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BTCEN Project: Application of Blockchain Technology in Supply Chain

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The scholarly publication titled "BTCEN Project: Application of Blockchain Technology in Supply Chain" examines the potential impact of blockchain technology on the management of supply chains. This article elucidates the potential of items to enhance transparency, reliability, and traceability within supply chains through the documentation of their journey from the point of origin. By incorporating e-commerce, tokenization, CRM, and ERP components, BTCEN aims to enhance the modernization of its supply chain. Through the elimination of middlemen, the effort expedites business processes and reduces costs, resulting in substantial advantages for both companies and customers. The article elucidates the potential applications of blockchain technology beyond its conventional usage in financial transactions, with a specific focus on its potential in supply chain management. The BTCEN Project's triumph serves as an optimistic illustration of blockchain technology's capacity to provide novel solutions across diverse sectors, while also establishing a robust foundation for forthcoming applications.

Keywords: Blockchain, Supply Chain Management, Transparency, BTCEN Project, Efficiency.

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Introduction

The emergence of blockchain technology is effective not only in the transformation of the banking or, more broadly, finance sector, but also in many other areas. The most important of these areas, from a production perspective, is Supply Management. The BTCEN Project discussed in this study reveals how supply chains can be further developed with the help of technological developments. In the production sector, development opportunities are presented in terms of transparency, traceability and reliability at all stages, starting from the source to the end user. While doing this, we will try to see the impact of Blockchain on supply chain management by including e-commerce, CRM, ERP and tokenization modules. The use of blockchain technology holds significant promise in impacting the field of supply chain management. We'll also look at what the BTCEN Project has to offer in terms of success stories.

Blockchain Technology

Blockchain technology is a distributed electronic file ledger system that secures digital documentation without the need for a central authority. This approach enhances user trust by allowing transactions to be documented in an immutable and transparent manner. Although initially developed for cryptocurrencies, the application areas of blockchain technology are expanding also, they all have potential applications in many areas beyond financial transactions. Supply chain management, voting systems, authentication, and other applications may all benefit from blockchain's transparency, security, and efficiency. This technology is still growing, and new uses and applications are emerging. (Yaga, Mell, Roby, and Scarfone, 2018).

The following is a list of Blockchain's primary features (Features of Blockchain, 2023):

Openness and Checkability: Every user on the network can view and validate every transaction made on the blockchain, which guarantees a high degree of system transparency. As an outcome of this feature, the software motivates customer confidence, which makes the entire process easier to utilize.

Distributed Structure: Blockchain operates autonomously, eliminating the need for a central governing body or server. Networking increases the security and resilience of the system by distributing data across several computers or "nodes". Additionally, this decentralized framework greatly reduces the possibility of a single point of failure, thereby increasing the resilience of the system.

Immutability: When a block is created and added to the chain, the data in it becomes resistant to modification. This creates a privilege in terms of tracking transaction history. Because this feature adds an additional layer of security to the data, the connection between the past and the future becomes stronger.

Consensus Algorithms: These algorithms ensure the accuracy of the transactions and create a consensus process between nodes. In this way, it becomes easier to include new blocks and they play an important role in blockchain networks. With Proof of Work (PoW) and Proof of Stake

(PoS) techniques, the status of the blockchain is verified and a reliable and consistent recording system can be guaranteed.

Smart Contracts: These are a feature offered by certain blockchain systems, wherein pre-programmed contracts are performed automatically upon the satisfaction of specific circumstances. The implementation of automation systems optimizes operational procedures and obviates the necessity for middlemen. Therefore, the incorporation of smart contracts not only improves operational effectiveness but also gives contractual agreements inside the blockchain framework a heightened degree of independence.

Potential Applications of Blockchain Technology in the Market

Blockchain technology has usage opportunities in many different areas, starting from the financial sector (Feger, 2023). Some of the market potential applications for Blockchain technology include:

In the Field of Finance: Blockchain can also lower transaction fees, enhance security, and reduce costs. For example, blockchain can lower the costs and speed of international remittances. It can also reduce fraud and improve transparency.

