Symposium

Exploring the potential for blockchains in fragile states

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Abstract

Blockchains have been hailed as a game-changing institutional technology. Most of the analysis of blockchains focuses on their uses in the Global North. Though there is increasing consideration of their uses in the Global South, few studies consider the uses of blockchains in fragile states. In this paper, we consider the potential for blockchain deployments by governments, international organizations, and citizens in fragile states. We find that government deployments are unlikely in fragile states, though blockchains can be useful through their increasing use by aid organizations and by providing people with opportunities, such as access to cryptocurrencies. Blockchains may be revolutionary, but the extent to which they have improved the lives of people in fragile states is questionable.

Keywords

Blockchain, blockchain for good (B4G), cryptocurrency, state-building

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Introduction

Blockchains are distributed ledgers. People who may not know much about blockchains have most likely heard about cryptocurrencies such as Bitcoin, which rely on blockchains. Perhaps less known is that blockchains have been piloted for over a decade in applications besides cryptocurrencies, including in public sector applications such as procurement and by international organizations responding to crises (Bustamante et al., 2022). Nonprofits have also been increasingly using blockchains (Novak, 2023).

Despite increasing use of blockchains, analysis of the prospects and challenges with blockchains for public administration is just getting off the ground (Chen & Murtazashvili, 2023). Though there is some recognition of the role of blockchains in developing contexts (Zambrano, 2020), including to the Global South (Kshetri & Voas, 2018), there is very little consideration of the role of blockchains in fragile states. Our contribution is to explore prospects for blockchains to improve wellbeing in fragile states.

A focus on blockchains in fragile states is significant because there are many applications in the public sector that appear promising to improve governance. What is less clear is how much they have been deployed in fragile states, and if not, to understand why. In addition, since international aid organizations have a prominent role in fragile states, it is important to consider how blockchains may improve service delivery. Finally, blockchain applications such as cryptocurrencies may be of use to citizens in fragile states, such as by providing people with a way to store wealth in countries experiencing hyperinflation or collapses of the banking sector.

To fix ideas, we consider the potential for blockchains in Afghanistan. The Fund for Peace Fragile State Index offers a useful definition of a fragile state.[1] The definition consists of four categories: Cohesion, Economic, Political, and Social. Cohesions includes security apparatus, factionalized elites, and group grievance. The Economic category includes economic decline, uneven economic development, human flight, and brain drain. Political indicators include

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state legitimacy, public services, human rights, and rule of law. Under the Social category are demographic pressure, refugees and IDPs, and external intervention. According to the rankings, Afghanistan is one of the world's most fragile states. Since fragile states share similar challenges, our focus on Afghanistan reflects our relative expertise on Afghanistan, as well as that the United States led a decades-long state-building effort that ultimately failed. If blockchains did not have much application in a two-decade, extremely costly intervention, then they likely have even less potential in public sector applications where there was less of an extensive investment to improve governance capacity.

Our main conclusions are that public sector deployments are unlikely to be feasible in fragile states. Existing applications in the public sector, from public sector procurement to use of blockchains to improve efficiency of land registries, have been implemented almost exclusively in contexts with substantial governance capacity. There is more promise for improvements in international assistance through use of blockchains, which as we argue could improve the wellbeing of citizens in fragile states. However, even international aid uses of blockchain do not appear to have lived up to their promise. Blockchains offer people in fragile states solutions, including in supply chain management, though there are, so to speak, much larger fish to fry when it comes to establishing a robust economy in fragile states. More generally, blockchains are sometimes seen as a way to govern ourselves without government (Allen et al., 2019). This might seem like a wonderful opportunity for people in fragile states. Unfortunately, blockchains do not appear to be used all that much for self-governance in fragile states.

Our analysis also has implications for how a government might make use of blockchain in state building, mainly through enabling and encouraging its use outside of government. Braithwaite and Wardak (2012, 2013) distinguish Hobbesian and Jeffersonian conceptions of state-building, one which recognizes that the early US republic was rural, not especially democratic, and probably a more useful approach for state-building in Afghanistan. For blockchains, what makes more sense is seeing how people might deploy them locally, rather than presuming deployments by the central government. One might even think of this as encouraging people to experiment with novel technologies, much in the sense the US was a frontier of experience with limited roles for the government.

Another general issue is that while blockchains. Levy (2015) recognizes that customary and community organizations could suppress certain individuals. Blockchain has the potential to have those rights recognized, though one would still have to overcome the challenge: would a community that oppresses people based on social identity agree to these changes? Blockchains could offer more options for people to identify as they wish, and control their identity, but it is not clear that blockchains can overcome social norms that may suppress such freedom to choose one's identity.

