarian assistance.

These recommendations and conditions of which Umoja Labs must be aware are then the answers to our second subquestion. It is important to note that some of these recommendations are also addressed to the implementing partner, as they are also responsible for pilot design. Both the implementing partner and Umoja Labs should

ensure that the pilot consistently follows a user-centered design approach. As we have documented, the introduction of blockchain to the humanitarian context requires a considerable upfront effort by the implementing partner as they must learn how to operate a new technology, which might be completely new to them, as in the case of H4H, or which the partner might have some knowledge, as in the case of SC. In all cases, a certain degree of experience in providing cash assistance is valuable. Based on the cross-pilot comparison where we evaluate the relative success of the pilots, we have developed a series of recommendations listed below:

- Ensuring a longer pilot timeframe and the engagement of all the members of the local NGO team from the very beginning
- Dedicating more time and resources to testing and adapting their products to the local NGOs needs before its deployment
- Engaging one local staff member as the focal point within the NGO as well as securing on-the-ground technical support
- Increasing the duration of the training for local staff, the vendors, and recipients so that they are more comfortable in their use of the Umoja products and introduced to the concept of blockchain
- Training the local staff and vendors to learn how to leverage the data produced by the Umoja platform
- Guaranteeing the active participation of recipients during the pilot, especially during the vendor selection process to ensure the user-centered design approach
- Assuring a greater transparency with the participants of the pilots in regards to pilot design decisions and their access to the Umoja products
- Providing recipients of assistance with a way to access their budget and a receipt for their purchases

This list of recommendations is not exhaustive but we believe that these changes in pilot and product design could empower the local NGO, vendors and recipients greatly. These changes could contribute to the decentralization of hierarchical power structures, the enhancement of the agency of the networked participants, an increase in transparency, and the facilitation of social interactions. In conclusion, Umoja products and their embedded pilot design must be a better embodiment of the theoretical promises of blockchain in advancing the goal of 'decolonizing aid'.

11. Appendix

11.1. Further information on the context of each pilot

11.1.1. Ecuador

Operational context

The pilot was conducted in Ecuador, specifically in the province of Manabi, but since several Venezuelan women benefited from it, it is useful to consider the Venezuelan context as well. Over the past two years, Venezuela's ongoing social, economic, and political instability as well as COVID-19 restriction measures have had negative economic and social effects. As a result of this, Venezuelans have increasingly migrated to neighboring countries. Around six million Venezuelans are estimated to have emigrated to neighboring countries by the beginning of 2022 (Regional Inter-Agency Coordination Platform, 2022). According to the UN, there are currently over 500,000 migrants and refugees from Venezuela living in Ecuador, and there are over 800,000 people there who require humanitarian assistance (Regional Inter-Agency Coordination Platform, 2022). The public resources and services of hosting nations like Ecuador have been severely strained by the Venezuelan crisis. Many Venezuelan migrants arrive in Ecuador with unmet health requirements. Despite the fact that everyone in Ecuador is theoretically entitled to free access to healthcare services regardless of their immigration status, Ecuador's public health system has been unable to keep up with the rising demand for healthcare. The Covid-19 outbreak caused Ecuador's healthcare system yet another setback.

NGO Structure

CARE is an international NGO with local staff and community partners in over 90 countries. On 25 January 1962, CARE was registered in Ecuador. CARE Ecuador has as its mission to improve the living conditions of the most vulnerable populations, work towards poverty eradication and aim for social justice. CARE Ecuador puts women and girls at the center of its actions (CARE, 2022).

