Humanitarian Blockchain:
Inventory and Recommendations

August 2022

DH Network
Digital Humanitarian Network

Licensing Information

Humanitarian Blockchain: **Inventory and Recommendations**

By

Zoey Zhang (zoey.zhang1005@gmail.com | LinkedIn)
University of Edinburgh, School of Social and Political Sciences

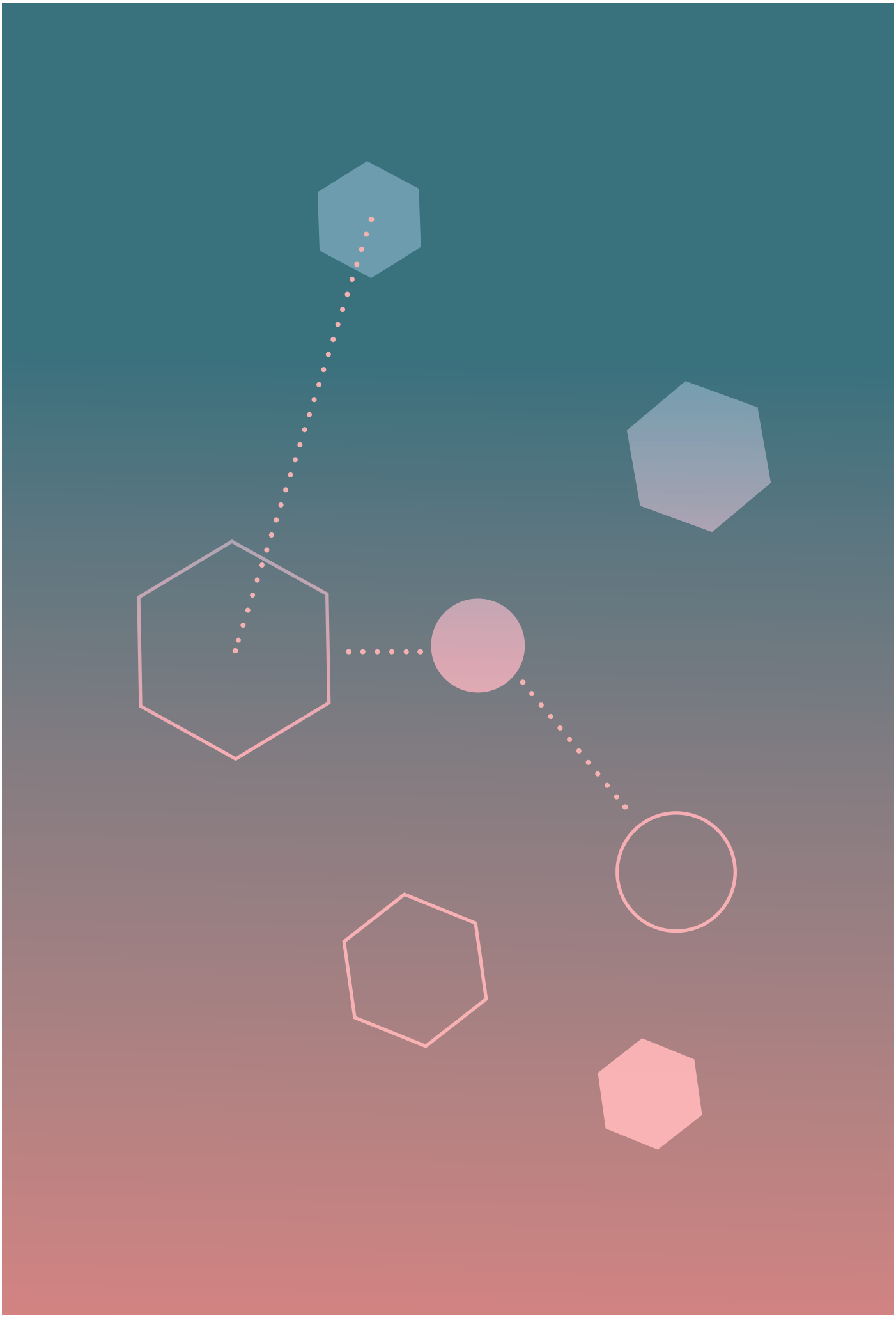
Andrej Verity (verity@un.org | LinkedIn)
United Nations Office for the Coordination of Humanitarian Affairs (UN-OCHA)

Design

Alexandra Sternin | alexsternin.com

This document was made possible with the support of

OCHA



Intention of this paper:

In recent years, an increasing number of blockchain projects have been piloted to test its feasibility in humanitarian response. Some projects proved blockchain's potential benefits in humanitarian aid contexts and have been scaling up to assist the people we serve. Meanwhile, other pilot projects did not find blockchain's added value for their use case.

Based on interviews with the focal points of several humanitarian blockchain projects and experts, this paper compiles a list of humanitarian blockchain projects and builds a set of lessons learned and recommendations from successful and unsuccessful projects.

The authors hope this paper will help others who are considering a blockchain implementation in the humanitarian sector.

Interviewees

The authors would like to extend our deepest gratitude to the 13 individuals who took the time to meet with us to share details about their projects, lessons learned and recommendations. Without their contributions, this report would not be as compelling.

Name	Title	Organization
Abdinassir Shale Sagar	Programme management officer	UN Habitat
Anonymous interviewee	Technology expert	UNICEF
Elisa Molena	Programme manager	EMPACT, WFP
Fabio Tranchitella	Technology expert	Building Blocks
Houman Haddad	Head of Emerging Technologies	WFP
Jessica Stanford	Programme Manager	WFP Bangladesh
Joel Kaiser	Project manager	Medair
Joseph Oliveros	Senior officer, Cash Transfer	IFRC
Kate Dodgson	Technology and Innovation Consultant	Freelance
Lars Stevens	Operations lead	The Netherlands Red Cross
Maciej Bulanda	Chief Programme Officer	Emerging Impact
Monika Bernard	Corporate manager	WFP
Nidal Al-Hajjaj	Programme manager	UN Women Jordan

We also thank Alejandro Hernandez, Head of Data Analytics, Reporting & Quality Control at Organization for the Prohibition of Chemical Weapons, for his informal discussion about their ongoing work in the blockchain space.

Key messages

- It should never be about blockchain but rather about finding the correct technical solution to a clearly defined problem.
- Digital divide is the biggest challenge for any digital solution, especially in remote areas.
- Power inequality and digital divide impair meaningful consent and true data ownership, despite technical possibilities.
- Data protection requires organizations to align with General Data Protection Regulation (GDPR) and other legal principles, which should also be translated in the field.
- Data minimization, role-based access and decentralized data storage are effective ways to reduce risks associated with privacy, security and data sharing.
- Risk assessment about the exclusion nature of technology, the level of digital divide and the available solutions should be in place.
- Growing misinformation and misunderstandings now demand higher transparency from humanitarian organizations.

