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WORLD ECONOMIC FORUM

Blockchain-Based Digital Currency and Tools for Cross-Border Aid Disbursement

WHITE PAPER

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Contents

This white paper is part of the Digital Currency Governance Consortium White Paper Series. Its authors, contributors and acknowledgements can be found in that compendium report.

Preface

This paper explores the applications of digital currencies and blockchain-based tools for cross-border development and humanitarian aid delivery and disbursement.

The biggest challenges facing cross-border aid disbursement are human, process and geopolitical challenges, which technology alone cannot remedy. The introduction of a blockchain-based digital currency will, at most, only ever solve a piece of a much larger problem. Nevertheless, with this reality in mind, there is a range of cross-border aid pilots that are being conducted using blockchain-based digital aid solutions. Serious ethical questions and nuances arise regarding the testing of emerging technologies on people who may be caught up in crisis or find themselves in a vulnerable state, as there are considerable risks to tracking targeted groups of people.

However, vulnerable populations risk being left behind as technology advances. Humanitarian organizations can mitigate this risk by gaining a deep understanding of the possibilities offered by the future of money and new technologies, and by committing to bring the value of those technologies to underserved people. Given the current momentum and volume of pilot projects, it is likely that cross-border aid disbursement will continue to include and even increase the use of blockchain-based digital aid over the next 10 years. It is therefore important to keep exploring ways in which these technologies can deliver benefit to people who are underserved and in vulnerable situations. This is particularly true as legacy financial systems begin to incorporate digital currencies, which in turn may inadvertently enhance the digital divide.

This white paper examines both the promise and challenges posed by blockchain-based digital currencies, such as cryptocurrency and stablecoins, as well as blockchain-based tools and platforms, which create infrastructure aimed at improving cross-border humanitarian aid disbursement. The paper also examines whether these digital currencies and distributed ledger platforms could have a viable long-term net benefit to the way in which aid is disbursed to people in need globally. The paper does not focus on central bank digital currencies (CBDC), although this community may explore the use of CBDC for cross-border aid in the future.

Specifically, this white paper explores examples of pilot projects conducted by humanitarian aid organizations, which aim to test whether blockchain-based tools and currencies can enable cross-border aid transfers in a more efficient, transparent and less costly way than cash, commercial bank payments, or e-money. After a short section framing the context of cross-border humanitarian aid, the paper is divided into two chapters:

1. **Priorities for cross-border humanitarian aid** disbursement in which blockchain plays a role

2. **Examples of blockchain-based pilot projects** for cross-border humanitarian aid currently underway

This work is based on a review of literature describing the value and utilization of stablecoins and blockchain in humanitarian aid, as well as on primary research – including semi-structured interviews with leaders from major humanitarian organizations.

The target readership for this white paper includes:

- Individuals and organizations involved in the delivery of cross-border aid, such as humanitarian and development agencies, policy-makers, health authorities, private-sector investors and technologists who wish to learn about the value proposition of stablecoins for aid delivery and disbursement.

- Blended-finance investors, institutions and aid organizations that are keen to enhance ways of assessing the impact of aid projects.

Context of humanitarian aid

The primary objective of humanitarian assistance is to save lives, alleviate suffering and maintain human dignity during and after man-made crises and disasters associated with natural hazards, as well as to prevent and strengthen preparedness for when such situations occur. Today, over one billion people live in countries that are affected by long-term humanitarian crises.[1] The COVID-19 pandemic has exacerbated existing vulnerabilities, putting those living in fragility and poverty at even higher risk.

According to the United Nations Office for the Coordination of Humanitarian Affairs (OCHA), 235 million people needed humanitarian assistance and protection in 2021. The UN estimated that it would require $35 billion to serve the 160 million of those in greatest need.[2]

Further, the humanitarian aid system itself is under pressure. The pandemic has further exposed its vulnerabilities and challenged its capacity to serve the growing numbers of those affected by crises. One positive development is the shift from in-kind assistance to cash transfers, which paves the way for the digitization of aid disbursements.[3]

Current challenges to cross-border aid are related to the cost of delivery and resource flows, inequality of access to global aid, and challenges with the accuracy of traceability and reporting. These are some of the ongoing challenges that organizations face as they assess the value of blockchain-based technologies and digital currencies in this space.

> **The potential traceability offered by stablecoins and distributed ledger technology opens the door for unprecedented innovations to monitor and assess the impact of aid-funded projects. However, such opportunity comes in tandem with the need to address complex human behaviour and judgement. Hence, it is important to study all interlinked dimensions including the technical, operational, legal and ethical aspects.**
>
> Rania Al-Mashat, Minister of International Cooperation, Ministry of International Cooperation of Egypt

1 Priorities for blockchain-based digital currencies in humanitarian aid

Based on our primary research and interview conversations, there is a consensus that human, process and contextual factors – such as collaboration between agencies and governments – have a greater impact on the effectiveness of humanitarian aid disbursement than the role new technologies are likely to play. Bearing that in mind, this chapter examines key priorities and questions which will need to be considered if blockchain-based tools and digital currencies are to be used for cross-border aid disbursement.

Blockchain-based currencies, such as stablecoins, cryptocurrencies and central bank digital currency (CBDC), should be used where they would have a net benefit for people in need of aid. For this reason, the future of blockchain-based technologies in aid should be grounded in a sound analysis of the benefits and risks as well as regulatory compliance.

In navigating the future of aid disbursement and the applicability of blockchain-based digital currencies, the following are some key barriers and issues to address. These need to be prioritized to realize the full value and effectiveness that digital technologies can bring to aid disbursement in the coming decades.

1.1 Last-mile connectivity and device accessibility

The breadth and reach of digital currency systems will depend on the strength of last-mile connectivity. This challenge will create major inequalities between places that invest in infrastructure and those that do not. Coverage of and access to internet systems in low-connectivity regions will be an important factor in the next 5-10 years.

Given disparities in access, most of the poorest customers are unlikely, for example, to be able to send and receive cryptocurrency via a device, until the costs of smartphones fall or the capabilities of feature phones rise.

Failing to consider the technology gap may, in turn, unintentionally reinforce the existing gender inequity in access to financial services. Women in lower- and middle-income countries are 8% less likely to own a mobile phone and 20% less likely to own a smartphone than men. Smartphone ownership rates may mean that historically excluded or underserved women could lag behind men in their ability to use stablecoins. This disparity in device accessibility could further the digital divide.[4]

1.2 Digital identity gap

New digital currencies in humanitarian aid could create the potential for financial inclusion, since the digital aid given to historically excluded people could incentivize them to join the financial system. However, over 1.1 billion people do not have government-issued IDs.[5] This ID gap is one of the key reasons why restrictive Know Your Customer (KYC) requirements present a significant barrier to financial inclusion. People lack government-issued IDs for a variety of reasons, but mainly because of government capacity failures. Other significant groups lacking official identity documentation include refugees and populations displaced by natural disasters and conflict. The provision of identity documents for such people will be a critical factor in advancing digital financial inclusion in the coming decade.

