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Policy Brief

Introduction to Blockchain for Local Government

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Background

Blockchain for Social Impact is an initiative at the Institute for Technology & Society (ITS Rio) located in Rio de Janeiro, Brazil. The initiative aims to improve access to blockchain education and to discuss the socio-economic potential of blockchain technology, especially in Brazil and across the Global South.

The following policy brief, developed in collaboration with the city government of Medellín (ACI Medellín), serves as a guide for policy makers interested in the basics of blockchain technology, applications in local government, and potential use cases. The City of Medellín convened a working group to explore blockchain technologies and many similarly situated cities are beginning to explore potential applications of blockchain to improve service delivery. This Policy Brief serves as an introduction for working groups, committees, and other local government groups interested in learning about blockchain applications in city policy and planning. This Policy Brief was developed through consultations and contributions from graduate students at Harvard University, Columbia University, FGV Brazil, and experts in the technology sector.

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Introduction

Deemed by experts as the most important technological innovation since the Internet, blockchain is set to revolutionize the global economy. PwC predicts that blockchain technology has the potential to increase global GDP by an impressive US$ 1.76 trillion over the next decade. PwC predicts that the logistics sector is set to benefit the most with US$ 962 billion but the firm adds that public administration, education, and healthcare will benefit the most.[1]

Blockchain has significant potential to impact how governments interact with residents and deliver services such as registries, voting, utilities, and verification. For example, blockchain can be used to create secure ledgers of public records such as land titles or it can be used to ensure that public benefits are spent locally.

Before diving into more specifics on how local governments can use blockchain technology, it's critical to outline the basics behind blockchain technology. The links below will first introduce the basic fundamentals of blockchain technology.

English Version, Spanish Version, Portuguese Version

Now that we have a basic understanding of blockchain technology, let's review common applications in for local governments. The following sections will outline key challenges that local governments face and then present blockchain based solutions along with suggested strategies. We will tackle blockchain applications in public registries, social benefit programs, and vaccination tracking. The final section will introduce the nascent application of blockchain technology for Digital ID.

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[1] https://pwc.to/2GWZ0fp

Blockchain & Public Registries

The Challenge

In 2010 an earthquake devastated Haiti, destroying municipal record-holding buildings [2]. A decade later, farmers are still fighting legal battles over land ownership. In addition to natural disasters, conflicts often displace large amounts of the population in afflicted locations, leading to confusion and chaos during the land restitution process.

Even in stable times, local government land management can be ineffective due to inefficient judicial systems and a lack of consistent property records[3]. Property rights also extend beyond determining land boundaries and ownership. Property rights also often include "water rights, mineral rights, air rights, easements that allow other people to access the property, liens for taxes, mortgages, loans, or other improvements"[4] Determining ownership of these coveted economic resources often becomes contentious in contexts with weak public trust.

Paper records create an additional challenge. Records for land and ownership titles are generally paper based, leading to the possibility of damage, forgery, and intentional destruction. Even when land ownership records are stored safely, administrative fees and processes often create barriers for registering and proving land ownership. These hurdles challenge economic growth since unclear ownership or delays in determining ownership impact financial services such as loans through the formal economy, leading to over 20 trillion lost in "dead capital" in the informal economy [5].

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[2]https://www.govtech.com/computing/blockchain-based-property-registries-may-help-lift-poor-people-out-of-poverty.html

[3]https://odihpn.org/magazine/land-housing-and-property-restitution-after-conflict-principles-and-practice/

[4] https://www.govops.ca.gov/wp-content/uploads/sites/11/2020/07/BWG-Final-Report-2020-July1.pdf

[5] https://www.weforum.org/agenda/2016/03/could-blockchain-technology-help-the-worlds-poor

Traditional systems also present complex corruption challenges. In cities across Brazil, decentralized agents, called *cartorios*, keep records of land ownership. *Cartorios* are often bribed by wealthy landowners to misrepresent boundaries and falsely register ownership[6]. Since most small-scale farmers cannot afford the services of *cartorios*, many are unable to fight against land grabs. This has fueled violence and fraud in the state of Para, a state near the Amazon where four times as much land has been registered as exists in the state.

Even when centralization exists, registries are still vulnerable to fraud. For example, land registries in Honduras had few controls, allowing bureaucrats to access and alter the property registry system to give themselves beachfront properties[7]. Digitization can be a partial solution to issues such as data loss from natural disasters or conflict. However, digital databases are still vulnerable to fraud and abuse.