11.1.2. Vanuatu

Operational Context

Three quarters of its 300000 population live in rural areas, with the remaining 25% split between the capital city of Port-Vila and the city of Luganville. Due to its geography, the country suffers from multiple environmental hazards, including a low percentage of stable potable water supply, intense volcanic activity and frequent exposure to earthquakes, tsunamis and cyclones (CIA, 2021)

NGO structure

Save The Children International is a British NGO established with the aim to improve the lives of children through better education, healthcare and economic opportunities (Save The Children, 2019). The NGO has multiple offices around the world and, in the case of Vanuatu, the island's office is not a legal entity per se but functions as a sub-office of SC Australia and SC New Zealand under the "SC in Pacific Islands" partnership (Save The Children, 2012). SC offices in Vanuatu are located in the capital city, Port-Vila.

11.1.3. Haiti

Operational context

Haiti is the Western one-third of the island of Hispaniola, between the Caribbean Sea and the North Atlantic Ocean, west of the Dominican Republic, a country that shares the rest of the island. With a population of 11 million people, it is a low-income country with deep structural issues, including unskilled labor, high dependence on imports and a small industrial base. Poverty, corruption and low levels of education for much of the population represent some of the most serious impediments to Haiti's development. Said issues are further exacerbated by the country's natural hazards: Haiti lies in the middle of the hurricane belt and it is subject to severe storms, cyclones, floods and landslides whose impact is stronger due to the extensive deforestation and soil erosion. Furthermore, a high population number has led to inadequate supply of potable water and general lack of sanitation, prompting a high incidence of food and waterborne diseases, including dengue fever and malaria (CIA, 2021). A massive magnitude 7.0 earthquake struck Haiti in January 2010 with an epicenter about 25 km (15 mi) west of the capital, Port-au-Prince. Estimates are that over 300,000 people were killed and some 1.5 million left homeless. On 4 October 2016, Hurricane Matthew made landfall in Haiti, resulting in over 500 deaths and causing extensive damage to crops, houses, livestock, and infrastructure. The assassination of the president, Jovenel Moïse, in July 2021 threw Haiti deeper into political turmoil as violent crime—including hijacking of critical infrastructure by gangs, kidnapping and murder— has increased dramatically (Economist Intelligence Unit, 2022). On 14 August 2021 a 7.2 magnitude earthquake struck the south-western coast of Haiti causing large-scale damage across the country's southern peninsula. The powerful earthquake occurred in the department of Nippes, the same region devastated by Hurricane Matthew in 2016. Only two days after the quake, Tropical Depression Grace dumped extremely heavy rains in southern Haiti, causing flooding in the same quake-affected areas, causing a death toll of 2248 with more than 12,200 people injured. Almost 53,000 homes have been destroyed and more than 77,000 have sustained damage. About 800,000 people have been affected and an estimated 650,000 people – 40 per cent of the 1.6 million people living in the affected departments – are in need of emergency humanitarian assistance.

NGO Structure

Hope for Haiti is an NGO based in Naples, Florida, USA, founded in 1989. The mission of the organization is to improve the quality of life for the Haitian people, particularly children, through education, healthcare, water, infrastructure and economy (Hope For Haiti, 2022). H4H started as an organization focused on children only, but now has four core programs serving different categories of the population: education, health, economic development. On the island, the NGO is based in the South West city of Les Cayes and has 160 people staff, the great majority of which are locals. After the 2021 earthquake, they became interested in digital technologies such as AI, IoT, and blockchain and their possible applications in their programs. To note, Hope for Haiti is one of the few NGOs currently operating in Haiti that accepts donations in cryptocurrency.