1.3 Know Your Customer (KYC) challenges

Often the most vulnerable people lack addresses or identification and are therefore excluded from financial services. Many have cell phones, they regularly communicate with relatives around the world and they may have some level of access to the internet. Yet they are unable to receive digital aid due to a lack of proper identification or because the cost of accessing that aid is exorbitant. Given the financial reality that disbursing digital aid entails facilitating smaller transaction amounts and account balances, it is imperative for policy-makers, entrepreneurs and innovators to enable and promote screening measures that are proportional to the context. One potential example from blockchain-based digital payments is an "unhosted wallet", a digital wallet that is not hosted by a financial institution, which can potentially serve the needs of many of the world's most vulnerable. However, it should be noted that unhosted wallets bear the risk of lost funds if passwords or keys are lost.[6]

The Bahamas CBDC, known as the "Sand Dollar", provides an example of pre-KYC onboarding. The network is designed to "provide non-discriminatory access to payment systems without regard for age, immigration or residency status, [so] government-issued identification is not an enrolment requirement". The limit for account balances is set at $500.[7]

KYC requirements in the context of digital humanitarian aid raise an important policy question, in which policy-makers should carefully weigh the advantages of lowering barriers to entering the financial system for the historically excluded against the potential risks of failing to prevent illicit activity. Another important policy consideration is the management of de-risking,[8] a practice in which financial institutions terminate or restrict business relationships with clients or categories of clients to avoid, rather than manage, risk.[9] De-risking digital aid in this way would largely block off the potential inclusion of the 1.7 billion people who are already historically excluded, simply creating a new digital version of a system that is already in place.

1.4 Ethics

Aid agencies operate according to commonly agreed humanitarian principles, although the application and interpretation of those principles may vary across organizations (see Table 1). Donors and implementing agencies will need to navigate ethical risks, responsibilities and trade-offs in the application of rapidly scaling technologies in the financial sector, such as digital currencies. These trade-offs include:

- Privacy and data protection risks *vs.* traceability and auditability
- The power of conducting remote aid disbursement *vs.* the potential of a new digital divide, which excludes populations that lack the requisite digital devices or literacy
- The risks for testing emerging technologies on already vulnerable populations *vs.* the importance of enabling access to financial services
- The positive impact of providing vulnerable populations with access to new digital currencies and stablecoins *vs.* the policy risks to governments from currency substitution and capital flight, particularly in smaller economies and those experiencing hyperinflation
- The potential to expand digital financial innovation to aid disbursement *vs.* the risk of crowding-out other means of payment (e.g. cash) that aid recipients currently have more access to and find to be relatively more secure

For further discussion of the potential risks posed by digital technology to beneficiaries in humanitarian aid contexts, refer to the subsection in the Appendix entitled Ethical considerations and the risk of digital harm.

TABLE 1 **Humanitarian Principles**[10]

Humanity	Neutrality	Impartiality	Independence
Human suffering must be addressed wherever it is found. The purpose of humanitarian action is to protect life and health and ensure respect for human beings.	Humanitarian actors must not take sides in hostilities or engage in controversies of a political, racial, religious or ideological nature.	Humanitarian action must be carried out on the basis of need alone, giving priority to the most urgent cases of distress and making no distinctions on the basis of nationality, race, gender, religious belief, class or political opinions.	Humanitarian action must be autonomous from the political, economic, military or other objectives that any actor may hold with regard to areas where humanitarian action is being implemented.

Source: United Nations Office for the Coordination of Humanitarian Affairs (OCHA)

1.5 Programmable aid

Advances in innovation make possible the concept of "programmable aid", which leverages software to automatically disburse digital aid to a set of predetermined ("pre-vetted") aid recipients' destination accounts. An example of this would be an aid agency account that can be programmed to rapidly distribute digital aid to all the households in a disaster-affected region within hours of the event. This would prevent the lengthy timelines and delays that are typical of aid programme fundraising, disbursement setup and delivery. As is currently possible with digital tokens such as food stamps, blockchain-based digital aid could also be programmed to be spent at certain qualified vendors or within certain geographic areas.

1.6 A humanitarian stablecoin?

Digital technologies have begun to disrupt the traditional model for one-off physical cash distributions by providing aid recipients with the infrastructure (digital wallets) for more financial services beyond basic consumption. Typically, aid organizations rely heavily on third-party banking and financial institutions, particularly for digital aid delivery. However, new fintech platforms and API-based designs open the possibility for humanitarian aid organizations to operate as regulated financial institutions (e.g. virtual asset service providers or VASPs). Related to this, our interview respondents raised the potential value that lies in a consortium of aid organizations creating a global stablecoin for aid disbursement. This idea remains largely hypothetical, although some aid organizations have expressed support for the concept.

One point of concern is that a global stablecoin for aid could centralize humanitarian delivery, thereby exacerbating the divide between well-resourced multilateral organizations and their smaller local counterparts. If such an offering were considered the principal unit or vehicle of delivery, it could further entrench a digital divide between international organizations with the means, access and capacity to use a humanitarian stablecoin, and small, local and civil society organizations without the means or the access. It also remains unclear what the specific advantages of a global humanitarian stablecoin might be over the status quo.

1.7 CBDC for cross-border humanitarian aid

Over the next decade, central bank digital currencies (CBDCs) will become operational in various countries. While CBDCs for cross-border humanitarian aid are not the focus of this white paper, they may play a role in the future. Domestic aid use-cases for CBDC are more obvious (e.g. for domestic stimulus) than cross-border use-cases, although pilots in this space may arise in the coming years.