Blockchain as a Solution

Blockchain creates resiliency in data storage, allowing for recovery of data in the event of a natural disaster or conflict, as the data is distributed across the entire network. If an individual server or computer is destroyed, the data remains intact.

Blockchain based public registries also allow for trust and accountability, as any changes to the land ownership records create an immutable log, with cryptographic signatures proving that an individual official approved the change. If an entry in a blockchain-based registry is discovered to be fraudulent, the relevant official can be identified and investigated.

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[6]https://www.reuters.com/article/brazil-environment-landrights/rural-amazon-violence-rises-amid-bureaucratic-mess-over-land-titles-idUSL8N1J45G6

[7]https://www.reuters.com/article/usa-honduras-technology/honduras-to-build-land-title-registry-using-bitcoin-technology-idINKBN0O01V720150515?edition-redirect=in

In Sweden, a pilot between the national land registry and a startup (Chromaway) led to a 90% reduction in the cost of selling land and transferring ownership[8]. The pilot's results helped Chromaway secure a contract with the state of Andhra Pradesh in India, advising them as they began implementing a blockchain-based land registry in the state.

Despite the pilot's success, larger scale deployment in Sweden is blocked, as Sweden requires physical signatures for legal documents. The European Union has endorsed digital signatures, which are compatible with blockchain-based registries and smart contracts. However, these standards have not been implemented across the EU yet. As evidenced by this example in Sweden, blockchain based applications should be analyzed across the regulatory deployment loop to ensure compliance with local and national regulations.

Key Strategies for Blockchain & Public Registries

A successful blockchain-based public registry is well planned, strategically launched, and carefully maintained. A pilot will likely be necessary to test the technology's application in a particular local context. When planning to launch a pilot or full-scale registry, it is important to consider regulatory barriers, private sector implementation partners, and success metrics.

Regulatory Barriers

Regulatory barriers such as signature requirements can prevent blockchain-based registries from adoption, as the transactions must be considered legally valid for the registry to be effective. Governments should do a regulatory analysis across the full data lifecycle so they are aware of regulatory hurdles from the onset.

Public-Private Partnerships

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[8]https://publications.jrc.ec.europa.eu/repository/bitstream/JRC115049/blockchain_for_digital_government_online.pdf

As policy makers plan to implement blockchain-based registries, they should consider partnering with private-sector firms. Platform development, data migration, and maintenance are critical tasks, which all are even more complicated due to the quickly-evolving nature of blockchain. A private-sector partner with existing government contracts will likely be able to execute quicker than a government-only effort. When structuring the contract, it is important to keep the records publicly accessible via an interoperable system so that market forces keep costs down for searching the database (CA Govops)[9].

Program Assessment & Evaluation

If policy makers implement a pilot, they should define metrics and track second-order impacts before launching the pilot. Creating clear success metrics and a scale-up plan for pilots prevents both private sector actors (such as *cartorios*) and other bureaucrats from preventing a successful technology from scaling.

Additionally, many of the social and economic impacts of a blockchain-based land registry will not be captured by the system's annual profitability. Return on Investment (RoI) for such systems need to be calculated with long term financial considerations. Moreover, policy makers should track positive externalities, both qualitative and quantitative, created by measuring the uptake in land registered, increase in speed of land transactions, user satisfaction, and decrease in costs of a title search.

Privacy Considerations

Finally, policy makers must consider what roles will interface with the registry, and what permissions each role should have. As many land registries are public, security and privacy are not as high of a concern as for other applications. However, policy should ensure that the data is not misused by third parties (CA Govops). Effective privacy provisions for use, storage, and third-party sharing will prevent future legal complications for city government.

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[9]
https://www.govops.ca.gov/wp-content/uploads/sites/11/2020/07/BWG-Final-Report-2020-July1.pdf

Blockchain & Public Benefits

The Challenge

The COVID19 pandemic created significant pressure on public benefits infrastructure. Governments turned to emergency funding for cash transfer payments to support residents that lost income due to the COVID19 pandemic. Providing sufficient support was an unprecedented challenge. Governments used established public registry systems to reach individuals in the formal economy who were now in need of dire help. Even more challenging was the task of reaching vulnerable and impoverished communities, home to many informal workers without consistent and/or accurate registration with the government.