11.2. Extended methodology

Unit of Analysis	Criteria				
	Decentralization	Agency	Localisation	Transparency (data)	Transparency (resources)
Implementing partner (local NGO)	1. Did the use of blockchain enable the local NGO to deliver aid independent of irrelevant third parties that are common within the hierarchy of the traditional aid system and within the financial system such as banks?	2. How did the aid provider balance between giving recipients enough agency in deciding the form and usage of aid and fulfilling its programmatic objectives? 2g) How much agency did the local NGO have in the decision-making process vis à vis Umoja?	3. Was the pilot designed with the aim of engaging and stimulating the local economy?	4. In the collection and processing of data, did the aid provider ensure the protection of personal data and remain transparent about their methodology?	5. Has the aid provider been transparent on the source of funding and resource allocation for the pilot?
Question(s) for interview	1i. What are the differences between working with Umoja and other non-blockchain enabled actors? 1ii Did working with Umoja and a blockchain enabled aid delivery method enable you as an NGO to interact with less third parties? 1iii Did working with a blockchain-based platform enable you to reduce administrative and transaction costs?	2i. How was your relationship with Umoja labs during the pilot? 2ii. How would you compare the blockchain enabled solution and the traditional method of aid delivery in terms of giving recipients the freedom of choice in how they use the aid?	3i. What were the criteria used when deciding which vendors to include in the pilot? 3. ii What do you see as ther main advantages of using DCA/ UMOJA compared to CVA and other more traditional assisted delivery methods? 3iii What was the level of knowledge acquired by the participants of the pilot in terms of blockchain and Umoja platform? 3iv How does the aid provider understand the continuity of the use of the Umoja platform and/or blockchain in their local context?	4i. What was the provider's experience of using the Umoja platform in terms of blockchain enabled access to data? 4ii. Did the provider inform the recipients about what data is collected and for what purpose? 4iii Did the aid provider make a plan on how to make use of the data collected by the Umoja platform?	5i. Are the sources of funding for the pilot always publicly available (in the forms of financial reports, project presentations, etc.)? 5ii. Were the recipients made aware of what the sources of funding are?
Coding categories	Number & usefulness of intermediary actors. Efficiency (or issues with) blockchain-umoja. Centralization of decision making	Relationship of local NGO vis a vis Umoja. Comparison of DCA vs CVA. Agency given to the beneficiaries	Benefits for local economy. Digital inclusion - literacy of vendors/local NGO. Long-term sustainability. Vendors or beneficiaries training or explanation	Transparency of data collection. Blockchain enabled access to data. Comparison of DCA vs CVA	Funding decisions for pilot (And transparency of). Selection procedure

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Intermediary (UMOJA)	6. Did the use of blockchain decrease organizational inertia in centralized institutions and increase efficiency in the management of the pilot (low administrative and transaction costs)? 6a. To what extent were the decision-making processes within the pilot decentralized and driven by the end user of the aid?	7. What was the degree of involvement of local people in the pilot? 7a. Did the intermediary provide the local NGO and recipients with sufficient knowledge of the technology being used in the pilot? 7b. How has the intermediary worked to develop a relationship with the local NGO based on equality?	8. What was the rationale behind participants' and vendors' selection in the specific contextual conditions of each pilot?	9. Did the use of blockchain enable the collection of anonymised and granular data through real-time transaction monitoring?	10. Has the intermediary been transparent on the source and allocation (including choice of pilot participants and donors) of funding through the pilot management?
Questions(s)	6.i. What are some of the obstacles the aid provider faced whilst using the Umoja platform? 6.ii. How long does it take for the aid providers to understand the functioning of the platform? 6.iv. What are some of the benefits of using the Umoja platform? 6.v. What are the ethical issues related to the use of new technology such as the UMOJA platform with vulnerable communities?	7i. How was the relationship between the Umoja staff and the local NGO staff? 7ii What was the level of responsibility of the Umoja staff to provide the local NGO with sufficient knowledge of the technology being used in the pilot? 7iii What are the advantages and disadvantages of DCA in comparison to traditional assistance methods? 7iv How do you understand blockchain as a tool to help in the decolonisation of aid?	8.i. What are the deciding factors used when selecting the participants (both vendors and beneficiaries) of each pilot? 8.ii. How does Umoja lab decide on which pilot, region, and collaborating organisations it engages with? 8.iii. How do you envision blockchain being able to help people in fragile communities?	9.i. Does the Umoja platform provide real-time data on the monitoring of transactions and the analysis of it? 9.ii What are the benefits of the access to this real-time data? 9.iii. Are recipients' data protected by anonymity?	10.i. Has Umoja lab made such information available in the form of press releases, activity reports, financial reports, etc. to the wider public as well as the participants of the pilot?
Coding categories	Benefits (or issues) with using blockchain/Umoja platform Ethical considerations of blockchain/Umoja platform Decision-making process of pilot design and operation View on Umoja's role Blockchain tech and decentralisation	Training of local NGOs on Umoja products and platform Relationship and interaction of local NGO vis a vis Umoja Comparison of DCA vs CVA Blockchain tech and agency	Pilot selection process and criteria Long term sustainability of pilots blockchain Blockchain tech and localisation	Blockchain enabled access to data Comparison of DCA vs CVA	Funding decisions for pilots