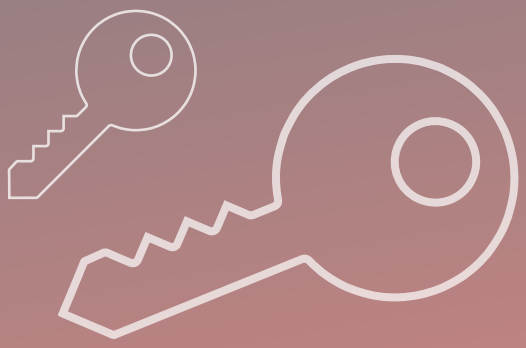


Table of Contents

Case Studies

1. Building Blocks — A Beneficiary-Centric Blockchain-Based Humanitarian Network

Organizations: World Food Programme (founder/initiator), UN Women

Type: Private permissioned blockchain

Status: Building Blocks (BB) has been scaled to provide assistance to 1 million refugees in Bangladesh and Jordan, making it the world's largest implementation of blockchain technology for humanitarian assistance. BB is currently inviting UN agencies and reputable NGOs to join forces, collaborate on the network towards common objectives and maximize the impact on the ground.

Problem(s) addressed: Multiple organizations often assist the same people through food, health, shelter, etc. Organizations often use segregated, proprietary solutions for programme design and assistance allocation, leading to uncoordinated siloed assistance operations and a fragmented view of the people served. The result is a lack of common, granular visibility on precisely who is assisting whom with what, leading to a risk of over or under targeting the assistance provided to beneficiaries and increased complexity for beneficiaries in accessing their entitlements.

In response to an increased need for cohesion, better collaboration and transparency, BB provides a neutral blockchain network where organizations coordinate and securely and privately exchange data in real time using peer-to-peer communication. On top of this network, various applications (smart contracts) can be launched to accommodate different programmatic needs.

The governance mechanism:

- **Governance:** BB is governed by a governance committee (strategic management and governance) and a technical committee (execution of the strategy).
- **Decision-making:** a) each member has an equal representation in the two governance bodies; b) 'one member one vote' for on-chain (everyone has to have an equal number of validator nodes) and off-chain votes so that smaller organizations or those who join later are not penalized.
- **Intellectual property (IP) rights:** a) principles are established for code development of applications to enable the synching use of the network; b) anything developed on the network is available to other members for free; c) everyone pays for their own infrastructure but they are all connected with the BB network.

- **Two principles:** The World Food Programme (WFP) does not govern the use cases, the applications or how members use it, but with two big caveats: the 'do no harm' principle, and new applications have to be vetted to prevent network breakdown.

- **Incentives to join the network:** a) organizations gain shared visibility on their response efforts, and they can make more effective use of available resources, provide a more targeted response and empower people with greater choice; b) helps to avoid duplication of effort; c) profoundly changes how humanitarians work, removing silos across organizations.

- **Membership criteria:**[1] a) reputable organization with a demonstrated 'do no harm' track record; b) organization has sufficient funds to operate the minimum technical requirements; c) comply with technical requirements (e.g. use identical validator nodes); d) existing members can voluntarily leave the network or be voted out if they misbehave.

- **Dispute resolution:** BB identifies dispute categories (e.g. IP rights, technical specifications, strategic decisions) and resolves them according to the above mechanisms.

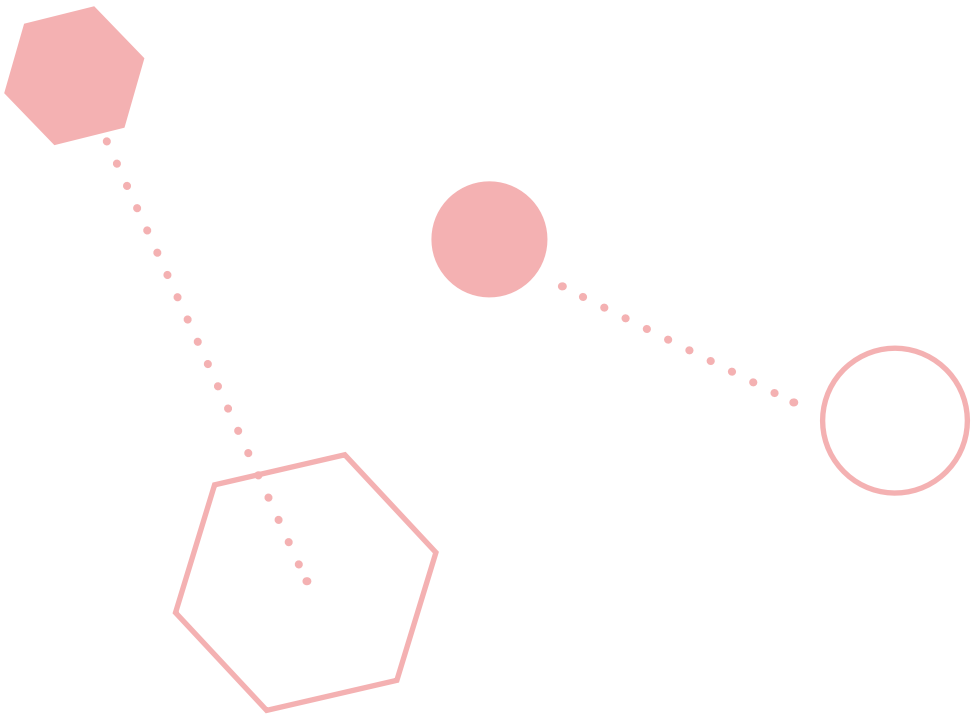
Recommendations / Lessons learned:

1. Have a vision, but take a practical approach to what can be achieved today and be prepared for the coming future.
2. Scale is being successfully achieved through incremental builds and roll-out.
3. Field experience and political buy in are key factors in a successful solution.
4. Public blockchain proved insufficient at scale and not compatible with what BB needs to provide: real-time transactions (in supermarkets), large numbers of transactions, coordination across different agencies, data protection, data ownership, and governance framework. Organizations should analyze your requirements closely before selecting private vs public blockchain.
5. Technical aspects are the least problematic. The challenge is to adapt the technology to implementing organizations' specific context.
6. Political and human aspects (misinformation & misunderstanding) proved to be the biggest hurdle.
7. Explaining the concept is hard. It is hard to convey the message that BB is about the network and the network effect. The concept of co-development is not well understood. It can be hard to persuade others to change their models and join the BB project.

