

***WHITE PAPER ON
BLOCK CHAIN IN
SUPPLY CHAIN
MANAGEMENT***

Table of contents

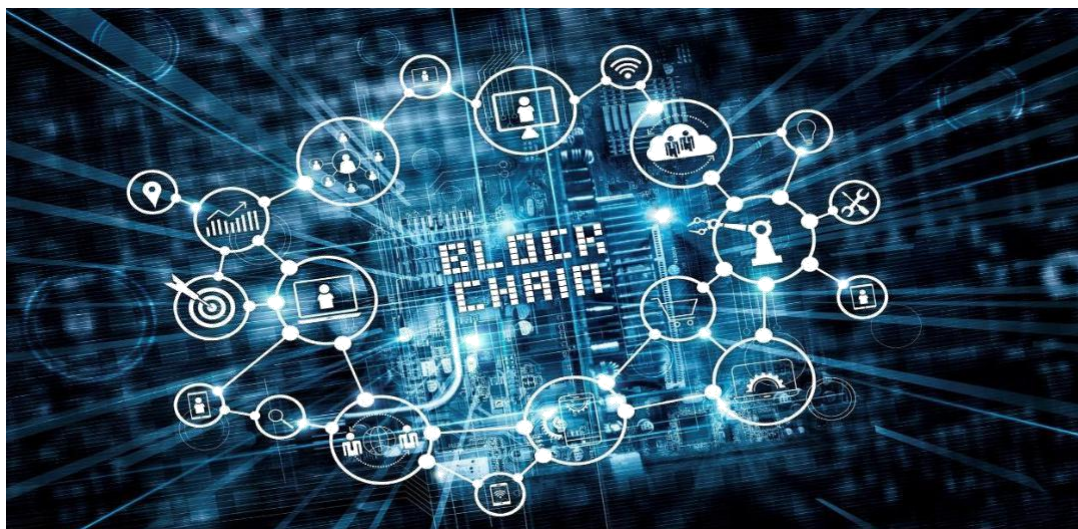
Introduction	3
Blockchain Applications	4
Blockchain in Healthcare Industry	4
Blockchain in Retail Industry	6
Blockchain in Aviation Industry	8
Conclusion	10
References	11

Introduction

Blockchain technology has been gaining traction in the supply chain management industry due to its potential to improve efficiency, reduce costs, and increase transparency. This distributed ledger technology allows for secure and immutable record-keeping of transactions, making it particularly useful in supply chain management. By using a distributed ledger, all parties involved in a transaction can have access to the same information at any given time, eliminating the need for manual reconciliation and reducing the risk of errors or fraud. Additionally, blockchain technology can be used to create smart contracts that automate certain processes such as payments or product delivery, helping to reduce paperwork and speed up transactions. Moreover, blockchain technology provides increased transparency by having an immutable record of all transactions. This allows companies to trace products back to their origin and verify their authenticity, reducing counterfeiting and ensuring customers receive genuine products. Furthermore, companies can monitor their suppliers more closely and ensure they are meeting quality standards with blockchain technology. Additionally, digital tokens representing physical assets such as raw materials or finished goods can be tracked throughout the entire supply chain process with blockchain technology, allowing companies to better manage inventory levels and ensure the timely delivery of products. In this whitepaper, we have explored how blockchain technology is being leveraged in three different industries - Healthcare, FMCG (Fast Moving Consumer Goods), and Aviation Manufacturing – to understand how it is creating a new paradigm shift in the evolving world of Supply Chain Management.

What is Blockchain Technology?

Blockchain technology is a disrupting distributed ledger technology system that securely, transparently, and immutably stores and records data. It is a decentralized system that does not require any third-party intermediaries to validate transactions; instead, it relies on a peer-to-peer network of computers to verify and validate them. This technology utilizes cryptography to guarantee the security of the data stored on the blockchain. It also provides users with an unchangeable record of all transactions that have occurred on the network, making it difficult for anyone to tamper with or alter the data stored on the blockchain. Blockchain technology has been utilized in various industries such as finance, healthcare, supply chain management, and more. It has enabled organizations to streamline their processes and reduce costs associated with manual verification and validation of transactions. Furthermore, it has enabled businesses to create trust less systems where users can securely store and transfer digital assets without relying on third-party intermediaries.



Cost Benefit Analysis of Blockchain in Health Care Industry

Pharmaceutical manufacturing organizations will be benefitted from implementation of blockchain in their supply chain processes to track drugs, thus saving around \$200 billion these companies lose every year from the counterfeit drugs sales in the parallel medicinal market.

Similarly, health insurance organizations will also benefit from the blockchain by reducing their IT and operational costs while processing health insurance claims. Concurrently blockchain implementation enables them to track the entire claim process from claim generation to settlement, thus preventing risk of fraudulent claims occurrences.

The essentiality of having healthcare blockchain for health data management is expected to acquire a significant market share of \$1.89 billion by the year 2025. Blockchain will solve the most widespread problem in healthcare industry in IT related aspects is the non-standardization that arises in the data silos in the industry.