Blockchains and their governance

Blockchains replace centralized recording of information with code based on consensus algorithms that verify information in the ledger without relying on a third party to verify that information. The revolutionary aspect of blockchains is starting around 1500, governments, firms, and courts of law have generally been the main organizations that record information about people, property, contracts, and money (Allen, 2011). Blockchains enable distributed recording of this information, as well as provides a unique combination of transparency, openness, and, arguably, security (Rozas et al., 2021). In this regard, blockchains can be thought of as an institutional technology alongside governments, firms, and relational contracting as a source of governance (Davidson et al., 2018).

The state of the ledger is determined by consensus mechanisms implemented by members of the network. These consensus mechanisms replace human verification and auditing. Bitcoin uses Proof of Work (PoW), which requires computational power to solve an encrypted puzzle (or hash). Solving the hash is called mining. After a miner solves the hash, PoW requires every node on the network to verify the new data. Consensus mechanism such as PoW and Proof of Stake (PoS) are how blockchains reach distributed agreement on the ledger's state. This is an innovation in that it does not require human verification. Verification is faster than with humans and can be less prone to errors and more transparent, as any member of the blockchain has access to information.

A significant distinction in blockchains is whether they are permissioned or permissionless. A permissionless blockchain, or public blockchain, allows anyone access. Cryptocurrencies are examples of permissionless blockchains. Bitcoin and Ethereum are the leading examples. Theoretically, anyone can participate in these networks, and the rules evolve in response to the demands of the contracting parties. In practice, permissionless currencies involve multiple layers of governance, including the design of the protocol (akin to constitutional choice), rules for change in the code (akin to collective choice), and interact with rules and regulations that address specific challenges that the network cannot necessarily address itself (Alston et al., 2021). Permissioned blockchains allow users to determine membership. For example, a permissioned blockchain can be implemented with controls on who has access to information contained on the blockchain.

Smart contracts can be built onto blockchains. These smart contracts are self-executing: once agreed, everything is public record, and anyone has access to whether the terms of the contract are met. Distributed autonomous organizations

can build in contracting with other individuals or blockchains. They can also provide for their own cryptocurrencies (De Filippi & Wright, 2018). They are the idealization of the notion of the firm as a "nexus of contracts" (Jensen & Meckling, 1976).

Blockchains are, for many applications, a superior ledger, and so it would be possible to replace a current digital ledger with a blockchain to improve transparency and security. But such a view understates the significance of blockchains, which are unlike any previous ledger in that they reduce the need for trusted third parties to verify information, which is accomplished by blockchain's powerful consensus mechanisms. Nor can we simply see blockchain as an alternative to markets and states since blockchains have features of government, markets, and commons (Allen et al., 2021). They also have features of a knowledge commons, especially permissionless blockchains, as the underlying technology is akin to a public good, as anyone can participate and contribute to the ledger and use it (Murtazashvili et al., 2022).

There are many opportunities presented by blockchains. People may be able to record information about members of their community, their property, and execute contracts without relying on government. This is an advantage when people cannot rely on their government or legal system to do that. Blockchains also enable people to experiment with civil and democratic societies, including with designing their own voting rules for deciding on matters of collective choice (Allen et al., 2018, 2019). These are some of the reasons why blockchains are linked to innovation (Allen et al., 2020). The anonymity offered by blockchains also provides solutions for individuals concerned about privacy with licit transactions, such as sex workers and their patrons (Cowen, 2019). There are also concerns raised about blockchains. Blockchains create new opportunities for criminal organizations, as they offer opportunities to conduct transactions in largely untraceable cryptocurrencies (Vigna & Casey, 2016). The Silk Road, a massive illegal trading market, was one of the first large-scale users of blockchains. Blockchains may also erode trust in government (Atzori, 2015). Perhaps unsurprisingly, governments across the world have been regulating blockchains since their inception, including some which have banned blockchains (Novak, 2019).

Despite its significance as a new institutional technology, blockchains require governance. The creation of a blockchain is an exercise in constitution building (Alston, 2021). Once in place, disputes may arise, as may conflict among users. Technological spaces can also be thought of as a commons in the sense that challenges arise from the sheer number of users (Bustamante et al., 2020; Harris, 2018). Blockchain also has a feature of a commons, with its success reflecting the ability of its users to develop rules, procedures, and processes for resolving disputes, as well as processes for establishing boundaries, including excludability, which is a central governance feature of permissioned blockchains (Bodon et al., 2022). Law remains significant, including aspects of contract law, tort law, and property law (Werbach, 2018). Rather, the question is how well law can adapt in an environment in which institutions have traditionally been centralized (Hadfield, 2016; Hadfield & Bozovic, 2016).