In Brazil, for example, cash transfers were implemented through a national emergency aid program paid by a federal bank. Faced with many challenges, governments did their best to provide an economic lifeline for those who needed it most during the peak of the COVID19 pandemic. By the end of 2020, the United Nations estimated that Brazil's COVID19 emergency assistance program reached 66 million people with payments totaling 280 billion Brazilian reais, nearly 4% of Brazil's GDP. These resources, although significant, were slow to reach those in need. In addition, many eligible individuals failed to receive aid due to the federal government's lack of capacity to correctly identify many requests in a short time.

Simultaneously, local governments were working to add support from their funds to alleviate poverty and spur much-needed local economic activity. These local government driven public benefits are instruments developed locally to fight social exclusion and promote local development. They complement national benefit programs to protect, stimulate, or guide local economies, especially in times of financial crisis. These public benefits can also be tailored to certain municipalities with higher economic needs or vulnerability. Ideally, recipients use local government cash transfers to purchase products

and services in their local neighborhood, thereby maintaining resources locally and strengthening local economies wakened by an economic or pandemic-induced downturn.

Once disbursed, however, cash transfers aren't tied to any single local or area of economic activity. Local public benefits can be easily spent outside of the local jurisdictions where they were administered and disbursed. This significantly reduces the community economic benefits of money transfer programs administered by local governments. Empirical analysis shows that people spend local and federal governments emergency funds in wealthier places and on products from large, often international, companies. These observations show that local benefits face obstacles in achieving their goal of strengthening vulnerable local economies. Another challenge involves large-scale implantation. Federal government lack the granularity and agility to timely reach those who most need money transfers, whereas local governments often lack the necessary infrastructure to maintain transparency, security, and trust among a wide range of stakeholders involved in administering a local public benefits system.

The municipality of Maricá, located just outside of Rio de Janeiro, Brazil, is home to a local coin based public benefits system. The municipality implemented an emergency aid program paid through a digital currency, the Mumbuca Coin – Mumbuca is the name of a local beach near Maricá. This system emerged as an alternative to traditional local cash transfer programs and researchers are now studying ways to put the system on the blockchain. Across the ocean in Europe, local governments are also using blockchain for public benefits that can be designed for specific purposes. For example, a local public benefit coin can promote citizen engagement. In Limburg, Belgium, local public benefits also serve as rewards for residents who pursue sustainable actions. These initiatives are generally small and lack transparency. Today, many initiatives around the world are experimenting with blockchain technology to tackle these issues and power a local cryptocurrency based public benefits system for economic growth and local resilience.

Blockchain as a Solution

Blockchain offers technology infrastructure to support the operation of local digital currencies for distributing social benefits. Blockchain can enable local governments to create a social accounting system to increase the transparency and reliability of local coins. Currently, there are several projects around the world that develop local coins or other digital currencies. Among the best known are FairCoin, in Spain, Moneda PAR, in Argentina, and Sarafu, in Kenya.

The social accounting of a local coin or digital currency can be summarized in two parts. First, through the public blockchain registry, it is possible to establish mechanisms for registering resources in a national currency that are transformed into local digital currencies, such as the Mumbuca coin in Brazil. Through this type of registry, community and municipal organizations that manage local coins can be accountable to residents and other partner organizations.

Second, the permissioned registry of the blockchain makes it possible for transactions carried out in local digital currency to be tracked and verified by managers, auditors, and responsible authorities. At an aggregate level, this information can be used for monitoring and auditing the use of resources, as well as for decision making. For example, a public manager could check how much of a social benefit is spent on a particular drug and thereby develop public policies more suited to the profile and demands of the local population.

Through blockchain smart contracts, you can implement rules for the specific purposes of each local cryptocurrency. For example, a local cryptocurrency designed to promote the circulation of local wealth can create mechanisms to encourage consumption in local businesses. A digital currency designed to encourage sustainable actions by the population can offer rewards linked to a given action. These incentive mechanisms can be programmed and executed automatically, enabling greater scale and customization.

The digitization and encryption of local cryptocurrencies restrict fraud that occurs in paper currencies, bringing greater confidence to the complementary monetary circuit and

facilitating the issuance of these currencies, especially by local governments with limited resources.

Finally, the decentralization and open nature of blockchain allows for local cryptocurrencies to be issued and managed locally, with community participation. This helps bring legitimacy and local interaction, both essential for the success of the local cryptocurrencies.

Key Strategies for Local Cryptocurrencies & Social Benefits

Cultivate relationships with local organizations

Unlike national government backed currencies, local cryptocurrencies depend on a network of relationships and trust in the community. These networks are often already established by community initiatives and non-profit organizations. It is important for local policy makers to map community assets and consider these actors as central to the process of developing a local cryptocurrency. Through this approach, policy makers can incorporate social relationships and existing local knowledge to establish legitimacy for the local cryptocurrency and enable its wider use.