Cryptocurrencies: As it is known, cryptocurrencies are digital currencies that are used on the internet and do not have a specific centre. The most well-known ones, Bitcoin and Ethereum, are digital currencies that offer alternatives to currencies printed by governments.

Smart Contracts: As it is known, smart contracts are digital contracts that are automatically executed and stored in a blockchain when their conditions are met. These agreements are generally made to automate the implementation of the desired agreements. In this way, it is ensured that the result is obtained without wasting time.

Supply Chain Management: Blockchain technology has an impact on the supply chain due to its potential impact on the documentation process of transactions. It provides significant benefits in tracking purchase orders, allocating and verifying documents, and establishing a physical connection between IoT compatible devices and products. In this way, the entire journey of a product from the very beginning is monitored, increasing reliability and efficiency.

Marketing: Using blockchain technology in marketing, businesses and consumers alike can better protect their data and determine who has the right to it.

Voting Systems: Integrating voting systems leveraging blockchain technology provides a concrete solution to address concerns regarding the reliability of election procedures. This represents significant progress in the movement towards democratization of the electoral process.

Healthcare Sector: Blockchain can be used to store patients' medical records securely and privately. It can also be used for medication monitoring and medical research.

Identity Verification and Notarization: Blockchain technology also provides a valid solution for digitizing identities and documents in areas such as identity verification and notarization.

Arts and Entertainment: In the arts and entertainment industry, the importance of non-fungible tokens is increasingly recognized. Because it offers serious advantages in terms of verifying ownership, copyright and originality of digital artworks and media content.

The way Blockchain is used in economic life is constantly changing, new applications emerge every day and offer developing application potential. As Di Vaio A, Varriale L (2020) stated, many theoretical studies have discussed the important benefits that blockchain technology provides in logistics and supply chains. Enhanced cybersecurity and protection (Kshetri, 2017), transparency and accountability (Kshetri, 2018; Zou et al., 2018), traceability and fraud prevention (Biswas, Muthukkumarasamy, & Tan, 2018; Chen, 2018; Lu & Xu), the potential of blockchain technology to redesign and shape the process in the supply chain (Queiroz and Fosso Wamba, 2019) are attractive attention among these benefits. Similarly, there are other studies: (Hughes et al., 2019; Kamble, Gunasekaran and Arha, 2019; Kamble, Gunasekaran and Sharma, 2019; Morkunas, Paschen and Boon, 2019; Queiroz and Fosso Wamba, 2019; Shuetz and Venkatesh, 2019; Tönnissen and Teuteberg, 2019; Wang, Singgih, Wang and Rit, 2019; Wang, Han and Beynon-Davies, 2019; Ying, Jia and Du, 2018).

Benefits of Blockchain Technology for Businesses

Technology holds the potential to offer many benefits to organizations. It has the capability to enhance company processes by fortifying security and promoting transparency. This feature facilitates smoother business-to-business interactions. Below are some of the key benefits that organizations may derive from blockchain technology (Pratt, 2023):

Transparency: As it is known, transparency will prevent possible mistakes and frauds by ensuring its verifiability. As mentioned before, Blockchain does not have a specific central structure. This means that every transaction will be seen by everyone on the network, which has an important role in creating trust in businesses.

Security: The fact that data is not stored in a single point in Blockchain and that the records are distributed and encrypted ensures that the system is secure. The most important issue here is to ensure that each transaction is linked to the previous transaction. That is, using cryptography to create a chain structure. Thus, serious protection is provided for the security of both data and balances.

Efficiency and Speed: Blockchain technology eliminates the time-consuming and error-prone aspects of traditional database mechanisms by connecting them to automated methods. It optimally meets the success criteria based on the data acquisition process, such as speed and efficiency.

Cost Savings: Blockchain increases trust, security and transparency between parties by improving the traceability of shared data. Serious cost savings are achieved by removing intermediaries, increasing speed, efficiency and streamlining business processes. Additionally, overhead and transaction costs are significantly reduced as paperwork and possible errors are greatly reduced.

