

# BLOCKCHAIN FOR DEVELOPMENT – HOPE OR HYPE?

Blockchain technology has been heralded by many as the next big thing. The potential use of blockchains has attracted widespread attention from the media, the IMF, the UN, and the UK Government’s Chief Scientific Advisor. Some argue that within 20 years, blockchain will disrupt society more profoundly than the internet has disrupted communication and media. With the reported potential to replace powerful financial institutions with a new form of cheap and secure banking globally, could it also transform development? It has the potential to offer new ways to track aid and tackle corruption, facilitate smart-aid contracts and cut costs for international payments, but experience suggests it is through adding value to existing development processes that it could have the most benefit.

## What is blockchain technology?

At its heart, the blockchain is a ledger. It is a digital ledger of transactions that is distributed, verified and monitored by multiple sources simultaneously. It may be difficult to think of something as basic as the way we keep and maintain records as a technology, but this is because record-keeping is so ingrained in daily life, albeit often invisibly. The ubiquity of ledgers is in part the reason why blockchains are held as having so much disruptive potential.

Traditionally, ledgers have enabled and facilitated vital functions, with the help of trusted third parties such as financial institutions and governments. These include: ensuring us of who owns what; validating transactions; or verifying that a given piece of information is true.

## Why is the blockchain such a transformative ledger?

It is not just one, but a combination of several characteristics that feeds its hype. As opposed to the ledgers of intermediaries (see Table 1), the blockchain is distributed, public, transparent, encrypted and immutable.

**Table 1: Comparing traditional ledgers with the blockchain**

Ledgers of intermediaries e.g. Bank account	Blockchain e.g. Bitcoin
Centralised: Single owner such as a bank makes these ledgers vulnerable since they have a <i>single point of failure</i> that can be hacked.	Distributed: Nobody/everybody owns it. Because it is distributed across millions of users it has <i>no single point of failure</i> making it especially difficult and economically unfeasible to hack.
Opaque: Only authorised users can view them or have access to them.	Transparent: Anyone can view or access the entire ledger, which is updated in near-real time.
Alterable: Errors can be corrected by (internal) users with overriding privileges.	Immutable: Transactions cannot be reversed.
Subject to identity theft: Accounts are often hacked.	Encryption and pseudo-anonymity: This makes it very difficult to hack blockchain.
Time lag: Can take days or even weeks to complete transactions.	Near-real time: Transactions completed in ten minutes (on average).
Borders: Varying international and conversion fees that can cost up to 20 per cent.	Borderless: Same low fee everywhere (usually a few US cents).

Source: Adapted from Paul Baran’s networks, Paul Baran, Introduction to Distributed Communications Networks, 1964, Rand Corporation

## The ‘trust protocol’

The hype is not about the blockchain itself but what it enables. It has been called ‘the trust protocol’ because it facilitates trust between people without the need for an intermediary to verify and/or validate identities, funds, or ensure compliance. Since ledgers are so ubiquitous, blockchains can disrupt just

about every sector. It goes beyond money. Any unit of value can be transacted on blockchains. Some are calling it ‘the second era of the internet’ or the ‘economic layer the internet never had’. Whereas the first era of the internet fostered a greater democratisation and decentralisation of knowledge creation and sharing, blockchain technology may do something similar for units of value and transactions.

### Potential development applications

**Microfinance:** Anyone using the blockchain application bitcoin has the equivalent to an online bank account in the form of a bitcoin wallet. Getting a bitcoin wallet is free and it is available to anyone with internet access. Some wallet providers are working on SMS solutions. No legal identification is required, just an email address or phone number, and there are no maintenance fees or minimum balance requirements. However, digital inequalities mean blockchain banking may be less accessible to those less likely to be online, such as poorer communities, women (especially in developing countries) and minorities.

**Remittances and international payments:** Blockchain transactions are borderless. The same minimal fee (a few US cents) is charged regardless of where the two sides of a transaction reside. Currently the average remittance cost is 7.6 per cent globally but can cost up to 20 per cent – depending on the sending and receiving country. The World Bank estimates that cutting the cost by 5 percentage points can save US\$16bn per year.

**Digital registries:** As an immutable, time-stamped ledger, the blockchain is an attractive tool to prove ownership and existence. There are already initiatives aiming to use blockchains to register land and improve property rights, including Bitfury in Georgia and Factom in Honduras. Registering assets may allow people in developing countries to leverage up to US\$20tn (as estimated by economist Hernando de Soto) for capital which they do not currently have proof of ownership for. Furthermore, the blockchain can be used to track assets from raw materials to the end user to ensure they meet standards (e.g. organic or fair trade).

