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Technology-based Food Supply Chain Management to Support Zero Hunger and Healthy Lifestyle

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ABSTRACT
The global food system is one of the industries that has been compelled by the Fourth Industrial Revolution to use digital technology in order to improve the resilience and efficiency of food delivery. Examining and synthesizing recent scientific research on digital technology use in food supply chain management and its connection to the Sustainable Development Goals of Healthy Lifestyle and Zero Hunger is the goal of this study. A survey of academic papers published in the previous five years was used to conduct the study, which focused on how technologies like blockchain, digital twins, artificial intelligence (AI), and the Internet of Things (IoT) are being incorporated into the food supply chain. Results show that digital technologies are essential for reducing food insecurity, increasing access to nutrient-dense food, and promoting healthy consumption habits in addition to boosting efficiency, transparency, and traceability in food supply chains. This study provides a useful conceptual underpinning for the creation of adaptable, sustainable food systems that put human welfare first.

Keywords: Food Supply Chain Management, Digital Technology, Zero Hunger, Healthy Lifestyle, IoT, Blockchain, Artificial Intelligence

1 Introduction

One of the biggest challenges to reaching the second Sustainable Development Goal (SDG), Zero Hunger, is ensuring that food is available and distributed fairly. The issues facing global food supply chains (FSCs) are growing as a result of geopolitical instability, climate change, and population growth. Even though there is enough food produced worldwide, a significant percentage of it is lost or wasted, and over 820 million people still suffer from chronic hunger, which highlights structural injustices and inefficiencies in food delivery networks (1). Food management techniques from production to consumption urgently need to be overhauled, since the Food and Agriculture Organization (FAO) estimates that almost one-third of all food produced worldwide is lost or wasted annually (2).

A major strategic force behind improving the sustainability, efficiency, and openness of food supply chains is the digital transformation of these networks. To allow real-time logistics tracking, enhance traceability, and lower losses that occur after harvest and throughout distribution, emerging technologies including the Internet of Things (IoT), blockchain, artificial intelligence (AI), and cloud-based systems are being used more and more (3). These technology developments enable supply chain participants to make data-driven, well-informed decisions and adjust more skillfully to changes in customer demand and interruptions. Building a resilient and responsive supply network requires integrating cross-functional data and guaranteeing platform compatibility, as the frameworks provided by (4) emphasize.

Despite these advances, multiple structural and technical challenges still hinder full-scale adoption of digital technologies in FSCs. Infrastructure limitations, technological illiteracy among smallholder farmers, and a lack of standardized platforms remain prevalent, particularly in developing countries (5). Furthermore, digital solutions often require significant financial investment and institutional support, making implementation uneven across regions. The effectiveness of technology-based FSCs also

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depends on collaborative governance and policy frameworks that align public-private interests while promoting inclusivity and access (3).

In addition to addressing hunger, modern FSC management must support broader health goals by ensuring access to nutritious, safe, and affordable food. A well-functioning FSC contributes significantly to the promotion of healthy lifestyles by ensuring continuous availability of fresh and high-quality food products (2). Research has shown that poor food supply infrastructure contributes to the nutritional gap, especially in rural and economically marginalized areas. Therefore, technological integration in FSCs is not solely an economic imperative but also a public health necessity.

Various global initiatives have been introduced to implement digital food supply chains in support of Zero Hunger. These include the development of digital implementation frameworks that assess technological readiness, governance models, and ecosystem engagement strategies (4). Multistakeholder cooperation—among governments, private sectors, academic institutions, and civil society—is also emphasized as a crucial strategy to ensure equitable access to innovations and long-term sustainability (1).

Given these complexities and opportunities, research on technology-based food supply chain management is both timely and essential. It offers a strategic lens to understand how digital innovations can be harnessed not only to combat hunger but also to promote public health through sustainable and inclusive food systems.

2 Literature Review

Digital Transformation in Food Supply Chain

In order to improve the openness, effectiveness, and resilience of food systems, the digitalization of food supply chains entails integrating technologies like blockchain, the Internet of Things (IoT), and big data analytics. By using environmentally friendly supply chain strategies, research by (6) highlights how these technologies can minimize food waste and lower carbon emissions. Additionally, results from (7) show that blockchain-based solutions greatly improve food product traceability from the point of origin to the end user or customer.

Zero Hunger

In order to eradicate hunger, guarantee food security, improve nutrition, and encourage sustainable agricultural practices, the United Nations (UN) set Zero Hunger as its second Sustainable Development Goal (SDG) (8) . According to (9) the idea goes beyond simply meeting calorie needs; it also includes ensuring that everyone has year-round access to wholesome, sustainably produced food. In order to accomplish this aim, it is also necessary to ensure that healthy meals are affordable, build local food systems, and promote cooperation between various stakeholders, such as governments, the commercial sector, and civil society, in order to enhance food supply chains.