Tokenization: Tokenization is a method of the protection of sensitive data such as bank account numbers, identification numbers and email addresses. With tokenization, data is divided into small units. Data can be tokenized by encrypting words or characters. Tokenization is considered a data privacy protection method. It uses the tokenization method because there is no need for third parties to confirm the transactions taking place in the blockchain network. Thanks to tokenization, blockchain can perform transactions quickly and transparently, without intermediary costs or authority rules.

Traceability: It can be defined as recording all transactions of a product throughout the supply chain. Blockchain technology facilitates performance optimization in businesses by facilitating traceability in this production process.

Smart Contracts: A smart contract is a type of contract that works by writing the contract between the parties (buyer and seller) directly in lines of code. The code here allows contracts to be verified and entered into force automatically and easily. These types of contracts are very important for companies as they can minimize human errors and automate processes.

New Business Models and Revenue Streams: In today's rapidly evolving business environment, Blockchain has increased the hopes of businesses to open new business models and new revenue streams. The emergence of blockchain technology has ushered in an era that offers businesses unprecedented opportunities to increase their efficiency and unlock innovative revenue streams.

Although the benefits of blockchain technology vary depending on the sector and application, it can be said with certainty that it increases the efficiency, security and competitiveness of businesses. Finance, healthcare, supply chain management, government, cybersecurity, media, agriculture, infrastructure, energy, and information and communications industries can leverage blockchain's capabilities.

Supply Chain Management and Blockchain Relations

SCM (supply chain management) is the process of managing the movement of goods, information and finance related to a product or service, from raw materials to final destination. Thanks to advances in technology, the Today’s supply chain is large, complex and ever-changing. In the past, the needs of buyers and sellers could be met without much change. However, users are now purchasing products from a wider range of sellers, including online stores. So, it must be agile to be effective. In the past, supply chains met the needs of customers and organizations through an end-to-end model that was immune to change. Consumers can now purchase products in stores, online stores, or many other ways. Customers also expect greater levels of personalization. An agile supply chain can meet these expectations. Supply chain management (SCM) is one of the most important business processes in today’s world. Today’s businesses rely on SCM to reduce costs, improve productivity and improve customer satisfaction. COVID-19 and the war in eastern Europe have highlighted the need for a resilient and sustainable supply chain. Companies have learned from these challenges and are turning to technology and digitalization to deliver on-time delivery (Rodini 2022) and gain a competitive edge.

Supply Chain Management is a somewhat complex and difficult process. But it is also vital for operational success. By understanding the basics of supply chain management, its evolution and each stage and key of the process, companies that want to be successful in their industry can improve their supply chain processes, increase customer value and always stay ahead of the competition (wrike team, 2023). According to some studies using the characteristics of traditional supply chains, there are some challenges with these supply chain systems, and they reveal the main reasons for these challenges. The mentioned difficulties: it can be said that inefficiency in activities, lack of transparency of data, lack of traceability, insufficiency in supply chain information cooperation, technological and financial inequalities between businesses and lack of trust between partners, etc. To eliminate these deficiencies, Blockchain technology began to be used instead of traditional centralized supply chain management. The mentioned difficulties: it can be said that inefficiency in activities, lack of transparency of data, lack of traceability, insufficiency in supply chain information cooperation, technological and financial inequalities between businesses and lack of trust between partners, etc. As an alternative to traditional, centralized supply chain management, blockchain technology has recently found its way into this field. According to Xia, Li, and He (2023), this solution greatly enhances operational efficiency and facilitates effective information sharing among companies.

Supply chain management and blockchain technology, whose relationship has reached remarkable levels in recent years, cause some transformations. It is possible to address the underlying relationships of transformation at several points. Considering the information discussed above, it is possible to discuss this relationship at a few basic points:

Transparency and Traceability,

Security and Anti-Fraud,

Efficiency and Cost Reduction,

Real-Time Data Access,

Sustainability and Compliance,

Managing Complexity,

This relationship between supply chain and blockchain technology allows businesses to create more transparent, secure, efficient, and sustainable supply chains. However, the adoption of this technology may present challenges such as technical difficulties, high startup costs, and regulatory uncertainties. Therefore, integrating blockchain into supply chains will require a comprehensive strategy and careful planning. When looking at the application, blockchain technology has been successfully applied in various supply chain scenarios and significant improvements have been achieved in terms of transparency, efficiency, and security.