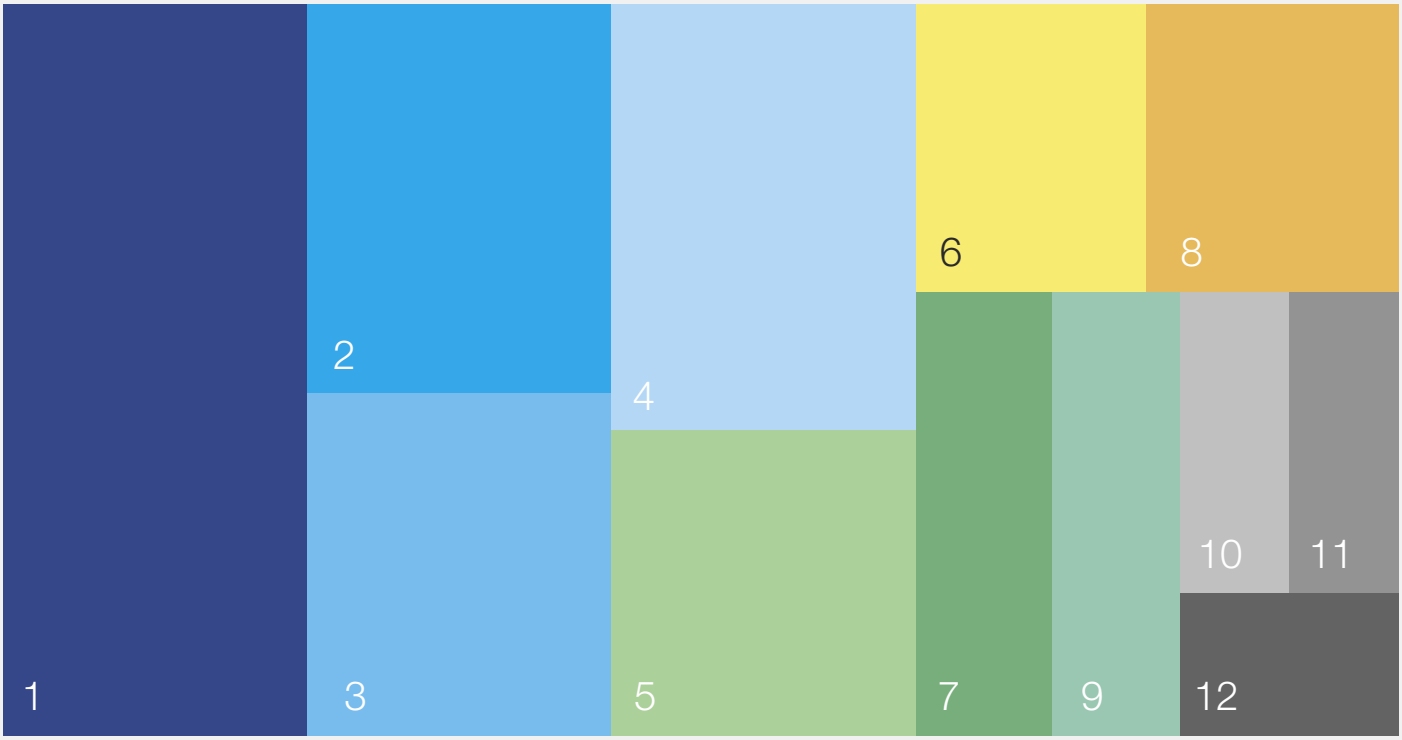
2 Pilot projects for blockchain-based digital humanitarian aid

2.1 Benefits and challenges of digital aid pilot projects

This chapter focuses on examples of blockchain-based cross-border humanitarian aid being piloted globally. Information was obtained through primary research and interviews with leaders from humanitarian aid organizations. Each leader showcased how their initiative or pilot is testing the applicability of blockchain to make progress towards delivering aid more efficiently and effectively. This research aims to inform dialogue among organizations, to bring visibility to the range of possibilities for digital currencies, and to encourage continued discussion and debate as to whether blockchain-based digital currencies and platforms can provide value in cross-border aid distribution and delivery.

Table 2 illustrates the benefits arising from digital aid pilot projects, as cited during project interviews with leaders of major humanitarian aid organizations, organized in the table by frequency of mentions during interviews.

TABLE 2 **Benefits by number of mentions across pilot interviews**

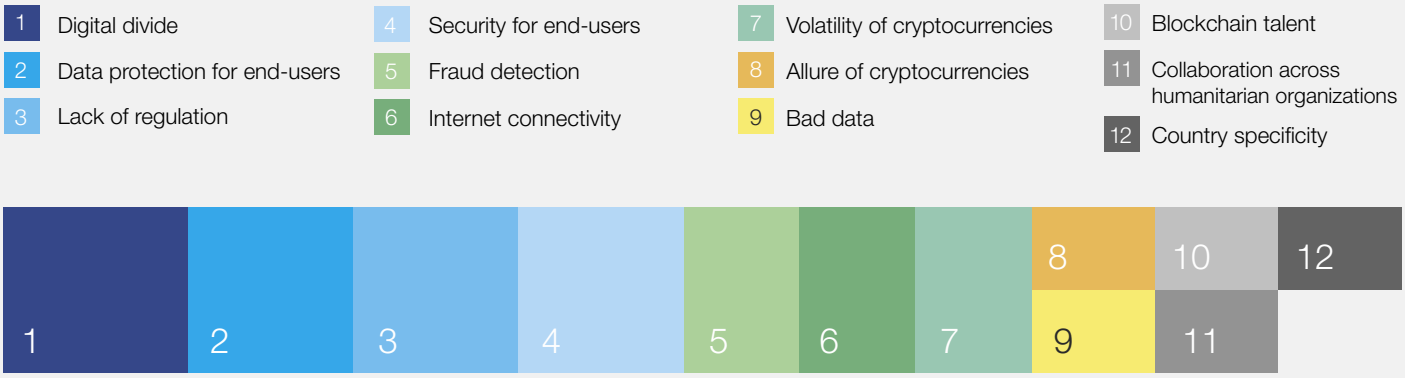


1 Visibility/Transparency
2 Access to banking
3 Cost efficiency of payment transfer
4 Security
5 Increased coordination of support
6 Economic creation
7 More stability than some currencies
8 Modernising for recipient country
9 Privacy
10 Circumvention of government resistance to aid
11 Fraud prevention
12 Reconciliation

Source: Interviews conducted by World Economic Forum, January-March 2021

Table 3 illustrates the challenges arising with digital aid pilot projects, as cited during project interviews with leaders of major humanitarian aid organizations.

TABLE 3 **Challenges by number of mentions in pilot interviews**



Source: Interviews conducted by World Economic Forum, January-March 2021

2.2 A selection of blockchain-based digital aid pilot projects

This section presents a selection of prominent pilot projects, with a focus on the cited benefits and challenges arising from the use of blockchain in cross-border humanitarian aid disbursement. The analysis below reflects the information provided by interviewees and is not the assessment or opinion of the World Economic Forum. This selection does not reflect the full slate of projects in the world, nor should inclusion of a project be taken as endorsement by the World Economic Forum. However, this sampling is intended to reflect the variety and diversity of projects around the world.

Further analysis is needed to determine the incremental value and efficacy of digital aid over pre-existing options for cross-border aid. The Forum's recently launched Crypto Impact & Sustainability Accelerator plans to dive deeper into topics related to humanitarian issues and financial inclusion.

For more detail on the pilot projects referenced, please refer to the Appendix for project summaries as explained by each organization. Project descriptions in the section below are also hyperlinked to each organization's website.

Circle Partners with Bolivarian Republic of Venezuela and Airtm[11]

Blockchain-based solution:	– Stablecoin
Project description:	– Unique private-public partnership – Dollar-backed, open, internet-based digital currency payments direct to frontline medical workers battling COVID-19 in Venezuela
Benefits:	– Direct distribution of funds avoiding censorship by Maduro regime – Helps recipients cope with hyperinflation and geopolitical insecurity, by bypassing state-controlled banking system – Airtm's network supports half a million users
Challenges:	– Airtm may need to be accessed via VPN due to Maduro government blocks on Airtm website and app

Red Cross blockchain-based credit system in Kenya[12]

Blockchain-based solution:	– Tradable digital tokens
Project description:	– Humanitarian response and recovery solution that enables communities to create and trade digital tokens for essential goods and services, using mobile networks – Users self-register to receive Community Inclusion Currencies (CICs), created on blockchain and guaranteed by reserves seeded by donors – Donors airdrop CICs into users' mobile wallets, enabling donors to remotely pay salaries, transfer aid and conduct training
Benefits:	– Communities trade CICs to access scarce goods and services – CIC transactions are recorded on blockchain, analysed and displayed in a web-based dashboard – Aid workers access analytics to improve field activities – Blockchain helps record aid provided to the region and enables increased transparency and accountability for distribution – Traceability enables aid workers to collect real-time data, useful for prompt response to crisis (e.g. during COVID response in Mukuru, an informal settlement in Nairobi)
Challenges:	– Need for more focus on governance in this space – Policy procurement side of aid is an important area in which problems need to be addressed