**Tracking aid:** The blockchain can help give governments and taxpayers piece of mind as it makes it possible to track aid funds in near-real time through the aid chain, allowing donors to ensure money is being spent as intended and to crack down on misappropriated funds.

**Smart-aid contracts:** Smart contracts are essentially bank accounts for contracts that live on blockchains in the form of computer code with instructions that self-execute and automatically disperse funds once predetermined conditions are met. This can potentially streamline results-based finance. Funds can be automatically dispersed as objectives and milestones are reached, albeit such rigid forms of financing can make it even more difficult to adapt to complex contexts and issues. Smart contracts could also help improve response time to crises by automatically dispersing predetermined amounts of funds after a certain amount of deaths during an epidemic or if a natural disaster of a predetermined magnitude hits a vulnerable country.

**P2P aid:** Peer-to-peer (P2P) donations could be made via blockchain without the help of aid organisations, NGOs, community organisations, or any other intermediaries in the aid chain as well as financial institutions. This could ensure that a larger share of donations and loans reach beneficiaries, and smart contracts can be built into them to ensure money is used as intended (e.g. sending kids to school). However, overreliance on such models could leave out digitally poor groups unable to upload their stories onto P2P platforms.

### A ten-point checklist for development policymakers and practitioners interested in blockchain

As Figure 1 shows, the components for successful innovation are *technical feasibility*, *business viability* and *human desirability*, all of which come together within social, cultural, political and economic settings that ultimately determine *contextual achievability*. The sweet spot in the middle is what we call *grounded innovation*.

#### Technical feasibility

##### 1. If I just need a ledger, is blockchain technology the best fit for me?

The blockchain is essentially a ledger, and although it is arguably more powerful than others, at times other systems may be more appropriate. Moreover, sometimes other contextual factors may need to be tackled before any ledger will work.

##### 2. Are blockchain developers willing to adapt and iterate their proposed solutions if they don't work?

Blockchain developers must be willing to try alternative solutions when things don't go as planned. Letting go may be especially difficult for organisations composed of technology activists treating the blockchain as a paradigm-shifting technology.

##### 3. Is it reasonable to finish this project within the given timeframe?

When the blockchain is used to tackle social issues, there are political issues and power relations that need to be overcome before, during and after implementation. Tackling these often takes much longer than implementing the technology itself. Timeframes for projects should take into account these factors, and not simply assume that delivering the technology will be the end of the intervention.

## Business viability

### 4. If this project is donor funded, is funding sustainable?

Ongoing IDS research shows that a lack of continuous funding for technology for transparency and accountability solutions can lead to imperfect technical solutions put on hold that may remain so permanently if new funding is not available.

### 5. Does the blockchain solution fit existing business models in my context or are new ones needed?

Proposed technological solutions to social problems do not operate in a vacuum. To assess the potential for any solution to tackle a social issue, a deep understanding of organisational and strategic enablers and disablers to innovation is essential. These institutional factors can determine the success or failure of any intervention just as much as, and sometimes more than, technological ones.

## Human desirability

### 6. Does the proposed solution put users at the centre of the design process?

Given that context is important in determining what will work, be sceptical of outsider blockchain solutions to local problems. Remote design or sending people for short periods of time to set up blockchain solutions is likely to be inadequate. Successful blockchain applications are likely to be those designed *in* developing countries putting the end user at the centre of the design process, not those designed *for* developing countries. In order for a solution to be inclusive it needs to be designed with inclusivity as a focal point from the outset.

### 7. Will I be able to win over the people that I need to engage?

Initiatives using technology for social change often find that getting buy-in is the toughest part of delivering an effective solution, not the technology. This buy-in is required not just from national governments but also local government, expected partners, influential and powerful community members, and citizens themselves.

### 8. Could the blockchain stop me from doing some of the things I would like to do?

Just as any given technology facilitates doing certain things better and more efficiently, it can also hinder other behaviours. If dynamic complex issues are to be tackled, rigid blockchain solutions with predetermined code may not provide the room necessary to adapt to changes. It is important to think about these trade-offs.

