

## Implementation of Food Supply Chain Management System

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### Abstract

Over the past few years, the market has undergone tremendous transformation, growing more dynamic and demanding, which has heightened competition. The food business cannot respond to a changing environment without the cooperation, integration, and flexibility of the supply chain. Blockchain seems to be a technology that can manage data efficiently and transparently while building trust. It can also assist with payments that are made in the supply chain without the need for transaction authorization and verification from a third party. Blockchain technology presents a practical answer to the existing supply chain management issues. Supply chain management is implementing Blockchain mostly for transparency and traceability, information sharing, product anti-counterfeiting, and building trust. Utilizing supply chain management as a likely technology for transaction security.

**Keywords:** Blockchain; Security; Supply chain management; Traceability; Transparency

### 1. Introduction

The global food supply chain has grown more intricate and interwoven in recent years, making the adoption of cutting-edge technologies necessary to improve productivity, traceability, and management overall. The difficulties the food industry faces in guaranteeing the smooth transition of goods from farm to table are addressed by the design and implementation of a food supply chain management system. This method seeks to streamline procedures, cut down on waste, improve transparency, and eventually guarantee that customers receive food products that are both safe and of the highest caliber. The food supply chain consists of several interrelated phases, such as retail, distribution, processing, and manufacturing. Numerous parties are involved at each stage, including farmers, manufacturers, shipping companies, and merchants. [3] Sustaining objectives of sustainability and regulatory compliance while satisfying the needs of an expanding world population depends on the effective management of this complex network. In the ever-changing global food sector, a smooth transition of goods from production to consumption is contingent upon the efficient management of the supply chain. To improve efficiency, traceability, and overall

operational excellence, the design and implementation of a food supply chain management system offers a strategic response to the complexities and challenges faced by the food supply chain. A wide range of stakeholders, including farmers, producers, distributors, retailers, and consumers, are involved in the food supply chain. [2] Because of this system's complexity and other aspects including perishability, regulatory compliance, and customer expectations, management must be thorough and technologically advanced. There is a pressing need for creative solutions that can deal with problems with waste reduction, quality assurance, and timely delivery as the world's population continues to grow. To address these issues head-on, the Design and Implementation of a Food Supply Chain Management System becomes a strategic endeavor [7]. Blockchain can only be accessed via an internet-connected PC, laptop, or server. When connected, all devices are referred to as block chain nodes. The nodes store the block chain, and certain users are granted permission—a topic that will be covered in the supply chain block chain study. When data is saved and exchanged across different sites, countries, or institutions, it is known as a block chain, and this

is where a ledger is generated. The distributed ledger, where digital data is contained in a single area, and block chain, where nodes hold identical data, are contrasted with traditional databases.

### 1.1. Block Chain Technology for Secure Product Traceability

The 2008 launch of the initial Bitcoin concept saw it grow into a very well-known decentralized digital currency. [1] The foundation of Bitcoin is a peer-to-peer (P2P) network, or the Bitcoin network, which highlights the following three consensus problems. Preventing falsification: Transaction records could be altered by hackers, resulting in discrepancies between data on various devices and mistakes in the Bitcoin network. Preventing reuse: Bitcoin earnings can be distributed to multiple individuals at once. However, the order in which transactions are received by various devices may vary because of the various broadcasting paths that a transaction takes on the Bitcoin network. Disagreements between devices over the authenticity of transaction records will arise from this. [3]

### 1.2. Comparisons with The Existing Surveys

Among the most widely discussed BC applications are several non-financial businesses, like the supply chain. Supply chain issues are best addressed using BC technology. Investigations into the potential application of BC technology in SCM have resulted in several reviews that provide an overview of the state of the field and suggest future directions for research. These factors have motivated us to analyze different supply networks in the suggested survey. Modern publications that concentrate on the BC and SCM and their integration are contrasted in this area. [4] It also outlines their main goal, significant contributions, and limitations, which can provide beginners with important background information before they begin their research in this developing field. [5]

## 2. Method

The utilization of decentralized ledger technology by block chain has the potential to drastically alter supply management's vendor operations. Using automated smart contracts, transparent traceability, and immutable data, vendors may lower the risk of fraud, increase accountability, and expedite inventory management. Additionally, by providing customers

with verified information about the products' origins and consequences, block chain technology responds to the growing demand from customers for ethical sourcing and ecologically friendly products. Ultimately, by improving operational efficiency, this approach increases trust, competitiveness, and industry compliance. decreasing expenses and putting suppliers at the forefront of innovation in technology. [6] The program seeks to address the growing demand for sustainable development and ethical sourcing in addition to the broader industry trends of digital transformation. The initiative aims to tackle the wider industry trends of digital transformation as well as the growing need for ethical sourcing and sustainability.