Diem payment system

Blockchain-based solution:	– Stablecoin
Project description:	– Decentralized programmable database (private, permissioned blockchain), designed to support a stablecoin – No current aid pilot, but included here as it is a possible future currency that may be considered for aid disbursement
Benefits:	– Intends to be a digital payment network accessible to a much larger swathe of the historically excluded population, through mobile app integration (e.g. WhatsApp) for individuals and businesses – Within-country and cross-border payment services on the network intended to be extremely low cost, with a focus on generating value from more complex services

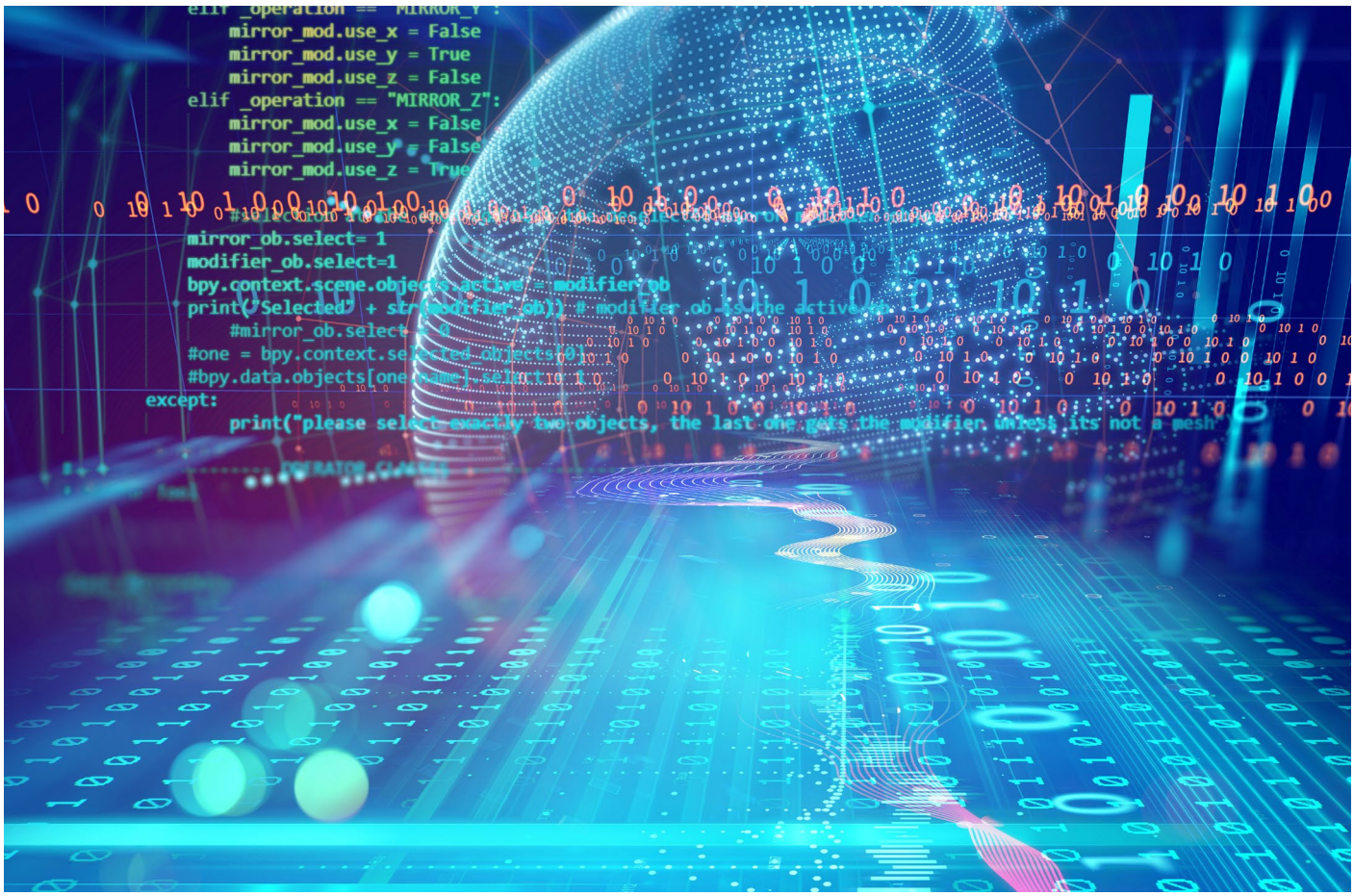
Challenges:	– As with other pilots listed here, Diem does not overcome common roadblocks to inclusion for the historically excluded and underserved, including:
	  – lack of identity documentation
	  – lack of first or last mile digital infrastructure
	  – weak digital and financial literacy
	  – limited internet or mobile phone access
	  – currency conversion costs (which increase the price of cross-border payments)
	– May aggravate digital divide and gender gaps in finance and technology

GoodDollar by eToro[13]

Blockchain-based solution:	– Cryptocurrency backed by value of other cryptos
Project description:	– Crypto-asset freely distributed as a digital universal basic income, backed by the value of other cryptocurrencies – Decentralized impact investment tool to sustainably fund and scale a digital basic income for recipients, while delivering a financial and social return to financial sponsors
Benefits:	– Used smart contracts to autonomously create and distribute cryptocurrency to 250,000 people in 181 countries, with 80,000 daily active users (based on a $58,000 principal) – GoodDollar has performed as an appreciating asset with relative stability
Challenges:	– As with other pilots listed here, some digital literacy is required to use this app – App users face verification to ensure “one person-one account”, but verification is influenced by quality of cell phone camera

Grameen Foundation and the Celo Platform[14]

Blockchain-based solution:	– Stablecoin (cUSD)
Project description:	– Mobile payments app, built on the Celo Platform, to provide emergency cash relief – cLabs developed a blockchain-powered disbursement dashboard for tracking, monitoring and reporting on transfers and balances
Benefits:	– Each transaction on Grameen's disbursement to the Philippines costs less than $0.01. This represents a 99.5% reduction in costs, compared to the 2-3% cost of the average Filipino remittance – Blockchain-powered dashboard serves as a simple tool for tracking, monitoring and reporting on transfers and balances, which facilitates transparency
Challenges:	– As with other pilots listed here, technological literacy, internet connectivity and trust-building are barriers – The account key (Valora's security feature) is too long and the words are currently only in English – Self-custody has proved to be risky, as 1% of users eventually lost access to their funds



Inter-American Development Bank (IDB) and LACChain Blockchain Network[15]

