Resilience in Recovery

The Unblocked Cash Project and Blockchain Humanitarianism in Vanuatu

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The Reach Alliance was created in 2015 by the University of Toronto's Munk School of Global Affairs & Public Policy, in partnership with Mastercard's Center for Inclusive Growth. Our global university network now includes: Ashesi University, the University of Cape Town, Tecnológico de Monterrey, Singapore Management University, University College London, University of Melbourne, University of Oxford, and University of Toronto.

We are grateful to every community organization, stakeholder, service provider, and interviewee who offered their valuable contributions for this case study. We are particularly appreciative of those we had the pleasure of meeting during our time in Port Vila, including Oxfam Vanuatu, the Vanuatu Business Resilience Council, and the Vanuatu Red Cross Society. Their assistance throughout the data collection process and commitment to inclusive humanitarian aid distribution was central to our case study.

This research was conducted at the University of Toronto, on the traditional land of the Huron-Wendat, the Seneca, and the Missisaugas of the Credit, and we are grateful for the opportunity to work on this land. Our research focuses on the disaster recovery of Ni-Vanuatu in Vanuatu, and we wish to acknowledge the many Indigenous Ni-Vanuatu we spoke to throughout the research process, whose insights and experience on innovative and inclusive disaster relief were central to our findings. We hope that our research highlights the innate resilience of Vanuatu's Indigenous population and contributes to further research that recognizes the importance of dignity, autonomy, and self-determination during humanitarian response.

Note: Authors are listed alphabetically with the faculty mentor listed last.

Cover photo: A beneficiary scans their NFC card at a participating vendor (source: Keith Parsons/OxfamAUS — photo provided by Oxfam)

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Executive Summary

The Republic of Vanuatu is a group of small islands located in the South Pacific Ocean within the Cyclone Belt and the Ring of Fire. The most disaster-prone country in the world, Vanuatu has experienced increasingly destructive natural disasters over the past decade, largely due to the effects of climate change. Alongside high geographical risk, the country is also decentralized, with the majority of the Ni-Vanuatu (native) population spread out across dozens of tiny islands, which has led to a large unbanked population and isolated communities. To address the accelerating need for humanitarian aid in the region, nongovernmental organizations are exploring innovative ways to efficiently deliver essential resources.

In 2019, Oxfam Australia, in collaboration with fin-tech start-up Sempo and software developer Consensys, piloted the Unblocked Cash Project (UBC): a blockchain-powered cash-and-voucher

assistance (CVA) system aiming to increase the accessibility, cost-effectiveness, and speed of humanitarian aid distribution. Beneficiaries received near field communication (NFC) cards with a preset monetary value that they could use to purchase goods and services from a network of vendors that Oxfam equipped with mobile phones. Vendors scanned a QR code on the NFC cards to transmit the transaction to a decentralized, digital blockchain ledger. The process allowed marginalized Ni-Vanuatu to efficiently receive humanitarian aid, empowered beneficiaries through providing autonomy of choice, and injected liquidity back into the economy after a crisis.

Following the 2019 pilot, in response to Tropical Cyclone Harold and COVID-19, Oxfam, Sempo, and 18 consortium partners scaled up UBC to 35,000 participants across 11 islands — the majority of whom had never used digital payments or banking services before — and injected approximately USD 4,300,000 into

the Vanuatuan economy. As a digital financial tool, UBC claims to have achieved two pivotal achievements. First, it purports to enhance the well-being of businesses and households. Second, it asserts that it has yielded enduring benefits, such as improved digital access, literacy, and agency for marginalized groups.

Following an extensive literature review, we conducted a series of semi-structured interviews with community stakeholders involved in the implementation of UBC to explore the impact of the intervention on marginalized Ni-Vanuatu communities.

We evaluate the impact of UBC through interviews with key stakeholders and implementation partners. This research adds to existing reports on understanding UBC and how it relates to economic empowerment, independence, and dignity of choice for beneficiaries. It further exemplifies the challenges associated with integrating such technologies into the unique cultural context of Vanuatu and what this signifies, more broadly, for opportunities to build digital literacies. In addition, the case study explores the capacity to scale UBC, the limitations associated with introducing foreign-led, high-energy technologies into Global South countries, whether UBC builds or destabilizes cultural resilience, the role of local NGO partners in project implementation, and the future of blockchain humanitarianism.

Vanuatu's Challenges

The Republic of Vanuatu regularly experiences earthquakes, volcanic eruptions, cyclones, droughts, tsunamis, landslides, and floods. As the effects of climate change become more severe, Vanuatu is experiencing increasingly destructive natural disasters at a more frequent rate. On average, the country incurs a loss of USD 48 million a year as a result of earthquakes and tropical cyclones. As natural disasters become more frequent and severe, the country is expected to incur even greater losses to its gross domestic product (GDP) and quality of life.[1]

On top of this geographical risk, the country is also decentralized, with much of its Ni-Vanuatu (native) population spread out across its tiny islands, leading to a large unbanked population and many communities that are isolated in times of disaster. To address the accelerating need for humanitarian aid in the region, nongovernmental organizations are finding new and innovative ways to efficiently deliver helpful resources.

Vanuatu is categorized as a Small Island Developing State. These states are particularly vulnerable to the destruction caused by natural disasters because (a) the small area of the islands leaves limited options for escape, and (b) socioeconomic conditions are characterized by low overall populations but high population growth rates, rapid urbanization and migration, remote populations within archipelago islands, high levels of relative poverty, cash-based economies, and limited human resources. Postdisaster recovery in Vanuatu is largely attributed to the strong resilience of the Ni-Vanuatu people. However, the country struggles to recover from major natural disasters that have previously affected up to 70 per cent of the country's GDP. This is because the Ni-Vanuatu are subject to economic, social, and physical barriers that affect accessibility and recovery following natural disasters. Most of the economy is dependent on the agricultural and tourism sectors, both of which are significantly affected in the event of a natural disaster. This leaves the Ni-Vanuatu limited in their ability to address their

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1   Björn Rust, "UnBlocked Cash: Piloting Accelerated Cash Transfer Delivery in Vanuatu," Oxfam Australia, October 2019. ↗

everyday needs and recover housing/business infrastructure following climate catastrophes.

