



E-commerce as a Modern Mechanism to Support Food Security A Theoretical Approach

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Abstract:

This study, entitled “*E-commerce as a Modern Mechanism to Support Food Security: A Theoretical Approach*,” aims to examine the role of e-commerce in supporting food security and enhancing the sustainability of food systems in light of contemporary digital transformations. The study adopts a descriptive-analytical approach by addressing the fundamental concepts and analyzing the relationship between e-commerce and food security.

The findings indicate that e-commerce contributes significantly to facilitating market access, improving the distribution of food products, reducing the role of intermediaries, and expanding consumers’ access to food. Furthermore, it helps reduce food waste, improve inventory management, and utilize data analytics for demand forecasting. On the other hand, the study highlights several challenges, including the digital divide, weak infrastructure, cybersecurity risks, and disruptions in supply chains.

Ultimately, the study concludes that e-commerce is not a substitute for food policies; rather, it serves as a supportive mechanism for achieving food security and enhancing the sustainability of food systems in the future.

Keywords : E-commerce, Food Security, Digital Transformation, Food Sustainability

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1. INTRODUCTION

The contemporary world is witnessing rapid transformations driven by technological development and the digital revolution, which have impacted various economic and social fields. This has led to the emergence of new patterns of economic transactions based on digitalization and communication via electronic networks, most notably e-commerce, which has become one of the most prominent features of the modern digital economy. The widespread proliferation of the internet, digital applications, and online platforms has brought about fundamental changes in production, marketing, distribution, and consumption methods, creating new opportunities for institutions and individuals to exchange goods and services with greater flexibility and higher efficiency.

In this context, e-commerce has emerged as one of the modern mechanisms that have reshaped economic relations and market access patterns. The buying and selling process is no longer confined by geographical borders or traditional channels; instead, it relies on digital media that facilitate the flow of goods and information and improve supply chain management. This has led to increasing attention towards e-commerce as a tool capable of supporting economic and social development.

On the other hand, food security is considered a strategic issue that has gained central importance in the agendas of countries and international organizations, especially in light of the growing challenges related to population growth, climate change, and economic crises. The concept of food security is no longer limited to merely providing food; it now encompasses ensuring its availability, accessibility, and sustainable access, thereby continuously and safely meeting individuals' nutritional needs.

Stemming from this interconnectedness between digital transformation and the requirements of sustainable development, the question arises about the extent to which e-commerce can contribute to enhancing food security by improving production and distribution processes, reducing food loss, and expanding access to food products, particularly in light of the transformations occurring in the global economy.

Accordingly, the problem addressed by this study is the following question:
To what extent does e-commerce, as a modern digital mechanism, contribute to supporting food security and enhancing the sustainability of food systems?

This main question branches into several sub-questions

1. What is meant by e-commerce and food security?
2. How does e-commerce affect the provision and accessibility of food?
3. What are the most prominent challenges that limit the role of e-commerce in achieving food security?

Objectives of the Study This study aims to:

Study Objectives

This study seeks to achieve the following objectives:

1. To identify and clarify the concepts of e-commerce and food security,
2. To examine the role of e-commerce in enhancing food provision and improving access to food.
3. To identify and analyze the major challenges that limit the effectiveness of e-commerce in achieving food security.

Significance of the Study

The importance of this study stems from its focus on a topic that combines two variables that are increasingly significant in contemporary research, namely e-commerce and food security, in light of the rapid digital transformations taking place worldwide and the emergence of new patterns of production, distribution, and consumption. The study is significant in that it contributes to enriching the theoretical literature related to understanding the relationship between e-commerce and food security, and in revealing the role that digital technologies can play in improving the efficiency of food systems and enhancing their sustainability.

It also highlights the mechanisms through which e-commerce contributes to facilitating market access, improving the distribution of food products, reducing food waste, and supporting individuals' access to food in a more flexible and efficient manner. Furthermore, the study's importance lies in its practical and developmental dimension, as it provides a perspective on the potential of utilizing digital transformation to support food policies and achieve sustainable development goals. It also opens the door for future research addressing more advanced applications, such as artificial intelligence and data analytics in food security management and the development of modern food systems.

The First Axis: The Conceptual Framework of E-Commerce and Food Security

First: The Concept of E-Commerce

E-commerce consists of two components: commerce, which refers to the exchange of goods and services with the aim of achieving economic benefit, and electronic, which refers to the use of digital tools and technologies to carry out various operations. With the development of information and communication technologies, the concept of e-commerce has become broader to include all commercial transactions conducted within digital environments.