Blockchain-based solution:	– Custom stablecoin
Project description:	– The LACChain Blockchain Network enables cross-border payments from the US to countries in Latin America and the Caribbean, using blockchain and tokenized money to enhance traceability of transactions, exchange rates and fees – LACChain is intended to be used by IDB for project fund disbursement
Benefits:	– LACChain is categorized as public-permissioned under ISO/TC 307, enabling it to provide free regional infrastructure as a public good – Open to all, with a requirement for users to follow local regulations governing their behaviour on the platform – Allows for cross-border payments with fewer intermediaries (avoids correspondent banking) – Enables greater traceability, which helps ensure that donor dollars reach the intended recipient
Challenges:	– When you use a public blockchain like LACChain or Ethereum you are using a trace, which may violate privacy preferences, although use of mixing software can alleviate this – As with other pilots listed, LACChain needs to ensure that KYC and AML are achieved – In common with all blockchain-based aid distribution solutions, the system requires a device with access to the internet – Does not overcome foreign currency conversion costs

Islamic Development Bank (IsDB) and the Global Coordination Platform (GCP)[16]

Blockchain-based solution:	– Online platform for aid tracking
Project description:	– Tracks aid given in Senegal, Maldives, Chad and other IsDB member countries – Allows interaction between stakeholders and development partners, in which registered countries can view services offered by various providers worldwide (e.g. suppliers of financial or advisory services)[17] – Aims to ensure greater efficiency, transparency and better governance in COVID-19 response efforts[18]
Benefits:	– Connects members to six UN agencies to help acquire masks and vaccines from other member countries – Enables inter-agency cooperation, boosting trust between agencies that participate – Blockchain has created trust within this platform that the data has not been tampered with – Ethereum ensures no vendor favouritism – No interoperability issues
Challenges:	– Underdeveloped countries have challenges with technology development – Different countries are structured differently, so the platform configuration had to cater to each country's needs; however, blockchain itself didn't pose a challenge with this – Finding advisors and experts with skills in blockchain was not easy

The Kiva Protocol for rapid eKYC verification[19]

Blockchain-based solution:	– National digital identity platform (NDIP)
Project description:	– Enables identity verification to help Sierra Leone's 7 million citizens access financial services
Benefits:	– Speed: citizens perform electronic Know Your Customer (eKYC) verifications in about 11 seconds, using just their national ID number and a fingerprint – With Kiva Protocol's verification system, the nation's historically excluded can open a savings account and move into the formally banked population
Challenges:	– As with other pilots listed here, users must be digitally literate enough to hold the wallet

Mercy Corps' blockchain-enabled vouchers[20]

Blockchain-based solution:	– Blockchain-enabled digital tokens
Project description:	– Digital tokens pegged against the value of the local currency, used for value transfers under field conditions
Benefits:	– Potential for fraud is lower, because vouchers have no secondary market value – Beneficiaries can spend without revealing payment account information – Blockchain's auditable data trail allows near real-time tracking of funds' movement – Eases the burden of reconciliation
Challenges:	– High quality connectivity is required for blockchain-enabled cash transfers – Digital literacy and security training is essential in the onboarding phase – Scaling-up would require additional compliance and regulatory requirements – Protection of participants' data is critical.

Project Unblocked Cash: Oxfam, Sempo and ConsenSys in Vanuatu[21]

Blockchain-based solution:	– Cash and voucher assistance (CVA) pilot built on the Ethereum blockchain mainnet – Initiative implemented on behalf of the Australian Government by Oxfam, in partnership with Sempo and ConsenSys
Project description:	– The objective is to enhance CVA programmes in areas which are highly prone to natural disasters, so that aid can in future be distributed with greater speed and traceability – The current iteration uses a local (fiat) currency token due to the volume of humanitarian response, now exceeding $7 million
Benefits:	– The blockchain-based system allows donors to see their donation arriving with Oxfam and its subsequent disbursement to the addresses of the recipients – Joining the programme gives vendors access to a new customer base – This method of transfer is cheaper for small donations
Challenges:	– Even with blockchain records, it is still possible to defraud the system by entering bad programmatic data (e.g. local field-officer typos or targeting etc.). Bad data stored immutably is still bad data. – As with many reserve banks, the Reserve Bank of Vanuatu has yet to regulate cryptocurrency and blockchain

UNICEF's CryptoFund[22]

Blockchain-based solution:	– Bitcoin and Ethereum
Project description:	– The CryptoFund is a financial vehicle through which UNICEF makes investments directly into early-stage start-ups in emerging and developing economies using cryptocurrencies – It enables UNICEF and its stakeholders to track where aid money is going – The fund is a way for UNICEF to learn and explore blockchain and cryptocurrencies
Benefits:	– By using cryptocurrency, donors, recipients and the public can track where the money is going and how it is being spent, providing an unprecedented level of transparency in the funding framework and NGO space
Challenges:	– The volatility of investment dollars associated with ether and other cryptocurrencies

World Bank's disbursement traceability initiative[23]

Blockchain-based solution:	– DLT platform
Project description:	– Tracks and traces use of World Bank project funds – Explores use of blockchain/DLT technology for automating traceability of disbursements, and capturing evidence of payments and work performed related to World Bank projects
Benefits:	– Provides the World Bank, its member countries, donors and auditors visibility into disbursements beyond the borrowers – Improves efficiency through business process engineering and automated tracking of the flow of funds using smart contracts – Ensures and verifies that project funds are delivered to intended beneficiaries and are disbursed for the purpose intended, with and without the use of tokenization
Challenges:	– Depending on the operation DLT Platform Operating model, the question of ownership and maintenance of the platform would need to be addressed – Challenge around how client countries would adopt track and trace on the blockchain platform and how it would integrate with their legacy systems – Further exploration is required to ensure that funds only flow between approved participants, as well as flag any suspicious activities with AML capabilities through smart contract enabled fraud detection

World Food Programme's Building Blocks[24]

Blockchain-based solution:	– DLT platform based on Ethereum
Project description:	– The project's aim is to provide a neutral network to improve collaboration between humanitarian organizations – The blockchain technology allows cash transactions between participants and the World Food Programme, without requiring a financial intermediary to connect the two parties
Benefits:	– For those organizations on the platform, it provides common visibility of the people they serve – Goal is to avoid duplication of aid through common visibility across organizations of what is being disbursed and to whom
Challenges:	– Scaling requires working with other organizations, but collaboration is difficult to foster – Organizations prefer to build their own platforms, sometimes with differing system architecture

Cash Learning Partnership (CaLP)

Finally, while not a project as such, the Cash Learning Partnership (CaLP) is global network of over 90 organizations engaged in the areas of policy, practice and research in humanitarian cash and voucher assistance (CVA) and financial assistance more broadly. CaLP places a strong focus on questions around the safety, dignity and preferences of people in crisis while exploring the efficiency and effectiveness of new technologies.

For more detailed descriptions of the pilot projects referenced above, refer to the Appendix, which organizes the projects in two thematic areas:

- Digital currency payment initiatives
- Digital systems to enhance humanitarian aid infrastructure

Conclusion

While there are serious ethical considerations to consider when conducting technology pilots with vulnerable people, iterative learning about the benefits and challenges of blockchain-based digital tools for cross-border aid is key to shaping the future of humanitarian assistance. Human issues, such as collaboration among international organizations, political cooperation and process changes are what will transform this space. To that end, greater efforts are needed to speak directly with those the technology aims to serve at the core of the aid mission.

