



A STUDY ON ONLINE MARKETING STRATEGY FOR AGRICULTURAL SUPPLY CHAIN MANAGEMENT USING BLOCK CHAIN TECHNOLOGY

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Abstract

In the present scenario, agrarian directors are faced with multitudinous constrains, from seasonal changes to broken supply chain, their occupation is veritable laborious and demanding . In similar situation, a distinct information database conforming of believable information would be very helpful. Transfer of knowledge is important in all aspects may beget the spread of misinformation. This can be checked by using block chain, a data ledger which is reliable and incorruptible.

Block chain is a computing technology which facilitates the transfer of data or useful information in a decentralised and transparent manner. The block chain technology enables the traceability of information in the food supply chain and therefore helps ameliorate food safety. It provides a secure way of storing and managing data, which facilities the development and use of data driven innovations for smart husbandry and smart index based agriculture insurance in addition, it can reduce sale costs, which will benefit farmers access to markets and generating new profit aqueducts. The paper focuses on different ways in which block chain technology can be incorporated in the agricultural supply chain, as a transparent and dependable transaction mechanism is explored

Key words – Agricultural marketing, supply chain, block chain, resources wastage.

1.1 Introduction

Block chain is a ledger of accounts and transactions that are written and stored by all participants. It promises a reliable source of truth about the state of farms, inventories and contracts in agriculture, where the collection of such information is often incredibly costly.

Block chain technologies can track all kinds of information regarding plants, including the quality of the seed, how crops grow and even create a record of a plant's journey once it leaves the farm. This data can increase the transparency of supply chains and reduce issues related to illegal and unethical production. They can also make it easier to trace any contamination or other problems back to their source in the event of a recall. The top priority with these technologies is sustainability and food security.

The use of data and information becomes increasingly crucial for the agriculture sector to improve productivity and sustainability. Information and communication technology substantially increases the effectiveness and efficiency of collecting, storing, analysing and using data in agriculture.

1.2 Features of Block chain technology

Big chain DB doesn't enhance, rather, it builds upon block chain technology. It adds block chain characteristics like decentralised control, immutability and the transfer of digital assets by starting with a big data distributed

a. Decentralisation

It means there is no single point of control and failure. A federation of voting nodes constitute a P2P network and works through decentralised control

b. Immutability

It means it is more than only tamper resistant. Data once stored can't be deleted or changed

c. Query

Any mongo DB query can be written and run to search the content of all stored transactions, assets, metadata and blocks. It is powered Mongo DB itself

d. Customizable

We are designing the public network with custom assets, transactions, permissions and transparency using four nodes

1.3 Difference between Traditional database and block chain database

Traditional data bases are MySQL, MongoDB and Postgre. CRUD operations can be done in these databases; it means anybody can edit, copy, remove, delete or update the documents and hence, the security is breached. Whereas block chain is a secured data base where you can't do any CRUD operations. It means nobody can edit, delete or tamper data and the transactions are secured. Traditional databases are centralised in a central server but block chain data is decentralised throughout many servers

1.4 Potential Block chain technology benefits for agriculture

The block chain technology allows peer to peer transactions to take place transparently and without the need for an intermediary like a bank or a middle man in the agriculture sector. By eliminating the need for a central authority, the technology changes the way that trust is granted- instead of trusting an authority, trust is placed in cryptography and peer-to-peer architecture. It thus helps restore the trust between producers and consumers, which can reduce the transaction costs in the agri- food market .

The block chain technology offers a reliable approach of tracing transactions between anonymous participants. Fraud and malfunctions can thus be detected quickly. Moreover, problems can be reported in real time by incorporating smart contracts. This helps address the challenge of tracking products in the wide reaching supply chain due to the complexity of the agri-food system. The technology thus provides to issues of food quality and safety, which are highly concerned by consumers, government

This article reviews applications of the block chain technology in the agriculture and food sector. The reliable data of the farming process are highly valuable for developing data driven facilities and insurance solutions for making farming smarter and less vulnerable.