When natural disaster strikes, the government coordinates initial recovery, specifically the Natural Disaster Management Office (NDMO), which works closely with provincial and local authorities, communities, chiefs, churches, the private sector, civil society, and development partners. The NDMO visits the affected areas immediately after a natural disaster and conducts a postdisaster needs assessment that identifies recovery needs and estimates recovery costs. International partners, under the direction of the NDMO, support disaster recovery needs. In traditional disaster recovery, relief items — including food (bags of rice, nonperishable canned foods etc.), clean drinking water, clothes, and tarpaulins — are distributed to those affected, typically about three weeks after the disaster.

In traditional disaster recovery, it is difficult for local economies to rebuild in part because local businesses are often bypassed and have to compete with external donors who flood recovering communities with relief items at no cost. This makes it difficult, if not impossible, for local economies to recover as the market becomes saturated. In addition, the relief items provided may not be appropriate or meet the needs of the affected population. Traditional disaster recovery is also rooted in colonial and hierarchical frameworks, with international aid organizations often claiming authority over the recovery phase without appropriate consultation with Indigenous populations. The lack of autonomy that local communities have over selecting the materials they need to recuperate undermines their agency and Indigenous ways of knowing.

The challenges associated with traditional disaster recovery have led to the introduction of cash-and-voucher assistance (CVA). CVA is a method of emergency relief where cash, vouchers, or similar representations of monetary value are provided to beneficiaries who can use them to purchase goods or services. Unlike traditional humanitarian assistance, CVA allows recipients to determine how they respond to emergency situations and emphasizes the use of locally available resources. In remote regions such as Vanuatu, where distribution is complicated by financial and physical barriers, CVA has become an increasingly popular tool that allows donors and aid organizations to send monetary assistance directly and quickly to beneficiaries.

Following the initial relief phase (three months), nongovernmental organizations often implement their own recovery programs independent of the NDMO. For example, following the eruption of a volcano on the island of Ambae in 2018, over 2,000 individuals were relocated to the island of Santo where they were taken in by host families. To overcome the gaps in traditional aid, a CVA program was launched. Beneficiaries received cheques that, once deposited into their bank account, they could use as unrestricted funds for disaster recovery items.

However, because Vanuatu is a cash-based society, most citizens do not have bank accounts and lack the national identification that is required to open a bank account. This cheque-based intervention was resource intensive — beneficiaries had to obtain a national ID and then open a bank account before they could get help. The funds distributed through paper cheques were also time intensive to write, manage, and distribute. Although CVA provides beneficiaries with a sense of dignity and empowerment because they can select their own disaster-recovery items, it is not always feasible to distribute cash through traditional banking methods.

The Unblocked Cash Project (UBC) worked to overcome these challenges by employing an intervention aligned with the United Nations Sustainable Development Goals: (9) Industry, Innovation and Infrastructure, (10) Reduced Inequalities, and (11) Sustainable Cities and Communities.

About Our Research

Between April and May 2023, the research team conducted 15 semi-structured interviews with stakeholders involved in the implementation of unblocked cash (UBC) and postdisaster relief in Vanuatu. The questions we posed to interviewees were informed by an extensive literature review. Interview questions were based on our primary aims to: (a) analyze service providers' enablement of financial autonomy and economic empowerment, (b) understand the ethical implications of introducing a blockchain-powered cash-transfer program among a population with low digital and financial literacy, and (c) explore the impact of Vanuatu's distinct social and cultural landscape on the implementation of UBC.

Each interview lasted approximately 30 to 60 minutes. We used written notes to record the interviewees' responses. Interviewees were identified based on their role and involvement with UBC stakeholders. Names of potential interviewees were identified by searching the websites of UBC stakeholders and through referrals from existing interviewees.

Most interviews were conducted in person in Port Vila, Vanuatu, in May 2023, while a few select interviewees were conducted virtually via Microsoft Teams and WhatsApp audio calls in April and May 2023. Informed consent was collected from each interviewee and interview data was saved to anonymized and encrypted folders in SharePoint. All interviews were conducted in English (one of the official languages of Vanuatu) so no translators were required. All quotations from interviews are exact quotes.

The Hardest to Reach

A recent feasibility study (2015–2018) conducted by Oxfam found that 68 per cent of Ni-Vanuatu communities received external disaster recovery assistance related to their everyday needs such
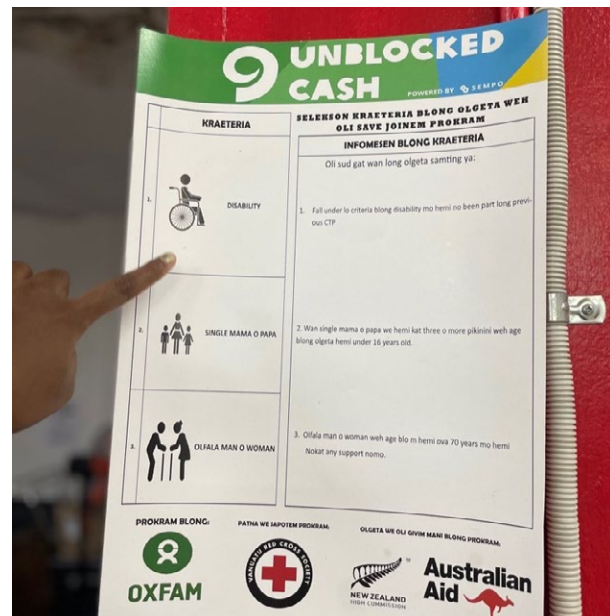

Figure 1. A poster (printed in Bislama) at the Vanuatu Red Cross Society headquarters in Port Vila identifying the "hardest-to-reach" populations that were eligible to enroll in UBC (source: Sumayyah Shah)

as food, water, and shelter. However, access to this traditional disaster recovery assistance often excluded the most "at-risk" community groups and took an average of more than three weeks to receive. Although Vanuatu's geographic isolation and poor infrastructure put the whole population at risk, some of the most vulnerable community members include: the elderly, people with disabilities, widows, single mothers, children (girls more than boys), and the LGBTQ+ community. In Vanuatu, these groups have low or no incomes, participate in livelihoods (e.g., agriculture, tourism) most affected by natural disasters, and have limited funds in savings. They lack access to assets and decision-making power and are therefore more vulnerable in the event of a natural disaster.

Vanuatu exercises a traditional social security system whereby healthy, young generations who earn an income care for those who may have their ability to earn an income affected by age, disability, and gender. This traditional social security system is compromised in the event of natural disasters when marginalized groups are

restricted in accessing the resources they need to recover. During disaster recovery, a male "head of household" is usually responsible for coordinating a family's rehabilitation. In this type of system, individual needs and the preferences of marginalized household members might be overlooked. The current system, thus, often fails to address, consider, and include the opinions, perceptions, and feelings of individuals with certain age, disability, and gender characteristics. These individuals lack decision-making power and are forced to comply with the head of the household whom they rely on.