Few major players who play key role in developing blockchain implementation in healthcare industry are Hashed Health, iSolve, Patientory, Medical Chain, Chronicled, FarmaTrust, SimplyVital Health, The Link Lab, IBM, Change Healthcare, Microsoft, and Optum.

Examples of companies using Blockchain in Health Care:

Blockpharma: Addressing the global challenge of low-quality and fake medicines.

One issue the health sector faces globally is low-quality and fake products. Every region of the world is affected by poor quality and low-quality pharmaceuticals, but low- and middle-income nations are most affected. Over 800,000 people die each year because of utilizing such low-quality medications, which also adds to drug-resistant diseases.

Blockpharma, a biotech business owned by CrystalChain with its headquarters in France, has created an app that uses blockchain technology to let customers verify the legitimacy of a drug at the point of sale. An app that tracks medications from manufacturing through end-user tracking has been developed.

Dentacoin:

Dental treatment is expensive, especially in areas with high incomes. One of the burgeoning healthcare blockchain firms, Dentacoin has had a significant influence on dental treatment.

In essence, a cryptocurrency acts as a link between patients and dentists. Instead, then concentrating on short-term care, Dentacoin encourages patients to pursue new opportunities for their long-term oral health. To receive effective dental care, patients are not needed to visit their dentists on a regular basis.

Dentacoin is a subscription-based platform that assists in bringing together patients and dentists. Dental professionals are paid for their services. Patients can also earn rewards for adopting good dietary and dental hygiene practices, such as "Dental Coins," at the same time. Additionally, Dentacoin features games and apps related to dental health, demonstrating how blockchain-based healthcare enterprises may make healthcare more engaging.

2. Blockchain in FMCG Retail Industry

Blockchain has multiple uses in retail, and its two main uses in retail are improving traceability and food safety.

In the traditional supply chain, there is no reliable system for tracking the provenance of products. Some retailers use barcode systems to track inventory, but their centralized nature has proven unreliable and vulnerable to fraud and cyberattacks.

Blockchain-based product traceability systems, on the other hand, are decentralized, allowing companies to track and authenticate their products more securely. Smart tags, which can track the location of products in near real-time, are a key component of an effective blockchain-based tracking system. Smart tags come in many shapes and sizes.

- QR codes that can be read by modern smartphones and tablets.
- Radio Frequency Identification (RFID) tags. It can be read by a special device that emits radio waves and receives the signal from the RFID tag. RFID readers can simultaneously scan multiple tags at distances of up to 1 mile.
- Near field communication (NFC) chip. It's like RFID, but works over a shorter range, which can be useful in some situations. Smart tags can be attached to almost any product and can be effectively tokenized. Every blockchain participant has a unique identifier (think signature) that they use to sign transactions with a particular token. This way you can follow the path of the product.

All companies in the food industry, from local grocers to multinational food retail chains to restaurants, are constantly trying to strike a balance between preventing economic loss from food spoilage and ensuring food safety. increase. For many years, food safety has been an ongoing concern around the world, with a recent CDC report estimating that there are approximately 48 million foodborne illnesses in the United States each year. rotten food. Importantly, sacrificing economic gains for increased food security is a double-edged sword. Food waste is her second leading cause of landfill expansion. Landfills are the third largest source of methane emissions, and one of the main contributors to global warming. Food waste also costs the US economy \$165 billion annually.

The FDA's Hazard Analysis and Critical Control Point (HACCP) system is in place to address these growing concerns, but compliance reporting remains manual, time-consuming, and prone to fraud. With the help of IoT and blockchain, food condition monitoring can be automated, greatly improving its accuracy, and streamlining regulatory compliance. The HACCP framework defines different environmental limit values for each type of food that companies in the food industry must comply with. His blockchain-enabled IoT framework works like this:

- His IoT sensor in the refrigerator detects that the temperature required to store turkey meat exceeds his HACCP-defined limits.
- Employees receive notification of issues on their tablets or smartphones. • Employee solves the problem according to HACCP guidelines (e.g., lowering refrigerator temperature).
- As soon as the temperature drops, the platform will confirm that the appropriate action has been taken and store this information on the blockchain.

Blockchain and IoT, on the other hand, can be integrated much earlier in the supply chain. Blockchain can be used as a powerful tool to provide businesses and consumers with trusted information about food safety and provenance, charting all touchpoints from farm to fork.

This technology has numerous advantages. For starters, it significantly boosts customer trust because consumers can scan a QR code to see where the food came from and how it was produced. Second, if

food becomes contaminated, blockchain can pinpoint where it occurred in the retail supply chain. Third, using environmental data from fulfilment centres, organizations can better predict when a food product will spoil and take preventative measures.

Cost Benefit Analysis of Blockchain in FMCG Retail Industry

With increasing globalization of supply chain processes in FMCG domain, it is growingly more complex to transport finish consumer packaged goods and materials across disperse geographical locations.

FMCG Suppliers are facing challenges with extreme global weather fluctuations disrupting their normal supply channels. This indeed makes difficult for procurement teams to take tough decisions of sourcing the raw materials or streamlining food produces from less familiar suppliers with low credibility in FMCG supply chain industry. This reducing transparency creates challenges for FMCG Companies who are facing issues which they are usually blamed for like counterfeiting of food products, loss of shipments, tampering on quality assurance.

