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Using Blockchain Technology to Reduce Food Waste in The Grocery Retail Sector: A Conceptual Framework for Sustainability in Gauteng, South Africa

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Abstract

Reducing food waste in the grocery retail sector is vital to achieving global sustainability. As global food production is projected to increase by 60% by 2050 with current food waste amounting to approximately 1.3 billion tons annually. Gauteng, which hosts some of South Africa's largest retailers, faces challenges such as limited tracking and tracing, inefficient inventory management, and a lack of transparency across the supply chain. Food waste is a global problem that needs to be addressed, given increasing concerns about resource scarcity, environmental degradation, and food insecurity. Blockchain offers a solution for food traceability and supply chain management by enhancing data integrity, accountability, and real-time tracking. These are key to sustainable food systems. This conceptual paper explores how implementing blockchain within the food supply chain can help to reduce food waste in Gauteng's grocery retail sector. Using existing literature, this paper proposes a conceptual framework that assumes blockchain technology's features such as decentralisation, immutability, and transparency to improved data accuracy, visibility and operational responsiveness. The study provides a comprehensive understanding of integrating technology with retail supply chains and offers insights to grocery retailers and policymakers that want to implement blockchain-based traceability solutions to enhance sustainability.

Keywords: blockchain; food traceability; food waste; grocery retail stores; sustainability