1.5 Review of literature

A whitepaper, “Bitcoin: A Peer-to-Peer Electronic Cash System”, mentioned the invention of Bitcoin was released decades ago ([Nakamoto, 2008](#)). It is the novel cryptocurrency attempt that endorsed trustworthy monetarist transactions deprived of a reliable principal authority ([Tschorsch and Scheuermann, 2016](#)). With the help of blockchain technology, Bitcoin resolves the imperfections associated with digital tokens as they can be easily replicated or created ([van Hoek, 2019](#)). Blockchain is a software engineering technology whose use is rapidly increasing, particularly in Pakistan, supporting smart city initiatives ([Khan et al., 2020](#)). Blockchain technology is currently integrated with other sophisticated information systems such as the Enterprise Resource Planning system ([Chofreh et al., 2011](#)) that can optimise the performance of internal data control, transactions, and operations ([Chofreh et al., 2015](#)). Blockchain technology is also used in project management for more accurate and transparent project control to support success in managing projects ([Chofreh et al., 2019](#)).

Blockchain is a ledger based on the concept of digital transactions supported by various machines that do not rely on reliable third parties ([Erol et al., 2020](#)). Separate files related to transaction data, known as blocks. These blocks are accomplished with the help of a particular software platform that sends, processes, stores, and displays data in a human-readable form ([Wang et al., 2019](#)). Separately each block encloses a header with a timestamp in the bitcoin setup. Data associated with transactions and links to the previous block and each block is hashed, grounded in its content, and then referenced in the next block title ([Zhang et al., 2019](#)).

In addition to cryptocurrency and financial transactions, the importance of Blockchain technology has been known since 2014 (Tayeb and Lago, 2018). It includes management of records, digital mode authentication, initiating smart contracts, electronic voting, the transmission of locally created items, and tracking items (Dujak and Sajter, 2019). Blockchain achieves accomplishment and demonstrates its usage in several cryptocurrencies, and numerous organisations aim at connecting its transparency and fault tolerance for solving complications in situations where various mistrustful actors are indulged in the distribution of resources (Manski, 2017).

1.6 Applications in Agriculture

In this paper the discussions has made on the applications in agricultural and food sectors; agricultural insurance, smart farming, food supply chain and transactions of agricultural products. Agricultural insurances differ with respect to how losses are assessed and consequently how payouts are triggered. Insurances that indemnify farmers based on a damage assessment that was made by an expert on the farm are denote as indemnity- based insurances. Indemnity based insurances are able to precisely cover losses, however, they are prone to problems arising from asymmetric information problems.

The adverse selection indicates that farmers with a higher ex-ante risk exposure are more likely to purchase insurance compared to farmers with lower risk. Moral hazard indicates that farmers shift to more risky production practices when being insured. Both phenomena lead to market failure of the insurance scheme if the insurer has insufficient information on the two cases. Thus, indemnity based insurances are prone to costly damage assessment and need to implement measures to avoid problems arising from asymmetric information, such as deductibles.

1.7 Smart Agriculture

Underlying the agri-food systems is the essential data and information on the natural resources that support all forms of farming . different actors and stake holders generate and manage data and information as per their needs and capacities. Smart agriculture is featured by the utilisation of ICT , internet of things(IoT) and various modern data collection and analysis technologies including unmanned aerial vehicles(UAV), sensors and machine learning.

A key issue of establishing smart agriculture is developing a comprehensive security system that facilitates the use and management of data. Traditional ways manage data in a centralised fashion and are prone to inaccurate data, data distortion and misuse as well as cyber attack.

Many smart farming models are proposed an implemented based on the joint application of IoT and block chain technology. IoT sensors act as a private local block chain that centrally managed by the owner. Block chain base ICT e-agriculture model for the use at the local and regional scale, in which each actor has a piece of real time water quality data store in the block chain.