According to (8) it is emphasized that a multidimensional approach is needed to achieve it, one of which is through digital transformation in the food supply chain. Digitalization is considered as one of the important enablers in improving production efficiency, distribution transparency, and data-driven food stock management. Technologies such as logistics information systems, blockchain-based tracking and predictive analytics are helpful in reducing food loss, accelerating food crisis response and ensuring food traceability from upstream to downstream.

Good Health

Good Health and Well-Being, as the third SDG, focuses on improving quality of life through inclusive health systems, access to medical services, and promotion of healthy lifestyles. This concept is not only limited to curing diseases, but also prevention, nutrition education, and promotion of healthy and balanced food consumption. (10) emphasized that the link between food systems and health is significant, as what individuals consume will have a direct impact on their short- and long-term health conditions. Therefore, the sustainability of food supply chains and transparent nutritional information are important elements in supporting the healthy lifestyle of modern society.

The role of digital technology in realizing Good Health is very real, especially through the development of smart labeling systems, nutrient content monitoring, and data-driven personal nutrition

applications. In a journal by (11) it is mentioned that consumers can now access nutritional information directly through QR code-based applications or IoT integration with product packaging, making it easier to make healthier consumption decisions and according to personal needs. Technology also strengthens quality control in the distribution of food products, ensuring freshness, safety and nutritional value are maintained throughout the supply chain.

3 Research Methods

This research uses a literature study approach by reviewing scientific journals published in the last five years, 2020 to 2025, that are relevant to the topics of technology-based food supply chain management, Zero Hunger, and healthy lifestyles. Data sources were obtained from databases such as Scopus, ScienceDirect, and accredited national journals. Journals that have been obtained are then selected and the results meet the criteria. The quality of the study was ensured through critical evaluation and triangulation of findings from various sources, resulting in comprehensive and integrated policy recommendations to achieve both sustainable development goals simultaneously (12).

4 Results and Discussion

Tabel 6. (Research on technology-based food supply chain management, Zero Hunger, and healthy lifestyle)

No.	Title	Result
1	Guest editorial: Digitizing food supply chains:apathtoen suring food security	The findings suggest that adopting digital tools can help mitigate the vulnerabilities exposed by global crises (13)
2	Nourish resilience in digital food supply chain in post COVID landscape: literature swill for past insights and future roadmap	Enhanced resilience from digital technology provides a competitive advantage, improving overall business performance (6)
3	Digital twin-enabled regional food supply chain: A review and research agenda	Digital Twins (DTs) enhance Regional Food Supply Chain management by improving decision-making and resource efficiency (14)
4	Food Nutrition Logging Platform Business to Help Healthy Diets	The integration of AI enhances user experience by automating nutritional recording and personalizing food recommendations (2)
5	Blockchain-Driven Food Supply Chains: A Systematic Review for Unexplored Opportunities	The study reveals Blockchain's potential to improve data integrity and reduce fraud through smart contracts (7)
6	Enablers to Achieve Zero Hunger Through IoT and Blockchain Technology and Transform the Green Food Supply Chain Systems	ANP findings indicate IoT and blockchain have the highest importance weights among enablers. The main aim is to contribute to achieving zero hunger by 2030 through enhanced food security and quality (8)
7	Digital Transformation in Food Supply Chains: An Implementation Framework	The research highlights the need for balanced integration of IoT, CC, and BDA to achieve successful digital transformation (15)
8	Exploring Factors and Impact of Blockchain Technology in the Food Supply Chains: An Exploratory Study	The study identifies nine significant factors driving blockchain adoption in food supply chains, categorized into technology, organization, and environment. Five impacts of blockchain technology adoption were identified: visibility, performance, efficiency, trust, and value creation (16)

Table 6 (continued)

No.	Title	Result
9	Factors affecting the adoption of blockchain technologies in the food supply chain	The study identifies factors affecting blockchain technology adoption in the food supply chain, including cost, scalability, firm size, and IT policy (17)
10	Analysis of the Influence and Impact of the Use of the Internet of Things on Supply Chain in Food and Beverages Industry	Key findings include the use of sensors, RFID tags, and blockchain for product tracking and monitoring. IoT facilitates real-time visibility, predictive analytics, and proactive troubleshooting, improving resource utilization and reducing waste (18)
11	Digital Anti-Aging Healthcare: An Overview of the Applications of Digital Technologies in Diet Management	Digital tools can track food intake, evaluate nutrient composition, and set dietary goals for individuals. The research indicates that integrated mobile apps and digital technologies improve diet control and user adherence (19)
12	Achieving UN SDGsinFoodSupply Chain Using Blockchain Technology	Blockchain is proposed as a solution for enhancing traceability, transparency, and reducing environmental impact in food supply chains (20)
13	The Impact of Emerging Technologies on Sustainable Agriculture and Rural Development	The integration of technologies like AI, IoT, and blockchain is expected to reshape agricultural practices and improve resource management. The findings suggest that these innovations can address challenges such as climate change and resource scarcity in agriculture (21)