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The goal for testing blockchain-based tools and technologies for cross-border aid is to extract the value of new technologies for the underserved and to ensure that they are not left behind. Digital humanitarian aid opens up new possibilities to connect the historically excluded to online financial services and it promotes financial inclusion. However, the pre-requisite infrastructure and digital and financial literacy, as underlined by the pilots highlighted in this white paper, are challenges that must be solved to unlock these possibilities.

This summary of findings should serve to inform future pilots in this space, which are anticipated to continue.

The application of blockchain-based technologies to humanitarian aid offers the opportunity for creative collaboration between donors, aid agencies, tech firms and host governments. This research and analysis have brought to the surface some key priorities for each of these groups:

- **Donors** (both governmental and private sector): encourage responsible innovation – especially where it can create cost efficiency.
- **Aid agencies:** build internal capacity to engage with emerging technology, to be able to adapt it effectively to humanitarian models, principles and standards.
- **Tech firms:** engage a diversity of local voices in developing digital solutions and infrastructure. This will enrich the innovation process and product adoption, as well as mitigating the risk of increasing the digital divide.
- **Host and donor governments:** harness technology to improve aid transparency, reduce corruption (leakage) and forge stronger links between humanitarian innovation and long-term development, especially in terms of increasing the access of the underserved to financial services.

Appendix: Detailed aid project summaries, by technology application

This appendix provides additional detail on the aid projects presented in this white paper, organized according to the following thematic areas:

- Digital currency payment initiatives
- Digital systems to enhance humanitarian aid infrastructure
- Ethical considerations and the risk of digital harm

These summaries are descriptions of each project as provided by interviewees and do not necessarily reflect the assessment of the World Economic Forum. Not all projects mentioned in this white paper are summarized below.

Digital currency payment initiatives

A report entitled *The Next Generation Humanitarian Distributed Platform*, published in November 2020 by the Danish Red Cross, Mercy Corps and hiveonline,[25] highlighted that "for traditional INGOs [international non-governmental organizations], the broad expansion of Cash and Voucher Assistance (CVA) programs stemming from commitments established in the 2016 Grand Bargain has led to an overall sector shift from distribution of in-kind aid to CVA. CVA totalled $5.6bn in 2019, doubling 2016 levels and accounting for 17.9% of total humanitarian assistance". This increase in the use of CVA has been coupled with further exploration into digital currencies and tokens.

Grameen Foundation and the Celo Platform in the Philippines[26]

In June 2020, the Grameen Foundation launched a project to provide emergency cash relief to women micro-entrepreneurs. Working with local microfinance institutions, Grameen identified 3,500 women in Manila and Cebu to receive immediate relief support for groceries and medical packages, via digital vouchers. COVID restrictions significantly hampered traditional aid disbursement processes and Grameen wanted to explore sustainable financial support for this cohort.

Following the successful pilot in 2019, Valora, the mobile payments app built on the Celo Platform, was selected. cLabs, a team building on Celo, designed the programme to meet the beneficiaries' needs and their level of digital and financial literacy. This was achieved through user research, iteration and close partnership with several other members of Celo's Alliance for Prosperity, including Beam and Go, Anchorage, Altonomy and Keyko.

A dedicated call centre was set up to contact each beneficiary. Call centre agents then provided step-by-step guidance in Filipino or Cebuano, to ensure that the women entrepreneurs knew how to use the app, learned to trust it and understood its use and value. Once the women had successfully downloaded the Valora app, Grameen directly topped up their Valora wallets with the full peso equivalent of Celo Dollars ("cUSD").

What made this initiative stand out?

- Beyond the much-needed financial support during COVID restrictions, the application of financial models of customer engagement, training and retention were used to build trust in the Valora app and self-confidence in the women's ability to use it.
- The use of call-centre agents who spoke the local language, the accessibility of these agents and the women's ability to spend the aid locally created a benefit loop of financial support, digital literacy and micro-business sustainability.
- The deployment of customer-centric tools ensured that 98% of beneficiaries successfully onboarded to Valora.

In terms of sustainability, feedback from beneficiaries suggested that beyond the instant

financial support, they enjoyed the convenience and safety of cashless transactions, despite their initial fear of using digital money. To further trust the technology, it would help if using and accessing the digital currency were to feel more like handling cash. Other beneficiaries suggested the possibility of using Valora to build up savings, with a view towards borrowing money from their microfinance institutions to invest in their businesses. This would preserve the financial and digital knowledge gained from this project and apply it to helping local entrepreneurs generate their own income.

Project Unblocked Cash: Oxfam, Sempo and ConsenSys in Vanuatu[27]

Vanuatu comprises an archipelago of more than 80 scattered volcanic islands in the South Pacific Ocean. The domestic payment network is highly fragmented, as the underlying technical and network infrastructure does not reach remote areas. The area is prone to cyclones and recurrent natural disasters. Access to cash, whether from an ATM or a micro-loan, can therefore be a challenge. Equally challenging is the availability of bank branches to safely deposit or lodge cash.

From October 2020, over 25,000 residents of three provinces affected by multiple crises – Cyclone Harold in Sanma province, Yasur Volcano ash fall in Tafea province and COVID-19 in Shefa province – can use digital tokens to buy relief goods through over 350 local vendors. The tokens are part of Oxfam's Unblocked Cash project, a partnership with the Vanuatu Business Resilience Council, Australian fintech company Sempo and a consortium of 17 local and international NGO and private sector partners.

According to project data, aid recipients were given a biodegradable and unbranded Near Field Communication (NFC) card topped up with tokenized Vatu (Vanuatu's national currency), via DAI, an Ethereum based stablecoin. The total value of DAI is collateralized by Vatu deposited at the Reserve Bank of Vanuatu (at a ratio of 4 tokens:1 Vatu). Local businesses can accept payment by simply tapping the NFC cards on a mobile phone that has the correct application. Prior to this initiative, 80% of vendors did not own a smartphone, so the learning curve was steep yet fast. Sempo's open-source blockchain-enabled system supports SMS, Android apps and tap-to-pay card transfers that work offline. It offers a real-time analytics dashboard to monitor cash disbursements and the overall programme. Using this innovative digitized token approach, Oxfam Australia reduced their aid delivery time in Vanuatu by 96%.

What made this initiative stand out?

In 2020, the project won the EU Horizon2020 Blockchains for Social Good Prize, providing €1 million to fully open-source the solution and to scale the initiative globally, via Oxfam International's network of civil society and INGO partners. The project has now been piloted in three countries.

Red Cross blockchain-based credit system in Mukuru, Kenya[28]

In November 2019, the Red Cross societies of Denmark, Kenya and Norway, together with Kenya-based NGO Grassroots Economics, launched a two-year project called Community Inclusion Currencies (CIC) to deploy blockchain-based "local currencies" to bolster trade within vulnerable communities of the Mukuru informal settlement of Nairobi, Kenya. The aim of the CIC initiative is to create a credit loop within the communities instead of purely donating cash. After an initial airdrop of digital credits (tokens) seeded from cash assistance, community members can earn digital credits through, for example, their work or completing micro-tasks and trainings. These credits can be exchanged for local goods and services. The aim is for villagers to become more self-sufficient and resilient, not only receiving aid, but earning an income through working, in turn incentivizing local economies through local spending of these tokens and strengthening community businesses. Because these tokens continue to circulate within the community for many months, rather than being extracted (as is the case with fiat currency), the initial funding achieves a multiplier ratio of 5x. In other words, for every $1 invested in the CIC reserve, $5 in economic value is realized. The system is like Kenya's popular M-Pesa mobile phone-based money transfer service. However, for the CIC initiative the user only needs a feature mobile phone without needing to hold Kenyan shillings.

