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Different Applications Of Block Chain Technology Belong To Supply Chain Management

Dr. C Gurudas Nayak[1] , Rakshitha Kiran P[2] , Dr. Surendra Singh Rajpurohit[3] , Dr. Farook Sayyad[4] , Akansh Garg[5]

Abstract:

Block Chain Technology Has been identified to be a significant mechanism in data analytics that helps in the effective transfer of information within a large number of collaborative businesses. The transparent and visible transfer of information helps bring about an effective increase in the performance within the companies and helps to generate a greater competitive edge. The distribution of the information from a single database in the cas[1]e of the technological system allows the network of companies to identify the data and perform their delegated tasks. The study has taken into consideration secondary qualitative evidence to examine the key variables aligned with the utilisation of Blockchain network in the supply chain management or SCM of organisations

Keywords: *Block Chain Technology, Supply Chain Management, SCM, Supply Chain Network, competitive edge, efficiency, global companies*

Introduction

The storage of the data in various blocks which are linked together and can be accessed via a variety of computers and systems is considered to be the backbone of blockchain technology (Wang et al. 2019). Within retail organisations, blockchain is used for keeping track of the transfer of goods and items from one point to another in the supply chain network. For instance, the transfer of raw materials between the suppliers and the buyers can be tracked by the organisations with the help of blockchain technology, as the visible data helps to verify the authenticated goods (Raja Santhi & Muthuswamy, 2022). The global chain suppliers can be tracked by the supply chain technology as the companies can map the transportation and transfer of items within several points in the supply chain management or SCM.

[P]Professor Department Of Instrumentation And Control Engineering Manipal Institute Of Technology, Manipal Academy Of Higher Education Manipal. City Manipal Karnataka -576104

[2]Assistant Professor Mca Dayananda Sagar College Of Engineering, Bangalore Bangalore Karnataka.

[3]Associate Professor School Of Business Mody University Of Science And Technology Sikar Laxmangarh Rajasthan

[4]Principal, Ajeenkya Dy Patil School Of Engineering, Pune

[5]Array Research Pvt Ltd

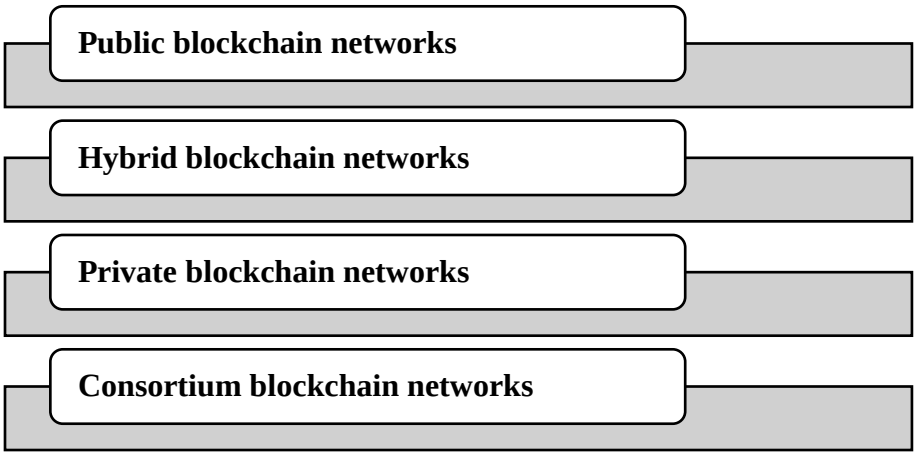

Figure 1: Types of blockchain technology
(Source: Influenced by Kramer, Bitsch & Hanf, 2021)

Several types of blockchain networks such as public, private, hybrid, and consortium blockchain networks can be taken into consideration by the companies to integrate option technology within their supply chain management (Kramer, Bitsch & Hanf, 2021). The decentralised form of the blockchain helps to gain a greater transfer and control over the decision-making patterns for each of the organisations linked with the system

Problem statement

The creation of a secure and transparent network has played a significant role in the utilisation of blockchain technology within SCM of global organisations. The rise of the complexity of such technology has enabled companies to face certain issues in its utilisation and reduce the overall effectiveness of its application. Even though a rise in effectiveness within the transportation of goods and adherence to the quality standards of the supply chain network, the lack of IT knowledge among the employees of the supply chain department has also reduced its extent of utilisation. The maintenance of visibility across an elaborate number of interconnected networks has also reduced overall potential and decreased the comparative edge gained by such a technological integration. Hence, the application of blockchain technology ought to be taken into consideration for the further improvement of the increase in working efficiency and the rise of computer advantage within global organisations.

