Book reviews

Business innovation through Blockchain: The B^3 perspective

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Blockchain as an emerging technology is considered a future game-changer for a wide range of economic activities. The true potential of the technology, though, is still at the enabling stage and much more research is required to understand the nature of the business opportunities.

Vincenzo Morabito, at the Bocconi Management School, in his recent book *Business Innovation Through Blockchain* provides an interesting viewpoint of blockchain research by studying the technology from a business innovation perspective. Although the blockchain has shown its disruptive potential in cryptocurrencies, real business cases outside of bitcoins have yet to emerge.

The book consists of three major parts: the blockchain technology and its management, the digital currency phenomenon and the blockchain business innovations.

The *first chapter* defines the blockchain technology as decentralised databases, which consist of proof of work/stake and smart contracts. Initially, blockchain as a form of decentralised database materialised through Bitcoin. Decentralisation, in as far as the database is concerned, has no central owner, but it adheres to strict rules of editing that are imposed beforehand. Each user is identified through a separate key. Proof of work/stake are algorithms used to protect attacks on the blockchain database. Smart contracts are algorithms executed by the database that help to ease agreement enforcements.

The *second chapter* describes the process behind blockchain technology operations, its application opportunities, key challenges and technological limitations. The technology works on the basis of transactions that are composed into blocks linked to the previous transactions. The transactions are created with the help of a "proof of work/stake" concept by "volunteers" (miners) – who are rewarded for their work. The future application of the blockchain in the financial industry focuses on replacing the multiple centralised databases with a single blockchain ledger (or separate parts like SWIFT). The major challenges and concerns of the blockchain application include software vulnerability and lack of sound government regulations.

The *third chapter* discusses the governance of blockchain. It highlights the fact that the decentralised blockchain allows for the provision of government services on a very cost-efficient basis. Especially in capital markets, the emerging technology can simplify, create, distribute and account for financial assets. The emergence of the P2P economy can help to manage property rights and administer royalties without a middleman. Another major perspective of blockchain governance involves Internet-of-Things development which enables smart property and smart machines (rent and property rights transfers can be automated).

The *fourth chapter* is devoted to security issues around blockchain. This chapter also provides information

on the blockchain structure and its exact composition. Each block contains a perfect mould (via the SHA256 algorithm) of the previous one, so that they can be traced to the original block. New blocks are generated on a random base, which work (proof of work algorithm) through different users who compete in generating a different "mask" of a block that corresponds to certain conditions. The "mask" generation demands vast computer power, as after every iteration, one number in a block is altered, which results in a different SHA256 hash. Proof-of-stake methods distribute the creation of the block through a lottery, forcing users to make safe deposits in case they break conventional rules.

The *fifth chapter* opens the second part of the book and is dedicated to digital currencies and Bitcoin in particular. E-money and digital currency are differentiated from each other as E-money builds on centralised online currency ledgers, while digital currencies are considered to be newly generated assets that are decentralised. Today a large number of different digital currency offerings exist – with different names and based on slightly adapted technologies. Some of them, such as Etherium, are tailored especially for smart contract execution. Independence, cost-effectiveness, high speed of payment processing and privacy are considered to be key advantages of blockchain-based digital currencies.

The nature of "smart contracts" is the topic of the *sixth chapter.* Smart contracts are defined as "pre-written and self-executed computer programs" in the blockchain database environment. An important distinction is made between "deterministic" and "non-deterministic" smart contracts. While the first type relies only on blockchain environment data (for example, saving 10 per cent of every incoming payment), the second type builds on information inflow from outside through special trusted devices or systems (oracles). Banking and legal industries are considered to be at high risk of disruption because of smart contract introduction.

Chapter seven analyses implications of the blockchain technology in enterprise systems, such as "enterprise resource planning" (ERP with SAP being one of the best-known examples). The book considers data archiving, reduced input data and privacy as the major benefits of the system in comparison with existing enterprise systems. Still, these applications need reliable data inputs, such as IOT. Finally, the greatest benefit can be achieved through standardised inter-enterprise logging information transition.

The *eighth chapter* is aimed at the analysis of innovative blockchain solutions. As of 2016, around US$1bn was invested by venture capitalists in blockchain start-ups, and this chapter presents the best innovation ideas in the industry. For example, Loyyal helps to manage loyalty programs, while Everledger traces diamond ownership to prevent theft (just like "find my mac"). GemHealth should provide access to patients' health records from any place in the world. Aligncommerce provides an alternative to PayPal for international money transfers. Civic can help track any usage of a customer's identity, while Shocard develops a new authentication system. The start-ups that build their business model on blockchain compete with existing centralised databases. In the *ninth chapter*, the presented information is briefly summarised (on only four pages). It outlines major development avenues for blockchain as payments, rights services and the connections to other systems.

The book provides valuable insights into the mechanics and different types of the blockchain technology. The novelty of this book is its connection to emerging business opportunities. The major focus rests on the analysis of cryptocurrencies (i.e. bitcoin) and digitally distributed autonomous organizations (DAO) development prospects. Bitcoin is the original cornerstone of the blockchain technology that made it popular, while DAO are currently starting their career (Etherium is considered a platform for DAO). Blockchain aims to address the major issue of counterpart mistrust through an independent mechanisation of currently centralised activities (i.e. in banking, booking, insuring, etc.). However, as the technology is only at the beginning of its development, forecasting business innovation is indeed very difficult. While cryptocurrencies flourish, a major issue for DAO is that it relies on outside world data (i.e. an indicator of insurance loss occurrence). Consequently, pure decentralisation cannot be achieved without "trusted oracles" for information input from the real world.

Although contemporary financial systems with SWIFT (and MasterCard or Visa) can benefit greatly from the blockchain technology, introducing innovation to such systems can take a long time to update existing infrastructure (even in the form of rising parallel FinTech industry). Which business models, based on the blockchain technology, will arise, remain to be seen.

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