What made this initiative stand out?

- Ability to turn aid disbursement into income creation, in turn s trengthening local businesses and building community resilience.

- Ability to monitor in real-time the impact of the programme (every transaction is written to the blockchain ledger), and to course-correct if the intervention is not

achieving its required goals and outcomes. Ability to toggle between response, recovery and resilience interventions without re-programming and within a few days.

- Ability to quickly enrol and continuously engage hundreds of thousands of users all linked together by digital wallets, so that when there is a disaster or conflict, aid can travel seamlessly to communities. (As of April 2021, there were over 200,000 users on the network, up from a few thousand in December 2019).

- Open-source solutions that enable other organizations to launch their own initiatives. For example, Germany's development agency (GIZ), France's development agency (AFD), the UN Children's Fund (UNICEF) and the World Food Programme (WFP) are all working with the Red Cross on versions of CIC.

Digital systems to enhance humanitarian aid infrastructure

The cash disbursement process in a humanitarian setting tends to have additional layers of complexity when compared to other cross-border cash transactions, such as trade or supply chain management. Obtaining funds, managing liquidity pools safely and adequately allocating aid are all part of the disbursement process. Our research aims to showcase how blockchain technology can enhance these processes and help to deliver tangible impact.

Inter-American Development Bank (IDB) and LACChain Blockchain Network[29]

In 2018, the Inter-American Development Bank (IDB) Group and representatives of the world's leading technology and consulting companies, announced the launch of LACChain Blockchain Network. The network was established to promote the open and inclusive use of blockchain by national consortiums in Latin America and the Caribbean, and comprises actors from the public sector, private sector and academia.

In Latin America, conditional cash transfers (programmes that provide financial assistance to households on the condition that they comply with certain predefined requirements) are the most used type of humanitarian assistance. By strengthening the infrastructure for cash disbursements in the region, and potentially using stablecoins or digital vouchers, the benefits of blockchain technology (traceability, smart contracts) would bring improvements to the conditional cash transfers in the region.

What made this initiative stand out?

This initiative aims at collectively developing robust, scalable and trusted technology layers that can increasingly be deployed and adapted for wider societal use. As of 2015, approximately half of all adults in Latin America and the Caribbean (LAC) were historically excluded, ranging from more than 80% in Haiti and Nicaragua to less than 35% in Brazil, Jamaica and Costa Rica.[30] The development of sustainable and scalable digital platforms in the region has been challenging. For example, there are nearly 40 mobile money services in 19 countries across LAC. By collaborating with financial institutions, such as Citigroup, to build LACChain, dual benefits can be achieved:

- Enabling faster, cheaper and more secure aid disbursement when needed

- Creating a digital financial services network that can be used to deploy humanitarian aid on a wholesale or individual basis

Through collaborations with financial institutions, the project teams at IDB are exploring the capabilities of the technology, working to solve big design questions such as: self-sovereign identity, KYC/AML checks and smart contracts for foreign exchange rates. Lack of regulatory and legal clarity in relation to stablecoins and tokenized fiat money may slow acceptance, but the fundamental roadblock will be the lack of technical infrastructure in the form of broadband and mobile services.

The Kiva Protocol for rapid eKYC verification[31]

Kiva has been supporting the historically excluded for over 15 years, making more than $1.6 billion in loans through the Kiva marketplace in over 90 countries, with borrower repayment

rates of 98%. This default rate of 2% is nearly identical to US credit card default rates.

In 2018, Kiva started to focus on initiatives that would connect emerging technologies with vulnerable populations as the last mile continues to rapidly digitize. Part of this mandate was to find ways that Kiva could address underlying barriers to inclusion within the financial system. Underpinning these efforts is the belief that digital inclusion can lead to financial inclusion, but only if foundational data – specifically, identity and transaction history – becomes broadly accessible alongside digital access.

Formal financial institutions may hold a perception that historically excluded individuals are inherently higher-risk customers than banked individuals, especially when it comes to lending products.[32] In the informal sector, individuals typically borrow between a few hundred and a few thousand dollars at a time, often with a short repayment term of about 12-18 months. Despite excellent repayment rates for these informal-sector loans, they remain unserved by local formal financial institutions. This is because the data from informal transactions is essentially invisible: the formal-sector institutions either do not trust the data sources or are unable to verify the provenance of the data. Solving this challenge is not possible without establishing verifiable identity credentials for these individuals and attaching that identity to their informal-sector transactions.

Kiva's solution – called Kiva Protocol – is built using Hyperledger, an open-source technical framework supported by the Linux Foundation. Kiva Protocol allows users to perform electronic Know Your Customer (eKYC) verifications in a matter of seconds, using just their national ID number and a form of authentication (typically biometric). With this verification, it is possible for historically excluded individuals to open a savings account and move into the formal economy.

What made this initiative stand out?

The first implementation of Kiva Protocol has gone live in Sierra Leone, as the National Digital Identity Platform. While Sierra Leone may not typically be a place where emerging technologies are piloted, the country offered the necessary conditions to deliver a successful population-scale intervention with the support of key stakeholders, who included:

- Regulatory and government enablers
- Private-sector financial service providers
- End-users

In Sierra Leone, the regulator had an existing digital financial inclusion strategy, and there were pre-existing efforts targeted at national-scale identity registration as well as consumer protection and privacy frameworks in development. Engagement from these stakeholders was instrumental in establishing a user-centric consent framework to digitize personal and financial data and make it usable in the financial sector.

Additionally, ensuring data sovereignty to prevent unintended consequences, such as broad surveillance or user profiling outside of the intended use-cases, was paramount to the system's architecture.

Kiva Protocol prompts the question as to how financial inclusion is measured and extended, especially in an era of rapid digitization of last-mile financial products and services. If we can provide fast, cheap and secure account access to all, and if we can assess credit worthiness based on lending transaction histories – then it is possible to add straightforward interventions for savings, insurance and other initiatives, thus increasing people's financial cushion for future crises.

Kiva Protocol was one of 193 blockchain initiatives included in Stanford Graduate School of Business' report *Blockchain for Social Impact: Moving Beyond the Hype*, because of its potential to generate accretive social impact that would not be possible without the use of blockchain in the first place.

Finally, initiatives like Kiva Protocol have demonstrated viability in very low-capacity environments, and provide a pathway for KYC and AML/CFT.

