Potential of Decentralized Autonomous Organizations in Developing Countries

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Key Points

- Decentralized autonomous organizations provide a modern and promising substitute for the conventional Village Savings and Loan Association (VSLA) model by integrating blockchain and smart contract innovation, thereby allowing community-based finance and governance in developing economies in the Global South to be scaled up.

- The combination of decentralized autonomous organizations and VSLA principles has the potential to dramatically alter financial inclusion and empowerment in the Global South by utilizing the efficiency and transparency of blockchain (distributed ledger) technology to enhance community-based financial institutions.

- The comparison between decentralized autonomous organizations and VSLAs demonstrates how blockchain technology may be implemented in the Global South to enhance traditional practices and encourage development.

- Developing communities face many challenges in implementing decentralized autonomous organizations. These include insufficient digital infrastructure, intricate legislative frameworks and insufficient knowledge and expertise in blockchain technology, all of which impedes the efficient utilization and comprehension of decentralized autonomous organizations.

- Developing favourable legislative frameworks, improving technology infrastructure and launching extensive educational initiatives to close skills shortages and create a favourable atmosphere for blockchain applications are key recommendations for the adoption of decentralized autonomous organizations.

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Introduction

Initially developed as the foundation for cryptocurrencies, blockchain technology has since expanded to innovate various aspects of the digital economy, notably information management and transaction processing. Blockchain technology functions by utilizing a collection of "blocks" that count as units of transactional data and are linked and secured using cryptographic principles to store data, often resembling a record of transactions. What sets blockchain technology apart from traditional record-keeping methods is the decentralized nature and distribution of the ledger across a network of devices participating in the blockchain network. These devices are referred to simply as "nodes" and work to increase security by preventing data manipulation, with each node being a central point of information and allowing the system to function without it in case of failure. Network participants can agree on the legitimacy of transactions without the need for a central authority thanks to cryptographic consensus mechanisms.

Blockchain technology has since been implemented in numerous applications in addition to cryptocurrency, including supply chain optimization, voting system integrity assurance and identity management. Regardless of the technology's use, blockchain's foundational decentralization, permanence and transparency characteristics provide new approaches to age-old issues in a variety of domains, especially those in which security and trust are critical (Swan 2015).

But, as with any new technology, implementing blockchain comes with its own set of difficulties; concerns including scalability, energy consumption and regulatory compliance need to be resolved (Wright and De Filippi 2018). These ramifications limit technology accessibility, particularly in developing economies in which blockchain could be used to help alleviate poverty. One example of this is the formation of decentralized autonomous organizations to improve financial transparency and inclusiveness, the focus of this working paper.

Decentralized Autonomous Organizations and VSLAs

The foundation of decentralized autonomous organizations initially evolved from advancements in blockchain technology, specifically from Ethereum's implementation of smart contracts (Buterin 2014). Smart contracts are automated computer scripts that execute coded contracts, enabling operations without the need for human intermediaries (Tapscott and Tapscott 2016).

Building off this concept of automated management, decentralized autonomous organizations were introduced as an answer to issues of trust and centralized decision making prevalent in traditional organizational models. In traditional organizational models, decision-making capacity is held by a limited number of individuals, leading to potential inefficiencies and lack of transparency (Malone 2004). However, decentralized autonomous organizations are distinguished by their decentralized and democratic-by-design approach to governance. Decentralized autonomous organizations that operate on a democratic basis, with decisions executed by automated smart contracts, allow all members to participate and aim to improve efficiency by eliminating the need for intermediaries to rectify decisions and minimizing the possibility for corruption (Wright and De Filippi 2015). At the operations level, the governance of decentralized autonomous organizations is collectively carried out by members, often via a digitized token system representing voting rights (Swan 2015). The decision-making process in decentralized autonomous organizations includes member-generated proposals and collective voting on matters ranging from funding projects to amending governance policies. Smart contracts facilitate these processes, ensuring transparent and secure outcomes (Christidis and Devetsikiotis 2016).

The self-governing nature of decentralized autonomous organizations permits ongoing operation as long as the blockchain foundation remains active. This adaptability has led to decentralized autonomous organizations being used in various domains, including decentralized finance, group investments and community-based projects (Tapscott and Tapscott 2016). One of the most notable cases demonstrating the practical application and potential of these organizations is the collective attempt by a decentralized autonomous organization to purchase an original copy of the US Constitution, raising US$47 million in the process. Despite falling short of its financial goal, this example not only showcased the capacity of these organizations to mobilize resources for common goals, but also highlighted the broad public interest and participatory nature that these decentralized organizations can engender (DuPont 2017).