1 Offering BB as a service is against the vision that BB is a decentralized and neutral network. This option may be considered when the network grows or is mature. At this point, BB can be offered to small organizations that do not have sufficient resources to run their operations independently.

Additional information:

1. BB takes a privacy-by-design approach. No sensitive data, such as name, dates of birth or biometrics, are stored on-chain. All accounts are under pseudonymous identifiers. Information is visible only to approved members.
2. BB runs on a highly optimized private permissioned Ethereum network with a Proof of Authority consensus algorithm. It has a high throughput, there are no transaction fees, and its energy/ environmental costs are comparable to standard computers.
3. BB's code has been extensively audited for cybersecurity risks, and it has been assessed against the ISO 27001 information security standard.
4. BB undergoes regular code and security reviews by industry-leading specialized firms.



2. Cash-for-Work Pilot

Organizations: UN Women-WFP, UNHCR

Type: Private permissioned blockchain

Status: As of June 2022, the pilot had been expanded to all four camp-based Oasis Centers for the Resilience and Empowerment of Women (Oases) in response to the COVID-19 pandemic[2] in Jordan. The project is now scaling up to include the host community and 18 centres within the refugee camps.

Problem addressed: Within the camp context, beneficiaries encounter several restrictions around receiving cash assistance. Refugees must obtain regular approval to leave camps. As a result, UN Women staff had to carry bags of cash and distribute it to beneficiaries. This increased security risks and resulted in programmatic and operational inefficiencies.

By leveraging the BB network, women's cash-for-work entitlements can be accessed either as cash or goods. Beneficiaries themselves (women in this case) go to WFP-contracted supermarkets, where an iris scan verifies their identity against the database of the UN High Commissioner for Refugees (UNHCR) and links them to their blockchain accounts. The amount of the cash distribution is then automatically sent to BB for payment.[3]

Achievements: UN Women's system gives women convenient access to their cash entitlement as well as a flexible and secure means of managing their income, thereby increasing women's agency and extending their financial independence. For UN Women and partners, removing banks as intermediaries has streamlined costs and reconciliation processes, improved security and increased the harmonization of aid efforts.

2 UN Women. January 2021. UN Women-WFP blockchain pilot project for cash transfers in refugee camps: Jordan case study [accessed April 2022].

3 UN Women Jordan. 2018. UN Women and World Food Programme harness innovation for women's economic empowerment in crisis situations. [Accessed April 2022].

Recommendation:

- Learn as much as you can about the technology before using it to start a project.
- Remember that reading about a technology is significantly different from implementing it in a real project.

Inclusion: Women with disabilities are supported with necessary facilities. Those who have issues with iris scans have been referred to UNHCR to update their database or offered another option (i.e. they delegate a trusted person who will be accompanied by a UN Women staff member to receive entitlements).

> *"This technology can be adapted by any organization according to their needs. You just change the code of Building Blocks according to your project's mandate and requirements, and it's done. At UN Women, we were very successful and satisfied with this technology."*
>
> **— Nidal Al-Hajjaj, Programme Manager, UN Women Jordan**

3. EMPACT – Connecting Youth to the Digital Economy

Organizations: The project is a collaboration between WFP and the private sector partners (Innovation Accelerator, Celo, and Corsali).

Type: Public blockchain

Status: Pilot completed in Kenya in 2021. Now working to scale to other countries. .

Problem addressed: The rising digital economy can provide job opportunities to food-insecure youth and help unlock their potential.[4] Unfortunately, most of these people have no access to (digital) bank accounts, or they are underbanked due to a lack of formal identity.

4 EMPACT website: https://innovation.wfp.org/project/empact

The project provides participants with digital skills training and digital devices. They are then connected with online global and local digital employment opportunities. Since blockchain and cryptocurrency have lower Know Your Customer (KYC) requirements, participants can open a digital wallet, using a smartphone, where they receive their digital work income. In the EMPACT Kenya case, it costs less than 1 Kenyan shilling (K Sh) (US$0.0086) to send a transaction from the US to Kenya. Each transaction takes about 10 seconds, after which participants can access and withdraw the money immediately.

Lessons learned and recommendations:

1. It's important to educate all project members and participants about the project, especially the technology parts, to ensure it is not misrepresented or lost in buzzwords.
2. Be as transparent as possible in order to scale. For some people, using crypto may seem a bit suspicious.
3. Be aware that crypto is banned in some countries (e.g. Iraq). And even if it is not illegal, crypto cannot be cashed out into fiat in some countries because there is no exchange and off-ramp.
4. Demand for mobile-based digital work is consistently robust. Participants can earn $87.73 on average (10-15 work hours).
5. Participants can be trained to do commercially viable work with improved accuracy and performance.
6. First-hand experience with blockchain and crypto builds confidence and trust. Initially skeptical participants are now mostly happy about it.
7. Most participants kept the crypto in their wallets and started to invest in cryptocurrencies because of political instability and inflation of local currencies.
8. Digital microwork unlocks new Decentralized Finance (DeFi)[5] products. Pezesha[6] offered a participant a loan of K Sh 20,000 ($175) because of her microwork track record during the EMPACT project.

Inclusion: EMPACT selects vulnerable participants according to a baseline of digital skills, but it also designs within the project a specific allowance for women: a) If less than 50 per cent of participants are women, the baseline will decrease to make sure there are at least 50 per cent of women; b) Provide online and flexible training schedules to women with children and/or a job; c) Have additional rooms available for women who need to care for family members while learning.

5 DeFi is an umbrella term for financial services on public blockchains, primarily Ethereum. With DeFi, one can do most of the things that banks support, but it's faster and doesn't require paperwork or a third party. More information can be found here.

6 Pezesha means 'capital enabler' in Kenyan (as per company's LinkedIn page). Pezesha the company builds a digital financial trust infrastructure to provide affordable financial services to underserved small and medium businesses in sub-Saharan Africa.

Challenges:

1. The speed of transaction should be seconds, but there are times where it takes a few minutes to transfer the crypto to the digital wallet and then withdraw it.
2. The project needs to find more companies willing to hire the project participants and pay crypto.
3. EMPACT can ensure only one month of work for participants at this time.

Additional information:

1. WFP's Privacy Framework regulates internal and external data management practices. All partners must sign and abide by it. Private companies need to have certain certificates and infrastructure/frameworks to implement what they signed.
2. EMPACT doesn't share beneficiary data with private companies.
3. Participants control their data and can ask to be removed from the system.
4. EMPACT uses only stable coins, in this case crypto USDs.

