



# Blockchain Revolution in Supply Chain

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## Abstract:

A blockchain is a distributed public consensus system that maintains an immutable record of transactions on the web, incapable of being falsified after the event. The cryptography behind the protocol is based on asymmetric encryption modulo mathematics where the 'key' for encrypting a message or transaction is different from the 'key' to decrypt it. Blockchain advocates claim transparency, speed, accessibility and non-falsifiability as the cornerstones of this new paradigm. Blockchain technology should make it much more difficult, if not impossible, for illicit or counterfeit products, for example goods whose processing is environmentally detrimental to enter legitimate supply chains. The inherited characteristics of this technology enhance trust through transparency and traceability within any transaction of data, goods, and financial resources. Despite initial doubts about this technology, recently governments and large corporations have investigated to adopt and improve this technology in various domains of applications, from finance, social and legal industries to design, manufacturing and supply chain networks. In this article, the authors review the current status of this technology and some of its applications.

## I. INTRODUCTION

Blockchain is one of the most widely discussed technologies. There are only very few industries that are not exhilarated or enthusiastic about the concept, as use cases, proof of concepts and fully fledged businesses based on blockchain principles are emerging at an increasing pace. The blockchain has potential to disrupt existing but also to enable new business model. Blockchain based technology have potential to resolve some of the current challenges in supply chain management. Proponents say these traits make blockchain well-suited for logging and monitoring large amounts of data, such as short-term loans or the millions of parts coursing through the aviation industry's supply chain.

## II. WHAT IS BLOCKCHAIN?

Blockchain, the new technology that can store and transfer data at minimal cost, decentralized, and totally secure, is a hot topic. It has the potential to disrupt many industries, and it is now finding its way into journalism. It's not just for banks: The coming blockchain revolution is going to have dramatic ramifications for all of us. The Internet and Smartphone have transformed our lives already, but the earth beneath our feet is beginning to shift due to the next big thing. It's called blockchain technology, a clunky name for the underlying technology behind bitcoin.

A new book, Blockchain Revolution (by tech guru Don Tapscott and son Alex Tapscott) describes how this is the architecture of the future. It works by establishing trust in a transaction, not through powerful institutions or other intermediaries getting involved, but through clever software code and mass collaboration. The Internet as we know it is great for collaboration and communication, but is deeply flawed when it comes to commerce and privacy. The new blockchain technology facilitates peer-to-peer transactions without any intermediary such as a bank or governing body. Keeping the user's information anonymous, the blockchain validates and keeps a permanent public record of all transactions.

## III. HOW BLOCKCHAIN COULD CHANGE THE WORLD?

In the early 1990s, we said the old media is centralized. It's one way, it's one too many; it's controlled by powerful forces, and everyone is a passive recipient. The new web, the new media, we said, is one to one, it's many to many; it's highly distributed, and it's not centralized. This has awesome neutrality. It will be what we want it to be, and we can craft a much more egalitarian, prosperous society where everyone gets to share in the wealth that they create.

Lots of great things have happened, but overall the benefits of the digital age have been asymmetrical. For example, we have this great asset of data that's been created by us, and yet we don't get to keep it. It's owned by a tiny handful of powerful companies or governments.

They monetize that data or, in the case of governments, use it to spy on us, and our privacy is undermined. The blockchain is an extraordinary thing. An immutable unhackable distributed database of digital assets. This is a platform for truth and it's a platform for trust. The implications are staggering, not just for the financial-services industry but also right across virtually every aspect of society.

## IV. ADOPTION OF BLOCKCHAIN IN SUPPLY CHAIN

Supply chain has revolutionized our society and now it is being revolutionized. Supply chains can lack transparency and traceability. Two things at which blockchain are great at systems work based on transactions.

They are built on a distributed blockchain ledger can record the transfer of goods as transactions. This transparency can ensure the cost of goods will more accurately reflect the actual cost of manufacturing them. Issues such as use of forced labour and illegal sourcing of materials can potentially disappear. But despite the hype and its potential, it could take a decade or more before the technology achieves its full potential.