1.8 food chain supply

With increased globalisation and intense competition in the market, food supply chains have become longer and more complex than ever before. There are some common problems in food supply chains such as food traceability, food safety and quality food traceability, which add additional risks on the entire society, economy and the health of human

From the producers' perspective the use of block chain technology helps establish a trust relationship with consumers and build up the reputation of their products, by transparently providing individual product information in the block chain . enterprises can better achieve the value of their products and thus increase their competitiveness.

Block chain is capable of recording the information of a product from its provenance to the retail store. It provides a secure and immutable way of storing data collected at the start of the supply chain. Collecting such data for all products can be very costly, but it can be done on samples.

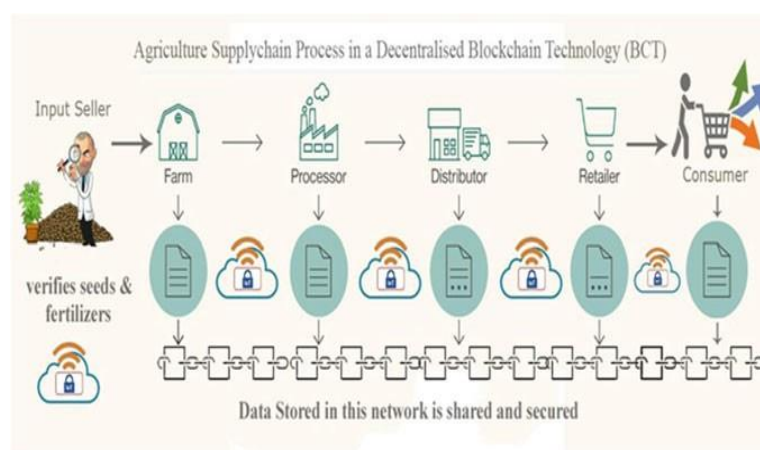
1.9 E – commerce of agricultural products

The commerce and trade of agricultural product face some crucial problems to solve. The basic information of agriculture products is not easy to be confirmed and trusted by consumers. Block chain technology may provide proper solutions for many aspects of these problems. It provides private key encryption which is powerful tool that provides the authentication requirements. Block chain technology could enable supply chain management more efficiently than traditional monitoring mechanisms by lowering signalling costs for each entity.

The blockchain provides a digital payment solution with zero rates. Furthermore, application of crypto currency in the transaction of agricultural products will reduce transaction costs more substantially.

Block chain technology can greatly reduce transaction costs and incorporate them into the market again. The application of block chain technology in e- commerce and trade of agricultural product is still in its infancy and the current case is not simply perfect .

Agriculture supply chain process in decentralised block chain technology



Graphical representation of shared data in the decentralised and distributed network

The distribution network takes care of linking the farmer and retailer via a supply chain. This supply chain network has the geographical reach, as well as the scale up capability to take care of fluctuating supply and demand. The distribution network itself comprises of many players who have the logistics capability to handle the supply chain at local and global levels (source: radiostud.io). To eliminate the middleman in the supply chain management, blockchain technology can help in the following manner. This process consists of series of steps that are going to work in actual SCM where at each and every point an IoT device is kept for tracking and all the data is added in the blockchain network through a shared ledger (Fig)

1.10 Objective of the Work

- Design of a decentralized and secured supply chain management system. Reduction in the number of middlemen in the system.
- Increased cost efficiency, Enhanced quality of goods
- Sustainable development of India's GDP in the long run. Facilitate fast and transparent delivery of products.

1.11 Conclusion

The block chain technology enables the traceability of information in the food supply chain and thus helps improve food safety. It provides a secure way of storing and managing data, which facilitates the development and use of data, which facilitates the development and use of data-driven innovations for smart farming and smart index based agriculture insurance. In addition, it can reduce transaction costs, which will benefit farmers' access to markets and generating new revenue streams. Despite enormous potential advantages, key limitations remain for applying the block chain technology in agriculture and food sectors

Further research is required on the transacting parties motivation to provide genuine and precise information to the block chain ledger. This might be especially important in the case of small holder farming process is scattered owned by individual

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