Aim

The aim of the study is to perform an effective examination of the various applications of blockchain technology within the supply chain management of organisations

Objectives

The objectives of the study are as follows:

RO1: To inspect the various features of blockchain technology which increases its application in SCM

RO2: To scrutinize the advantages of the integration of blockchain technology within supply chain network

RO3: To examine the issues of blockchain technology which hinders its effective integration in SCM

RO4: To analyses the strategies associated with the improvement of blockchain technology to enhance its application in SCM

Research questions

The research questions developed for the study are mentioned below:

RQ1: What are the numerous features of blockchain technology that increase its application in SCM?

RQ2: What are the advantages of the integration of blockchain technology within the supply chain network?

RQ3: What are the shortcomings of blockchain technology that hinder its effective integration in SCM?

RQ4: What are the tactics associated with the improvement of blockchain technology to enhance its application in SCM?

Significance of study

With the help of the study, the different applications that can be identified in SCM through the advanced scientific inclusion of blockchain technology have been enabled. In terms of the corporate importance of the study, the different kinds of tactics and the advantages of utilising such technology to improve its quality standards and compliance with the specific production factors can be identified. On the other hand, academic importance of the study lies in the identification of theoretical factors and features associated with blockchain technology which can be forgot enhanced through practical measures. Therefore, the demonstration of the study helps in providing and overall inspection of the application of such a technological advancement in SCM and improving the comparative edge and work efficiency of the international organisations.

Literature Review

Critical examination of the key components of Blockchain technology to increase its application in supply chain management

Blockchain technology has been identified to contain two major key components, which impacts the usage and the application of the technology. According to the suggestions of Verhoeven, Sinn & Herden (2018), smart contracts has been a key factor which allows the companies for managing the features of Blockchain technology within itself. The smart contracts are regarded as the software which are stored into the Blockchain system and helps in the automatic running of the database.

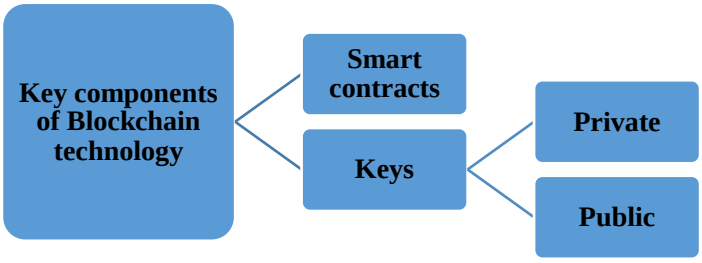

Figure 2: Two main components of blockchain technology

(Source: Influenced by Verhoeven, Sinn & Herden, 2018)

In the case of the supply chain, the integration of the smart contract feature of the Blockchain system helps in the automation of the payment processes, once the conditions of the automation are run. On the other hand, according to the comments by Banerjee (2018), public key cryptography has been regarded as a vital component which helps in the identification of the contributors in the blockchain network. Through the creation of the two keys, a public and the private key, the members have the potential to collaborate with one another based on the two keys. Hence, the usage of the two factors has proven to be necessary in the working efficiency of the blockchain network.

Methodology

The study has considered the utilisation of positivism research philosophy where factual data and evidence has been obtained from the various sources to examine the information based on the numerous situations. With the help of a descriptive research approach, an extensive assessment of the key factors and variables of the study has been achieved which helps in developing abroad spectrum examination. Qualitative research method has been followed to obtain theoretical information and examine the key factors based on such conceptual evidence. According to the findings by Pandey & Pandey (2021), data and evidence can be collected for a study from two different sources such as the primary and the secondary sources. For the respective study, data collection has been obtained from secondary sources where books, journals and articles have been sieved and chosen to examine the key concepts. Based on the evidence from the study, key concepts have been generated, and such aspects have been elaborately assessed.

Findings and analysis

Factors and features linked with blockchain technology in SCM

The protocols and factors of the blockchain network which have been developed for the increase of working efficiency on the SCM has been towards the hyperledger fabric. According to the views of Kim & Shin (2019), the integration of hyperledger fabric has been important for increasing the traceability and accountability in SCM, where the data are transferred without the need of the central authority. In such a manner, the smooth flow of the tasks in supply network of the global companies can occur. On the contrary, as per the notions by Khan et al. (2021), ethereum, the decentralized open-source blockchain platform has played a vital role in the achievement of interoperable exchange of transaction information in the network system. The inclusion of the method has helped the companies to increase their competitive edge as the smooth flow of information has been enabled. Corda has been regarded as the open-source blockchain project, and has acted as the distributed ledger (Benji & Sindhu, 2019). The automation of the financial trading and settlement processes have been performed through Corda, which further improves the SCM. Hence, these factors have increased the effectiveness of blockchain performance in the SCM.