## Contextual achievability

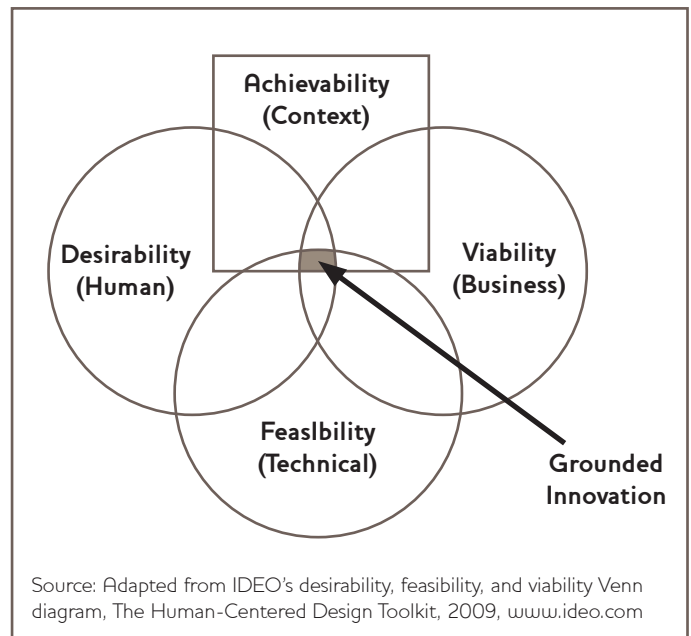
### 9. Is the blockchain solution appropriate and relevant for reaching stated development goals and stakeholders?

Blockchain solutions need to be designed with digital divides and inequalities in mind, which often mirror analogue inequalities: there is a strong tendency for the better off to adapt to new technologies first. Citizens in poorer countries, those in rural areas, or marginalised groups are less likely to be online or have the digital literacy required to engage with blockchain-based technologies, which can therefore potentially exacerbate digital inequalities.

### 10. How does the political economy of different contexts affect the likelihood of success? Are powerful actors in the context providing the space for success?

It has long been argued that technology initiatives that push on open doors are most likely to succeed, while those that push on closed or locked doors are not. Governments who are already making efforts to be more transparent are likely to welcome technology improving transparency whilst those that seek to remain opaque are likely to push back. Moreover, vested interests may be opposed to blockchain solutions and do everything in their power to hinder them. Cookie cutter approaches often fail to replicate successes elsewhere due to an inability to replicate enabling contextual political economy and social factors in the original context.

Figure 1: Components for successful innovation



## Recommendations

Will blockchain be a case of hope or hype? It's hard to say at this stage. What is clear is that the blockchain does have the potential to add value to development programmes, if its application is undertaken in a strategic, creative and robust fashion. Experience suggests that it is through adding value to existing development processes that disruptive technologies get their toehold, both within development and more widely. With this in mind, we make five recommendations for all development professionals thinking about or currently working on blockchain applications.

- **Be hopeful but avoid the hype:** There is still no evidence that it leads to social transformation. Although blockchain technology is transformational in theory, it is still unproven. Just as there is no reason that it will not work, there is no reason that it will.
- **Look into the pros and cons:** Along with enabling some behaviours, technologies can limit or hinder others. Given its rigid coded nature, the blockchain may make it difficult to tackle complex development issues that require continuous adaptations.
- **Be contextually grounded:** In order to work, blockchain-based solutions need to be able to navigate local political economies and power relations. Assessing this possibility from the onset is essential.
- **Keep digital inequalities in mind:** Not doing so risks further exacerbating inequalities (and thus digital and social exclusion) or creating new ones and opens the door for opportunistic behaviour by powerful actors that can make full use of blockchains. In order for a solution to be inclusive it needs to be designed with inclusivity as a focal point from the outset.
- **Learn from the past, and the present:** One-size-fits-all cookie cutter approaches to development do not work. Innovations that take context into account and are embedded in the social realities of those contexts are most likely to succeed. Above all, ensure an experimental learning mentality is built into all efforts, balancing technical creativity with a hunger for evidence and results.

## Further reading

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## Credits

This Rapid Response Briefing was written by Kevin Hernandez, Research Officer, Institute of Development Studies and reviewed by Ben Ramalingam, Research Fellow and Leader of the Digital and Technology cluster, Institute of Development Studies. Further editing was provided by Sophie Robinson.

The material has been funded by UK aid from the UK Government; however, the views expressed do not necessarily reflect the UK Government's official policies.

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AG Level 2 Output ID: 751



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