Additionally, blockchain is a nested, polycentric enterprise. Polycentricity refers to multiple levels of governance, each with some degree of autonomy, each subjected to a set of overarching rules (Aligica & Tarko, 2012; Ostrom, 1994). Blockchain is quintessentially polycentric: it has substantial autonomy, which requires self-governance, and is governed by overarching rules, including regulations and laws (Alston, 2022).

Most significantly, blockchains can be deployed by individuals, firms, and nonstate organizations. Or they can be used by governments. Both can be relevant, though as we will see, in post-conflict reconstruction, the challenge is that most applications of blockchains that could be useful require at least something of a strong state. That said, governments in fragile states can do more to enable people to use blockchains.

The situation in Afghanistan

From 2001 to 2021, the United States had a major role in Afghanistan. Most significantly, this was a period in which the US and Afghan government attempted to increase governance capacity. It was also a major effort to establish democracy in Afghanistan. The push for democracy in Afghanistan reflected the shift in US foreign policy after the Cold War from a strategy of containment to efforts to reconstruct polities damaged by war and conflict. As Ghani and Lockhart (2009) conceptualized of state-building, the goal of these efforts is to construct a more liberal democratic order to prevent conflict. Elections, and centralization of national authority, are central to the "liberal" vision of state-building. Others question the need for democracy in state building, focusing instead on efforts to improve the quality of governance, which does not necessarily include democracy (Fukuyama, 2004). Rather, the focus on governance prioritizes improvements in ability to implement policies (Fukuyama, 2013), along with creating limited government as a foundation for a more lasting political order (Acemoglu & Robinson, 2012, 2019).

It turns out that the efforts were not successful, as the Taliban was able to return to power in 2021. This occurred after trillions invested to provide greater security, to improve economic fortunes, and to provide for greater political legitimacy. There are many reasons for this, including overemphasis on democracy as opposed to increased ability to provide public services (Murtazashvili, 2022), as well as that constitutional design and public administration have been extremely centralized—so much so that scholars

have emphasized the governance systems harken back to communist-era governance systems originally implemented in Afghanistan with support of the Soviet Union (Murtazashvili & Qadam Shah, 2020).

For our purposes, we can consider the time from 2001 to 2021 as a window of opportunity. If there was a time for blockchains to be deployed for the public sector, that would have been the time. However, as we will see, there was almost no use of blockchains by the government. After considering potential applications, we offer insight into why they were never deployed.

Prospects for public sector deployments of blockchains in fragile states

There are several areas where blockchains have been deployed by government. We focus on a few, including public procurement, land registries, provenance of goods, election monitoring, and identity management. Each is a potentially enticing area for blockchain applications in fragile states. For example, technologies to reduce corruption and fraud in public procurement could improve trust in government, a key challenge in fragile states. Fragile states also suffer from poor record keeping in many situations. Blockchain-based systems for managing identities could be useful in overcoming that. But as we will see, all of these deployments depend on governance capacity that is missing in Afghanistan.

Blockchains for public procurement

All governments contract out to provide goods and services. Blockchains have been implemented for public procurement with the hopes of reducing corruption and increasing transparency. This potential is especially enticing for a country such as Afghanistan, where increasing funds from donors led to endemic corruption in public procurement (Murtazashvili, 2015, 2016a). Given the lack of legitimacy, the Afghan governments tends to tactically use the public funds to purchase political support (Qadam Shah, 2022). This extensively undermine the efficiency of the public funds and results in poor public service delivery. The reports show that billions of foreign aids have been wasted through corruption in Afghanistan (Special Inspector General for Afghanistan Reconstruction, 2019).

Consider the potential for blockchain in public procurement. The World Economic Forum (WEF), through its *Unlocking Government Transparency with Blockchain Project*, hopes to reduce corruption through use of blockchains in the process of selecting vendors.[2] The WEF bases its approach to procurement on best practices from the OECD Anti-Bribery Convention, the WTO's Government Procurement Agreement, the UN Commission on International Trade Law, and the Open Contracting Partnership and Open Data Charter, which it then applies to blockchain, which prioritize that procurement systems are accessible, adequate authentication/encryption/security, clear governance (mirroring best practices of non-e public procurement. Importantly, the WEF compares blockchain-based procurement to e-procurement, which refers to the use of Internet technology to automate or integrate any or all parts of public procurement to improve efficiency, transparency, and accountability to the wider public and which enables any or all aspects of procurement to be put on a blockchain—advertising, tendering, bidding, awarding, purchasing, ordering, contracting, and invoicing.

