

Three Ways Blockchain Technology Will Impact R&D Management

by Ted Farrington

What is blockchain, and how could it possibly apply to product development and R&D?

According to Wikipedia - A blockchain is a continuously growing list of records, called blocks, which are linked and secured using cryptography. At the heart of any blockchain application is the concept of a distributed ledger. Thousands of copies of the ledger are distributed across the blockchain network nodes. For a block of new information to be added to the chain it must be validated and confirmed by a consensus of nodes on the network. Trust is placed in the network as opposed to a central authority such as a bank or government agency.

More specifically, a blockchain is a concatenated string of blocks each containing transaction or other information. Included in a blockchain are:

1. The blocks; lists of documents, transactions or other data added to the distributed ledger over some time.
2. The chain; a linked series of blocks. Hashing¹ creates a digital fingerprint for each block, including previous block information, thus securely linking it to its predecessor.
3. The network; a network of peer-to-peer nodes that validates each new block to be added to the chain.

The most infamous blockchain application is Bitcoin², a cryptocurrency that can already be used to purchase everything from a cup of coffee to expensive artwork. Here a block contains financial transactions that have been entered across the network. Every ten minutes or so Bitcoin "miners" compete to validate the new block and add it to the chain. The winner must solve a mathematical problem in order to validate the new block, and upon doing so is rewarded with new bitcoin and processing fees. The rest of the network proceeds to confirm the winning miner's block.

The key to envisioning the potential of blockchain technology for R&D management is to realize that a block can contain any kind of information, not just financial transactions. And that the decentralized consensus and inherent security make them potentially useful for many types of records management.

Here are three areas where we can expect blockchain applications in the R&D community in the near future:

Contracts

We will soon see the end of "dueling redlines" in many types contract negotiations. The US General Services Administration is already [experimenting with blockchain](#) to speed up, and make more secure, the analysis and planning behind vendor contract negotiations. One of the biggest benefits is that all parties see the same documents and changes in real time. The [State Bank of India](#) is exploring the use of blockchain for a wide range of contracts ranging from simple confidentiality agreements to more complex IT contracts.

With the possible exception of procurement, R&D organizations often generate the most requests for legal contracts of any organization within a company. Confidentiality agreements, joint venture contracts, technology licensing arrangements and others would all be much more efficient and secure if executed with blockchain technology. All parties see changes in real time while the document's history is locked forever in the chain.

While Bitcoin is only for transfer of value, newer blockchains such as Ethereum³ allow contracts and transactions of any type to be added directly to their blockchains for confirmation and execution as "smart contracts" where tokenization allows to pay off if certain goals are met in real-time. These would serve R&D very well.

Intellectual Property

Blockchain technology, in combination with machine learning, will disrupt all current processes and systems used for the creation and management of intellectual property. A patent is, after all, just a special contract. It is a contract between the inventor, who agrees to share how the invention works with the governing agency (USPTO in United States), who in turn grants the inventor a twenty-year monopoly on the invention (US utility patents). Patent applications bounce between inventors, attorneys and others many times before being submitted to the agency for review. The situation is very complex if inventors from multiple firms are involved.

A shared source of the application's current state and past changes, that can be modified and seen by all in real time would make the process more transparent, efficient and secure. And the same would be true once negotiations begin with the patent office.

Financial Transactions

As the money in large corporations often flows through multiple operating companies or geographical regions, even the financial systems of major global firms often comprise many smaller, local systems. R&D organizations want to act globally, funding good research wherever it is found. International payments in local currency can still be a challenge for R&D teams in such companies.

Given its volatility and other shortcomings, no one should expect Fortune 100 companies to start paying in Bitcoin soon. But new cryptocurrencies are emerging, such as TradeCoin⁴, that are backed by real assets. At some point these will make it easier for R&D organizations to conduct business globally, executing smart contracts via blockchain and making payments with stable cryptocurrencies.

In addition to these three areas where blockchain will directly impact how R&D is managed, there will be other applications that impact the entire company and therefore R&D directly. Product tracking and life cycle management will be one, [especially in the food industry](#). Internal document management, reports, specifications, etc. will be another. While blockchain technology is still in its early stages of development, one thing is for certain: many R&D processes and systems will be disrupted and made obsolete as blockchains become more proven and part of our daily lives.

References

- 1 – Hashing: a mathematical algorithm that can reduce any string of characters to a string of fixed length using a process that cannot be reversed, basically creating a fingerprint of the information.
- 2 – Mastering Bitcoin: Programming the Open Blockchain, A. M. Antonopoulos, O'Reilly Media, 2017.
- 3 – Ethereum: blockchains, digital assets, smart contracts, etc., H. Diedrich, Wildfire Publishing, 2016.
- 4 – Breaking the Bank, A. Lypton and A. Pentland, Scientific American, January 2018, pp. 26-31.

Originally published on April 23rd, 2018

[What's your view? Add your question or comment](#)

About the Author



Ted Farrington

ted.farrington@kalypso.com

Ted's 35 years of research and development experience were built in the CPG industry, where he held leadership roles in advanced research and R&D. As a fellow at Kalypso, he uses his years of experience in breakthrough innovation, research foresight and R&D business processes & systems to support clients.