Chapter 67
Blockchain and IoT-Based Diary Supply Chain Management System for Sri Lanka

K. Pubudu Nuwnthika Jayasena
Sbaragamuwa University of Sri Lanka, Sri Lanka

Poddivila Marage Nimasha Ruwandi Madhunamali
Sabaragamuwa University of Sri Lanka, Sri Lanka

ABSTRACT

The central problem to be addressed in this research is to investigate how blockchain technology can be used in today's food supply chains to deliver greater traceability of assets. The aim is to create a blockchain model in the dairy supply chain that can be implemented across any food supply chains and present the advantages and limitations in its implementation. Blockchain allows monitoring all types of transactions in a supply chain more safely and transparently. Acceptance of blockchain in the supply chain and logistics is slow right now because of related risks and the lack of demonstrable models. The proposed solution removes the need for a trusted centralized authority, intermediaries and provides records of transactions, improving high integrity, reliability, and security efficiency and protection. All transactions are registered and maintained in the unchangeable database of the blockchain with access to a shared file network.

INTRODUCTION

Every day we consume food products on the basis of the confidence because that providers are produced, transported and warehouse in accordance with the internal and government regulations on food safety. Before reaching the end consumer, food product moving through different phases of supply chain from suppliers to retailers. These intermittent stages contribute to product design, manufacture, delivery, and sales. Although food safety measurements do periodic measure of food safety and provide certifications of the quality, it is often difficult to trust when searching a supply chain scaling across countries with

the distribution of technology. For example, The United States stopped imports of meat from Brazil due to the acceptance of bribes by food examiners in Brazil, the horsemeat scandal in Europe, the milk powder of babies scandal in China and the growing problem of food pollution in India. Over the past decade, these incidents have occurred periodically, pushing consumers and governments to request greater transparency throughout the food supply chain(Aung & Chang, 2014)(Bosona & Gebresenbet, 2013).

Based on Food and Drink research, organizations decide, increasing consideration of the food provenance as a business challenge. They are finding business opportunities through increasing health awareness. Nowadays consumers highly consider the quality of food product so they hesitate to purchase. It is because there is no way to ensure the quality of the food product and less transparency through the supply chain process of the product. Nowadays organizations are identified that customers are always looking for trusted products with verified sources. For that, they are plan to get a competitive advantage by providing a transparent supply chain and sustainable manufacturing. For example, Walmart has joined with IBM to study as of February 2018 to test whether the organization can guarantee the Health of food products that they sell in their retail stores. Nevertheless, contemporary repositories for each silo stage of the logistic transportation are ineffective in giving unparalleled trust to the client, because they are not dishonest. A lot of food supply chains today only check their product end of the logistic transportation processes and still there is no way to map their product in source and stages between customers.

Although the different phases of the food supply chain has many possible adverse results such as Irreversible disruption to the environment, abuse of working conditions, unethical manufacturing practices, counterfeiting and large quantities of agricultural waste attributable to imbalanced sourcing and storage strategies. End users tend to use these programs without realizing the repercussions that they create by their footprint and food supply chains are easily kept hidden with little effort to provide end-to-end access to their stakeholders. Although these challenges, the idea of requiring a single agency to provide data and transaction control in food supply chain was the only realistic solution until recently when a modern system called blockchain provided a whole modern way of addressing food provenance

BACKGROUND

Supply Chain

Global Supply Chains are becoming progressively difficult over the years. Therefore, it has become more challenging to manage social sustainability problems which are concerned by many foreign buyers (including large retailers and brand owners) and consumers, where monitoring and analysis of their transportation supply networks relies on many suppliers, distributors and delivery centers, some of them uncommon or even one-time. (Venkatesh, Kang, Wang, Zhong, & Zhang, 2020a)(Petri Helo & Shamsuzzoha, 2020). Supply chains are not fixed. It develops and changes in size, shape, and configuration, and in how they are coordinated, controlled and managed. Not only the economic drivers but also the technological drivers affect the changes in the supply chain. As a result of that, digital technology integrates with supply chain management. The new step introduces as "Supply Chain Digitization". Digitization may play a leverage role in aligning current sourcing strategies as well as developing new sourcing strategies to enhance long-term efficiency, productivity, and competitive advantage overall organizational objectives.

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