Though blockchain has significant potential, what is clear is that there have been few actual deployments. One example is an implementation in Aragon, Spain, which has placed vendor selection on a blockchain, specifically a hybrid blockchain architecture with the Etherum public blockchain coupled with a Hyberledger Fabric permissioned blockchain to automate tender vendor evaluation that is reviewed by civil servants. To date, the most current review found that in cases in Colombia, Peru, and Spain, only Peru had a project that made it out of the pilot stage (Telles, 2022).

Another issue is that blockchains are always better than e-procurement. An example of effective e-procurement is ProZorro in Ukraine, which provides a public record of all public transactions, with e-procurement that constraints predation (P. Bustamante et al., 2022). It can be more effective with blockchain, which could in theory further reduce the possibility of fraud in the system. ProZorro Sale extends the concept to sale of government assets. This reduces prospects for corruption in sale of public assets, increasing government revenue, as well as building legitimacy in institutions (Mylovanov et al., 2017).

What is clear is that solutions to procurement are enticing in Afghanistan, which has suffered lack of trust. There are also clear reasons why blockchains have not been deployed. One is that there is not even any progress toward e-procurement, which would seem to be a prerequisite for a more complicated blockchain deployment. In addition, it is not clear that governments want to improve transparency in procurement because corrupt officials often benefit. However, even with political will to implement blockchain, the lesson from Ukraine is that e-procurement systems are a more workable solution. Since e-procurement is deployed successfully in many transitional countries, exploring e-procurement in Afghanistan is a more realistic option. In addition, since there are so few deployments of blockchains in practice, it does not seem that there is much hope for its deployment in fragile states.

Land registries

Another challenge in fragile states is that the system of land administration is complicated and inefficient. The stakes for improving registration are significant. de Soto (1989, 2000) argued eloquently that legal titling is what unlocks

prospects for the poor. The reason is that when land is not recorded, banks cannot use their assets as collateral. As a result, capital is "dead:" even though people possess land, they cannot use it to spur investment.

Though it is clear that legal titling can improve prospects for state-building, de Soto tends to underestimate the challenge with legal titling, which at a minimum requires the government has capacity to record ownership can be trusted to record ownership (Kerekes & Williamson, 2008; Murtazashvili & Murtazashvili, 2019). In many post-conflict settings, as many do not have legal documentation, or their land was never documented in the first place. Land registration is an important aspect of post-conflict peace and stability operations (Unruh & Williams, 2013). There are also challenges that arise because in many developing contexts, people's legitimate claims to ownership are based in custom and tradition (Meinzen-Dick & Mwangi, 2009; Stanfield et al., 2010; Unruh, 2003). A more fundamental challenge is that in such contexts, people may not trust government, in part because the law is often perceived as unreliable or a source of land grievances (Alden Wily, 2011).

We consider here the potential for blockchains to improve efficiency of land registries. As Graglia and Mellon (2018) explain, blockchain can improve prospects for formalization of property rights, modernize registries, and record land-related data. Blockchain-based property registries can reduce fees. Property transactions rely on many intermediaries—broker, government property databases, title companies, escrow companies, attorneys, and many more. Blockchain can save on these transactions. Since property is a bundle of rights (Ellickson, 1993), blockchain can ease the transfer of any part of property. Once digitalized, there is no risk of destruction of records. Public managers can use the record for taxation, increasing ability to provide public goods. Eventually, interoperability is possible: all property transactions are initiated by users, with peer-to-peer trading of fractional rights, all based on smart contracts executing transactions, with an immutable record of all transactions. To do this requires a digital infrastructure: Digital identities, digital records, digital wallets, private or hybrid blockchains, accurate data, connectivity, and a tech aware population (as well as tech accepting).

The Republic of Georgia has led countries in its embrace of blockchains for legal titling. As Shang and Price (2018) explain, the previous system requires lawyers, databases, and centralization. Citizens confronted loss of data, fraud (from participants or government), and operating expenses. The blockchain system allows for use of personal phones to initiate transactions. Millions of land titles were published on the blockchain. They explain that the reasons it worked reflected the government's investment to record ownership, education, and public engagement.

Georgia, despite some recent conflict over individual rights, is a middle-income country with robust economic freedom. Can this work in Afghanistan? Around 80% of Afghans live in rural parts of the country. Most consider themselves to own land, but few have legal title. The legal titling projects to date have done little to improve land tenure security (Gaston & Dang, 2015). There is so little capacity in the formal system of land administration that there is no realistic way that the country could begin, through governments, the process of digitalization of ownership records.

