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Abstract

Framework for Assessing Trust in the Use of Blockchain Technology in Agrifood Supply Chains †

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Abstract: The advent of Industry 4.0 (I4.0) technologies has revolutionized production environments with their application in supply chains, particularly within the agrifood sector. One notable I4.0 technology is blockchain, which holds significant potential for traceability in agrifood supply chains. However, there are concerns regarding digital trust among the actors involved in adopting this technology. The concept of digital trust, essential for successful implementation, remains underexplored. This research aims to propose a framework for evaluating digital trust in the context of blockchain technology to foster a secure and reliable information sharing environment among all stakeholders within the agrifood supply chain to build confidence in security based on data permissions for user identity. To accomplish this, an extensive literature review was conducted to identify the factors affecting stakeholders' expectations and trust in using blockchain technology in agrifood supply chains. The literature review will enhance the knowledge about these different factors affecting digital trust under four key dimensions, that are, security/privacy, data control, accountability, and benefit/value. These factors are then ranked using a multi criteria decision-making technique, enabling the development of a framework for industries and government organizations. This framework addresses the use of blockchain technology for traceability in agrifood supply chains while ensuring the trust of actors utilizing this technology. In regions facing war-like situations, such as Ukraine, it becomes crucial to evaluate the factors that can enhance food safety in agrifood supply chains, mitigate food waste and fraud risks, and maintain the supply chain sustainability by exploring alternative food supplies from reliable partners. The situation is the same all over the globe, in which supply chain risks include frauds and lack of transparency. This study outlines the managerial implications and suggests future research directions to develop a model for assessing digital trust. This model aims to foster information sharing among actors, considering aspects, such as willingness, vulnerability acceptance, shared values, security, identifiability, and digital trust. Smart contracts can be added to the model that removes the need for a third party, warranting more trust. The deployment of this model on a private or public blockchain can enhance transparency, traceability, and address food safety concerns within transactions by addressing issues of security and reliability, accountability, and oversight with an inclusive, ethical, and responsible use.

Keywords: digital trust; agrifood supply chain; traceability; food safety

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