UNICEF's CryptoFund[33]

In October 2019, UNICEF launched the CryptoFund, a new financial vehicle allowing UNICEF to receive, hold and disburse cryptocurrency, the first such fund for the UN. The CryptoFund is part of UNICEF's Innovation Fund and comprises a pool of funds of bitcoin and ether. It enables the UN Children's Agency to receive cryptocurrency donations via four official UNICEF fundraising entities or national committees: Australia, France, New Zealand and the United States. Donors can contribute to the CryptoFund in either bitcoin or ether.

The fund has three main goals:

- The prototype fund is a vehicle for UNICEF to explore and learn more about blockchain and cryptocurrencies.
- UNICEF, donors, recipients and the public can track where the money is going. This is an unprecedented level of transparency in the funding framework. Transfers can be made to investors around the world in minutes, for a fraction of the cost of an international cross-border bank transfer using banking networks.

– The fund offers an additional way for UNICEF to make investments directly into early-stage start-ups in emerging and developing economies.

UNICEF has also rolled out Juniper,[34] a web-based visualization tool created to help the general public understand how and why UNICEF is using cryptocurrencies (and the CryptoFund).

The CryptoFund has invested in over 10 projects, including the following which are using blockchain applications:[35]

– Democratizing social impact financing with blockchain – Argentina

– Seeking to make sensitive clinical data portable, safe and private with blockchain – Mexico

– Using blockchain technology to inspire young people to become local changemakers – Tunisia

– Using a low-cost Interactive Voice Response platform to send key information about COVID-19 – Cambodia

– Utilizing virtual reality (VR) technology to address phobias and social anxieties – Turkey

What made this initiative stand out?

According to UNICEF, one of the most challenging aspects of the launch of the CryptoFund has been generating a sense of personal ownership over an asset that isn't associated with a familiar entity, like the government. A critical challenge was user trust in an asset that is not backed by a public authority.

The CryptoFund enables research and experimentation on blockchain platforms (and other disruptive technologies) while laying the foundations of a use-base of knowledge on the technology. This allows for talent proficient in these technologies to develop on the ground, thus minimizing lack of humanitarian personnel or related process frictions in future initiatives.

World Food Programme's Building Blocks[36]

WFP's Building Blocks project uses a private instance of the Ethereum blockchain network. The aim is to improve collaboration across the aid ecosystem.

The original pilot project in Jordan in 2017 reached more than 100,000 people. It was then rolled out to Bangladesh where, by September 2020, over 500,000 of the 855,000 Rohingya refugees in Cox's Bazar, a town on the southeast coast of Bangladesh, had access to food assistance via a QR code. The Building Blocks project has processed $162 million of cash-based transfers (including $85 million in 2020) and saved $1.8 million in bank fees.

Building Blocks is integrated with the existing authentication technology of the UN High Commissioner for Refugees (UNHCR). This not only saves on financial transaction fees in the refugee camp setting, but also ensures greater security and privacy for refugees. The Building Blocks initiative has the potential to collect assistance from multiple humanitarian organizations and offer it as one package to each refugee.

Feedback received during interviews found that collaboration across aid organizations is difficult, as they are rife with many process duplications and there is a proliferation of similar platforms that are not integrated.

What made this initiative stand out?

The success of WFP's Building Blocks project rests strongly on its integration with UNHCR's existing authentication technology, which provides trust and identification credentials for the distribution and use of voucher-based aid disbursements. It is not clear if the same benefits of speed and low-cost transactions would apply to the project if another technology was used alongside the authentication technology.

The project is continuing to explore ways to offer beneficiaries more choice and more control over how and when they receive and spend their cash benefits. This raises the question: will blockchain be the technology that welcomes humanitarian actors to collaborate on a network to improve cooperation, reduce fragmentation and bolster efficiency?

Ethical considerations and the risk of digital harm

Cash Learning Partnership (CaLP)[37]

The Cash Learning Partnership (CaLP) is a global network of humanitarian actors engaged in policy, practice and research in cash and voucher assistance (CVA). What makes CaLP unique is its diversity. CaLP members currently include local and international NGOs, UN agencies, the International Red Cross and Crescent Movement, donors, specialist social innovation, technology and financial services companies, researchers and academics, and individual practitioners. CaLP enables collaboration between organizations to increase the scale and quality of CVA. Their technical advisory group contributes to research into how to best achieve scale and quality in CVA within the humanitarian sector.

CaLP places a strong focus on questions around the safety, dignity and preferences of people in crisis while exploring the efficiency and effectiveness of new technologies.

Digital technology is transforming the way we respond to emergencies. Digital payment systems, including mobile devices, electronic vouchers and cards can deliver timelier and more secure, cost effective and inclusive assistance. Other digital innovations help ascertain which beneficiaries are eligible for assistance, collect data for assessments and monitoring, communicate with crisis-affected communities and even enable forecast-based financing, using weather forecasts to trigger aid disbursements to help soften the impact of natural disasters. As the volume of data collected, stored and shared grows, CaLP's members are working to ensure that data protection and payment systems are fit for purpose and that risks to beneficiaries are mitigated.

Humanitarian organizations have been researching and trialling the use of blockchain for aid disbursement for over five years. Within this context, CaLP has raised concerns regarding responsible data management in general, not just related to blockchain. CaLP is encouraging more rigorous questioning about the amount of data collected, bearing in mind beneficiaries' fundamental rights of choice and dignity, as well as the need for better data management.

Are the rights of beneficiaries protected? Are they part of the project or initiative and do they have a choice as to which data is given and stored? In cases of emergency aid and extreme situations, where beneficiaries may be particularly vulnerable, how do we ensure that beneficiaries are sufficiently well-informed of their rights and data protection choices, and that those choices are available to them in practice? How should we balance the imperative to reach out to beneficiaries with these inherent technological risks? The benefits of using a digital currency to disburse humanitarian aid may outweigh these risks, for example in cases of hyperinflationary economies.

Digital technology allows vast amounts of personal data to be collected (with transparency and immutability qualities), but does it mean that we should do so? Do we need to collect so much data? Are principles of data minimization being followed so that only data that is essential to an intervention is collected? Just because something is technically possible does not mean it is ethically appropriate.

Where is the data stored – is it managed by a humanitarian organization or outsourced to a cloud provider? Who is controlling the use of algorithms on such data? How is data protected against illicit access or cyber-attacks? Predictions as to use of cash, movements and location can be retrieved and potentially used against aid beneficiaries. For example, a personal digital record can be used and exploited.

The risk of digital harm in any context is real, with risks exacerbated when working with vulnerable communities. Digital and personal identification could be a tool to identify and target people in multiple ways: their digital presence and financial affairs could be exploited (e.g. targeting of loans), they could lose access to savings, or their profiles could be sold on the darknet. In extreme scenarios, data could be used to guide attacks on specific communities.

Any developments and proposals to use blockchain in aid disbursement must consider how to adhere to humanitarian principles (see Table 1 above) and how to preserve beneficiaries' fundamental rights today and in the future.

> **The use of stablecoins for aid situations raises a lot of interesting challenges. The specific scenario will matter greatly: delivering aid in the aftermath of a natural disaster/pandemic to individuals who want support could vary quite a bit from delivering aid to, say, political refugees who may not be able to prove who they are – or may not want to identify themselves if they fear reprisals against family members they may have left behind in their home countries**

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