What might work would be for the international community to implement blockchain based solutions through an aid project. In Afghanistan, much registration has occurred through communities, without reliance on the state. Such initiatives can be called community-based land adjudication and registration, or CBLAR (Murtazashvili & Murtazashvili, 2016a). Such CLBAR initiatives are possible because in the Afghan context, community self-governance of land is often robust (Murtazashvili & Murtazashvili, 2015, 2016b). Customary village administrators (*malik*, *shura*, or *wakil*, which translates as "representative") or trusted elders (*rishi-i safidan*, or "white beard"), have a prominent role in adjudicating land conflict, as well as may serve as a repository of customary deeds, which are land ownership documents countersigned by members of the community, but without legal sanction.

Blockchain could help in this context, but the process would differ than the examples above. In the Afghan context, the process would initiate with communities, rather than with government registration. The reason is the state is not especially reliable. While best practices may be to use digital identities and digital wallets at the national level, that may not be feasible, and so the digitalization could be part of a coordinated project. Like digital wallets, the trust to record information would be placed on agencies, and there would still be the necessity of recording information. The difference is that the primary responsibility would be with communities, in the Afghan context, through a community based deliberative process (*shura* or *jirga*, literally, "circle"), which is the traditional method for resolving conflict, including over land. Once the process is initiated and technology is recorded, the process can seek formalization, which involves government recognition of these deeds. By providing an immutable, transparent record of ownership, the government's costs of formalization will be lower, as will the costs of maintaining the system, provided judges are trained and accept this approach.

The question is why a blockchain would justify the added complexity compared to exiting community-based systems. Implementing such a system can also be costly, and a fully blockchain-based system does not have clear advantages over a "normal" digital registry of property (Arruñada, 2018). For many in Afghanistan, what would be valuable is a simple digital record of land ownership, adjudicated through a community process. That could be useful in dealing with disputes at local land offices.

There is also the political problem of secure property rights. A legal title, a digital record of a customary claim to property, or either of those placed on a registry offers

individuals information about what they own. The political problem is that governments can ignore those rights even when they are valid (Leeson et al., 2020; Leeson & Harris, 2018). Thus, the more significant challenge in Afghanistan and similar contexts is to constrain government to respect property rights.

Provenance

One of the most significant applications of blockchains is to bring traders together. In markets, exchange often provides an opportunity for consumers to police bad behavior. However, there are some instances of trade in goods that are illegal or illicit. Blockchain applications include improving government regulation of trade. In Dubai, blockchain is being explored as an alternative for diamond trade. Specifically, Dubai's government is interested in digitizing the process of managing diamond certificates to prevent diamonds allocated through force from entering the market.

These challenges are exacerbated in a fragile state. Afghanistan recently launched its first gemstone certification lab. It is a partnership of investors, local Afghan entrepreneurs, and USAID's INVEST initiative, which mobilizes private capital in developing contexts. The Silk Road Heart Gem Lab provides identification and origins reports, rough sorting, and cutting and polishing services to Afghan miners and traders (Langhorne, 2020).

Blockchains provide solutions to gem traders when government cannot be relied on. In the example from Afghanistan, such transactions indirectly benefit the government—exchange is necessary for revenue, and revenue improves ability to provide public goods. Thus, savvy leaders could promote blockchain to strengthen trade and hence build the state indirectly. But there are limitations to blockchains. Simply having more information about gems says little about the protections to miners, those who physically possess them, and so forth. On the other hand, we know from predatory theories of government that the ability to hide goods from predatory rulers is what determines the empirical limitations of government (Vahabi, 2016). Since blockchains may improve the ability to evade predatory rulers, its deployment could overall improve the ability of "prey" to engage in economic exchange free from predation. Nor is it clear that a weak state government like the Taliban could even prevent blockchain deployment, though its ability to coerce people at the points of extraction, or in transit with physical goods, remains an issue.

Democracy and elections

Fraud in elections is an issue in any democracy, especially in a fragile state. Electoral violence and corruption is also an ongoing issue in fragile states. Governments routinely face challenges with manipulating elections. Blockchain can address this, as one of its most important applications is to democratic deliberation (Allen et al., 2019). It provides an immutable record of voting. Providing citizens can participate (violence may of course prevent it), a blockchain system can improve prospects for democracy. Digital identification could also reduce fraud.

Blockchain can also coordinate citizens on violations of fundamental norms. Citizen collective action is central to the emergence of limited government (Myerson, 2014). An important source of coordination is a constitution (Weingast, 1997). Blockchain, by providing immutable information, better allows citizens to identify when the government has violated norms. Once you have the immutable record, it is easier for citizens to coordinate in their collective action when governments lie or hide information.