Partner with private companies and research institutes

Private companies with experience in cryptocurrency software development can help local governments deploy the latest and safest blockchain technologies. When working with the private sector, local governments should focus on flexibility and scalability and a long-time horizon for the project. Policy makers also need to communicate issues regarding the local context to private sector partners.

Research institutions such as universities can help consider broader social and economic issues that relate to a local cryptocurrency rollout. These institutions are particularly

well-positioned to evaluate the limits and possibilities of blockchain from both a socio-economic and software perspective.

Manage a cost strategy

Costs relating to maintenance, security, and blockchain protocols need to be evaluated over the time frame of implementing and running a local cryptocurrency. The costs of operating local cryptocurrencies are generally covered through fees charged to merchants when there is a transaction for a service or product. Local governments need to ensure that these fees are lower than those charged by traditional payment operators.

Evaluate regulatory barriers

In the case of Brazil, policy makers need to comply with digital currency regulation. For example, a local cryptocurrency should be paired with national currency and backed by funds deposited in traditional banks.

Municipalities can rely on municipal decrees and laws that regulate the issuance and management of local cryptocurrencies. It is critical to analyze federal and local regulatory frameworks before implementing a local cryptocurrency.

Develop local knowledge

Finally, local cryptocurrencies need to encourage engagement and participation by local communities. Residents need to be trained so that they can understand and manage the technological challenges of blockchain. Therefore, establishing community blockchain development labs and educational opportunities is essential for the long-term sustainability of a local cryptocurrency project.

Blockchain & Public Health (Vaccination Tracking)

The Challenge

In 2021, the US Centers for Disease Control and Prevention (CDC) rolled out a $44 million vaccine data tracking software system, known as VAMS— Vaccine Administration Management System. VAMS was designed to streamline and manage the rollout of Covid-19 vaccine, but it was riddled with flaws. VAMS inaccurately monitored supply chains and was heavily criticized for its vulnerability to cyberattacks and for its lack of a user-friendly interface.[10] Moreover, many clinics received far fewer doses than expected and these doses were at times of unreliable quality. The VAMS appointment scheduling and system mismatched online appointment requests, which resulted in long lines of people waiting outside clinics for appointments. The VAMS rollout highlighted government struggles to implement reliable and efficient vaccine monitoring and management processes.

There are limited public sector systems that are consolidated and offer streamlined usage, monitoring, and tracking of healthcare data. Data pertaining to pharmaceutical supply chain transactions and patient healthcare history are often kept in silos between the multitude of healthcare actors such as providers, insurance groups, and government officials. Additionally, the public health sector often lacks secure data infrastructure, making highly sensitive information vulnerable to interception or manipulation by unauthorized users or hackers.

Quality of vaccines and other medications cannot be effectively controlled if health supply chains are not easily accessible and well-managed. With the frequency and scale of pandemics likely to increase in the future, the healthcare industry's current data

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[10] Browning, Kellen. "Faulty Software Snarls Vaccine Sign-Ups." *The New York Times*, March 12, 2021, sec. Technology.
https://www.nytimes.com/2021/03/12/technology/vaccine-sites-technology-problems-covid.html.

infrastructure will continue to fall short without improved healthcare data management improvements.[11]

Blockchain as a Solution

Blockchain can bring real-time tracking and visibility to the vaccine supply chain, ensuring end-to-end traceability in production, transportation, and distribution of pharmaceuticals. This data can be consolidated in a secure digital infrastructure that is accessible to permissioned health care providers to share and transfer protected information within the health network.

Blockchain-based healthcare networks can also increase trust and accountability of health data due to the encrypted verification methods that encode any new data added to the ledger system. Health data is immutable when secured into the blockchain network system and protected against security breaches. Even if an unauthorized actor did gain access to the data, the tamperproof database records would reflect a trail of information about the security breach, including when the data was changed, what was changed, and location in the network the change happened.