> *"The participants are so used to waking up one day being able to buy bread and the day after only being able to buy a tiny piece of bread. The participants are so interested in the fact that the crypto in their wallet won't change in value."*
>
> **— Elisa Molena, Global Project Lead, WFP Innovation Accelerator**

4. Direct Cash Aid

Organizations: 121 Consortium — a collaboration between the Netherlands Red Cross and five partners within the Dutch Relief Alliance: Dorcas, Cordaid, Help a Child, Tearfund and ZOA.

Status: Pilots completed in Ethiopia, Malawi, Kenya and the Netherlands. The 121 platform is now running in Ethiopia and Lebanon.[7]

Problem addressed:

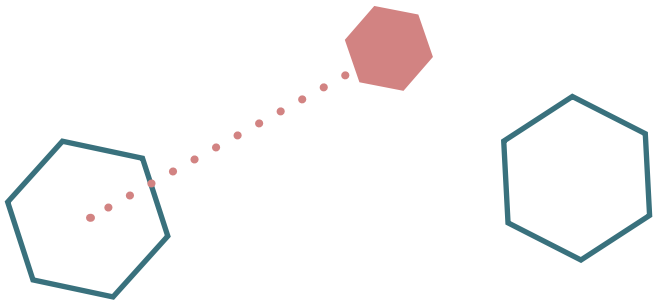
- Lack of proof of identity by implementing a Self-Sovereign Identity (SSI).[8]
- Lack of interoperability, data security and responsible use of data in the humanitarian sector.

The 510 team of the Netherlands Red Cross believed that SSI could tackle these problems because:

1. The affected person could create one SSI and get different validated identity attributes, which could be used with multiple organizations.
2. SSI could be used by the sector and eventually expand into a more foundational purpose.
3. SSI is decentralized, Sovrin has a strong governance framework and blockchain is tamper proof.
4. SSI is developed using privacy-by-design principles, which will force organizations to consider responsible use of data.

Problem addressed:

- Lack of proof of identity by implementing a Self-Sovereign Identity (SSI).[9]
- Lack of interoperability, data security and responsible use of data in the humanitarian sector.



7 121 eventually becomes an opensource platform for cash-based aid built with digital identity creation and cash aid distribution. The case discusses the project from its ideation to the decision of removing blockchain components.

8 SSI means that the individual (or organization) manages the elements that make up their identity and controls access to those credentials digitally. More information can be found here.

9 SSI means that the individual (or organization) manages the elements that make up their identity and controls access to those credentials digitally. More information can be found here.

Assumptions disproved:

a. There was limited Internet connectivity and very low smartphone penetration in the pilot context (rural, African) to use the functions of SSI.

b. Not all organizations want interoperability.

c. Identities validated by one organization are not trusted by others, even within a consortium.

d. Deduplication using SSI is not easy technically.

e. Not all organizations are digitally literate to work with SSI.

f. Sovereign Governments may not accept SSI (e.g. Kenya).

g. Data security is not necessarily improved if personal data is stored off the chain, especially if humanitarian organizations continue to demand that data be downloaded as Excel sheets.

h. Legal and donor obligations for organizations may come into conflict with individuals being able to own and control their own data.

Lessons learned and recommendations:

1. SSI proved to currently have no value.
2. If you want to build the software yourself, ensure you have experienced technical team members.
3. Go to the field and do more tests.
4. Take more time to ideate and use a human-centred design process from the start.
5. Begin with understanding the problem. Then decide on the technical solution.
6. Make sure the product is modular in a way that you can replace certain contextual elements.

Inclusion:

- Affected people and M-Pesa agents were included in the project's co-design session to understand each other's needs and the different environments people find themselves in.
- Community village meetings to communicate project inclusion and exclusion criteria, complaints, feedback and accountability.
- Conducted research on critical parts of the 121 platform, such as registration, validation and inclusion using digital identities.

5. Open Loop Cash-Transfer Pilot

Organizations: The pilot was a collaboration between the International Federation of Red Cross and Red Crescent Societies (IFRC) and the Kenya Red Cross Society (KRCS), with four third-sector partners (Safaricom M-Pesa, Red Rose and Coin Sciences).

Type: Private permissioned blockchain

Status: Pilot completed in Isiolo County, Kenya, in 2018, assisting over 2,000 drought-affected households.

Opportunities:

1. Increased accountability and auditability underpinned by immutability and traceability.
2. Distributed reporting system enabled by decentralization.
3. Digital identity and its associated impacts: decentralized credential exchange; a secure, portable, user-managed identity; potential use for multiple use-cases.[10]

Impact:

1. Auditability: Data discrepancies within the ecosystem of applications can be investigated against time-stamped records.
2. Technical: The architecture demonstrates that blockchain solutions can be implemented in a lighter and less complicated manner.

Success factors:[11]

- Collaboration with third-sector partners and the widespread availability of mobile money networks in Kenya were fundamental for the pilot's success.
- Important features of the data management solution included:

  a) a data-collection tool that worked offline.

  b) an ability to allow KRCS to automate the distribution and reconciliation with M-Pesa.

  c) several security- and reporting-related functionalities.

10 IFRC. 2018. Blockchain and humanitarian assistance presentation.

11 IFRC. 2018. Learning review: Blockchain open loop cash transfer pilot project [accessed May 2022].

Challenges:

- The architecture was challenging, and it was unclear how to expand to allow third parties and/or the public blockchain.
- Correcting a mistake (e.g. disbursement requested by mistake) was burdensome.
- The processes, tools and skill sets needed to audit data on a blockchain were unclear.
- Making a blockchain-based application truly GDPR compliant may prove to be challenging.
- The legality and acceptance of an SSI, issued by a humanitarian organization, is still murky at best.
- Negotiations around IP with private partners was time consuming. An agreement was not reached within the pilot's time frame.

Lessons learned and recommendations:

1. In the end, the main benefactor of accountability was IFRC audit and finance. Programmatically, blockchain did not add any new value from a cash practitioner's perspective.
2. When a private company approaches you with a solution, even one that's free, understand your leverage, clarify payment issues and ensure the solution will be sustainable.
3. Find a solution to a clearly defined problem. Technology should not drive the decision. It is not about blockchain.

> *"Regardless if it's blockchain or not, it's around identities because we identify that 25% of KRCS's caseloads did not have official identities and that was also a barrier to receiving cash due to Know Your Customer regulations."*
>
> **— Joseph Oliveros, Senior Officer of Cash Transfer Programming Innovations, IFRC**

Inclusion: People with no Internet access were provided with QR codes so they could receive their entitlement by going to a location where Internet is available.

6. Comparative test of Social Fundraising and Last Mile Aid Distribution Solution

Organizations: Medair, ADONIC

Type: Public blockchain

Status: Medair piloted and tested AIDONIC in the Beqaa valley, Lebanon, during COVID-19.[12] AIDONIC now supports several other humanitarian campaigns' fundraising and aid distribution.