But as with any technology, there are risks. Blockchains are not immune from cyberattacks. Chaos could result from a situation in which there is a cyberattack and no paper trail for an election. In addition, citizens must place trust in such a system. Even e-voting suffers from challenges of legitimacy, and a less understood technology such as blockchain might reduce turnout because of fear of the technology. Still, its promise is hard to deny, provided that the technology could improve more secure and transparent voting, thus improving the quality of democracy.

Though this is interesting in theory, in Afghanistan, the challenges with elections before 2021 was terrorism at the polls. There is also very little capacity for e-voting. This means blockchains would not address the core challenge of insecurity and the technology is just not at the level where blockchain deployments would be feasible. As with public sector procurement and land registries, simpler electronic systems would appear to be a more reasonable goal.

Identity management

There are around a billion people who cannot provide their legal identity. Conflict often leaves people without access to documents, especially refugees. In many contexts, government repositories of information are destroyed. Inability to prove one's identity makes it challenging to return to one's home country, to a new country, and to be integrated into the economy, such as finding a job, opening a bank account, etc.

Enter the concepts of "digital wallets" and "self-sovereign identity." In theory, digital proof of one's identity does not depend on a government (or any centralized authority), though it is more likely that governments have at least some role in the original verification of identities, or some third party. A digital wallet can include virtually any information: one's identity, bank records, citizenship, family data, etc. Blockchain can store one's identity on a blockchain, encoding and storing identifiers on a blockchain. Since data is encrypted and identities are separated from one's data, digital wallets can protect privacy in ways that a government cannot. The data can be accessed with physical

characteristics, such as through an eye scan. Unlike many centralized recording institutions, blockchain data is immune from disasters once the information is recorded.

Here as in the other cases, if one could wave a magic wand, it would be an improvement to have all identities managed on a blockchain. This would be a source of resilience. However, even in countries with tremendous capacity, such as the United States, there is almost no progress in creating digital identities. In a fragile state, there would be appear to be limited basis for governments to implement such solutions, though as we discuss below, international aid agencies have shown some promise in using these technologies to provide people with digital identities that can be used to improve their ability to access aid.

Improving international aid

International assistance is a persistent feature in fragile states (Easterly, 2006). There are also many challenges with international assistance as it is sometimes deployed in ways that undermine wellbeing in fragile states (Coyne, 2013). Here, we consider some of the ways blockchains promise to improve the process of aid delivery. Unlike with public sector deployments, aid agency deployment of blockchains offer more promise in Afghanistan.

Crisis response

There are possibilities for international organizations to implement, locally, blockchain-based solutions for managing identities. Though identities are probably not going to be placed on blockchains by the Afghan government any time soon, there is the potential to deploy blockchains through international organizations on a more limited scale. An important example of digital sovereignty is the UN World Food Programme "Building Blocks program, which was established in response to challenges that arise from lack of documentation, government taking IDs, and destruction of registries in conflict. Part of the UN's Innovation Accelerator initiative, the project was initially implemented in Pakistan with a permissionless blockchain, though the fully public system resulted in too many transaction fees.[3] By the time the project was implemented in Jordan and Syrian refugee communities, the program has switched to permissioned blockchains, also on an Ethereum platform. The program in Syria hoped to eliminate reliance on local or regional banks, whose fees accounted for around 30% of total aid, thereby reducing the ability to feed people. By shifting to blockchain, these fees were reduced by up to 98%. The digitalization of identities can then be used by individuals to secure loans, as well as to start business or to work (Juskalian, 2018).

Digital wallets are promising, though they do not eliminate all need for a trusted third party. When records are destroyed or withheld, an agency still must discern which information can be placed on the blockchain. In the case of Syrian refugee camps, the community and individuals provide their information, which then become immutable once it is on the blockchain. Employers and governments can then use it, but it is not fully decentralized; the community did not provide the information themselves. Trust remains significant, though the trust in this case is placed in an institution, which like individuals vary in the extent to which they are perceived as trustworthy (Tyler, 2003, 2006). In situations of recording information in refugee camps, the trust placed in the international organization substitutes for the trust placed in a trusted government entity. This is perhaps best described as transferring trust from an untrustworthy institutions to a more trusted one.

It turns out that these applications, as of 2022, were not working as well as anticipated. People missed receipts, and people stopped using the digital wallets, withdrawing their payments from a local refugee supermarket. Among the issues were that people liked having receipts in their hand and did not like the continual use of biometric scans to access wallets, some citing privacy concerns (Cheesman, 2022).

Before 2021, there was more of an opportunity to use blockchains to reduce reliance on banks for communities confronting challenges. After 2021, the challenge is the collapse of formal banking. Hence, there is a potential for a program like Building Blocks, though it is not clear that the Taliban will allow it.