About Unblocked Cash

In 2018, Oxfam, a nongovernmental organization and one of Vanuatu's leading humanitarian aid providers, responded to the challenges associated with the distribution of humanitarian aid in Vanuatu by piloting the Unblocked Cash Project (UBC). UBC aimed to mitigate the challenges experienced by vulnerable communities during natural disaster recovery by providing these communities with the ability to access financial aid through an innovative cash-and-voucher assistance (CVA) program. UBC was led by Oxfam, in partnership with Sempo, an Australian-based fintech startup, and Consensys, a blockchain and software developer.

UBC was first piloted in 2019 in two urban communities in the Efate province — Pango and Mele Maat. Oxfam selected the communities through a cash-transfer feasibility assessment that identified which regions had the infrastructure and community willingness to support the program. Beneficiaries were individuals who qualified to receive monetary aid because of their status as a member of a marginalized group, and vendors were stores where beneficiaries

Figure 2. Map of Vanuatu demonstrating the feasibility of UBC in each region in 2020. Red dots indicate the provincial capital and darker green areas indicate the highest levels of feasibility based on infrastructure and community response (source: OxfamAUS, used with permission)

could purchase food, household supplies, and other materials related to disaster recovery. A total of 1,209 beneficiaries and 29 vendors were enrolled in the pilot. Over the course of a month, VUV 966,443 (approximately CAD 11,300) was distributed.[2]

Following the pilot's success, in 2020 Oxfam and Sempo collaborated with 18 consortium partners, including international and local aid agencies and donors, to scale up UBC in response to COVID-19 and Tropical Cyclone Harold. This scale-up involved implementing the intervention across three other provinces in Vanuatu — Sanma, Shefa, and Tafea. Across 13 islands, a total of 24,000 vulnerable individuals received a total of VUV 300 million (approximately CAD 3,340,000).[3]

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2   Ibid.

3   Ibid.

Designing Unblocked Cash (UBC)

Unblocked cash (UBC) is a blockchain-powered cash-and-voucher assistance (CVA) program employing innovative digital and financial tools that amplify the speed and reach of humanitarian aid. Blockchain refers to a type of digital database that records financial transactions in a secure and transparent manner. When a user sends money using blockchain, each transaction is entered into a series of interconnected "blocks" that form a chronological chain. Each block is cryptographically linked to the previous one, creating an unalterable history of the transaction and presenting a secure method of accessing information on the source and location of monetary funds. In UBC, the use of blockchain enabled stakeholders to record the details of each donation, preventing concerns over transparency and accountability that often exist in the humanitarian sphere.

UBC was built on Ethereum, one of the multiple platforms on which blockchain can operate. Ethereum allows the use of "smart contracts" to process transactions. In traditional humanitarian aid donations, when individuals donate to an organization such as Oxfam, an intermediary, such as a bank or an employee at the organization, must manually verify the donation to ensure there is no risk of fraud and that it reaches the intended recipients. However, the blockchain in UBC eliminates the need for intermediaries through smart contracts.

When a donor sends money through UBC, they automatically establish a set of conditions for donation, which includes the amount of money they are donating and where it is going, through a smart contract that resides within the blockchain. Once it is recorded on the blockchain, the transaction cannot be altered, and the funds cannot be released until the conditions in the

smart contract have been met. If a smart contract specifies that the donation must be placed in the digital wallet of a beneficiary who is enrolled in UBC, the funds can be accessed by only that beneficiary and it is impossible for Oxfam, Sempo, or any other stakeholder to attempt to withdraw funds outside of the conditions of the contract.[4]

In UBC, funds were accessed through near field communication (NFC) cards, which resembled a debit or credit card. NFC is a short-range, wireless communication technology that enables communication between two devices when they come into contact with one another, similar to Apple Pay or other mobile payments. Once a beneficiary was enrolled in UBC, they were given an NFC card which they could use at participating vendors. Each vendor had the Sempo app downloaded onto a smartphone provided by Oxfam. When presented with the NFC card, they use their phones to scan a QR code on the card and process the payment. The payment process did not require an internet connection. However, once a week, vendors were required to access the internet to "cash out" the week's transactions.[5]

Every time a beneficiary used their NFC card to pay for goods, the transaction was recorded by Sempo whose dashboard tracked all transactions,
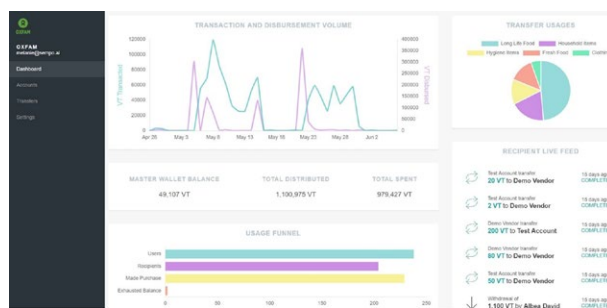
Figure 3. Oxfam's view of the Sempo dashboard, displaying transaction history and spending patterns tracked by Sempo and Oxfam (source: Oxfam)

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4   Hossein Baharmand, Amin Maghsoudi, and Giulio Coppi, "Exploring the Application of Blockchain to Humanitarian Supply Chains: Insights from Humanitarian Supply Blockchain Pilot Project," *International Journal of Operations and Production Management* 41, no. 9 (2021): 1525–26.

5   Rust, "Unblocked Cash."

including where and how beneficiaries spent the money. Sempo also defined certain products, such as alcohol, cigarettes, firearms, and other non-essential or potentially harmful products, as "taboo products." When a beneficiary used their NFC card to purchase a "taboo product," it was flagged and sent to Sempo. According to Oxfam, the purpose of tracking these so-called taboo items was not to reduce the beneficiaries' agency, but to demonstrate that tracking and responding to the spending patterns of humanitarian aid recipients was possible and to respond to larger concerns over the potential misuse of humanitarian funds if recipients were able to control how money was spent.[6] Sempo found that taboo products constituted less than 1 per cent of purchases with UBC, confirming that providing beneficiaries with control over how their money is spent does not lead to misuse.

Oxfam and Sempo relied heavily on local organizations and community leaders to implement UBC on the ground. They employed local NGOs, including multiple faith-based organizations, to train beneficiaries and vendors and oversee implementation. Due to the highly technical nature of the program, compounded by language barriers between English and Bislama (the common language in Vanuatu), Sempo created a "simple English" reference guide that offered plain explanations for each contract element. Local stakeholders hosted community sessions, and in cases of uncertainty or issues, participants readily reported them to Oxfam staff.