Problems addressed:

1. AIDONIC's blockchain-based social fundraising and aid distribution platform enables full end-to-end transparency and accountability. All platform users, including NGO project managers, implementing partners, service providers, donors and beneficiaries, can monitor and track in real time the distribution of any entitlement, whether in-kind aid or cash assistance, while safeguarding personally identifiable information.
2. The platform optimizes the first-mile donation and last-mile distribution processes by incorporating best practices in GDPR, data protection and aid delivery within the platform's architecture. Within the SaaS version, Medair will aim to build core humanitarian standards into the platform's processes in aid delivery and reporting to ensure programme quality.
3. The platform also addresses localization challenges; it enables local and national NGOs that lack brand awareness with global donors to build relationships of enhanced trust through the use of blockchain. Medair's testing revealed 72 per cent greater engagement by a key donor demographic (age 25–44) for a project that incorporated blockchain.

Success factors:

- In-depth testing with users, including control groups who received entitlements through a traditional mechanism.
- Recipients were chosen based on clear, predefined criteria, including a vulnerability-based weighting.
- Surveying beneficiaries to understand their digital literacy helped to target necessary support.

Challenges:

- Some beneficiaries were not digital literate, but they were able to rely on their children for help.
- Survey respondents perceived it as slightly less organized, likely explained by on-the-job training required of the platform.

12 AIDONIC. 2020. Successful pilot in Beirut, Lebanon.

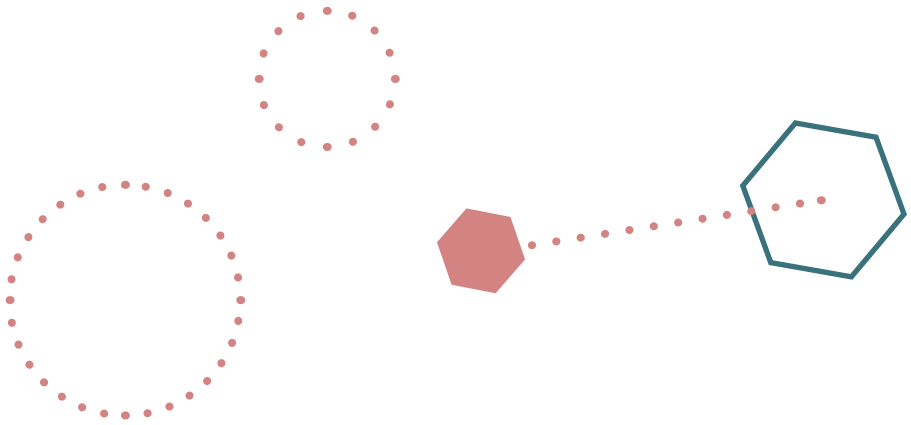
Impacts:

- Aid recipients perceived AIDONIC as easier to use, more efficient, less time consuming and more secure than the control group.
- There were slight improvements in the quality of information received, the number of problems experienced and satisfaction with the financial service provider.
- Beneficiaries' interest in the platform was underestimated; many wished to use all of its features.
- The increased transparency enabled beneficiaries to see the cost and expiry date of medication.
- Donors had a much higher degree of insight into the impact of their financial contributions.

Lessons learned and recommendations:

1. The time invested in the one-on-one relationship with a beneficiary ensured that everyone succeeded with the project.
2. Organizations should be more transparent. The content or details about their use of blockchain is too simple/minimal to have a clear view at the research stage.
3. More comparative evidence is needed about the benefits, risks and impacts on aid recipients and stakeholders.

Inclusion: Spent more time with and provided one-on-one support to people who are more vulnerable.



Recommendations

Based on the expert interviews and relevant literature, we have outlined several recommendations that humanitarian blockchain projects should consider. Although blockchain is an advanced technology, interviewees made it clear that the human aspect of a project is the critical aspect to ensuring its success. Most of your time will likely be spent with people — lobbying, explaining, communicating and supporting.

Below are a series of recommendations grouped in a way that we hope facilitates understanding and eases the effort required to create your own checklist.

Blockchains are most valuable when:[13]

- They are used to track ownership of complex issues over time.
- There are multiple groups or actors involved.
- There is no well-established or effective central authority in place.
- Groups or actors involved need to work collaboratively.
- A record or proof of transactions is desired.

If your particular requirements do not fall within one of these sets of criteria, a centralized database may be a better solution.

Before implementation:

- Spend time getting to know your users or clients as well as their needs and expectations.
  - Communicating and explaining upfront to all parties involved (or interested) will take up the most time and effort by far. Achieving understanding, buy-in and ongoing support is critical.
  - Be sure to outline the benefits that project participants will receive. For example, if they have to run a blockchain node, it can be expensive with costs slowly increasing as volume and participation increase. What extra value will participants have from getting involved?
- Start with understanding and clearly defining the problem. You will save a lot of time and/or problems if you do this upfront. There must be a clear need for blockchain.
- Break down your motivation and see if blockchain can address it.

13 Ko & Verity. 2016. Blockchain for the Humanitarian Sector – Future Opportunities.

- Really question if you need blockchain and review it from multiple angles. Ideally, work through the Blockchain for Humanitarian Aid Decision Tree[14] to confirm your motivations.
- Make sure there are no suitable alternatives. Blockchain is still a complicated and more expensive technology than others, and finding skilled developers is challenging.
- Learn the nuances and differences between public and private blockchain.
- Ensure the project's benefits are directed towards beneficiaries.
- Be careful when involving cryptocurrencies due to their volatility and reputation associated with legally grey areas, e.g. anti-money laundering (AML), scams.

Implementation:

- Include the majority of the stakeholders to co-create the system from the beginning.
- Do a rough calculation of how many transactions, accounts, wallets or stakeholders are expected. The blockchain should be able to support that volume well into the future.
- A more established blockchain, with many years of deployments, will often be a better solution.
- Simplify the data flow to reduce platform complexity and increase usability.
- Provide a standard interface to interact with non-blockchain IT systems.
- Do not store everything on the blockchain (unless absolutely necessary).
- Always have someone in-house who understands blockchain (even if they are not the developer).
- Hire appropriately skilled contractors or companies. You cannot simply repurpose your website developer to build you a blockchain. Technology has advanced significantly in the past few years, meaning there are now companies that specialize in this area and can quickly build proof-of-concepts or full solutions.

Risk assessment:

- Assess connectivity and decide which parts can be done online/offline.
- Reflect on blockchain's inclusive nature, since it requires users to have Internet connectivity, a smartphone and digital skills.
- Assess if the infrastructure (e.g. data centres, policies, legislations, developers) can support the solution on the ground.
- Determine how to ensure the data's accuracy before it's imported into the blockchain system.
- Confirm that you have a framework to regulate data-sharing practices and to ensure data privacy and security.