There is also a need to ensure that the international organizations provide the services communities want. This has not always been the case in Afghanistan. An example is the World Bank's National Solidarity Program (NSP). Hailed to strengthen communities, the NSP often established community development councils parallel to the customary councils mentioned above (Murtazashvili, 2016b). Hence, the extent to which people trust these organizations is questionable.

Coordinating relief efforts

Blockchain has been used to design solutions that provide efficient, trustworthy, and transparent transactions between donors, organizations, and beneficiaries. Additionally, blockchain-based applications have been developed to provide support and assistance to refugees. Examples include BanOu which allows refugees and displaced citizens to transact among themselves or with businesses in their regions. Another example is Building Blocks, which allows cheaper and secure cash transfers that give refugees access to food. Indeed, this app allows refugees to pay for food in retailer stores by just scanning their irises (Reinsberg, 2019). For example, AID:Tech provides blockchain-based systems for donors, organizations, and recipients, which has been piloted to assist humanitarian aid to 500 Syrian refugees in Lebanon in 2017. BanQu allows refugees a digital identity.

Afghanistan has not experimented with these systems. They have promise, but now that the Syrian programs are

more established, it is also clear that there is work to establish trust in a blockchain system. Thus, it makes sense to consider deployments (provided the Taliban allow them), but to consider lessons learned from previous deployments.

Private uses of blockchains in fragile Ssates

Another way blockchains may improve the lives of citizens is by providing them with a new technology. Blockchain optimists see blockchain as a technology of freedom, one which reduces reliance on government. In Afghanistan, the government has often been predatory. Hence, it is important to consider how people can use blockchains to improve their situation.

Cryptocurrency

Bitcoin is one of the most significant topics of consideration with blockchains, including its origins (Luther, 2019), institutional features (Luther & Stein Smith, 2020), political economy (Hendrickson et al., 2016), and prospects for bitcoin to attain what Salter and Tarko (2017) call polycentric central banking. One of the most significant features of monetary policy, especially from a public choice perspective, is that constitutions influence the performance of central banks (Boettke et al., 2021). This is an especially acute problem in fragile states, they may not have any at all. The rise of the Taliban, and the monetary chaos, illustrates how state-building efforts that focus on creating a space for cryptocurrency regulations could improve prospects for a more effective and resilient state, in this case by providing citizens with a way to transact when the government is unable to do so. In July, crypto use increased substantially in Afghanistan, increasing it to a top-20 country for crypto adoption.[4] The fears were realized, as the Taliban takeover came with inflation, collapse of the Central Bank, suspension of financial services by companies like Western Union. The result is that Afghans confront shortages of cash, no banks, and few operational ATMs. To address such situations, institutions such as hawala—personal networks—are available, but they do not protect against devaluations of currency. Beyond this, capital flows were highly restricted before the Taliban's return to power.

This translates into a demand for protection from volatility, which crypto fills. CNBC reported on August 21, 2021, on a 22-year-old Afghan in Zabul, in Southern Afghanistan, who used a crypto portfolio on Binance because Afghanistan does not have platforms like Venmo.[5] Afghanistan NGO Digital Citizen Fund has for a decade been providing know-how in IT, including teaching how to create a crypto wallet.[6]

None of this is a panacea. Since Afghanistan's economy mostly operators on cash, blockchain is not a medium of exchange. What it does is provide an investment opportunity to hedge against financial collapse. It also can be used to coordinate networks such as hawala, thus providing an innovative way to govern such networks. Putting hawala on a blockchain is a possibility, once that could provide greater resilience.

It is also important to consider crypto providing opportunities for criminal and illicit activities. Blockchain was used by one of the world's largest illegal markets almost as soon as it was developed, which illustrates its potential to reduce constraints on criminal organizations. This is an especially important issue in fragile states where the illegal and illicit economy is one of the most reliable ways for insurgent organizations to fund their operations.

The Taliban relied heavily on the opium trade to finance their activities. Criminal organizations may also use fragile states as a base for operations. Criminal organizations have sophisticated networks (Shortland, 2019). State building can reinforce them, as happened in Somalia: pirates emboldened by the creation of better networks and more security (Percy & Shortland, 2013).

The challenge posed by criminal organizations using blockchain does reduce the importance of deploying it. Criminal organizations or insurgents are going to use it regardless. Rather, its use suggests that the governments may have greater challenges in controlling crime and insurgency if their operations become more efficient. The challenges would therefore fall under the umbrella of counterinsurgency or countertrafficking, whether the transited goods are people, illicit or illegal drugs, or weapons.