Significance of integrating blockchain technology to enhance the effectiveness of supply chain network

Blockchain technology has played a vital role in the SCM improvement through the Traceability of the goods and the items between the various points of the sully network. The integration of the technology has helped in raising the transparency and trust in terms of the transfer of information between the associated members of the SCM. The tracing of

products has aided in the improvement of product accountability, and shows the performance of the elements in real time. Alternatively, as per the statements by Lim et al. (2021), quality assurance has also been achieved through the usage of the Blockchain technology as every record during the production to the deliverance of the goods are kept track of. Hence, the rise in the competitive edge of the global firms have been improved through a greater observation upon the produced goods.

Shortcomings and problems associated with blockchain technology for its integration in SCM

One of the main issues linked with the integration of blockchain technology within the supply chain network has been the lack of cyber- security. As per the depictions by Xu et al. (2021), data privacy concerns has been generated as the transfer of potential information, private for the company, can be leaked onto the digital platforms.

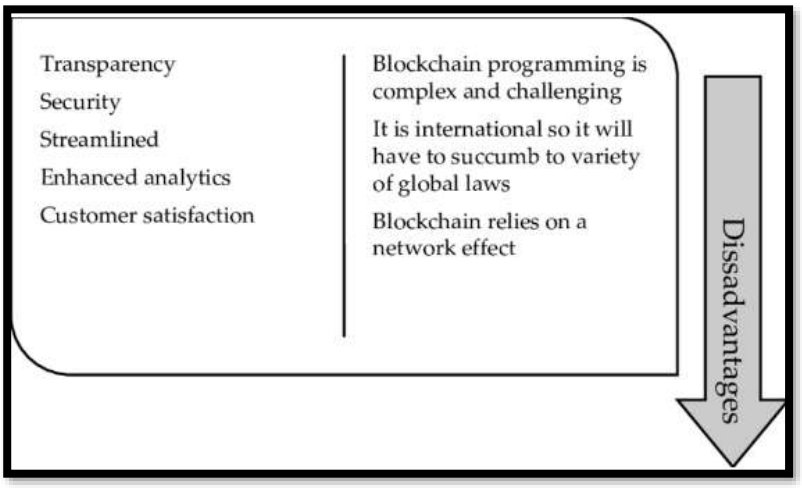

Figure 3: Issues of blockchain technology

(Source: Rejeb et al. 2019)

The risk of the leakage of the sensitive information can hamper the company's proceedings. Alternatively, according to the thoughts by Rejeb et al. (2019), scalability issues have also been identified in the technology, as the present technological infrastructure of the companies do not have the potential to transmit information at such large volumes. Hence, strict methods are to be followed by the global companies to effectively apply blockchain technology in the SCM.

Strategies to improve the performance efficiency of blockchain technology for enhancing the potential of SCM

The performance efficiency of blockchain technology needs to be increased for applying the tools in the administration of SCM. As per the comments by Müßigmann, von der Gracht & Hartmann (2020), a key tactic which can be integrated within the SC network is the off- chain storage where the evidence behaves as a back-up for the data on the blockchain technology system. Such a measure will decrease the risk of being released to the hackers and the cyber criminals, increasing the overall efficiency of the SC system.

Discussion

The major advantage of the application has been towards the increase of visibility and transparency of the data amongst the different networks of the companies which increases the efficiency of the administration of the supply chain. In the thoughts and beliefs by Kumar, Liu & Shan (2020), the usage of encryption, firewalls, and antivirus software will enhance the cyber- security measures associated with the blockchain technology. The transactions which are being processes outside the arena of the technology, in the form of off- chain storage, will work as a key measure for increasing the effectiveness of the tool.

Conclusion

Therefore, the study has identified the various kinds of applications of blockchain technology within the supply chain network of global organisations. The key components of the blocks in technology have been recognised to be the generation of smart contracts and cryptography of the public key which helps in the identification of the various participants within the blockchain network. However, issues in terms of traceability of the data within the connected networks and the increase of cyber threats, where leakage of information can occur have been recognised. An improvement of the application of the advanced system within SCM can be generated through the usage of off- chain storage for the generation of greater data security.

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