Some Notable Instances and Success Stories

Walmart and IBM Food Trust: Walmart has partnered with IBM to implement blockchain technology for traceability of food products within its supply chain. Through the IBM Food Trust

platform, Walmart can trace the origin of more than 25 products sourced from 5 different vendors. This initiative improves food safety by providing granular traceability in seconds, rather than days or weeks, allowing for faster response to contamination incidents (Hyperledger no date).

De Beers and Diamond Traceability: One of the world's largest diamond brands, De Beers, has launched Tracr, a blockchain-based platform that tracks diamonds from the mine all the way to retail. Tracr ensures that De Beers' diamonds are sourced ethically and are conflict-free, increasing consumer confidence and compliance with industry standards. Tracr provides immutable information about the origin of De Beers diamonds, enabling source assurance for 100% of the company's diamonds (De Beers group, 2022).

Maersk and IBM TradeLens: Maersk is the world's biggest container shipping company with operations in 130 countries. Maersk has partnered with IBM to create TradeLens. TradeLens is a blockchain based shipping solution that streamlines global trade. TradeLens enables real-time visibility of shipping information and documents. TradeLens reduces delays, fraud, and human error within the logistics process. (A. P. Moller – Maersk and IBM, 2022).

Alibaba and Food Trust Framework: Alibaba's Food Trust Framework (Long, 2018) uses blockchain to improve traceability within its supply chain, especially for imported products. QR codes on products can be scanned by consumers to learn more about the product's origin, manufacturing process, and supply chain journey.

Everledger and Luxury Goods: Everledger utilizes blockchain technology to trace the origin and history of luxury goods, such as diamonds, wine, art, and more. This helps to fight counterfeiting, uphold ethical sourcing principles, and give consumers peace of mind about their purchases (Everledger; Gokhberg; E. no date).

Modum and Pharmaceutical Compliance: Modum's blockchain-based drug supply chain compliance solution tracks the temperature of medicines as they move through the supply chain, keeping them compliant with EU drug supply chain regulations and reducing the chances of compromised drugs ending up in the wrong hands. Modum's drug supply chain compliance system keeps medicines at the right temperature as they move throughout the supply chain, lowering the chances of contaminated drugs making it to the consumer's door. (Modum, 2021).

Provenance and Supply Chain Transparency: Provenance leverages blockchain technology to bring transparency to supply chains for everything from food to cosmetics. Brands can reveal the journey of their product, and its environmental and social impact, helping to build consumer confidence and loyalty (Culliney 2023).

These success stories illustrate how blockchain can transform supply chain management across a wide range of industries. By creating an immutable, open, and secure ledger, blockchain can dramatically improve traceability, eliminate inefficient processes, and ensure compliance with regulatory requirements. In the years to come, blockchain's impact on supply chain management is expected to grow and transform even more industries.

It is worth noting that there are also some challenges in blockchain technology and supply chain collaboration. Of course, these difficulties can be gradually overcome with the help of technological developments, future research, and applications.

Some of these difficulties can be listed as follows (Xia, Li & He, 2023):

First, the security of the data used must be increased to higher levels. In many applications, it has been observed that uploading private data on-chain is avoided to protect trade secrets. However, as emphasized before, sharing real business data in supply chains is valued in the field of supply chain collaboration. This obstacle can be overcome with the extensive use of cryptographic algorithms and even hardware to strengthen privacy protection in blockchain.

Secondly, the implementation of blockchain-based supply chain collaboration needs to be further encouraged and supported. Compared to applications in finance, blockchain-based applications in supply chain collaboration require more complex technologies. However, it appears that businesses are not ready or willing to adopt these additional practices.