## 3. Results and Discussion

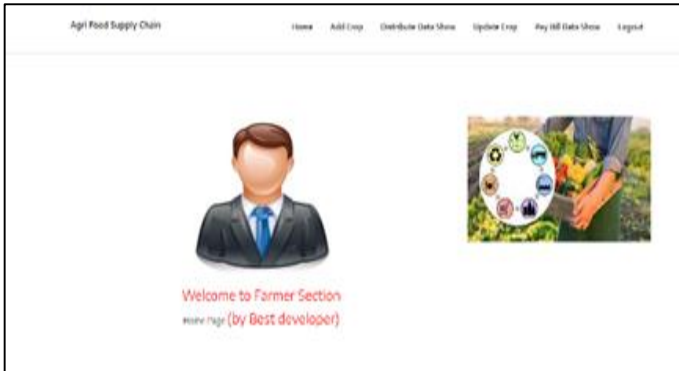
### 3.1. Results



Figure 1 Registration Page



Figure 2 Login Page



**Figure 3 Farmers Dashboard**



**Figure 7 QR Uploader**



**Figure 4 Order Information**



ProductName	CompanyName	Description	MFGDate	Price
6Wheat	58 Wkesh	49 Uniform golden colour with no discoloration or mild green...	11/08 2024-03-07	1108 60
7Wheat	58 Wkesh	49 High quality, uniform size,color and shape,rounded seeds	5/08 2024-03-11	1108 63
8Rice	48 Jan	38 uniform size and shape,whitenee,long,thin	4/08 2024-03-15	1108 14
9onion	58 Pune...	110 Green onion,45-75 mm size	7/08 2024-04-03	1108 110
10maka	48 fact	48 jadh t	7/08 2024-04-28	1108 60

**Figure 8 SQL Data of Product Information**

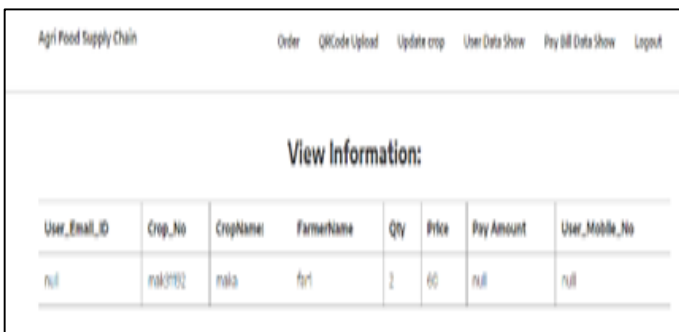


**Figure 5 Order Acc/Rej**

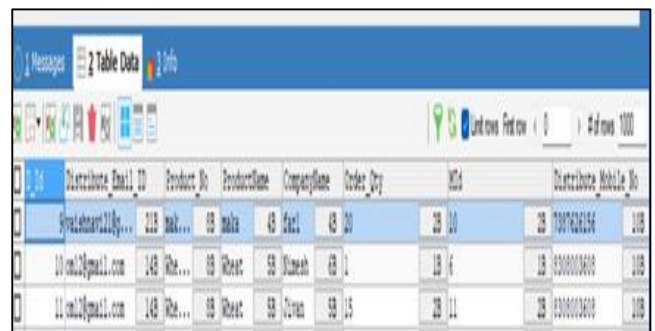


ProductName	CompanyName	Description	MFGDate	Price	ExpiryDate	Qty	Distribute_Mobile_No
Shaka	48 fact	48 jadh t	7/08 2024-04-28	1108 60	28 000...	1108 0	28 7307920156

**Figure 9 SQL Data of User Bill Amount**



**Figure 6 Payment Information**



Distribute_Email_ID	Product_No	ProductName	CompanyName	Order_Qty	Mid	Distribute_Mobile_No
9preethan@ilg...	218 mak...	48 maka	48 fact	48 00	28 10	28 7307920156
10ml@gmail.com	148 whe...	48 Wheat	58 Wkesh	48 1	18 6	18 8300000000
11ml@gmail.com	148 whe...	48 Wheat	58 Wkesh	58 15	28 11	28 8300000000

**Figure 10 SQL Data of Order Information**

The notion that applying block chain technology is a stand-alone program that dramatically reduces the cost of conventional software, on the other hand, was disputed by certain experts. However, most scholars have consistently agreed that adding block chain technology to Internet of Things devices reduces expenses. After registering, users of the supply chain management system can access their designated domain by logging in. Users who identify as farmers will have the option to submit details like crop availability, price, and so on. you can see the manufacturer's order data. As a manufacturer, the user would be able to see information on crops, including names, prices, and availability. and can place the order. The farmer has the final say over whether to accept or reject the order. The third block is the consumer's block. Consumers have access to data on produced products, agricultural details, and manufactured items. Transparency makes it possible to confirm the food's quality. Figure [1-10] explains the methods in the Implementation of Food Supply Chain Management System.

### Conclusion

Blockchain technology is being used by several businesses for supply chain management. This paper looks at how smart contracts and block chain technology are now being used in many important industrial fields. Based on scholarly research, the paper offers data on the overall use of Blockchain for various supply chains. The study's conclusions and outcomes show that supply chain research with a focus on block chain technology is a growing area of inquiry and interest. The majority of the articles that were reviewed and evaluated agreed that block chain technology might benefit the supply chain. [7] Furthermore, an extensive investigation is carried out to ascertain open research questions about the viability, advantages, and prospects of using block chain technology in the supply chain. There is a dearth of in-depth understanding of block chain technology [8]. Furthermore, an examination of smart contracts concerning data input into the block chain has been carried out.

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