Business supply chains

A challenge in fragile states is that, as a result of institutional weakness, the costs of doing business are often substantial (Bromley & Anderson, 2012). Much value is often lost through fees with brokers, as well as because of a lack of infrastructure. Given the lack of e-governance or the over bureaucratic nature of business registration, the businesses often resort to corruption that in turn results in unfair competition, tax evasion, and minor contribution for economic growth. Blockchain, for instance, can facilitate the business registration and different aspect of business for entrepreneurs, which in turn bring about transparent and open market. As another example, blockchain can provide a way for farmers and other business owners, for example, to record information about their crops. When combined with digitalization of identification and land, the entire process could be more efficient because of better record keeping. Currencies could also increase the ability of people to engage in transactions.

Physical infrastructure and security remain important. Transporting goods to markets is not simply a matter of record keeping. Without roads (as well as security along them), entrepreneurs will face constraints marketing their goods and services, as well as obstacles for mobility of labor. As we have seen, blockchain can indirectly contribute to such infrastructure, such as by increasing transparency in public procurement.

Afghanistan under the Taliban from 1996 to 2001, and in areas they controlled from 2001 to 2021, provides some insight into these challenges. Taliban are often criticized for their harsh rule, and rightfully so. Still, they created courts, which filled a gap because government courts are considered corrupt (Baczko, 2016), and they have some role in administration and governance even before 2001 (Jackson & Weigand, 2020), including warlord governors (Mukhopadhyay, 2013) and warlord bureaucrats (Jackson & Amiri, 2019).

But if we take seriously the criticisms of Taliban with farmers, especially poppy cultivation, we see that there are massive issues with governments extorting traders. Poppy farmers in areas of Taliban control received only a tiny fraction of the value of poppy (for an extensive look at the Taliban economy, see Rashid, 2010). Rather than promote trade, the Taliban engaged in something closer to what was common in many sub-Saharan African countries in the 1980s, when marketing boards were used to extort crops from farmers, export them, and pay farmers a paltry sum—it was so bad, some countries that began the independence agriculture rich were importing agricultural goods from other countries because farmers left, died, or simply shirked (Bates, 1981).

In such contexts, a technology that reduces reliance on government would be beneficial in that it would reduce costs of transporting goods, thus leaving more after the Taliban takes what it can. Still, there are challenges. Can opium farmers use the technology? What are the consequences of shifting regulatory views on opium? There is evidence of the costs of drug war in Afghanistan (Coyne et al., 2016), including the boomerang effects in the US (Coyne & Hall Blanco, 2018), and so any consideration of blockchains for farmers must consider its political economy.

Conclusion

What we have emphasized here is that blockchains offer a lot of promise, but the demands to implement this by a government are extreme. Blockchain is a new architecture of trust. But it is not the only source of trust. In Afghanistan, people trust customary governance. What would make more sense is to provide for already-trusted entities, such as customary, tribal, or clan-based governance entities (Murtazashvili, 2016a, 2016b, 2019). To date, such approaches have focused on creating autonomy for customary governance institutions that have proven effective in fragile states. This approach makes more sense than techno-state building.

The impact of blockchains is more likely to be through international aid, or through increasing opportunities for private uses of blockchains. Fragile states could avoid preventing uses of blockchains, thus enabling experimentation. That would be more realistic for a fragile state without much capacity.

Our analysis also serves as a cautionary tale. Critics of international assistance missions in Afghanistan and other fragile states have referred to them as trying to important import Denmark to Djibouti. Similarly, critics have called this emphasis on constructing a new state whole cloth as the fatal conceit of foreign intervention (Lambert et al., 2021), an empire state of mind (Coyne & Hall Blanco, 2016). The idea of implementing blockchains by government would be an extreme example of importing what works in another context to a fragile state. In the context of our paper, it might be like importing Sweden to Afghanistan. To the extent that international communities are often overly ambitious, a critical appraisal of the prospects for such deployments in fragile states offers insight into what not to do.

What is the future? Our conclusion is that deployments by the public sector are not recommended in fragile states. Governments in fragile states should explore blockchains but recognize that there is a lot that needs to occur first. Sequence is important. Before implementing blockchains, provide for real improvements in governance capacity. Then consider the fancier systems. The way governments can help is by allowing people to use blockchains and by enabling communities and international aid agencies, with community consent, to explore

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Notes

1. See https://fragilestatesindex.org/.
2. For a review of procurement and blockchain, see http://www3.weforum.org/docs/WEF_Blockchain_Government_Transparency_Report.pdf.
3. See https://innovation.wfp.org/project/building-blocks.
4. See https://blog.chainalysis.com/reports/2021-global-crypto-adoption-index.
5. See https://www.cnbc.com/2021/08/21/bitcoin-afghanistan-cryptocurrency-taliban-capital-flight.html.
6. See https://www.digitalcitizenfund.org/.

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