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Blockchain Technology: A Game Changer of Dairy Industry

"A valuable application of the Blockchain is its ability to tell the 'farm to fork' story in great detail"

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ABSTRACT:

Blockchain technologyimplementation can improve farmer's welfare, protect the environment, maintain food quality, prevent food adulteration, establish a trust relationship with consumers and sustain satisfactory rural lifestyles.The Blockchain technologywill help to improve the profitability, access the reliable information to improve efficiencies and confidence of our dairy industry. Understanding Blockchain technology from economic, ecological, technological and farmer's welfare views can increase the probability of success of industry. Blockchain-based certification of quality and safety would also add valuation of the selling price of various livestock farming inputs. Therefore, this article is designed to review the different aspects like application, benefits, and challenges of Blockchain technology.

INTRODUCTION

India has been the foremost producer and consumer of dairy products worldwide with a continuous growth in the availability of milk and milk products.In light of the increasing demand driven by the growing population, higher incomes and more health consciousness, the slowdown in dairy industry growth is severely annoying. Quality, safety, transparency, traceability, and knowledge flow are the leading challenges faced by the Indian dairy supply chain. Nowadays, food security can be

benefited from the upcoming technologies that enhance transparency, have low transaction costs, and provide outputs in real time. One of such technologies is the Blockchain.Blockchain consists of a linked chain that stores auditable data in units called blocks. Blockchain and distributed ledger is a decentralised, peer-to-peer network. It gives each farmer and processor their own 'node', keeping information secure and private. Their integration using the Blockchain technology would contribute to making the livestock sector more productive, efficient, sustainable, inclusive, transparent, and resilient.

CHARACTERISTICS OF BLOCKCHAIN

- Blockchain technology maintained by a network of multiple computing machines that are not relying on a trusted third party.
- Blocks are managed through specific software platforms that allows the data to be transmitted, processed, stored, and represented in human readable form.
- It makes ease of paperwork processing.
- It identifies counterfeit products.
- Increasing transparency of food safety.

POTENTIAL APPLICATIONS OF BLOCK CHAIN TECHNOLOGY

1. ***Blockchain technology in animal feed supply chain:*** Feed supply and feed safety are intimately interlinked because origin, processing, handling, and storage of feed resources, as well as many other factors related to the market, can affect both safety and quality of feed produced. It provides the information about crop production for using as feed ingredients, procurement, processing, retailing, distribution and feeding of animal.
2. ***Block chain technology in animal production:***The use of the Blockchain technology in the livestock sector is in the nascent stage.It provides the information about the location of farm, animal breed, vaccinations status, medications status, and special treatments of animals. It can also track the movement and health of the animals, which can be updated into the Blockchain network. Similarly, data can be captured and recorded during the milking of the animal.As the milk is milked, they are ready to be sent to chilling centers, milk collection center, processors, or food manufacturer.
3. ***Block chain technology in milk production and supply:***When a farmer sells milk, supply chain events are documented on the shared ledger and linked to the contract. Both the farmer and the processor can see this instantly. The ledger possesses a record of contracts, milk that has been ordered and delivered, milk quality testing results, payments etc. Only the farmer and the processor can add data to their shared ledger so they each can see the full history of their shared business relationship. This information cannot be adjusted or changed without the knowledge of the other, although regulators can view information to monitor the industry but can't change the ledgers. Payment is made between bank accounts as normal, with receipts automatically recorded and linked to the contract.

Competitors cannot see each other's commercially sensitive contracts or contacts. The transparency of shared information using Blockchain technology empowers our dairy farmers. It will also allow greater knowledge of what happens to a farmer's milk once it leaves their farm. It will provide consumers with trusted information about where their milk comes from.

BENEFIT OF USING BLOCKCHAIN TO DIFFERENT DAIRY-RELATED STAKE HOLDERS

The benefits of Blockchain technology to various participants are as follows:

1. ***Producers:***Using the Blockchain platform, producers can more efficiently communicate with the other participants of the dairy supply chain system. Producers can also maintain the reputation of the industry from the geographical indications, improved food production practices, sustainability and welfare practices, as Blockchain can help to disseminate such information in the market. The producer can supervise the movement of dairy items in the market. If in case, someone mishandles, one can be easily pinpointed and prevent it from reaching to consumers. Ultimately, the producer can have a better return on his produce and maintain the goodwill of the farm.
2. ***Certification Agencies and Regulatory Bodies:***Application of Blockchain technology will make the certification process more manageable. Other regulatory bodies, if needed, can track the location, their ecological footprint, working condition, and welfare condition of farm. Moreover, certification information can be disseminated through this platform to consumers. This makes, on the one hand, the certification process more manageable and, on the other hand, helps the farm to stand out among its competitors.
3. ***Milk Processing and Manufacturing Industries:***By using Blockchain technology, milk product processing and manufacturing industries now can better communicate with the consumers. They can disseminate the correct information about the food ingredients, handling instructions, expiry dates, consumption instructions and other beneficial information to the consumers.
4. ***Wholesalers and Retailers:***By using Blockchain technology, they have increased the sale of particular food items by focusing on attributes of it. If hazardous food product gets into their shelves, they can be easily identified and removed. Similarly, it can also be advantageous in making a profile of consumer.
5. ***Consumer***:With the application of Blockchain technology, traceability, accountability and quality assurance can be improved to such a level that food industries can react to the food safety issues with great speed preventing others from having a food-related illness. Blockchain technology can be used in tracking the food products easily and timely than conventional methods. This will give enough confidence to consumers on the food they purchase because they will know every detail of the food right from its site of production until it reaches to hand.

CHALLENGES IN ADOPTION OF BLOCKCHAIN TECHNOLOGY

Although there are various anticipated benefits of using Blockchain-based dairy supply chain system, there exist multiple challenges in the application of it.

A. Obtaining the data uploaded to a Blockchain can be very costly, which will be a barrier to the adoption of Blockchain technology in the livestock sector. The setup of distributed ledger itself may be relatively cheap, whereas collecting data required for making the ledger useful, e.g., DNA of livestock animals could be expensive.
B. Blockchaintechnology being the new technology, business owners are unaware whether they get higher payments for the increased cost of using it. Similarly, in many developing countries like India, the government has no proper plan for its use, and debate is still over its applicability.
C. Another major constraint lies in the dairy production system in the developing world, where dairy farming is a non-commercial and fragmented. A large number of farmers are engaged in it, but they have a small herd size. Existing challenge isto integrate these farmers into the Blockchain-based dairy supply chain system. Hence, there is a need for in-depth research on these issues to apply the Blockchain technology in the dairy sector.
D. Blockchain works on a strong internet-connected platform supported by necessary information technology (IT) infrastructure which can be challenging for the developing economies to adapt.
E. Trust is one of the critical factors of the supply chain that also proves to be a challenge in Blockchain implementation. Implementing Blockchain technology can increase visibility and traceability in the supply chain. But it is very important that there should be trust between supply chain partners so that they are ready to share their data.