It is estimated that counterfeiting of food or such fraudulent activities, amounts upto \$30-40 billion annually. Almost 2500 Metric Tons of food adulteration have been reported in across 47 countries at recent times.

Implementation of blockchain technology in this sector creates a robust mechanism in eliminating such activities which will in turn save money and reputation of such companies.

The net worth of blockchain in FMCG sector was reported \$83 million in 2018, which will skyrocketed to \$11.18 billion in the year 2026, at a staggering pace of 84.6% CAGR within the duration of 2019 to 2026.



Examples of companies using Blockchain in FMCG Retail Industry:

IBM:

IBM offers a range of blockchain consulting services to help businesses enhance the entire consumer experience. Businesses may track their products in transit and determine where they were manufactured using the IBM Blockchain Platform. The result is a more open supply chain that gives consumers confidence since they understand that the products, they purchase are secure and were sourced ethically.

IKEA:

To provide more solutions to its clients, the Swedish furniture giant IKEA maintains a design and innovation centre called Space10 that works on technologies like AI, blockchain, and the IoT. A visual artificial intelligence concept that leverages blockchain to show customers where and how the material was made is one of the newest offerings of its Everyday Experiments project.

3. Blockchain in Aviation Industry

The airline industry is becoming increasingly complex with data. Each aircraft configuration has approximately 6 million parts that need to be tracked and associated maintenance and component programs. In addition to documenting parts and aircraft maintenance history, Service Bulletins (SBs) and airworthiness requirements that aircraft must meet provide a wealth of information. This information is stored in various systems that vary from company to company. Companies spend a great deal of time and effort verifying the validity of this data. Multiple buyers who specialize in acquiring and reviewing these parts are involved to authenticate data when making decisions to buy, sell, or add items to inventory. This is also one of the reasons why his chain of supply for aircraft parts is long and inefficient. In traditional systems, there is a natural need to validate data.

The decentralized, immutable, consensus-based nature of blockchain is a great solution to help solve these problems. A blockchain is essentially a digital record of peer-to-peer transactions with the ability to control visibility. Who has permission to access what data? Blockchain allows the creation of a “digital birth certificate” for each item that is updated each time the part moves through the supply chain or is loaded onto the plane. If the aircraft has been repaired or inspected by a specialist, the item's status will also be updated. A digital record of that part includes the tail number and configuration of the aircraft, the location of the part on the aircraft, the manufacturer, the identity of each technician who handled the part, and where the service was performed.

These data records can be combined to create a “digital twin” of the aircraft, providing a real-time snapshot of its condition from the time it leaves the assembly line until it is returned to the lessor or decades into operation. increase.

Additionally, by ensuring participants have access to only the information they are entitled to, blockchain can help members gain a better understanding of their business while protecting their data from competitors. This makes blockchain the premier technological medium for the aviation industry.

Cost Benefit Analysis of Blockchain in Aviation Industry

It is projected that the blockchain technology application in airlines is expected to plummet from \$0.4 billion 2019 to \$1.4 billion by 2025, at a CAGR of 22.1 percent in this given timeframe.

While the aviation market adopting blockchain technology in North America is to grow at a rate of 25 percent, which is the highest CAGR in the aforesaid period. North America have always adopted new

technologies and infrastructure when it comes to aviation industry operations. Faster imbibing blockchain technology in aviation space has contributed to the highest CAGR in this region.

Major analytical firms have concluded that the efficiency of aviation operational activities using blockchain could increase aviation industry revenue by 4 percent annually, approximately \$40 billion, while reducing the maintenance, repair, and overhaul (MRO) costs by about 5 percent annually, or approximately \$3.5 billion.



Examples of companies using Blockchain in Aviation Industry:

Southwest Airlines:

One yet hypothetical idea—the smart ticket—can be credited with enabling tokenization for ticketing. Not only will the need for paper tickets be eliminated by using smart contracts and blockchain technology for airline tickets, but these tickets could also be built-in with several terms and conditions, such as airport lounge access, whether the seat is in economic or business class and more. The turmoil that results from the failure of an airline's or an airport's central ticketing database might also be lessened or eliminated by storing tickets on a blockchain.

Accenture: Prototype for aviation manufacturing and parts provenance

Accenture's prototype enables the capacity to check the legitimacy of parts and supplies from the start of the industry's complex and highly regulated supply chains, working with Thales, the French multinational aerospace and defence systems supplier.

The prototype will be able to create and maintain the dependability of a so-called "digital twin" replica once the physical product has been delivered to the customer in addition to the track-and-trace feature, offering a significant value-add in comparison to other blockchain for supply chain systems that are currently being developed.

Conclusion

In a nutshell, blockchain technology has great potential for improving efficiency and reducing costs in supply chain management. It provides increased transparency by creating an immutable record of all transactions, eliminates manual reconciliation processes, automates certain tasks with smart contracts, and creates digital tokens that represent physical assets throughout the entire process. As more companies begin adopting this technology, it is likely that we will see even more improvements in efficiency and cost savings over time.



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