Oral presentation: 260

Blockchain based solution for Sri Lankan agricultural supply chain to ensure food security

B. M. A. L. Basnayake* and R. A. C. P. Rajapakse

Department of Industrial Management, Faculty of Science, University of Kelaniya, Sri Lanka
*basnayake.bmal@gmail.com

Low quality agricultural products are added to the market daily. Overuse of chemicals in the production process, using uncertified chemicals and mechanisms for preservation and ripening processes, are the major issues with an impact on agricultural product's quality as well as overall health of the consumers. Mechanisms for identifying the quality of the agricultural products are highly demanded due to the lack of transparency in the current process. A crowd-based decentralized certification system is required instead of a central authority to certify the products. Blockchain technology is emerging as a decentralized and secure infrastructure which can replace involvement of a third party to verify the transactions within the system. The purpose of the research is to implement a blockchain based solution to verify the food quality and the origin of the agricultural supply chain. The data on the transactions, existing certification process, actors and their roles within the Sri Lankan agricultural supply chain context were identified and collected through self-experience and related institutes. The Agricultural department's Good Agricultural Practice certification process was studied to get data on the existing certification process. Furthermore, Hector Kobbakaduwa Agrarian Research and Training Institute's publications were used to gather data on local food supply chain. All the actors who are engaged with the supply chain must be able to interact with the system to achieve the goal. Each transaction and events related to a product is validated by peers of the blockchain system. Product ownership is changed for each relevant transaction. A token-based mechanism is used to indicate the farmers' reputation with their products. Farmers can place a certification request regarding their products and, they can be gained reputation tokens for each certification done by peers. A unique Quick Response (QR) code is used to identify each product container or package. In each step of the supply chain, the QR code is used to validate physical product with the virtual product. Consumers will be able to ensure the origin and the quality of each product by scanning the QR Code, with the mobile application. The proposed system will be implemented, following a systematic review of a literature as well as a series of interviews with stakeholders, as a prototype on a private blockchain and validated with the involvement of real users to arrive at conclusions.