

# REAL-WORLD BLOCKCHAIN APPLICATIONS AND THE FUTURE OF SUPPLY CHAIN TRACEABILITY IN VIETNAM

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## EXTENDED ABSTRACT

With the rapid development of blockchain in recent years, it is being demystified to most of the people across the globe. When the heat of crypto-currencies cool down, governments and enterprises pay more attention to the other applications of blockchain technologies. By making use of the decentralized architects and data immutability, more and more applications are being developed to resolve the real-world problems, including ID management, voting, food safety protection, supply-chain traceability, and so on.

In the 1986-2017 period, Vietnam achieved an average growth rate of 6.63% per year and is on track to reach over 6.7% in 2018, becoming one of the fastest growing economies in the world. Hence, to build up the sustainable supply-chain system in Vietnam, modernized technologies like warehouse management systems, robotic vision systems, supply chain planning, supply chain visibility, and more are required to apply. Combining the growing trend of traceability solutions and the significant demand from Vietnam supply-chain industry, we would suggest 'Blockchain' as one of the possible solutions that may enhance the data integrity, operation transparency, and overall traceability is to promote the technology to suppliers, distributors and exporters of fruits in Vietnam.

Keywords: blockchain, Viet Nam, supply-chain

## I. INTRODUCTION : BACKGROUND AND POTENTIAL OF VIETNAM AGRICULTURE MARKET

In 2018, Vietnamese agricultural products set a record when bringing in USD 40 billion from exports. Currently, Vietnam's agricultural products are ranked 15<sup>th</sup> in the world among 150 countries. The main markets are China (accounting for 22% of Vietnam's total agricultural export market share), the US (17.9%), Japan (19.1%), Association of Southeast Asian Nations (ASEAN) (10.64%) and South Korea (6.9%). At the same time, Vietnam is also participating in many free trade agreements such as the Comprehensive and Progressive Agreement for Trans-Pacific Partnership, European Union Vietnam Free Trade Agreement, Eurasian Economic Union-Vietnam Free Trade Agreement, and European Union-Vietnam Investment Protection Agreement, which open up more opportunities for exporting Vietnamese agricultural products and achieve the goal of bringing in USD 43 billion from agricultural exports in 2019.

However, to achieve that goal, Vietnamese agricultural products face many challenges. The first is the assurance of quality, food safety, and import standards of the market, especially difficult markets like Europe, US, and Japan. These markets require very high quality, uniform, hygienic, and safe agricultural products. On the other hand, issues related to postharvest management along the supply chain, such as packaging, transport, storage, distribution, and export can also

cause deterioration in the quality of goods when it reaches the consumer market. The next challenge is to build a brand for Vietnamese agricultural products for the international market, and the issue of informing consumers of the origin of the products, for instance whether they are genuinely produced or sourced from Vietnam. Therefore there is a strong reason as to why traceability solutions are important for the agricultural industry to ensure sustainability of markets for quality produces.

## **2. WHY SUPPLY CHAINS NEED TRACEABILITY**

Having a traceability system is not only helpful in tracing back the information, but it also brings additional value to businesses. Firstly, it helps organizations better manage risks. Through seamless data records from actual events, the supply chain manager can promptly know the current status of the moving or producing of products and anticipate potential risks which may occur and make right decisions to prevent it. Secondly, all the recorded data on consumer behaviour, in particular about how they buy products, how much, and when they buy will provide a better basis for forecasting and demand planning, thus, makes the demand forecast closer to actual demand. Another benefit of having a traceability system is cost saving as uninterrupted information flow helps to eliminate waste of production, material loss, and other opportunity costs. Hence, ethical traceability also reduces product callback costs or warranty costs by maintaining product quality and quickly implementing the returning process.

## **3. WOWTRACE TRACEABILITY SYSTEM AND SUPPLY CHAIN**

In Vietnam, a start-up named Chain Vision has developed a blockchain-based traceability Blockchain as a Service system called WOWTRACE to enable end to end traceability in the agrifood supply chain. WOWTRACE helps businesses manage supply-chains with instant, transparent, and immutable data. It is a network that allows producers, distributors, retailers, and consumers to retrieve product information reliably and securely through blockchain technology.

Having a transparent traceability brings businesses many advantages not only in supply chain operations but also in marketing and brand building. Firstly, it provides uncorrupted and trusted data flow because of the immutable characteristics of blockchain; all stakeholders can quickly identify the root of issues when it happens and use the data for efficiency improvements. On the other hand, if consumers can access to this transparent information, they will trust and be loyal to a brand. It is a golden asset and strong brand protector in the aspect of marketing.

## **4. BLOCKCHAIN TECHNOLOGY**

Blockchain, which is a technology for storing and handling information, is an ideal platform to perfect traceability. However, people generally mistakenly equate this term to Bitcoin, which is just an application of blockchain. Plainly explained, a blockchain is a time-stamped series of immutable records of data that is managed by a managed by a cluster of linked computers. Each of these blocks of data is secured and bound to each other using cryptographic principles. Therefore, there is no central server to execute data recording. Since it is a shared and immutable ledger, the information in it is open for anyone and everyone to see. Hence, anything that is built on the blockchain is by its very nature transparent, and everyone involved is accountable for their actions.

Unlike the centralized system, blockchain is a decentralized system, which has no central place

for data handling. In other words, blockchain is more secure, more transparent, and immutable. Once the data is updated on blockchain, it will be recorded with the exact time of updating called time-stamped, and it is unchangeable. Everyone can access to blockchain to retrieve the data easily and read the history of information updating. This makes blockchain data trustworthy and solves the weaknesses of current centralized Traceability systems.

## **5. CASE STUDY:**

Blockchain technology traceability system has been tested and implemented in selected food production systems in Vietnam.

This paper discusses its application in 4 case studies:

- Case study of mango
- Case study of chocolate
- Case of organic vegetable
- Case of melon