In Estonia, a blockchain-based health data platform called Keyless Signature Infrastructure (KSI) was deployed by the government in 2008 to streamline and safeguard all public sector data from cyberattacks and internal misuse. KSI uses hash values to allow government officials to identify but not change citizens' information, unless permission was specifically granted and verified. Estonia's government officials use KSI to securely store and transmit most billings, prescription, and other health-related data and transactions, which are all digitized, encrypted, and distributed across a private network of government computers data. Because the data is verifiable on the ledger system, officials

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[11] Duke Global Health Institute. "Statistics Say Large Pandemics Are More Likely Than We Thought." Accessed April 12, 2022. https://globalhealth.duke.edu/news/statistics-say-large-pandemics-are-more-likely-we-thought.

can count on the reliability of the information and respond accordingly to any medical needs or supply chain disruptions. Estonia had already spent decades building its digital health infrastructure thereby positioning the country to more effectively manage the 2020 Covid-19 pandemic.[12] [13]

In the UK, two hospitals used a blockchain database in tandem with sensor technology to collect, monitor, and safely store precise data. Covid-19 vaccines must be refrigerated at extremely precise temperatures; when temperature-related data is not properly collected, stored, and monitored, large batches of vaccines become unreliable, leading to wasteful drug recalls. To maintain safe temperatures, a UK firm, Everyware, and a US based blockchain consortium, Hedera Hashgraph, formed a partnership. Sensors collected real-time vaccine refrigerator temperatures and passed this data as encrypted information from a cloud platform onto the Hedera blockchain network. This allowed for a tamper-proof digital record of the exact Covid-19 vaccine temperatures.[14] The hospitals gained high visibility to critical vaccine information, helping them monitor the safety and quality of their vaccines.

In Jeju, a popular island and tourist destination in South Korea, the government is deploying a blockchain-based Covid-19 contact tracing system to track tourists. Visitors are required to download an app onto their smartphones that will verify their identity using a public blockchain. The tourists use the app to scan QR codes of businesses and facilities that they visit, while the blockchain verifies and stores this information in a private blockchain that the businesses do not have access to. If the visitor does not test positive, all of the data will remain private; if the visitor tests positive, the data will only be

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[12] OECD. "Opportunities and Challenges of Blockchain Technologies in Health Care," December, 2020.

[13] World Economic Forum. "How Estonia's Digital Society Became a Lifeline during COVID-19." Accessed January 28, 2022. https://www.weforum.org/agenda/2020/07/estonia-advanced-digital-society-here-s-how-that-helped-it-during-covid-19/.

[14] Browne, Ryan. "UK Hospitals Are Using Blockchain to Track the Temperature of Coronavirus Vaccines." CNBC, January 19, 2021. https://www.cnbc.com/uk-hospitals-use-blockchain.html.

used for epidemiological purposes. This blockchain use-case is an affordable, user-convenient, and secure solution for virus contact tracing.[15]

Key Strategies for Blockchain & Vaccination Tracking

Incremental Integration

Government should integrate blockchain technology into health data networks in a gradual fashion. This allows for testing the performance and suitability of the technology in a smaller, controlled scale. Gradual implementation also enables the government to isolate any problems before larger scale deployment.[16]

An Ecosystem Approach

Blockchain based health data solutions should leverage and complement existing health information systems efficiently. Policy makers need to map the full scale of data assets and consider approaches across the data ecosystem. Next, policy makers should identify areas where other healthcare technologies can work in tandem with blockchain tracking, as blockchain technology is most useful when it is operationalized in combination with other technologies within the health information network.

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[15] The Organisation for Economic Co-operation and Development, "Opportunities and Challenges of Blockchain Technology in Health Care." December 2020, https://www.oecd.org/finance/Opportunities-and-Challenges-of-Blockchain-Technologies-in-Health-Care.pdf

[16] https://www.oecd.org/finance/Opportunities-and-Challenges-of-Blockchain-Technologies-in-Health-Care

Working Groups

Policy makers should adopt a team to identify and prioritize opportunities for blockchain pilot programs.[17] These working groups can be tasked with exploring public-private partnerships by creating pilot programs to test compatibility of blockchain ventures with municipal healthcare processes.

Training & Technology Awareness

Policy makers should ensure that workers in the health care industries have capacity to provide information about their services and supplies.

Integrated Policies

Policy to facilitate blockchain vaccine tracking should generally promote uniformity of data and data flows at higher levels of government. This will standardize data flows between all actors involved in the healthcare ecosystem of vaccines, including clinics, transportation companies, hospitals, and administrators. Policy makers should define exactly what situations would allow internal healthcare operators to change data in the blockchain health database.

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[17] "Using Blockchain to Improve Data Management in the Public Sector | McKinsey." Accessed April 9, 2022.
https://www.mckinsey.com/business-functions/mckinsey-digital/our-insights/using-blockchain-to-improve-data-management-in-the-public-sector.