Aid recipients & vendors	11. Did the use of blockchain enable participants and vendors to exchange money in an agile, secure and efficient way?	12. What degree of freedom do recipients have in spending the digital voucher?	13. Did the knowledge provided on blockchain help foster the use and culture of blockchain and defi?	14. To what degree were recipients able to see how much they were spending and how their data was treated?	15. To what degree were recipients aware of the resource allocation and selection procedure in the respective pilots?
Questions(s)	11.i. Do you think that people with DCA could buy products in a more efficient way compared to CVA? 11.ii. Have you experienced challenges when using the Umoja wallet? 11.iii. How does the use of this form of currency feel compared to money in its traditional form?	12.i. Has using the Umoja wallet made your purchases more convenient, and how? 12.ii. Is there any feature that you would be happy to have from the Umoja wallet? 12.iii. How does the Umoja wallet compare to other methods of payment in your opinion in terms of freedom of choice?	13.i. Have you ever heard about blockchain? 13.ii. If yes, do you know if was the technology used in this pilot? How do you feel about it?	14.i. Were you able to visualize your spending behavior? 14.ii. If not, how did you experience the inability to see how much money you had to spend? 14.iii. How would you do this differently?	15.i. Do you know why you were selected for this pilot? 15.ii. Do you think there are other people in your communities that would have needed such kind of aid?
Coding categories	Efficiency (time and price)	Freedom of choice Knowledge on Umoja wallet Feeling of use of DCA vs CVA (in terms of safety/spending behavior)	Knowledge of blockchain Digital inclusion	Access to info on their budget	Access to info regarding selection procedure

11.3. Interview questions for stakeholders

Questions for local NGO staff
1. Have you ever worked with other actors who do not use blockchain as a tool for humanitarian aid?
   a. According to your experience, what are the differences between working with Umoja and these other actors?

2. Did working with Umoja and a blockchain enabled aid delivery method enable you as an NGO to interact with less third parties?
   a. For example, institutional actors like the UN or financial institutions like banks

3. Did working with Umoja enable you to streamline the process of delivering assistance, through automation for example?

4. How do you feel about the relationship with Umoja labs in terms of decision-making within the pilot?
   a. Did you feel like you could suggest features you like or give feedback on features you don't like?
   b. When you did, did you usually get timely and useful responses?

5. In your opinion, to what extent was the decision-making process more decentralized? In the sense that there were multiple relevant stakeholders involved in the process?
   a. Also, to what extent do you feel the decision making process was driven by the end user of the assistance? In other words, the beneficiaries?
   b. Was this any different than previous projects/pilots that used a different modality of assistance delivery?

6. When it comes to giving recipients the freedom of choice in how to use their aid, do you think that there was a difference between the use of blockchain and the use of more traditional methods (like delivering goods or cash aid)?
   a. Does the beneficiary/vendor/end user have more agency in the decision making process?

7. Were you involved in the process of selection of the vendors?
   a. What were the criteria used when deciding which vendors to include in the pilot?
   b. In your opinion, was the pilot designed with the aim of stimulating the local economy? Was there a consideration of this objective?
   c. What decisions inherent to the pilot have become more localized than previously?