Regarding their potential application in developing economies, decentralized autonomous organizations share certain characteristics of VSLAs, which are

conventional organizations and financial models in developing countries. VSLAs were initially introduced in the 1990s by CARE International to address the lack of conventional banking in rural communities. They offered straightforward, community-centred financial services by focusing on collective savings and microloans, which benefited under-represented communities that lacked the formal structures required for conventional banking (Anyango et al. 2007). VSLAs function through a simple community-managed structure, generally involving periodic savings gatherings and a cycle-based distribution of the accumulated savings and earnings (Allen and Panetta 2010). As decentralized autonomous organizations and VSLAs operate via a similar organizational structure — without a structural hierarchy and with decisions made through community consensus — the latter could utilize blockchain for greater efficiency and scalability in much the same way as the former. Through decentralized autonomous organizations, smart contracts might automate the processes of saving and lending, leading to increased efficiency, and because they are only accessible remotely through an internet connection, they may also broaden the scope of financial services in rural communities in developing countries (Christidis and Devetsikiotis 2016).

Both decentralized autonomous organizations and VSLAs are potential models for community-driven finance and governance. Decentralized autonomous organizations provide a digital alternative to the conventional community-based VSLAs that are common in developing economies, with their use representing a more advanced, open and effective approach.

Challenges for Implementation

Technological Constraints

The main obstacles to the adoption of decentralized autonomous organizations in the Global South are technological in nature. VSLAs often operate in rural areas, but these areas frequently struggle with the adequate infrastructure required for the implementation of decentralized autonomous organizations, such as reliable internet access. The technological environment is marked by outdated systems, erratic power supplies and a lack of available technology in rural communities. This perpetuates a wide digital gap because many people cannot afford the technology upgrades needed for decentralized autonomous organizations to operate effectively (Huda and McDonald 2016).

Furthermore, due to a lack of funding for information technology infrastructure and a concentration on other developmental requirements, these locations frequently experience a slow rate of technological improvement. Because of this slow pace of technological advancement, the novel features of decentralized autonomous organizations, such as smart contracts and decentralized decision-making procedures, remain untapped. For these organizations to function well, the proper infrastructure is needed, namely reliable internet and sophisticated processing power. Without this infrastructure, these organizations' capacity to operate efficiently and provide desired outcomes are severely jeopardized. Were this technology widely available, members of decentralized autonomous organizations in rural communities would not have to commute as they would for a VSLA meeting;

digital accessibility would allow membership in a decentralized autonomous organization to be much larger and more widespread than that in a VSLA.

Decentralized autonomous organizations also have their own technological pitfalls. A public example of this was "The DAO," an Ethereum-based funding vehicle, which suffered a significant setback when it was hacked due to vulnerabilities in its smart contract code, leading to a substantial loss of funds (Siegel 2016). This hacking incident underscored the importance of rigorous security protocols and the necessity for ongoing code auditing with decentralized autonomous organizations. It also prompted a discussion of the responsibilities of decentralized autonomous organization members, particularly the requirement for active involvement in governance decisions to mitigate risks (DuPont 2017). As many developing countries often lack widespread education in digital technology, especially in rural communities where VSLAs often exist, ensuring that automated code for decentralized autonomous organizations is regularly audited and secure may be difficult.

Regulatory and Legal Constraints

Developing countries have particular difficulties in adjusting their legal and regulatory structures to fit the decentralized and innovative character of decentralized autonomous organizations. Many of these nations' current legal frameworks are ill-suited to deal with the requirements of blockchain-based businesses due to a lack of recognition and understanding of the technology as well as their organizational format. This leaves decentralized autonomous organizations facing uncertainty and legal ambiguity in a regulatory environment that is either unduly restrictive or inadequately defined; when the legislation that addresses blockchain technology and decentralized organizations is unclear, there are resulting challenges with governance, operational legality and compliance. Because stakeholders are unsure of the legal ramifications of their involvement, this may discourage their investment and participation in decentralized autonomous organizations.