Empowering Women and Other Vulnerable Populations

For the Ni-Vanuatu, their land is symbolic of their identity and power within the community, yet due to patriarchal society structures, land power is male dominated. The patriarchial societal

Figure 4. (Top) Front of an NFC card used by beneficiaries for UBC; (bottom) back of an NFC card showing the QR code that vendors scanned to process payment (source: Keith Parsons/Oxfam AUS)

Table 1. Unblocked Cash Project (UBC) collaborating partners and their roles

ORGANIZATION	ROLE
Oxfam, Sempo	Technical oversight
Save the Children Vanuatu, World Vision, Vanuatu Red Cross Society, Vanuatu Church of Christ, Churches of Christ Conference, Adventist Development and Relief Agency (ADRA) Vanuatu, Vanuatu Business Resilience Council	Technical implementation: Oversaw implementation of intervention, technical training of beneficiaries and vendors, monitoring of funds
Government of New Zealand (Ministry of Foreign Affairs & Trade), Australian Department of Foreign Affairs & Trade (DFAT), Australian Humanitarian Partnership (AHP), International Organization for Migration (IOM)	Funding

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6   Ibid.

structure, which is prevalent in both Vanuatu and many other Global North countries including Canada, means that generally, women have less control of land and property.

With these social dynamics, Vanuatuan women remain ostracized and removed from positions of power and influence. In 2022, Vanuatu was one of the only three countries in the world to have no women in parliament. Women account for less than 40 per cent of the country's individuals who are formally employed, and many women face gender-based violence. This in turn means that women are especially vulnerable to disruptions such as natural disasters because they are economically and socially dependent on their male family members. They also operate as the primary caretakers in a traditional family structure but lack the ability, opportunity, and support to aid in the economic restoration of their homes.

Oxfam was cognizant of gender power disparities and they addressed these gender dynamics during the design and implementation of UBC, focusing on female empowerment. Oxfam understood that women were disproportionately affected by a lack of support following a natural disaster because they are displaced from their original families and do not have access to the financial means to rebuild their lives. Oxfam designed their eligibility criteria for beneficiaries by specifically targeting vulnerable populations including widows, single mothers, LGBTQ+, single-person households, the elderly (over the age of 60), and people with disabilities. Many women fit within this vulnerability index and are left defenceless in the aftermath of these disasters. Interviewees told us that as "many fathers travel during cyclone season … mothers are left behind with the children unless the children are big enough to help — that's okay — otherwise the mothers are really struggling."

In interviews with UBC program facilitators, we heard that "single mothers and female farmers were so happy and fortunate to be part of the program. [The program] increased their digital literacy and knowledge and empowered them to participate in the system and work." UBC's design removed complicated processes and gave dignity and autonomous choice to beneficiaries, many of whom were female. The NFC cards provided beneficiaries with the right to make decisions around purchasing whatever goods they felt were essential following a natural disaster.

Gender and Resiliency

Initially, as each beneficiary received an NFC card, there were social tensions. "In the beginning, the system could create tensions in homes because the wielder of the NFC card in the household were a daughter, a son, the elderly, a widow or a mother." In other words, the traditional head of the household — typically a man of working age — was no longer the main/sole provider for their family. However, over time, through the proliferation and wider adoption of UBC, communities were able to see the benefits of giving women a voice and autonomy in rebuilding their lives after a disaster. As families of beneficiaries settled into the new dynamics, women were able to step up to more responsibilities and were empowered to make decisions for themselves.

Despite this, the most prevalent tension that came up in our conversations with stakeholders is how UBC can work on building lasting resiliency in the community — especially for women. During UBC, there were concerns about the sustainability and long-term viability of providing monetary aid to vulnerable populations. Because money is not limitless, the scalability of these types of programs is restricted. Throughout UBC, none of the women used the monetary support to create long-term sustainable practices such as starting a business. Therefore, once the monetary support ceased, women's place in society and families went back to their original state and they did not take the opportunity to build lasting economic

independence and autonomy. Interviewees critical of UBC argued that as beneficiaries learn to rely on monetary assistance, this destroys the innate resilience of the Ni-Vanuatu population. While vulnerable populations in Vanuatu have felt empowered by the monetary aid, this type of solution is temporary, and more work needs to be done to understand how to make this type of program more sustainable as it provides autonomy and power.

Impact and Barriers

Unblocked Cash (UBC) has achieved success in Vanuatu, where Oxfam's efforts have resulted in over 200,000 transactions, offering support to hundreds of vendors and engaging 35,000 participants across 11 islands, many of whom were previously unfamiliar with digital payments or banking services. Sempo and Oxfam combined efforts to reduce the time it takes for recipients to enroll. Instead of taking over an hour to enroll in previous cash-and-voucher assistance (CVA) programs, it took an average of approximately 3.6 minutes for a beneficiary to enroll in UBC. Vendors' enrolment time was also reduced to eight minutes. This approach stands out from other CVA methods that involve long waiting times, ID verifications, and trips to the bank. User feedback from both communities highlighted a strong preference for UBC compared to traditional methods because of its user-friendliness, safety, and increased agency.

UBC injected approximately USD 4,300,000 into the country's economy. This success extends beyond Vanuatu — the platform has also been effectively piloted in the Solomon Islands and Papua New Guinea. UBC demonstrated that a human-centred approach, combined with the right skills and community engagement, can lead to success in deploying innovative technologies that reach remote communities. As a digital financial tool, UBC claims to have achieved

Figure 5. A vendor cashes out transactions made with UBC for the week in Pango (source: Keith Parsons/ OxfamAUS)

two pivotal achievements. First, it purports to enhance the well-being of businesses and households. Second, it asserts that it has yielded enduring benefits, such as improved digital access, financial literacy, agency for marginalized groups, and capacity across the board for local businesses and partner organizations.

The program has gained global visibility and was featured in publications by the OECD, international media outlets, and recognized as the EU's Horizon 2020 Prize winner for Blockchains for Social Good. UBC has expanded globally to Zimbabwe. However, as UBC continues to expand its reach, critical questions emerge concerning its sustainability, its impact on people's lives, and its long-term scalability, which will require careful consideration and evaluation.