1. Technology-Based Food Supply Chain Management

Digital transformation has revolutionized the food supply chain management system. Research results from various journals show that the adoption of technologies such as IoT (Internet of Things), Blockchain, Digital Twin, and AI (Artificial Intelligence) contributes significantly to improving the efficiency, transparency, and resilience of the food system. Studies such as those conducted by (6) and (15) highlight that the integration of these technologies can improve resource efficiency, data-driven decision-making and business competitiveness amid global uncertainty.

Furthermore, Blockchain-like systems are proven to improve data integrity and prevent fraud through smart contracts, as explained in (7) Blockchain-Driven Food Supply Chains and (15) Exploratory Study on Blockchain Adoption. The study identified important factors that influence technology adoption, including cost, scalability, internal policies, and organizational readiness. By utilizing IoT and other digital technologies, companies can conduct real-time product tracking, improve visibility, reduce waste, and ensure end-to-end food traceability.

2. Zero Hunger

The concept of Zero Hunger involves not only the elimination of hunger, but also long-term food security and a fair and efficient distribution system. According to the (8), technology plays an important role in achieving this goal. The results show that IoT and blockchain have a high significance weight in green food systems and can help achieve the Zero Hunger target by 2030.

The utilization of technology enables efficient monitoring of food stocks, prediction of shortages, and improved response to food crises. Other journals such as (20) state that technology can strengthen the traceability and transparency of food distribution systems, thereby reaching vulnerable populations who have been unable to access nutritious food. Technology also helps to reduce environmental impacts and improve global food distribution.

3. Healthy Lifestyle

A healthy lifestyle is closely related to the quality of food consumed and how nutritional information is conveyed to consumers. Studies from (19) that the integration of AI and mobile applications enables personalization of diet and evaluation of food composition based on individual needs. Digital technology is also capable of monitoring food consumption, setting nutritional goals, and providing recommendations automatically.

AI-based nutrition apps and mobile health apps can increase user adherence, which is an important aspect of long-term healthy diet success. Research (2) shows that people are increasingly helped by digital tools that provide real-time, practical and relevant information to support healthy lifestyles. Overall, technology not only enhances food safety and distribution, but also directly improves the quality of people's nutritional intake.

5 Conclusion

Based on the results of a literature review of various studies in the last five years, 2020 to 2025, it can be concluded that the integration of digital technology in the food supply chain management system makes a significant contribution in supporting the two major goals of sustainable development, namely Zero Hunger and Healthy Lifestyle. Technologies such as IoT, Blockchain, Digital Twin, and Artificial Intelligence not only improve operational efficiency and logistics visibility, but also strengthen data integrity, transparency, and data-driven decision-making in the food distribution system.

In the context of Zero Hunger, technology can drive the transformation of the food system to be more responsive, equitable and resilient to crises. Through digital technology, the food distribution process can reach populations that were previously difficult to access, strengthen food security, and support the reduction of waste and inefficiency. Meanwhile, in terms of Healthy Lifestyle, digital technologies such as diet apps and nutrition monitoring platforms enable individualization of food recommendations, real-time monitoring of consumption, and increased user adherence to healthy lifestyles.

Overall, the research results prove that digital-based technologies are important catalysts in realizing a sustainable and healthy food system, which supports the achievement of the Sustainable Development Goals (SDGs) in a more measurable and effective manner.