Furthermore, because these organizations are decentralized, they represent a serious threat to conventional legal frameworks, which are usually based on centralized governance systems. Decentralized autonomous organizations' lack of a central authority creates issues with ownership, liability and legal accountability when following traditional standards. A further layer of complication is added by the international operations of these organizations, as they will likely have to deal with various regulatory frameworks that have different rules governing blockchain technology and digital assets.

While there have been successful instances of recognizing decentralized autonomous organizations, such as in Wyoming where they may be registered as limited liability companies,[1] the majority of judicial systems are still continuing to work out legislation surrounding these organizations and their activities.

Tornado Cash, another high-profile decentralized autonomous organization, encountered challenges that brought to the forefront issues of cybersecurity, the anonymity of

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1   US, SF 38, *An Act Relating to Corporations; Providing for the Formation and Management of Decentralized Autonomous Organizations; Providing Definitions; and Providing for an Effective Date*, 66th Leg, Gen Sess, Wyo, 2021 (enacted), online: <www.wyoleg.gov/Legislation/2021/SF0038>.

blockchain transactions and regulatory compliance (Freiman 2022). After three years of serving as a system for anonymous cryptocurrency transactions, more than 1,000 contributors to Tornado Cash, and countless others who had participated in transactions through the service, were issued sanctions by the US Department of Treasury's Office of Foreign Assets Control on claims that approximately US$7 billion was illegally laundered, leading to Tornado Cash being subsequently banned in the United States.

The situation faced by Tornado Cash highlights the complexities of consumer protection within decentralized structures and the intricacies of fraud prevention. As regulatory scrutiny increases, the experiences of Tornado Cash and similar decentralized autonomous organizations contribute to a growing body of knowledge on navigating the intersection of innovation, security and compliance. However, as Wyoming has shown, it is possible for decentralized autonomous organizations to succeed if they have supportive regulation and a clearly defined legal identity.

Education and Skills-Based Limitations

The absence of required skills and experience is another major barrier to the adoption and effective use of decentralized autonomous organizations in the Global South, where blockchain technology is often not familiar to or well understood by the general population. Due to a lack of knowledge and technical expertise, people and communities in the Global South are unable to engage with and enjoy the advantages of decentralized autonomous organizations. Because there are not many comprehensive education and training programs on blockchain and its related technologies, many people lack the skills required to operate these cutting-edge systems. This is particularly problematic as decentralized autonomous organizations depend on their members' informed decision making and active involvement. Without a foundational understanding of how these technologies work, it is challenging for individuals to effectively contribute to or benefit from decentralized autonomous organization involvement (Hodgkinson-Williams and Arinto 2018).

Moreover, educational establishments in many developing countries frequently lack the funding necessary to offer instruction in cutting-edge technology such as blockchain, leaving a skills gap in the workforce. This gap is worsened by people's limited exposure to real-world uses of these technologies, which makes it harder for them to acquire the knowledge and abilities needed to effectively participate in or run decentralized autonomous organizations. For these organizations to be widely adopted and successful in developing countries, it is imperative that this educational and skills gap be closed.

Recommendations

- **Develop and implement supportive regulatory frameworks**: Governments in developing countries must work proactively to establish legal and regulatory frameworks that support the operation of decentralized autonomous organizations. This entails creating precise legal frameworks and terminology for blockchain-based transactions, smart contracts and decentralized organizations. Cooperation between regulators, technologists and local communities will ensure that these frameworks are inclusive and adaptable enough to keep up with the rapid improvements in blockchain technology.

- **Invest in infrastructure for technology**: Enhancing the technological infrastructure is crucial for the effective implementation of decentralized autonomous organizations, especially in isolated and impoverished areas. This means making digital devices, power sources and internet connectivity more accessible. In order to close the digital divide and promote the use of decentralized autonomous organizations and blockchain technology, governments and international organizations must finance the necessary infrastructure, including through public-private partnerships.

- **Education and capacity building**: Local communities can be strengthened through education about blockchain technology, digital literacy and decentralized autonomous organization operation. The creation of pertinent curricula and training programs can be facilitated by cooperation with IT companies and academic institutions in order to gain greater support through traditional and innovative sources.

- **Promoting financial inclusion through decentralized autonomous organization–VSLA integration**: Use credible existing VSLA design principles in combination with similar decentralized autonomous organizational structures that address regional financial requirements, with an emphasis on financial empowerment and inclusion. Governments need to support the creation of decentralized autonomous organizational models that employ blockchain technology to improve efficiency, reach and transparency in lieu of traditional VSLAs. This might entail developing platforms that make it easier for members of underserved and rural communities to participate in decentralized autonomous organizations.

