

BLOCKCHAIN: IN SEARCH OF A BUSINESS CASE

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What is a “blockchain”?

- The “blockchain” is the enabling technology behind the bitcoin crypto currency invented in 2008. The bitcoin market is a closed system for sending and receiving payments using individually numbered “bitcoins” as the means of exchange. -- [Wallace \(2011\)](#)
- The blockchain is a distributed database where no third party is required to validate or settle transactions. The peer-to-peer network maintains an identical, time-stamped record of every transaction, which is stored in a semi-public, semi-private manner and shared with all members of the network.

What is a “blockchain”? (2)

- Each time a transaction occurs between two members of a blockchain community, they announce the transaction to the other members. Other members – known as “miners” – then seek to validate the transaction via costly mathematical calculations. The first successful validation earns a reward. Other members of the network confirm the validation until a majority is achieved.
- Blockchain technology is a technology of *verification*: since it is far more expensive to solve the “Proof-of-Work” than to verify its correctness, honesty is the only strategy for profitability for [bitcoin] nodes, and the outcome is a record that is undisputed by any of the members of the network.

-- Ammous (2016)

Is there utility in blockchain beyond bitcoin?

- In the closed bitcoin system, a blockchain system for exchanging these tokens works reasonably well to record transactions without a trusted third party to validate. Bitcoin has accurately recorded more than 140 million transactions in over the past 8 years. But since the blockchain technology was first introduced with bitcoin, no other commercial applications other than digital cash have emerged.
- Some critics have called blockchain a solution in search of a problem, but this overstates the issue. The real question is whether this particular type of decentralized validation system has utility in other domains. Of note, the original bitcoin document does not even mention blockchain as a separate technology. In this sense, blockchain is best understood first and foremost as an enabler for digital cash exchange.

Claims regarding the benefits of blockchain

- “Blockchain could be the great economic leveller – a tool to strip out the middlemen from our economy and reward the makers and doers who truly create value” -- Don and Alex Tapscott (2016)
- “Goldman Sachs sees blockchain as one of the most important developments in technology” -- Credit Suisse (2016)
- “Blockchain technology has the potential to improve the efficiency and security of transactions and record keeping across a variety of mainstream processes and regulated industries” -- [Moody's \(2016\)](#)

Claims regarding the benefits of blockchain (2)

- “Block chain provides us with a mechanism to apply decentralized consensus to a variety of applications. Applying this decentralized concept to other technologies presents the prospect for profound future impact”

-- [James Haight \(2014\)](#)

- “The potential for blockchain to deliver substantial value to financial services is enormous. Not only does blockchain offer the promise of cost reduction and efficiency, but it could also enable revenue growth, as insurers attract new business through higher-quality service”

-- PricewaterhouseCoopers

Challenges for blockchain adoption: Cost

- The single most daunting obstacle to broader adoption of blockchain may be the lack of economic efficiencies. The blockchain is an extremely costly and inefficient technology with significant redundancies to utilize for tasks such as securities clearing or transaction processing when compared with centralized clearing systems.
- Blockchain is inefficient by design. A centralized clearing system offers scale efficiencies as volumes grow, but with blockchain the *minimum* cost of processing each transaction is fixed. The only way to introduce scale economies is to move away from a pure peer-to-peer configuration to more traditional third party validation model.

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“ Blockchains are something of a productivity paradox, therefore. At the scale of the entire network the process is significantly productivity enhancing, but requires a certain ‘critical mass’ of nodes. Yet, even so, individual nodes can work extremely hard and may not contribute very much to the network overall. Therefore, decisions about implementing blockchain applications need to be carefully thought through. The returns to individual processing nodes – either individuals in a public blockchain or organisations in a sector-wide blockchain – may diminish as the network grows in size. This means that blockchain applications must harness network effects to deliver value to consumers or to sectors at large. ”

-- [Deloitte Consulting](#)

Challenges for blockchain adoption: Security

- A second related challenge is security. While Ammous (2016) notes that the bitcoin system rewards honesty, the cost of obtaining the “benefit” of eliminating third party validation is an order of magnitude higher than a centrally cleared transaction. If the degree of difficulty in validating transactions is not sufficiently high, the network is vulnerable to manipulation.
- The highly correlated relationship between network security and cost illustrates the lack of scale economies and begs question whether there is a practical economic model for blockchain outside of the original bitcoin model. For example, Harvey (2014) notes: “It may be possible to hack the network if enough computing power is harnessed.”

Challenges for blockchain adoption: Immutability

- A third issue is whether the immutability of the blockchain transaction record is actually a benefit. To date, the bitcoin system has managed to operate without significant security failures, but there have been instances of “theft” of bitcoins by unscrupulous parties. Other examples such as the smart contracts network DAO show that network members can, in fact, alter the blockchain record.
- The more basic question is whether having a blockchain system without third party validation is truly a benefit given the lack of scale economies. While the creation of a digital cash system like bitcoin does offer utility, there has yet to be any other example where a blockchain offers a positive cost/benefit tradeoff.

Challenges for blockchain adoption: Speed

- A fourth issue related to the questions of cost and security is processing speed. The average processing time for a bitcoin is reportedly 43 minutes compared to mere seconds for a typical ACH transaction. And users may even pay additional fees or “rewards” to get faster execution, prejudicing other network members.
- “Some of the problem stems from the fact that anyone can add a fee to every bitcoin transaction, which bumps that transaction up in the queue, meaning that those who didn’t pay such a fee — or didn’t pay a sufficiently big fee — may be waiting hours and [sometimes even days](#) for a transaction to complete.”
-- [International Business Times](#) (2016)

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A critical appraisal of blockchain:

“ Blockchain technology involves costly redundancies and irreversibility, faces serious scaling problems and significant barriers to complying with regulations, and is a security liability unless secured with its own freely trading currency... A blockchain is a peculiar engineering design whose only advantage is in removing third party intermediation to allow for the creation of digital cash, and is unlikely to offer economic advantages for any commercial problem other than the one it was specifically engineered to solve. ”

-- [Ammous \(2016\)](#)

Conclusion: Blockchain seems limited to bitcoin

- A number of financial institutions and private investors have devoted significant time and financial resources to looking at ways to monetize the blockchain technology, but to date only the bitcoin payments system has achieved even modest adoption.
- While a number of financial institutions believe that blockchain will evolve into a more efficient medium for transferring value or ownership of assets, in fact the elegance and simplicity of blockchain as illustrated by bitcoin may also be the most daunting obstacle to broader adoption.
- Despite an enormous amount of hype and investment going back nearly a decade, blockchain remains an elegant but costly technology in search of real world relevance beyond the initial application of digital cash exchange.

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