14 Blockchain for Humanitarian Aid Decision Tree Website. PDF can be found here [accessed 18 May 2022].

Beneficiary consent and communication:

- Share all necessary information with potential beneficiaries.
- Be transparent about the technical side (especially when it involves biometrics) to avoid project failure due to misinformation.
- Align with legal principles and organizational data-protection guidelines.
- Keep the communication in a simple framework: What type of data will be collected? Why do we need it? How are we going to use the data? Where is the data physically hosted and stored? Who will manage and be responsible for the data? Who will have access to it? How can the data be deleted at the end of the project?
- Translate, and ensure you have done so correctly.
- Have staff who know the local languages in the field to translate and explain.
- Create audios, videos and graphics in the local language to facilitate communication.
- Provide a hotline or a direct contact for beneficiaries to ask questions.
- Give beneficiaries the option to drop out any time.

**Beneficiary communication is challenging when it involves complex technologies like blockchain. At present, organizations are still exploring a way that can ensure transparency and simplicity.*

Privacy and security:

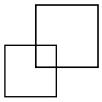
- Conduct a Data Protection Impact Assessment before using blockchain-based types of solutions.
- Obtain consent and a future data-use agreement from the start.
- Recognize there may be legal implications depending on where the data is physically stored.
- Minimize data collection. Collect only essential data.
- Do not collect data that you cannot be responsible for.
- Avoid putting personal identifiable information or biometrics on blockchain.
- Separate identification data from other data. And ensure that it can be accessed only by those authorized.
- Have clear guidelines on what you can/cannot share with whom and how to do so securely.
- Establish role-based access within an organization. Only concerned parties can see relevant information.

- Anonymize transactions.
- Educate field staff and affected people about good data practices.
- Delete data after the end of your project.
- If a government requires access to data:
    a) Use data minimization and decentralized storage to decrease potential risks.
    b) Lobby to set up data-processing/sharing agreements.
    c) Avoid oversharing. Just share the minimum.

Inclusion:

- Consider aspects that may exclude participation (such as access, connectivity, knowledge and skills) and potentially broaden the digital divide.
- Representation in the data set should be inclusive of gender, minority groups, people with disabilities, etc. Because if a programme provides shelter based on beneficiary lists, those who are not included in the data set will not have access to shelter.
- Provide services and facilities that enable the participation of people with disabilities.
- Design flexible approaches to accommodate people's special needs and promote gender equality.
- Update the technology when issues are reported, or when it can be expanded to offer affected people more options to receive their entitlements.
- Provide one-on-one assistance to people who are more vulnerable.

Concluding remarks on emerging themes



Private or public

Humanitarian organizations should learn the differences between private and public blockchain before choosing one according to their programmatic and operational requirements, and while taking into account the 'do no harm' principle. The table[15] below provides a structured understanding of different types of blockchain.

Decentralization, a key feature of blockchain, is an inherent result of the consensus mechanism of public blockchains. The decentralization or recentralization of permissioned blockchains depends on initial members designing the consensus mechanism. Decentralization on permissioned blockchains can be ensured if a) it starts off with enough distributed ledgers (members) with a consensus mechanism that everybody has to agree with; b) the mechanism is modified to ensure balance of power and equality when new members join. BB's governance mechanism is a great example of how decentralization can be achieved on a permissioned blockchain.

In terms of security, a public blockchain's strength is higher because it is built for strangers to interact and thus needs to be technically "bulletproof." Even when the system is secure and strong, a permissioned blockchain can be affected by the organization's real-world trust and reputation. Privacy and data protection is often cited as the primary consideration among organizations when it comes to the choice of public or permissioned blockchain. Not revealing data motivates most humanitarian organizations to choose permissioned blockchain. However, when a project involves cryptocurrency or crowdfunding, organizations usually then choose public blockchain.

15 EY. 2017 Global blockchain benchmarking study.

Types of blockchain		Read	Write	Commit
Open	Public permissionless	Open to anyone	Anyone	Anyone
	Public permissioned	Open to anyone	All or authorized participants	All or subset of authorized participants
Closed	Consortium	Restricted to an authorized set of participants	All or authorized participants	All or subset of authorized participants
	Private permissioned enterprise authorized nodes	Fully private or restricted limited set of nodes	Network operator only	Network operator only

The funding paradox and beyond

Not-for-profit and non-governmental organizations in the humanitarian and development sectors depend on donor funding to provide for the people we serve. All interviewees expressed that one of their key lessons learned is to start with a thorough understanding of the problem and only then find the best technical solution.

However, there is a clear tendency that funding is usually granted to the most innovative proposals decorated with buzzwords like blockchain. This environment has pushed some organizations to find problems for a given technology rather than the other way around. The existential threat of needing to be the most innovative organization further creates the issue of the political ownership of a certain technology, discourages collaboration and coordination between organizations, and exacerbates misunderstanding and misinformation. Subsequently, this can lead to fragmentation, where different agencies try to address similar problems and develop similar solutions. While waiting for policy change, improved donor strategies, and investment to augment the value and incentives for more inter-organizational efforts, fragmentation remains a real problem undermining the effectiveness of aid programmes and emergency responses globally.

A positive sign is that some humanitarian organizations are aware of this issue and are trying to address it. For example, BB employs bottom-up approaches focused on country-specific attributes and finding solutions to smaller problems. This can potentially open a new policy space for global aid effectiveness. Additionally, continuing to scale and illustrate positive practices implemented in field operations can serve as a starting point for a broader humanitarian collaboration growth. Responsible use of innovation and technology can change the way the humanitarian community operates. Blockchain is part of this solution because of its decentralized and neutral nature, as it avoids 'ownership' issues that often prevent the inter-organizational collaboration to scale.

Another issue is that while donors sponsor innovative projects, their reporting requirements are generally designed for traditional humanitarian aid. Interviewees reflected that the more important questions to report about an innovative project should be: Does it make sense to use this technology? Has a process been found to learn from? What was changed and why? Without (public) answers to such questions, it is challenging for other organizations to learn from other technologically innovative projects. With such reporting adjustments, the sector would quickly build up a knowledge bank around innovative technology, and donors would be able to target funding towards teams that are transparent and can demonstrate an ability to define problems clearly before selecting a technology.