62% Improvements in food security

50% Increased access to markets

86% Vendors reporting an increase in revenue
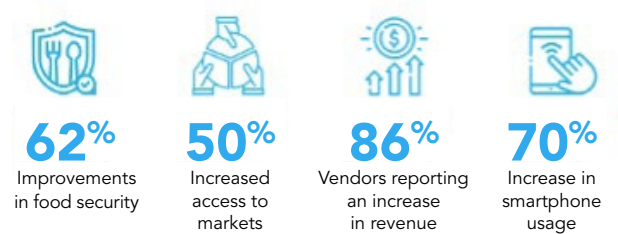
70% Increase in smartphone usage

Figure 6. UnBlocked Cash's long-term impact (source: Pacific Advisory, "Going Digital: What's Next for Vanuatu in Blockchain Innovation?" 2023)

Dependence and Independence in UBC

Cash and voucher programs support financial infrastructure, access, and inclusion, as well as economic growth. However, these programs often face challenges related to financial access and restrictive regulations that may not be suitable for remote or vulnerable communities. Acknowledging these challenges, UBC was designed with an understanding of the country's financial regulations, compliance considerations, and close consultation with the central/reserve banks to ensure that the most vulnerable populations that are often excluded from traditional financial systems and services are accounted for.

Prior to the implementation of UBC, Sempo conducted a survey involving 80 participants from the 2019 Pango and Melamat pilot project to examine Ni-Vanuatu perceptions of autonomous choice. Recipients who participated in the survey were asked about their previous disaster experiences and their "choice" in reference to resource allocation (rated on a scale from 1 to 5, where 1 indicated minimal choice and 5 indicated a substantial degree of choice). Eighty-five per cent indicated a score of 1, signifying a lack of choice. Conversely, when considering choice within the NFC card system, 96 per cent felt they had significant options (rated as 5). Furthermore, 86 per cent of respondents associated monetary aid with providing considerable choices. Looking ahead, over 98 per cent favoured the distribution of NFC cards for future disasters, with a majority finding them more user friendly than goods or cash. For the first time, traditionally unbanked populations were given the opportunity to have agency and financial freedom in not only making purchases but also in saving them for larger purchases.

> I knew about ATM cards because you have them in government jobs. But these cards [the NFC] are new. I thought, what is in the card? When Sempo came, they explained to us how to use the NFC card. It took us some time because we were used to the normal physical response with a protocol from the NDMO, Shefa, [and] the area councils and you go up that same tunnel. With the card, disaster relief was your choice. It was really nice. (local government representative, Port Vila)

A significant finding from the survey was that 38 per cent of respondents reported that the daughters within their families were actively using the card to make purchases on behalf of the primary cardholder. The fact that members of the family who previously didn't have access to shopping funds were entrusted to use the card for making purchase affirms the NFC card's practicality in shared family usage. This is further supported by 95 per cent of respondents specifying that the items acquired through these purchases were intended for their family members. This observation sheds light on recipients' ability to share and guide others in using the card. The success of the program underscores the strength of family and community values, where shared empowerment following a natural disaster plays a pivotal role in its effectiveness.

Less than 4 per cent of beneficiaries faced any issues related to NFC card usage, highlighting the card's user-friendly design that required no prior knowledge. Remarkably, 91 per cent expressed satisfaction with the assistance they received in using the NFC cards. Although most recipients (82.5%) were unaware of the technical details regarding the data stored on the NFC card, an impressive 95 per cent felt confident in entrusting their information to it, a significant level of mutual trust. The convergence of enhanced digital and financial literacy, which empowers both participants and implementors to embrace the system without deep technical understanding, is pivotal in enabling daily card usage to meet their needs. However, these positive economic impacts raise ethical questions about data governance and disclosure, highlighting the delicate balance between leveraging technology for improved aid delivery and ensuring ethical considerations are met.

Dignity of Choice

Numerous stakeholders associated with UBC articulated that, through UBC, people maintain their freedom of choice, a key component to protecting their sense of dignity. Having NFC cards has helped reduce interhousehold disputes around money getting lost or stolen, and there are generally fewer conflicts about money. One argument against traditional cash-transfer programs by the NDMO (Natural Disaster Management Office) has been how they create long-term dependency on aid payments and lack sustainability given that the population at large are given cash without the need for any other qualifying criteria. UBC effectively circumvents this long-term dependency by limiting NFC card distribution to only populations that are marginalized and vulnerable right after disasters including the elderly, people with disabilities, and single mothers. These recipients were selected by a combination of survey methods and advice from the community chiefs.

The program's departure from the traditional social security paradigm highlights the potential for embracing technological advancements to create more efficient, user-centric, and adaptable methods of delivering aid and support to those in need. Individuals who never had a means of identification or a traditional bank account not only gained access to financial independence but also dignity of choice. In fact, for the most vulnerable this was the first time they were able to spend money without depending on others.

This was further corroborated by the anecdotes we heard during interviews with local government and Oxfam personnel involved in both the pilot and subsequent programs. Stakeholders spoke about young individuals with disabilities who experienced new-found independence by being able to purchase necessities from stores, breaking free from relying on others. The introduction of a bus service to aid those who lacked mobility was highlighted as a significant stride in restoring dignity for people with disabilities, providing them with increased agency in spending and enhanced mobility.

In a few provinces, widowers even entrusted their cards to local stores, enabling larger families ineligible for the program to benefit from the surplus funds they did not require. These instances underscored how a keen sense of community naturally fostered a long-term perspective of sustainability within this initiative in communities. The values of sharing and communal support were evident as widows and their families extended the benefits of the program beyond their immediate households, reinforcing the program's positive impact on the broader community.

> There was one man on Efate — he had a child with a disability and was given a card. [It] helped to build and extend the house for the child to play outside. It had a really big impact on their homes. A lot of them also built little canteen or shops after the program ended —it provided them with financial income after the program ended. (Red Cross staff, implementor, Port Vila)

Concerns Over Resilience

UBC's capacity to imbue the aid distribution process with efficiency and dignity through blockchain technology and the upskilling of communities and stakeholders has led proponents of the program to emphasize UBC's promotion of resilience. Yet while UBC's localized approach endorsed community-based solutions, contrasting opinions on the project's impact on community resilience reflects the sociopolitical tensions that arise from cash-transfer programs. UBC succeeded thanks to the support of donors and a leading NGO, yet some stakeholders question whether it is possible to sustain UBC without the presence of foreign aid workers and technology companies, highlighting the risk of

dependency on a singular, foreign source rather than distributed local ownership.