## V. WALMART TESTING BLOCKCHAIN FOR SUPPLY CHAIN MANAGEMENT

U.S. retail giant, Walmart, has its eye on blockchain technology. The United States Patent and Trademark Office (USPTO) recently published a patent filed by the mega-retailer for a "delivery management system" that aims to improve upon last mile shipping—the final stretch extending to consumers homes by using robotics, sensors and blockchains. Blockchains are a kind of data structure that's dispersed across a network of computers in a way that proponents say is more secure than traditional means of record-keeping. Some companies, like the Danish shipping giant Maersk, are banking on the tech potentially reducing fraud and inaccuracies in their supply chains.

The patent application, entitled "Unmanned aerial delivery to secure location," describes a process by which Wal-Mart (wmt, +0.21%) could automate the logistics of delivery drones. Although the patent application is vague on specifics, its authors lay out the general mechanics of a hypothetical delivery. Here's how it works: As a drone approaches a delivery box, it authenticates itself with a "blockchain identifier," a type of numeric or encrypted key. If the code is valid, then the box unlocks, opens, and accepts the package. When a package arrives at its destination, its receipt could trigger a notification to be sent to a consumers' mobile device. Wal-Mart can use a blockchain not only to authenticate identity, but to also track other useful information about a package as it moves through a supply chain, too. For instance, a blockchain-based database could log information such as time, location, handlers, delivery date, temperature, pickup protocols, and other data in a tamper-resistant format that's accessible to and able to be trusted by couriers, customers, and any other intermediaries along route. Wal-Mart's initiative represents just one potential application of the still nascent technology. Blockchains continue to be hyped for their potential to disrupt many areas of business, including financial services, supply chains, media, and governance.

## VI. HOW IT IS GOING TO BENEFIT LOGISTIC INDUSTRY?

The Port of Rotterdam, Europe's largest shipping port, is taking part in a Blockchain consortium which is focusing on logistics, reported coin desk. The project has the support of more than fifteen public and private sector companies based in the Netherlands. Here are a few ways by which technology can benefits to the logistics and supply chain sector.

**1. TRANSPARENCY FOR CUSTOMERS.** For most people, little is known about the products they use. As let's talk payment.com phrases it an almost incomprehensible network of retailers, distributors, transporters, storage facilities and suppliers stand between us and the products we use. With blockchain technology, customers will be able to see every part of the journey their product took before arriving in their hands. The network behind the store shelf will no longer be hidden, allowing the customer to make better informed decisions.

**2. TRANSPARENCY FOR AUDITORS.** Because the history of transactions is locked into each block, auditors will have an easier time understanding where items and resources have gone. It helps supply chain leadership, such as C-level executives understand how to make the supply chain more efficient and productive."

**3. GREATER SECURITY.** The technology will enable supply chain companies to identify attempted fraud more easily. Blockchain promises to solve this problem. The technology at the heart of bitcoin and other virtual currencies, blockchain is an open, distributed ledger that can record transactions between two parties efficiently and in a verifiable and permanent way. The ledger itself can also be programmed to trigger transactions automatically. With blockchain, we can imagine a world in which contracts are embedded in digital code and stored in transparent, shared databases, where they are protected from deletion, tampering, and revision. In this world every agreement, every process, every task, and every payment would have a digital record and signature that could be identified, validated, stored, and shared. Intermediaries like lawyers, brokers, and bankers might no longer be necessary. Individuals, organizations, machines, and algorithms would freely transact and interact with one another with little friction. This is the immense potential of blockchain.

## VII. FUTURE OF SUPPLY CHAIN?

The blockchain has the potential to transform the supply chain and disrupt the way we produce, market, purchase and consume our goods. The added transparency, traceability and security to the supply chain can go a long way toward making our economies safer and much more reliable by promoting trust and honesty, and preventing the implementation of questionable practices. Beyond transparency, there are other definite advantages that result from the crossover of blockchain technology and the supply chain.

## VIII. CONCLUSION

A production and consumption system based on the blockchain that promotes cooperation and collaboration in communities and encourages consumers to become "prosumers" i.e. consumers that are also producers based on their vantage point. The blockchain and smart contract infrastructure provides local producers with a decentralized platform in which they can share and exchange skills, resources and products without relying on third parties. Envisioning a digitally enabled supply chain strategy is a must-do activity for everyone. Fitting blockchain into that strategy now means listening more than talking. Listen to your colleagues in corporate IT who are likely ahead of you since they've often faced this topic already with financial transactions. Also, listen also to vendors like IBM who are invested in establishing a market for this technology and can afford to find and foster pioneering users like Walmart and Maersk. Blockchain may still be down the road, but its potential demands your attention now.

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