Meaningful consent and data ownership

Humanitarian organizations collect beneficiary data for a variety of reasons, ranging from operational needs (assessing vulnerabilities to better target aid) to legal requirements (KYC, AML). Most affected people are willing to give consent to collect their personal information, as this intangible data comes only second to their basic needs. With such a power imbalance between humanitarian organizations and affected people, safeguarding beneficiary data and enabling its ownership by beneficiaries comes down to the organization's policy and architecture. However, even if a programme is designed in a way to enable data ownership, access to connectivity and digital devices, digital literacy and digital skills are often hurdles to true data ownership. As such, real meaningful consent and data ownership are still hard to achieve in most of the environments where we operate.

From humanitarian organizations' point of view, some balance between driving innovation and risk management should be achieved. It is important to emphasize that while many innovations rely on beneficiaries sharing their personal data, the innovators behind them are prioritizing safety of the most vulnerable (e.g. through privacy-by-design system architecture, security audits). The innovations are meant to improve the lives of people in humanitarian crises and are developed in the hope of providing better and faster aid. There is always an intention to empower people as much as we can — this also relates to an idea/a goal of making people the owners of their own data. But this goal can be achieved incrementally knowing the constraint environments in which organizations often operate (e.g. lack of connectivity, access to digital devices, Government restrictions).

> *It's not a binary approach, either it's perfect or we don't do it at all, because you learn so much. If you wanna wait for 10 years from now when everyone has a phone and connectivity and will only start, then that is only one element. There are a million other elements, including the governance frameworks, the agreements and all the other technical development irrelevant to blockchain. So, we know where we wanna go. This is what we can do today, and we incrementally move towards where we want to go."*
>
> **— Houman Haddad, Head of Emerging Technologies, WFP**

Two discourses surrounding private companies and emerging technology

To better respond to humanitarian crises, organizations have started leveraging public-private partnerships and emerging technologies. Two discourses have developed along with this transformation of humanitarian aid. On the one hand, humanitarian organizations state that by collaborating with private companies and leveraging emerging technologies, they can optimize operational efficiencies, reduce unnecessary costs, and coordinate various assistance harmoniously and synchronically. In such a manner, organizations can make full use of limited resources and provide higher-quality humanitarian aid, meaning affected people can have normal and dignified experiences.

On the other hand, critics argue that the humanitarian logic of deploying an assemblage of technologies, including biometrics, blockchain, digital identities and artificial intelligence, cannot be justified in the name of protection, dignity or quality of assistance. Critiques and concerns mostly centre on technology bias towards race, age and disabilities; lack of safeguards; risk of data breach, data sharing and function creep; surveillance of refugee bodies; capitalization of data; absence of legal frameworks; and technology hype and experimentation in the displaced context.

Humanitarian organizations are not working in an isolated world; influences from business and technology have permeated into the sector. Both discourses should be heard and communicated by those concerned. Throughout the research, humanitarian organizations have shown awareness of the criticism and are taking actions to address them gradually. Some of their efforts are demonstrated in this report. This criticism has also been a bit of a warning siren for humanitarian organizations that higher transparency and more public communication are needed to avoid future misunderstanding and misinformation.

Appendix

Other examples of blockchain in the humanitarian sector:

Cash Assistance	Cryptocurrency	Supply Chain	Digital Identity/ Financial Inclusion	Fundraising/ Donation
Community inclusion currency and relevant material Organizations: IFRC, Danish Red Cross, Kenya Red Cross	Crypto voucher pilot for women at risk of gender-based violence Organizations: CARE International, Celo, Emerging Impact, Blockchain Charity Foundation, Lab for Inclusive FinTech	Decapolis: Blockchain traceability platform for smallholder farmers Organizations: WFP Jordan Innovation Hub, Decapolis	ID2020: a good digital identity to right and opportunity Organizations: Alliance partners (Accenture, Gavi IDEO-ORG, Microsoft, The Rockefeller Foundation, etc.)	Plate by Plate: food donation and surplus management Organizations: Delhaize Serbia, UNDP
Digital cash for work Organizations: Emerging Impact, Polish Humanitarian Action, Celo	CARE crypto fund for humanitarian aid Organization: CARE	Blocks for humanitarian cargo transport Organization: WFP	Digital identity for asylum seekers Organizations: The Finnish Government, MONI	Disperse: to address key problems of fund aid Organizations: Disperse, Start Network, UK Government Department for International Development, UNOCHA
Dignified identity for cash assistance and learning review Organizations: IFRC, Kenya Red Cross, Norwegian Red Cross, Norwegian Refugee Council, Norwegian Church Aid, Save the Children Norway	Crypto donation for Ukraine Organizations: Aid for Ukraine, Everstake, FTX Trading Limited, Solana, Kuna Exchange	Agriledger: Supply chain for smallholder farmers Organizations: Tech UK, Digital Jersey, Godan	Leading blockchain networks announce initiatives to drive financial inclusion across Africa Organizations: Ethereum, Stellar, Celo, Cardano	

Cash Assistance	Cryptocurrency	Supply Chain	Digital Identity/ Financial Inclusion	Fundraising/ Donation
Sikka: streamlining cash transfers Organizations: Sikka, World Vision International Nepal	USA for UNHCR accepts first stablecoin crypto donation to support Ukraine effort Organizations: USA for UNHCR, Binance Charity			
Oxfam unblocked cash for those unbanked Organizations: Oxfam, SEMPO, Emerging Impact	Hope for Haiti, using crypto to help Haitians impacted by earthquakes and civil unrest (to be deployed for a six-month pilot) Organizations: Coinbase, Emerging Impact, Celo Foundation			

Other References

Cheesman, M. (2022). Self-sovereignty for refugees? The contested horizons of digital identity. Geopolitics. 27(1). https://doi.org/10.1080/14650045.2020.1823836.

Copic, E. & Franke, M. (2020). Influencing the velocity of central bank digital currencies. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3518736.

Coppi, Giulio; Fast, Larissa (2019). Blockchain and distributed ledger technologies in the humanitarian sector, Humanitarian Policy Group (HPG) Commissioned Report, Overseas Development Institute (ODI), London. https://www.econstor.eu/handle/10419/193658.

Danish Red Cross, Mercy Corps & hiveonline. (2020). The next generation humanitarian distributed platform. https://www.mercycorps.org/sites/default/files/2020-11/The-Next-Generation-Humanitarian-Distributed-Platform-v3.pdf.

Emerging Impact & Celo. Future-proof aid policy. https://drive.google.com/file/d/1Sf_jqhE8buy0qtIQiUI9IcfB4IiHGuBG/view.

Holloway, K., Masri, R. A. & Yahia, A. A. (2021). Digital identity, biometrics and inclusion in humanitarian responses to refugee crises. HPG working paper. https://odi.org/en/publications/digital-identity-biometrics-and-inclusion-in-humanitarian-responses-to-refugee-crises/.