Third, policies and regulatory systems related to this cooperation should be further developed. Blockchain's smart contract technology can replace intermediaries to some extent, thus avoiding human intervention and providing fair and reliable transaction information in supply chains. However, in practice, smart contracts are not yet considered legally binding contracts. As a result, this means that their legal impact is questionable.

Fourth, the international community has now begun to attach great importance to blockchain standardization, so the application standards for relevant technologies need to be further clarified, even if it is difficult.

BTCEN Blockchain Technology

BTCEN is a blockchain technology project that brings a modern and efficient approach to supply chain operations. The BTCEN Blockchain Technology Project brings together e-commerce and tokenization, a CRM, and an ERP module using the benefits of blockchain technology. The goal of BTCEN is to make transactions safer and more transparent by eliminating intermediary institutions and speeding up business processes and increasing efficiency (BTCEN no date). BTCEN is a blockchain-based e-commerce platform that helps sellers and buyers solve trust issues that are common in traditional online shopping platforms. BTCEN allows sellers and buyers to manage payment, product search, and purchasing processes using blockchain technology, which reduces inventory management, payment processing costs, and other costs associated with e-commerce. It also helps protect against cyber-attacks and financial security threats.

The goal of BTCEN is to use blockchain infrastructure to overcome the current issues with international sales protocols and allow e-commerce to be easily distributed around the world, including in developing countries. One of the main goals of the BTCEN project is to overcome the bottlenecks and middleman costs that traditional banking systems create. For instance, when

conducting e-commerce from overseas, a user can easily make payments using the BTCEN token without having to adhere to bank protocols. In a world where online merchants are struggling to keep up with the ever-increasing demands of their customers and the ever-increasing competition, BTCEN is the perfect solution to the problems that internet businesses face: cyber attacks, loss of customer data, etc. BTCEN is the first and only company registered as a trademark in Europe that can use the Bitcoin logo legally in the food sector. It is also the first project in the energy drink sector to plan to manage supply chains with blockchain technology in the energy drinks sector under the BTC Energy Drink brand. Supply chains can be extended through beverage vending machines that can be installed in public places like subway stations, hospitals, and shopping malls. In the Metaverse, BTCEN can be used as a payment method to expand supply networks for virtual stores (BTCEN no date).

The project will use blockchain codes that are algorithmically generated to be added to the labels of the energy drinks and beverage groups. This will provide various benefits to the consumers and users of the project. The code system will offer benefits to the consumers on the NFT gaming platform of Moba System which is part of the project's ecosystem. The NFT rewards will be provided to the users through the use of NFT vending machines that will recycle the waste from the energy drinks consumed. This approach will also contribute to sustainability and nature protection objectives (BTCEN no date).

BTCEN (Blockchain Technology Project) is a cutting-edge project that seeks to revolutionize supply chain management and e-commerce by harnessing the power, transparency, security, and efficiency of blockchain technology. The BTCEN project brings a fresh approach to supply chain management and solves existing issues in the industry.

Potential partners in the implementation phase of this project may include supply chain participants, manufacturers, suppliers, distributors, and retailers. In particular, other existing energy drink manufacturers and manufacturers can benefit from this application. BTCEN aims to eliminate the current challenges and limitations faced by blockchain technology in supply chains by solving trust issues in the e-commerce platform and making transactions in the supply chain more transparent and reliable.

Conclusion

The BTCEN Project will demonstrate how blockchain can revolutionize supply chain management by providing concrete examples of supply chain efficiency, security, transparency, traceability, and efficiency. BTCEN will showcase how blockchain can be used for e-commerce, tokenization, CRM, ERP modules and more. BTCEN will highlight how blockchain can not only be used for financial transactions, but also for improving supply chain processes and overcoming current challenges facing businesses and consumers. The BTCEN Project will provide a basis for future applications of blockchain technology, and its success will inspire similar projects in other industries to encourage widespread adoption and provide innovative solutions in various areas. In conclusion, this study predicts that blockchain technology will continue to grow and revolutionize more industries in the future.

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