Blockchain as a sustainability tool for supply chains

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Increasing public demand for sustainable business is a fact [1]. Many corporations, many partners and supply chains, but not much control over their conduct. Actually, corporations have identified the lack of visibility of being one of their main supply chain related concerns [2]. Blockchain technology may be able to help.

Blockchain is a way to share information

Blockchain technology is a way to share information in a secure and verifiable manner. **Melanie Swan**, the founder of the Institute for Blockchain Studies, describes it as "...combining BitTorrent peer-to-peer file-sharing technology with public-key cryptography..."[3]. The most unique of its features is its decentralized way of storing data. Instead of a central point of authority, each blockchain participant has the full dataset and, through particular blockchain mechanisms, the combination of datasets gets aggregated to authenticate a certain version thereof. In other words, reliability in data being accurate should improve.

Blockchains can be either public (permissionless) or private (permissioned). The model behind BitCoin and other similar cryptocurrencies is that of a ledger that can be accessed by anyone. Private blockchains are likely to be better suited for enterprise use, since they can be only joined by invitation and can be better tailored [4]. For example, concerns about competitors gaining knowledge of business secrets can be better managed in a closed, private ecosystem. There are

downsides, though. Blockchain data reliability increases with the number of participants – thus private blockchains may not be as reliable as public ones [5].

The key criteria in future business can be the presence of the mutual interest and a lack of trust in one another.

Shedding light on your supply chain

Blockchain technology helps with an issue that is both important and problematic in many supply chains – trust. Most purchasers lack direct contact with many prior supply chain suppliers. Instead, they need to trust whatever grains of information are relayed to them by their immediate partner. Blockchain challenges this by instead placing trust in the underlying technological platform [6].

The design of blockchain allows for information continuity. Information shared using blockchains is recorded, is verifiable and thus is more likely also reliable [7]. Corporations could gain knowledge of both the origin and authenticity of the goods supplied as well as about the conduct of the various actors operating along their supply chains, including concerning potential human rights violations, fraud, and other code of conduct violations. In addition to preventing and mitigating risks, such visibility could be used to improve overall predictability in business operations, allowing more informed supply chain management, as well as improved reporting accuracy [8].

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Smart contracts, i.e. contracts that are executed on blockchains, can also be useful in a distinct way. They are able to self-execute agreements and automatically enforce breaches, operating with minimal human intervention. [9] Fraud would be made more difficult – as would contract breaches – through deterrence resulting from a heightened threat of enforcement.

Key criteria in determining future worth and return on investment include the presence of multiple potential participants and that each have both an interest and a lack of trust in one another [10]. Thus, e.g., constructing intra-group blockchain solutions would miss the point. But few – if any – corporations are entirely vertically integrated. Thus, global supply chains could well benefit from a blockchain-based solution. This is not to say that this potential will necessarily materialize.

Limitations and challenges

Blockchain-based solutions are still in their infancy, presenting a number of challenges to early adopters. No proven standards or models exist for harnessing blockchain to promote sustainability in relation to supply chains. While development work is being done on several fronts, the landscape of available solutions is rather fragmented and, in any case, consists largely of untested alternatives [11]. This results in high implementation risk for corporations interested in utilizing said technology – consisting of both potentially high costs and uncertainty about adoption and, thus, utility.

The regulatory landscape should also be borne in mind. While it is still somewhat unclear, two distinct dimensions of regulation should, however, be considered in relation to blockchain.

1) **Competition law**, which limits the extent that competitors may share sensitive information with each other. Enterprise blockchain design should prevent exchanging sensitive information between competitors. Competition authorities have guidance on standard-setting and joint platform building that involves this kind of consideration [12].

2) **Data privacy**, which restricts the use of personal data. For example, the brand-new EU data protection regulation (GDPR) allows individuals rights concerning their data, including the right 'to be forgotten' [13] and data portability [14]. These might be difficult to reconcile with the decentralized nature of blockchains, where a person's data is spread out over several locations

and where the data processor might have less control than conventionally. Blockchain design should reflect these concerns as well as be flexible enough to allow for modifications, based on potential sector-specific requirements.

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Taking the plunge

Tracing the origin of raw materials and other components along the supply chain is likely the primary use of blockchain technology for most. A starting point should be to understand potential sustainability weaknesses in the corporation's supply chain. Once these are understood, the usefulness of blockchain can be analyzed [15]. Before implementing a blockchain-based solution, I however recommend considering the following:

a) **Choose your solution wisely**. Enterprise use is simplest as a closed-ecosystem blockchain. While established blockchain-based standards and solutions still elude us, interesting options do exist. Take a look, for instance, at solutions based on Hyperledger [16], an open-source initiative.

b) **Collaboration is key**. Blockchain technology is as useful as the number of interacting entities that adopt it. The more standardized the approach becomes in enterprise use, the easier it is later on for others to adopt. Also, collaboration is smart from a pure cost-sharing perspective, too. Indeed, tens of consortia are already doing just that. [17]

c) **Acknowledge potential regulatory issues**. The design of any solution should take into account data privacy and competition law requirements, as well as any sector-specific regulation that may come into play, e.g. in verifying sustainability certifications. Further, any blockchain-based smart contract solutions should try to ensure that they are enforceable – that is, clearly stating key terms, such as jurisdiction and applicable dispute resolution.

d) **Be open-minded** about the potential for blockchain to improve sustainability management, and share whatever you learn. Since generating goodwill is a main aim of a corporation's sustainability efforts, sharing useful practices works towards the same goal. Blockchain technology is still novel, particularly in the context of supply chains. But there is potential to be tapped. In any case, efforts in promoting sustainable business is surely appreciated by any corporation's stakeholders nowadays.

Sources

[1] See eg. BlackRock CEO Larry Fink's letter to portfolio CEOs A Sense of Purpose.
]2] Deloitte, Global Supply Chain Risk Survey, 2013.
[3] Melanie Swan, Blockchain: blueprint for a new economy 2 (O'Reilly 2015).
[4] Anant Kadiyala, Nuances Between Permissionless and Permissioned Blockchains, Medium (8 February 2018).
[5] Juri Mattila, The Blockchain Phenomenon: The Disruptive Potential of Distributed Consensus Architectures, 9. UC Berkeley Roundtable on The International Economy Working Paper 1 2016.
[6] Alan Penz-Sharp, Blockchain for Business: Ready or Not, Here it Comes, CMSWire (4 December 2017).
[7] Deloitte 2017, supra at 15.
[8] Id.
[9] Mattila, supra at 16.
[10] Gideon Greenspan 2015, Avoiding the pointless blockchain Project (22 November 2015).
[11] Deloitte 2017, supra at 19-20.
[12] See, e.g., the Guidelines on the applicability of Article 101 of the Treaty on the Functioning of the European Union to horizontal co-operation agreements, Chapter 7.
[13] Article 17 of Regulation (EU) 2016/679 (General Data Protection Regulation).
[14] Id. Article 20.
[15] Deloitte 2017, supra 22.
[16] Hyperledger-website.
[17] Peter Gratzke et al., Banding together for blockchain, Deloitte Insights (August 16 2017).

Teemasta lisää tietoa myös täällä. Artikkelin kirjoittajana **Sam Greengard**, teoksen *The Internet of Things* (MIT Press, 2015) kirjoittaja.

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