References

1. Gould-Yakovleva O. Voices from University Classrooms on Effects of Multimodality on Polylingual EAL College Students' Meaning Making. Int J Second Foreign Lang Educ. 2023;2(2):1–19.
2. Mahardhika BJ, Santoso B, Imron MA, Kuntari W. Bisnis Platform Pencatatan Nutrisi Makanan Untuk Membantu Pola Makan Yang Sehat. Wawasan J Ilmu Manajemen, Ekon dan Kewirausahan. 2025;(1).
3. Al-Omoush K, Ribeiro-Navarrete B, McDowell WC. The impact of digital corporate social responsibility on social entrepreneurship and organizational resilience. Manag Decis [Internet]. 2024 Jan 1;62(8):2621–40. Available from: https://doi.org/10.1108/MD-11-2022-1613
4. Kache F, Seuring S. Challenges and opportunities of digital information at the intersection of Big Data Analytics and supply chain management. Int J Oper Prod Manag [Internet]. 2017 Jan 1;37(1):10–36. Available from: https://doi.org/10.1108/IJOPM-02-2015-0078
5. Yadav S, Luthra S, Garg D. Modelling Internet of things (IoT)-driven global sustainability in multi-tier agri-food supply chain under natural epidemic outbreaks. Environ Sci Pollut Res. 2021;28(13):16633–54.
6. Kumar R, Samadhiya A, Kumar A, Luthra S, Pandey KK, El jaouhari A. Nourish resilience in digital food supply chain in post COVID landscape: literature swill for past insights and future roadmap. Int J Ind Eng Oper Manag. 2024;7(2):100–16.
7. Ellahi RM, Wood LC, Bekhit AEDA. Blockchain-Driven Food Supply Chains: A Systematic Review for Unexplored Opportunities. Appl Sci. 2024;14(19).
8. Kumar M, Choubey VK, Raut DR, Jagtap S. Enablers to achieve zero hunger through IoT and blockchain technology and transform the green food supply chain systems. Behav Res Ther [Internet]. 2023;104334. Available from: https://doi.org/10.1016/j.brat.2023.104334

9. Mbow, C., C. Rosenzweig, L.G. Barioni, T.G. Benton, M. Herrero, M. Krishnapillai, E. Liwenga, P. Pradhan, M.G. Rivera-Ferre, T. Sapkota, F.N. Tubiello, Y. Xu, 2019: Food Security. In: Climate Change and Land: an IPCC special report on climate change, dese (eds.)]. In press. Food security Supplementary Material Coordinating. Nature [Internet]. 2008;544(2):1–2. Available from: http://dx.doi.org/10.1038/544S5a
10. Mendoza I, Gonzales C, Favis A. Experience-based environmental education and significant life experiences that influence environmental action among Filipinos. J Environ Stud Sci. 2024 Jul 1;
11. Saragih ID, Hsiao C-T, Fann W-C, Hsu C-M, Saragih IS, Lee B-O. Impacts of interprofessional education on collaborative practice of healthcare professionals: A systematic review and meta-analysis. Nurse Educ Today [Internet].2024;136:106136. Available from: https://www.sciencedirect.com/science/article/pii/S0260691724000467
12. Aisyah NZ, Nurfansepta AG, Sianturi RS. NOWFood (No Wasting Food): Inovasi Aplikasi Donasi Dan Supermarket Online Guna. Kumpul Karya Tulis Ilm Tingkat Nas 2022 Inst Teknol Telkom Surabaya [Internet]. 2022;115–27. Available from: https://journal.ittelkom-sby.ac.id/lkti/article/view/285
13. Jagtap S, Trollman H, Woolley E. Guest editorial: Digitizing food supply chains: a path to ensuring food security. Int J Ind Eng Oper Manag. 2025;7(2):97–9.
14. Monteiro J, Barata J. Digital twin-enabled regional food supply chain: A review and research agenda. J Ind Inf Integr. 2025;45(April).
15. Wang S, Ghadge A, Aktas E. Digital transformation in food supply chains: an implementation framework. Supply Chain Manag. 2024;29(2):328–50.
16. Mohammed A, Potdar V, Quaddus M. Exploring Factors and Impact of Blockchain Technology in the Food Supply Chains: An Exploratory Study. Foods. 2023;12(10).
17. Masekwana F, Jokonya O. Factors affecting the adoption of RFID in the food supply chain: a systematic literature review. Front Sustain Food Syst. 2024;8(December):1–11.
18. Indra E, Fauzi A, Cahyadi Widharto F, Indah Pangesti S, Karuna Ernesto T, Billy Harland Y. Analisis Pengaruh dan Dampak Penggunaan Internet of Things pada Supply Chain di Food and Beverages Industry. 2024;2(2):60–74. Available from: https://creativecommons.org/licenses/by/4.0/
19. Theodore Armand TP, Kim HC, Kim JI. Digital Anti-Aging Healthcare: An Overview of the Applications of Digital Technologies in Diet Management. J Pers Med. 2024;14(3).
20. Chandan A, John M, Potdar V. Achieving UN SDGs in Food Supply Chain Using Blockchain Technology. Sustain. 2023;15(3):1–21.
21. Saikanth DRK, Ragini M, Tripathi G, Rajesh K, Giri A, Pandey SK, et al. The Impact of Emerging Technologies on Sustainable Agriculture and Rural Development. Int J Environ Clim Chang. 2024;14(1):253–63.

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