IFRC. (2021). Digital identity: An analysis for the humanitarian sector. https://www.ifrc.org/document/digital-identity-analysis-humanitarian-sector.

IFRC & University of Oxford. (2021). Case studies: 121consortiym direct cash aid in Kenya. In Digital Identity: An Analysis for the Humanitarian Sector. https://octd.co.uk/DIGID.pdf.

Kenya Red Cross. (2018). Blockchain technology in humanitarian programming: A pilot project in cash transfer programming in Kenya. https://cash-hub.org/wp-content/uploads/sites/3/2020/10/Blockchain-Technology_Pilot-Project-in-Kenya_2018.pdf.

Lemberg-Pedersen, M., & Haioty, E. H. M. (2020). Reassembling the surveillable refugee body in the era of data-craving. Citizenship Studies, 24(5). https://core.ac.uk/download/pdf/344940247.pdf.

Madianous, M. (2019). The biometric assemblage: Surveillance, experimentation, profit, and the measuring of refugee bodies. Television & New Media. 20(6). https://journals.sagepub.com/doi/10.1177/1527476419857682.

Seyedsayamdost, E. & Vanderwal, P. (2020). From good governance to governance for good: Blockchain for Social Impact. Journal of International Development. 32(3.)https://www.researchgate.net/publication/341659773_From_Good_Governance_to_Governance_for_Good_Blockchain_for_Social_Impact.

Tdlogreg, Saskia. (2021). Next level integration with financial service providers in Kenya and the Netherlands. https://cash-hub.org/resource/next-level-integration-with-financial-service-providers-in-kenya-and-the-netherlands/.

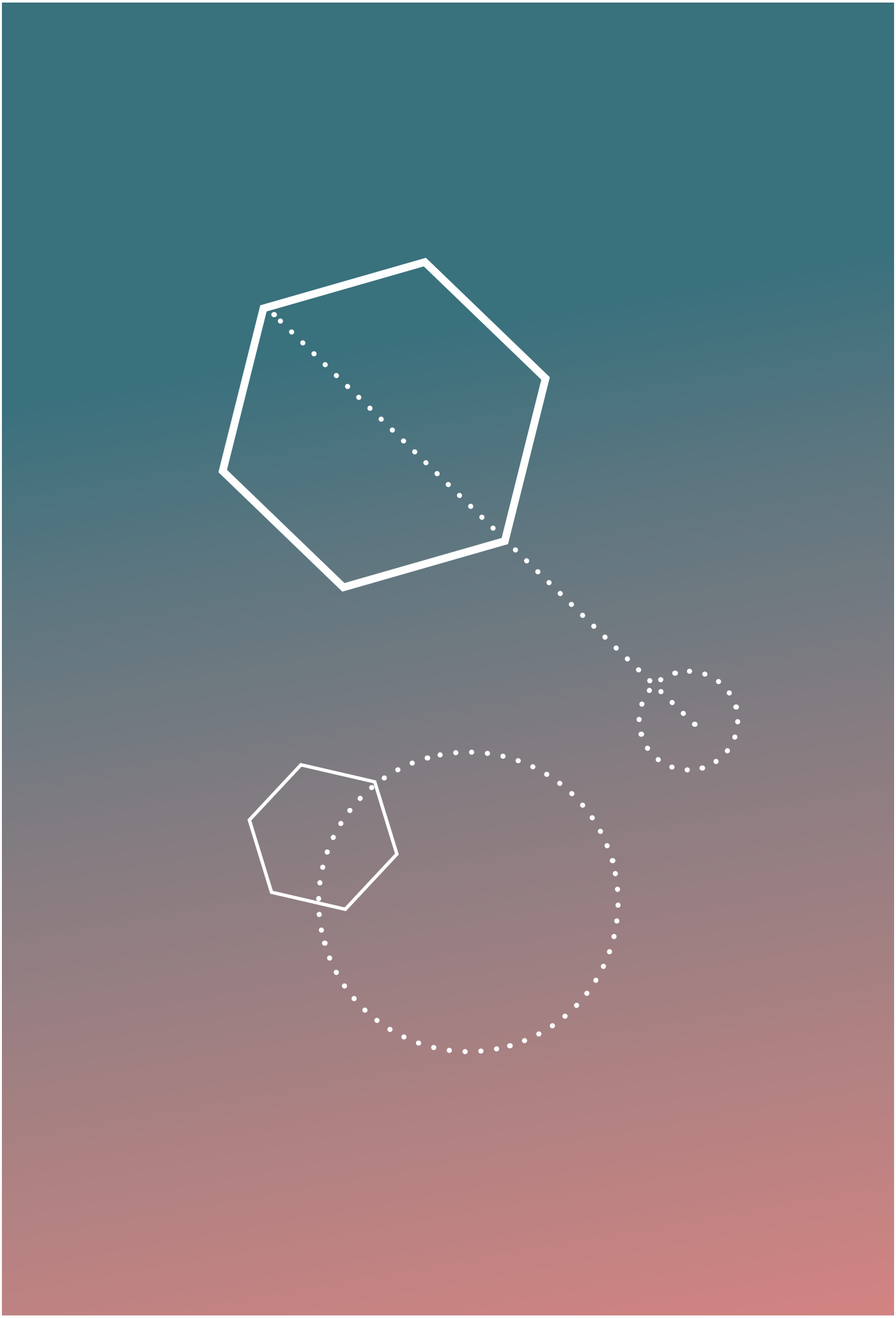
The United Nations Entity for Gender Equality and the Empowerment of Women. (2020). Gender and the digital divide in situations of displacement: The experiences of Syrian refugee women in Al-Azraq and Al-Zaatari camps. https://jordan.unwomen.org/en/digital-library/publications/gender-and-the-digital-divide.

Twelves, Rick. (2019). The promise and peril of digital identification for aid distribution. https://cash-hub.org/news-and-events/news-articles/the-promise-and-peril-of-digital-identification-for-aid-distribution/.

UN Women Jordan. (2018). UN Women and World Food Programme harness innovation for women's economic empowerment in crisis situations. https://jordan.unwomen.org/en/news/stories/2018/september/un-women-and-wfp-blockchain.

Wang, F. & Filippi, P. (2020). Self-sovereign identity in a globalized world: Credentials-based identity systems as a driver for economic inclusion. Frontiers in Blockchain. https://www.frontiersin.org/articles/10.3389/fbloc.2019.00028/full.

ZAmbrano, R., Young, A. & Verhulst, S. (2018). Case study Connecting refugees to aid through blockchain enabled ID management: World Food Programme's Building Blocks. https://blockchan.ge/blockchange-resource-provision.pdf.




DH Network
Digital Humanitarian Network