While the presidential office and regional governments approved UBC in the recovery phase of disaster management, a poor relationship with the NDMO and inefficient communication channels with their office have caused tensions. During early piloting of UBC, national disaster response officials reported that Oxfam did not notify them about the project's implementation. They felt that Oxfam and Sempo relied on attractive features, such as large donors, cash transfers, and "flashy" technology to supersede local authorities. One official recounted that while their office has been attempting to develop sustainable solutions to disaster recovery for decades with limited resources, Oxfam and Sempo prioritized an immediate, short-term solution and did not appropriately consult with other disaster response parties: "Some partners want to go quickly out there, and it causes a lot of complications."

Following Tropical Cyclone Harold, national agencies introduced training programs to encourage local communities to create their own disaster response plan and focused on community-led solutions to postdisaster recovery, including providing land for locals to farm on and organizing evacuee labour programs for displaced individuals. However, government employees reported that following the introduction of UBC, locals became less willing to participate and instead preferred immediate cash-transfer solutions provided by Oxfam, obstructing other community-based solutions.

Given that UBC has approval for work in the recovery phase only, the NDMO calls into question the project's effectiveness as a long-term solution. The NDMO's goal is to ensure that communities have the skills and resources to build independence after a disaster, with dependence on NGOs reducing the community's innate resilience: "My worry is the long-term

response for the people — what happens when cash runs out? How can we sustain this cash-transfer program?" Most Ni-Vanuatu recognize that the rise of climate change has impacted the frequency and intensity of natural disasters and question how effective CVA can be in the long-term: "If you do it [UBC] this year, will we have enough money to do it next year?"

Figure 7. A tsunami evacuation plan on public display outside the headquarters of the National Disaster Management Office (NDMO) in Port Vila (source: Sumayyah Shah)

Another concern is the use of blockchain technology. A relatively recent innovation, its implementation in developing countries is notable because there are few regulations governing its use and its success in projects like UBC, while benefiting the humanitarian sector, also generates mass profit for many tech-based companies. Stakeholders have an incentive to use blockchain because such an innovative source to fuel cash transfers can provide startups (such as Sempo) with a launching pad for other projects. In UBC, the use of blockchain garnered international accolades and attention for Sempo and legitimized other technology companies intervening in the humanitarian sphere in other Global South countries. National disaster agencies in Vanuatu express their reticence

over UBC, arguing that it prioritizes "for-profit" solutions and permanently makes Vanuatu dependent upon external, foreign, for-profit technology companies.[7]

Furthermore, the energy and technology required to operate the blockchain in UBC cannot exist in Vanuatu, which does not currently have the servers to host the blockchain so the data from UBC is stored in Australia, where Sempo is based. The data storage in Australia is another point of contention, since it makes Vanuatu permanently reliant on foreign aid to operate UBC and does not allow the country to own or control the data that Oxfam has collected on them.

The NDMO emphasizes the power of Indigenous knowledge when it comes to rebuilding, distributing resources, and recovering from cyclones and wants to harness this through its initiatives. While the success of the UBC project's intervention is undeniable for vulnerable populations, including the elderly and people with disabilities, scaling it to the rest of the population might have the opposite effect of the intended outcome. One local government official corroborated this: "For immediate response, it's [UBC] a yes, but for long-term, no … We want to be resilient in a way so that you can save some resources and use them in a disaster. When people wait for cash voucher, it's not as resilient."

Opportunities to Build Digital Literacy

Rather than viewing digital illiteracy as a barrier, UBC viewed it as an unexplored opportunity. It is only natural that the users of the NFC cards initially had a sense of distrust, confusion, and even fear of the unknown. This was seen by many partner implementors who themselves had never seen a system like this before.

For Vanuatu training, in town it was ok. In the remote community it was hard because technology was new to them. For some of them, it was the first time with a smartphone. They were originally scared but they got pride, and they liked it. It gives them pride using the smartphone. People who were low in the community, you could see it was so, so good — they learned something in their old age. (Oxfam staff, vendor training, implementor, Port Vila)

But these barriers were overcome by involving people the cardholders trusted within the communities to take part in the training sessions. Having Oxfam partner with local chiefs, churches, and nongovernmental organizations that have been working for a long time in the community to implement training helped to reassure the community and build trust. Having a call centre where community members could call and ask questions, get responses, and even home visits helped to build a relationship with the people on ground.

Vanuatu is a country that relies on interpersonal relationships. Capitalizing on that by having questions directly answered by Sempo representatives tapped into the community's strength. For the first month two full-time staff worked in Santo, so if the users had any issues they could go in and talk face to face. Beneficiaries themselves were looked after by whoever was providing aid — World Vision, Save the Children, Adventist Development and Relief Agency (ADRA), or Red Cross.

A cornerstone of building trust involves finding an effective way of communicating technical details that are new and unfamiliar. Oxfam achieved this by explaining outcomes and concepts rather than the technical details of how the technology of blockchain and crypto-tokens work. Both on-the-ground implementors of training and users

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7   Olivier Jutel, "Blockchain Imperialism in the Pacific," *Big Data and Society* 8, no. 1 (2021).

learned that the card worked like a voucher that holds value, just like a gift card, and it could be used to exchange for real goods at the selected vendors. Likewise, the vendors understood that the value held in their Sempo accounts would translate to weekly fiat currency payments. The sign-on bonus for vendors helped them see how they would receive future payments and acted as collateral for their future trust.

However, despite efforts from Oxfam and Sempo to ensure that communities understood the technologies they were interacting with, there remained significant knowledge gaps, particularly regarding the blockchain itself. While there was consensus from most involved parties that UBC was a positive venture, most individuals who were not directly involved with Sempo had very limited understanding of blockchain or the data collection process within the project. Locals who worked with Red Cross, Oxfam Vanuatu, or other local NGOs who helped train vendors and beneficiaries reported positive experiences working with Sempo, yet still demonstrated a limited understanding of blockchain. "It is a new thing for most of us in Vanuatu, so there is still some debate — some of us are excited … Some of us who are educated … will question it more." When asked about their understanding of blockchain or the data collected through transactions, most individuals reiterated Oxfam talking points — that blockchain made cash transfers quicker and more efficient yet did not know how it operated or where the data was stored. Alongside the contention over Australia's ownership of the data and efforts to scale UBC in Vanuatu, the knowledge gaps regarding blockchain must be addressed to maintain local ownership over the solution.