Conclusion

This paper highlights the revolutionary possibilities of incorporating blockchain technology into community-driven financial systems, especially in developing economies. Combining the communal and inclusive nature of VSLAs with the flexibility and efficiency of decentralized autonomous organizations creates a potentially powerful platform for achieving financial inclusion and empowerment.

However, challenges in regard to technology, legislation and education that have come to light emphasize the need for carefully calculated implementation. Governments, international organizations and local communities must collaborate in order to create extensive education and capacity-building initiatives, supportive legislative frameworks and enhanced technology infrastructure.

Developing countries' adoption of decentralized autonomous organizations for their economies holds promise for bridging financial divides, encouraging community empowerment and heralding a new era of transparent and open financial systems. The combination of decentralized autonomous organizations' digital innovation and VSLAs' communal spirit can create a strong basis for long-term economic growth and social change.

Acknowledgements

About the Author

Tyler Stevenson is completing his bachelor's degree in international economics with a minor in data science at the University of British Columbia. His interests are in the field of economics and the internet, with a focus on the capabilities and impact of digital neocolonialism on the development of the Global South and the potential of emerging technologies. He will expand on this research as an undergraduate fellow with the Digital Policy Hub.

Works Cited

Allen, Hugh and David Panetta. 2010. *Savings Groups: What Are They?* The SEEP Network, June. www.fsnnetwork.org/sites/default/files/savings-groups-what-are-they.pdf.

Anyango, Ezra, Ezekiel Esipisu, Lydia Opoku, Susan Johnson, Markku Malkamäki and Chris Musoke. 2007. "Village Savings and Loan Associations: experience from Zanzibar." *Enterprise Development & Microfinance* 18 (1): 11–24. https://doi.org/10.3362/0957-1329.2007.004.

Buterin, Vitalik. 2014. "Ethereum White Paper: A Next Generation Smart Contract & Decentralized Application Platform." https://blockchainlab.com/pdf/Ethereum_white_paper-a_next_generation_smart_contract_and_decentralized_application_platform-vitalik-buterin.pdf.

Christidis, Konstantinos and Michael Devetsikiotis. 2016. "Blockchains and Smart Contracts for the Internet of Things." *IEEE Access* 4: 2292–303. https://doi.org/10.1109/ACCESS.2016.2566339.

DuPont, Quinn. 2017. "Experiments in algorithmic governance: A history and ethnography of 'The DAO,' a failed decentralized autonomous organization." In *Bitcoin and Beyond: Cryptocurrencies, Blockchains, and Global Governance*, edited by Malcolm Campbell-Verduyn, 157–77. New York, NY: Routledge.

Freiman, Ori. 2022. "Liability, Privacy, and an Arrested Developer: The Ongoing Case of Tornado Cash." DataEthics, September 25. https://dataethics.eu/liability-privacy-and-an-arrested-developer-the-ongoing-case-of-tornado-cash/.

Hodgkinson-Williams, Cheryl and Patricia Arinto. 2018. *Adoption and Impact of OER in the Global South*. Cape Town, SA: African Minds. https://doi.org/10.47622/9781928331483.

Huda, Mirza Sadaqat and Matt McDonald. 2016. "Regional cooperation on energy in South Asia: Unraveling the political challenges in implementing transnational pipelines and electricity grids." *Energy Policy* 98: 73–83. https://doi.org/10.1016/J.ENPOL.2016.07.046.

Malone, Thomas W. 2004. *The Future of Work: How the New Order of Business Will Shape Your Organization, Your Management Style, and Your Life*. Harvard, MA: Harvard Business School Press.

Siegel, David. 2016. "Understanding The DAO Attack." CoinDesk, June 25. www.coindesk.com/learn/understanding-the-dao-attack/.

Swan, Melanie. 2015. *Blockchain: Blueprint for a New Economy*. Sebastopol, CA: O'Reilly Media.

Tapscott, Don and Alex Tapscott. 2016. *Blockchain Revolution: How the Technology behind Bitcoin Is Changing Money, Business, and the World*. New York, NY: Portfolio.

Wright, Aaron and Primavera De Filippi. 2015. "Decentralized Blockchain Technology and the Rise of Lex Cryptographia." *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.2580664.