8. What do you see as the main advantages of using DCA/ UMOJA compared to CVA and other more traditional assisted delivery methods?
Time, efficiency, market recovery (supporting local vendors),

9. How is Hope for Haiti planning on using the data collected by the Umoja Platform?
   a. Were you involved in deciding which data was collected?
   b. Did you think that the data collected would be helpful?
   c. What functions or utilities do you think the data will serve?

10. Did your team inform the recipients that some personal data and transaction data would be collected?
    a. Do you think that they were aware of what data was collected in the pilot?
    b. Do you think that they know what it was for?

11. How did you inform the recipients on how to use the app and the aid?
    a. Did you think they generally had a good knowledge of the tools after you informed them?
    b. Did they come to you for technical assistance or general problems during the pilot?
    c. What kind of problems did they usually run into?

     d. Did you know how to resolve them or did you have to defer to someone from Umoja?

12. Were the sources of funding for the pilot always made publicly available (in the forms of financial reports, project presentations, etc.)?
     a. If yes, were the recipients usually interested in knowing what the sources are?

13. How do you understand the continuity of the use of the Umoja platform & blockchain in your context?

14. How do you envision blockchain being able to help people in fragile communities?

Questions for Umoja staff

1. Could you tell us a bit more about your role in EI / Umoja?

2. How long does it take for the NGOs to understand the functioning of the platform?
     a. What are some of the obstacles with using the Umoja platform in your opinion or that the local NGOs have reported?
     b. What are some of the benefits of using the Umoja platform in your opinion or that the local NGOs have reported?

3. Was it the responsibility of the Umoja staff to provide the local NGO with sufficient knowledge of the technology being used in the pilot?
     a. If yes, how did this process occur? What did training look like?
     b. If not, who was responsible for this?

4. Has Umoja been transparent on the source and allocation of funding throughout the pilot management?

5. Could you tell us a bit more about the selection process for the pilots?
     a. How does Umoja lab decide on which pilot, region, and collaborating organizations it engages with?
     b. And how did the partnership with Celo Foundation arise?

6. Who was involved in the decision-making process of the M&E /design of the pilot?
     a. What was the level of involvement of the beneficiaries & vendors in this process?
     b. Were there issues of communication between Umoja and the NGO team on the ground?

7. In your opinion, to what extent was the decision-making process more decentralized?
     a. In the sense that there were multiple relevant stakeholders involved in the process?

8. In your opinion, to what extent did the use of blockchain decrease organizational inertia in centralized institutions?
     a. And also did it enable increased efficiency in the management of the pilot?

  b. In other words, did the use of the Umoja platform enable lower administrative and transactional costs of the total costs of the pilot?
  c. Future outlook?

9. Also, to what extent do you feel the decision making process was driven by the end user of the assistance? In other words, the beneficiaries?

10. What are the ethical issues related to the use of new technology such as the Umoja platform with vulnerable communities?
  a. How does the Umoja platform deal with this and how does it try to avoid/overcome them?

11. How do you understand blockchain enabling a balance between giving recipients enough agency in deciding the form and usage of aid and aid organizations being able to fulfill its own mandate as an aid organization?

12. How do you envision blockchain being able to help people in fragile communities? What are its advantages and disadvantages in comparison to traditional assistance methods?

13. What do you understand by the term 'decolonize aid'? Does this mean something to you? If yes, could you please explain?

14. How do you understand blockchainas a tool to help in the decolonization of aid? What do you see as the barriers to this goal?

15. What was the degree of control the local NGO had with regard to the Umoja platform?
  a. Were they able to modify features and functionalities of the platform real-time and adapt them to their own needs?
  b. If they were not, how do you think this affects their willingness to keep using the platform?
  c. When there are complaints, suggestions, or direct requests from the local NGO in relation to the platform, how did you handle this?

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