Ni-Vanuatu Culture

Although only a small number of people were selected to receive an NFC card from each community, the program's impact on the community at large can be attributed to the

Figure 8. A Red Cross vehicle parked at the Red Cross Vanuatu offices in Port Vila (source: Sumayyah Shah)

culture in Vanuatu. Society is built on strong interpersonal relationships, with large extended families depending on one another to share resources, rebuild, and grow. This means that the benefits of one card extend beyond the individual to their extended family and even community, causing a multiplier effect and assuaging concerns about conflict over the ownership of the card.

The intervention's design adapted to the local context by tapping into existing lines of support in the community. The community-based response relied heavily on the chief and his people — including the elders, the community council, and the church — for assessing needs, redistributing resources, and rebuilding. One local government official attested to the importance of the chief during UBC: "The chief is paramount in this setting." When Oxfam first began piloting UBC, they relied extensively on the chiefs to endorse the project. The chiefs' authority in the communities was crucial and simultaneously increased the chances of community acceptance.

By coordinating traditional means of community-based disaster response with provincial

government resources, Oxfam effectively employed NGOs with expertise in the different provinces to localize the dissemination of information, training efforts, and distribution of NFC cards. People's trust in the chief and traditional systems helped reinforce trust in the blockchain-powered program that would otherwise have been difficult to accept, given the inherent asymmetry of knowledge.

Lessons Learned

It is evident that the success of the project lies in the innate cultural resilience of the Indigenous population that is rooted in community values of sharing and receiving. Although the cards were given to only a select few individuals in the community, their impact was evident throughout the community. Not only did money reach local vendors and their families but also other individuals who benefited from the card being shared.

Decolonizing Aid and Sustainability

Since the 1980s, there has been increasing interest in solutions that decolonize the aid sector. CVA programs are often placed under scrutiny due to unwarranted concerns that recipients may "misuse" funds. Such scrutiny is a byproduct of Western parties depriving the Global South of agency and the maintenance of hierarchical control that disputes local communities' capacity to make autonomous financial decisions. Projects like UBC challenge these narratives, acknowledging that Indigenous communities have the agency and aptitude to decide how they want to respond to a disaster. In countries like Vanuatu, particularly in the South Pacific, where many nations have

recently achieved independence from former colonial powers, sovereignty is important and there is strong emphasis on moving away from dependence on foreign aid.[8]

UBC's localized approach respected the traditions and agency of locals, including local stakeholders and nonprofits, and focused on building local business resilience. Stakeholder members involved with the pilot emphasized the move away from a "top down" approach and a shift toward humanitarian solutions that included the voices and choices of local communities. Strong coordination between each stakeholder and the emphasis on enabling financial autonomy and empowerment, particularly for vulnerable groups, is significant. One local government official attested to the positive reception from community members who felt empowered by the project. "They felt that they were part of the relief, and they had a choice … In the natural disaster, they get rice. With the card, they can make a choice about what they want."

Yet for long-term sustainability, the intervention must recognize the need for local ownership, without external interests playing a role. While the actual code for UBC's blockchain can be provided at a low cost since it is an open-source platform, it will need technical experts to maintain, update, and monitor which seems unlikely without coordination by other parties. Additionally, currently Sempo-Oxfam have intermediary ownership of the data and the data collected from the NFC cards is stored in Australia. Due to the poor data infrastructure in Vanuatu and insufficient energy to maintain local data servers in Vanuatu, the capacity for UBC to scale and become locally implemented is limited.

Oxfam-Sempo's introduction of blockchain in Vanuatu has had significant ramifications. Both the private sector and the government are

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8   Rachel E. Smith, "Declarations of 'Self-Reliance': Alternate Visions of Dependency, Citizenship and Development in Vanuatu," *Oceania* 9, no. 21 (July 2021): 236–56.

interested in exploring this technology, and an extensive paper released by the Vanuatu Business Resilience Council with the support of USAID in early 2022 lays the groundwork for an "Adaptation Roadmap" for the use of blockchain at scale in the country's growing economy. The study includes the potential use of blockchain for other, non-aid-based projects, such as using blockchain to create national IDs for all citizens and creating a functional government database to manage and facilitate the links between digital IDs and access to government and private services. It also examines digitizing transactions in finance and bases its recommendations on financial transactions conducted through UBC.[9] The expansion of blockchain in Vanuatu reflects another consequence of foreign tech companies intervening in humanitarian aid.

While blockchain may have enhanced the efficiency and transparency of the project, its use also opened the doors for other foreign companies to move into Vanuatu and attempt to lay claim over another part of the growing blockchain empire, with UBC legitimizing tech companies treating the country as a "guinea pig" to test blockchain operations under the guise of innovation. Some believe that the use of blockchain, rather than decolonizing aid, cements the control of foreign bodies because locals are reliant on other organizations to manage the program. If CVA and blockchain servers cannot exist in Vanuatu due to the lack of existing resources, is it possible for Ni-Vanuatu to ever be self-sufficient? The rise of "blockchain humanitarianism" also calls into question the motivations of foreign organizations who use vulnerable, developing countries such as Vanuatu as sources of extraction. As many companies will profit greatly from the success of blockchain, testing it in Vanuatu propels their own interests while also legitimizing the growth of for-profit, humanitarian solutions.[10]

Figure 9. A community focus group hosted by Oxfam during the pilot stage of UBC (source: Keith Parsons/OxfamAUS)

Partner NGOs' Role

The partnerships that Oxfam forged are crucial. While the relationship with users was forged by working with chiefs, churches, and nongovernmental organizations, the relationship with vendors was mobilized through partnership with Vanuatu Business Resiliency Council (VBRC). VBRC has strong connections with the private sector stakeholders and has experience running climate resiliency workshops with small and medium-size businesses. They were thus tasked with identifying who the vendors involved should be, what they would require in terms of logistical support, what type of training was required, and what the telecommunication needs were.

In postdisaster recovery different NGOs, civil society actors, and private sector entities must work under the coordination of the National

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9   Vanuatu Business Resilience Council, "Blockchain Technology Adaptation Roadmap for Vanuatu," April 2022. ↗

10   Olivier Jutel, "Blockchain Humanitarianism and Crypto-colonialism," *Patterns* 3, no. 1 (January 2022).

Disaster Management Office (NDMO) so it's a complex environment. This disaster management working group meets on a regular basis to ensure a well-coordinated response. However, in Vanuatu, the field is divided by expertise — each NGO typically has a province where they do the majority of their work. In recent years, given the increase in intensity and frequency of natural disasters coupled with COVID-19, communication and structured responses to disasters among NGOs and the NDMO have deteriorated. For UBC to be scalable and sustainable in the long run, close coordination with the NDMO would be crucial.