Potential Applications: Blockchain & Digital ID

The Challenge

In 2017, state-sponsored hackers breached Equifax, one of the three main credit bureaus in the United States. Nearly half of all Americans had portions of their identity compromised, and will remain vulnerable to fraud for the rest of their lives. While the number of cyberattacks continues to increase by orders of magnitude year-on-year, ransomware attacks correspondingly rack up costs to local government entities in the billions of dollars. Most Americans have to worry about someone else taking out a large loan using their identity, as well as their tax dollars and personal information flowing to malicious actors.

Yet an identity compromise is today somewhat of a best-case scenario. The World Bank estimates that 1 billion people lack identification altogether.[18] Such individuals struggle to access the array of basic services that require ID, from healthcare to bank accounts to SIM cards. The World Bank data highlights that these people are predominantly poorer and younger and female.

In recent years, both the private and public sectors have taken a keen interest in Digital ID. A recent McKinsey report champions the potential of Digital ID to both better guarantee individual rights, while also unlocking enormous GDP growth potential in developing economies.[19] In India, the government successfully rolled out a Digital ID system that ensured that food subsidies, gas rations, and pensions truly went to the citizens who were

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[18]
https://blogs.worldbank.org/voices/global-identification-challenge-who-are-1-billion-people-without-proof-identity.

[19]
https://www.mckinsey.com/business-functions/mckinsey-digital/our-insights/digital-identification-a-key-to-inclusive-growth?cid=other-soc-lkn-mip-mck-oth-1904&kui=Ot3A9C44EH3WroolkNzZcA.

entitled to them.[20] The centralization of the system enabled individuals to access their benefits from locations far from their registered hometowns, thus better guaranteeing access to more vulnerable, migrant populations.

Blockchain as Solution

In the realm of Digital ID, blockchain would be able to provide data verification and security against manipulation. Digital IDs currently rely on cryptography, such that a user's identity is associated with a private and public key pair. The individual uses the private key to authenticate that something like an application for a driver's license is uniquely her own, while external entities use the public key to affirm that a submission originates from its putative source.

While the blockchain underlying bitcoin is public and widely decentralized, government entities would need to implement a private blockchain for Digital ID. The main distinction is that the number of nodes in the network are closed and pre-approved to facilitate easier administration, but also make the more centralized write-permissions more susceptible to security issues.[21] As outlined in the public health section, Estonia is again at the forefront of deploying Digital ID through blockchain. The government uses its KSI blockchain in domains ranging from taxes to residency to court records. A key takeaway from the KSI approach is its use of hashes and hash trees as opposed to personal data. Approved Estonian government agencies assign compact hash values to each individual datum, and the hash values are written into the blockchain.[22] This approach strongly bolsters the security of the system.

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[20] https://www.cgdev.org/publication/building-digital-id-inclusive-services-lessons-india.

[21] https://www.ctga.ox.ac.uk/sites/default/files/ctga/documents/media/wp7_martinovickellosluganovic.pdf.

[22] Id.

Major international development and investment groups, including the Gates Foundation, Omidyar Network, and several UN divisions, have signed on to ten principles on identification for sustainable development.[23] Many of the principles revolve around privacy, security, and interoperability. It is possible that blockchain presents the technological feasibility to address the sorts of concerns underlying the "ten principles."

Some scholars across different fields – from computer science to law – have begun aligning themselves with the idea of self-sovereign identity, whereby a user of services might selectively permit access to different portions of his or her identity. Blockchain ID would permit this philosophy to take shape. Instead of one person's data being scattered amongst different government databases and credit bureaus, not to mention surveilled and commodified by private companies, the individual would be able to take charge of her digital data. She could selectively permit different organizations to access only certain aspects of the ID stored on the blockchain, and could revoke such access after a certain time or with respect to certain uses.

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https://documents1.worldbank.org/curated/en/213581486378184357/pdf/Principles-on-Identification-for-Sustainable-Development-Toward-the-Digital-Age.pdf.

Conclusion

With applications ranging from the health sector to public benefits, blockchain can be a valuable tool for local governments to improve service delivery and quality of life. The key strategies and examples above are helpful in enabling local policy makers to think about potential use cases, challenges, and opportunities. Although less developed, Digital ID presents a promising future use case.

As local governments expand their experimentation with blockchain technologies, there will be greater potential for soliciting best practices and developing scalable solutions. This policy brief serves as critical first step to introduce local policy makers to the potential of adopting blockchain based technologies for public services.