Localization

Following Cyclone Pam in 2015 it became evident that disaster response — driven by the distribution of food and food items by the government, especially in remote areas — was extremely time consuming given that multiple levels of coordination were required between the NDMO, evacuation centres, and NGOs. This complexity increases in the context of archipelagos like Vanuatu which is geographically isolated. Coordination driven by smartphones and NFC cards that can be loaded virtually in a short amount of time after a disaster reduced the aid distribution time from four weeks to just three days, allowing this time to be used for other disaster-response needs.

The structure of Oxfam Vanuatu itself changed after Cyclone Pam and now all staff and most people in the hierarchy are Ni-Vanuatu. Having people on the team who understand and are the voice of the communities where the intervention is being implemented is crucial. Localized materials consistently enhance communication and community engagement in programs. This was evident during the vendor enrolment phase, which required vendors to understand and sign contracts related to their role and financial processes with Sempo.

Objectives
Most vulnerable: Meet basic needs, recover livelihoods & decrease food insecurity
For vendors: Increase revenue & sustain local markets
For partners: Learn how to deliver CTP effectively
Innovation: Demonstrate local solutions at scale — a Pacific example

Figure 10. Objectives of Unblocked Cash from the perspective of the different stakeholders involved (Pacific Learning Event 2022, Oxfam Vanuatu, courtesy of Oxfam)

Use of Blockchain to Distribute Aid

Given that digital infrastructure is often better than brick-and-mortar infrastructure in islands that are hard to reach, adopting a blockchain-based solution has incrementally improved the process of resource distribution from the perspective of implementors. The transparency it provides makes it preferable to aid distributers compared to cash transfers since it is more reliable and can be easily tracked. Live monitoring has allowed Oxfam to make improvements to the program during implementation stages. For example, the provision of buses to help increase mobility of people with disabilities began after Oxfam noticed the low spending on cards that were given to people with disabilities. This improvement was critical to allowing the program to truly reach those in need.

Yet the use of blockchain in UBC remains a contested area. Although blockchain was key to developing a transparent and efficient digital cash-and-voucher assistance program,

the lack of familiarity that many stakeholders demonstrated and issues over the capacity for the data produced from UBC to be owned and stored in Vanuatu reflects its limitations. As UBC aims to promote dignity and autonomy among beneficiaries, it should also consider how blockchain can potentially reduce the agency of populations due to the induced reliance on foreign, for-profit tech companies.

Blockchain is only a tool, and its usefulness depends on its ability to be used effectively. To make the digitization opportunities offered by blockchain successful, a considerable number of critical stakeholders in each area must be on board to create an enabling environment for accelerated innovation across the economy.

Research Team

Madalena Liougas is a second-year master of science student at the Rehabilitation Science Institute, Temerty Faculty of Medicine, University of Toronto. Her primary research focuses on social connection for older adults living in long-term care homes. Madalena is a passionate advocate for safe and inclusive communities and has been a member of various committees including the KITEC trainee committee, editor in chief of the *RehabINK* magazine, and member of the Rehabilitation Science Institute's COVID-19 task force. Last year she received the University of Toronto Student Leadership Award and the Rehabilitation Science Institute Community Service Award. In September 2023, Madalena began her PhD at the University of Toronto.

Sahana Prabhu is a third-year computer engineering student at University of Toronto. Involved in Engineers without Borders University of Toronto, Soap Cycling Singapore, and WNS Cares Mumbai, Sahana has engaged in collaborations with civil society, academic institutions, and social enterprises to amplify local developmental initiatives. These efforts endeavoured to decrease individual carbon footprints, enhance inclusivity within University of Toronto Engineering, bolster resilience in Southeast Asian communities against COVID-19, and enhance education access. With direct exposure to the consequences of climate change on vulnerable populations, Sahana aspires to craft sustainable solutions as an engineer and leader.

Sumayyah Shah is a graduate from the Munk School of Global Affairs & Public Policy, with an honours BA in peace, conflict, and justice and criminology. Her research interests include the securitization and disenfranchisement of legal resources from marginalized and criminalized populations. She has worked with METRAC's Community Justice Program for the past two years, developing public legal education resources and researching violence prevention for survivors of intimate partner violence in Ontario. She also has experience researching innovative responses to systemic gaps in the legal and educational sectors with the Mosaic Institute and the Diversity and Inclusivity offices at Blake's LLP and TD Legal, and she currently works as a program coordinator at the Urban Alliance for Race Relations. Sumayyah hopes to fuse her research and work experience to pursue a career in public interest law and develop innovative solutions for access to justice among disenfranchised populations in Canada.

Selina Yang is a fourth-year commerce and economics student at the University of Toronto. After a very international upbringing, Selina has collaborated with individuals across over 20 countries and wishes to continue building her global perspective. She is also a researcher with the Behavioural Economics in Action at Rotman (BEAR Labs) and continues to further her expertise in behavioural science. She is passionate about understanding how private and public organizations can work together to create sustainable and effective incentives. Her prior experiences in the social impact sector involve leadership positions working with peers to help nonprofit organizations such as Habitat for Humanity, Green Peace, and NATO Canada to achieve their goals and further their impact.

Priyank Chandra is an assistant professor at the Faculty of Information and director of the STREET Lab (Socio-Technical ResistancE and Ethical Technologies Lab), housed at the Knowledge Media Design Institute at University of Toronto. He studies the sociotechnical practices of marginalized communities as exemplified by current work that looks at social movements, worker resistance, and accessibility, with a focus on how communities self-organize. As a human-computer interaction (HCI) and computer-supported collaborative work (CSCW) researcher, his work is interdisciplinary and supported by a range of national funders (e.g., NSERC, SSHRC, NFRF).

Founded at the University of Toronto in 2015, with support from the Mastercard Center for Inclusive Growth, the Reach Alliance has since scaled to seven other leading universities around the world. As a student-led, faculty-mentored, research and leadership initiative, Reach's unique approach uncovers how and why certain programs are successful (or not) in getting to some of the world's hardly reached populations. Research teams, comprised of top students and faculty from across disciplines, spend nine to twelve months investigating each case study. Once the data collection process is complete, teams write case reports that are published and disseminated across the Reach Alliance's diverse network of policymakers, practitioners, academics, and business leaders.

Inspired by the United Nations' call to eliminate global poverty by 2030 as part of a set of Sustainable Development Goals (SDGs), our mission is to pursue the full achievement of the SDGs by equipping and empowering the next generation of global leaders to create knowledge and inspire action on reaching the hardest to reach.

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