In operational terms, e-commerce is defined as the buying and selling of goods and services through computer networks using digital means that allow orders to be placed and transactions to be completed electronically, regardless of the nature of the product or the method of payment or delivery. The classification of an activity as e-commerce depends more on how the order is executed electronically than on the type of goods or delivery method (OECD, 2025, p. 9).

E-commerce is also defined as a digital economic system that enables institutions and individuals to manage marketing, negotiation, exchange, and service delivery activities based on digital infrastructure and electronic communication, achieving speed and efficiency while expanding access to global markets (Sandu et al., 2025, p. 320).

In this study, e-commerce is operationally defined as a set of commercial activities and processes carried out through digital platforms and media in order to facilitate the circulation of food products and improve their accessibility and distribution efficiency. This is achieved by employing information and communication technologies in supply, demand, purchasing, and distribution processes in a way that contributes to supporting food security and enhancing the sustainability of food systems.

Specifically, in this study, it refers to the role played by digital platforms and applications in improving food availability, facilitating consumer access to food products, reducing gaps between producers and consumers, and enhancing the efficiency of food supply chain management.

2- Characteristics of E-Commerce

E-commerce is characterized by a set of features that make it a more advanced economic model compared to traditional trade. The most important of these include global reach, which enables access to international markets without geographical restrictions; speed and flexibility in conducting transactions around the clock; and reduced operational costs due to decreased reliance on intermediaries and traditional physical stores (Kvasnii, 2022, p. 35).

It is also characterized by easy access to information through the direct availability of product and service data to consumers, digital interaction that enables service customization and improves user experience, as well as reliance on data and intelligent technologies to support decision-making and analyze consumer behavior. These features have made e-commerce an effective tool in restructuring value chains as well as production and distribution processes within the digital economy (Sandu et al., 2025, p. 320).

3- Types of E-Commerce

E-commerce patterns vary according to the nature of the parties involved in the commercial process. This diversity reflects the evolution of the digital environment and the expansion of its use across various economic activities. E-commerce is generally classified into several main models that differ based on the nature of the relationship between buyers and sellers and the mechanisms of conducting transactions.

Business to Business (B2B)	Business to Consumer (B2C)	Consumer to Consumer (C2C)	Consumer to Government (C2G)
This model is considered one of the most widespread forms of e-commerce in terms of transaction volume and economic value. It refers to commercial transactions conducted between institutions and companies rather than with final consumers. These transactions include the purchase of raw materials, exchange of services, supply chain management, and electronic contracting between organizations. This model is characterized by large-scale transactions and long-term business relationships. It also contributes to improving production efficiency, reducing operational costs, and accelerating the flow of information and goods between institutions (OECD, 2019, p. 27).	This model is based on the direct relationship between businesses and end consumers, where companies offer their products or services through websites or digital applications, allowing consumers to browse and purchase them electronically. It is the most closely related model to everyday consumer life, especially with the widespread development of online stores and digital payment and delivery services. It also enables consumers to compare products and prices and access a wide range of options without temporal or spatial limitations. In the food sector, this model facilitates faster access to food products, improves the purchasing experience, and supports continuous access to food supplies (Wang & Archer, 2007, p. 91).	Consumer-to-consumer e-commerce refers to transactions conducted directly between individuals through online platforms that act as intermediaries to organize selling and buying processes. This model allows users to exchange goods and services among themselves, whether new or used products. It is characterized by low costs and easy access to a wide audience of users. It also reflects the shift toward a sharing economy, which has become a key feature of the modern digital environment, as it expands economic exchange beyond traditional commercial models (Wang & Archer, 2007, p. 91).	It also reflects the evolution of economic and administrative relations in the modern digital environment and the growing trend of public institutions toward digital transformation (Wang & Archer, 2007, p. 91). Thus, the various types of e-commerce demonstrate the breadth of its applications and the diversity of its fields, as it has become an integrated economic model that contributes to the development of commercial activities and improves the efficiency of economic transactions within the contemporary digital environment.

this model plays an important role in strengthening coordination between producers, suppliers, transport companies, and food distribution networks, thereby ensuring the continuity of supply and reducing disruptions in food availability.			
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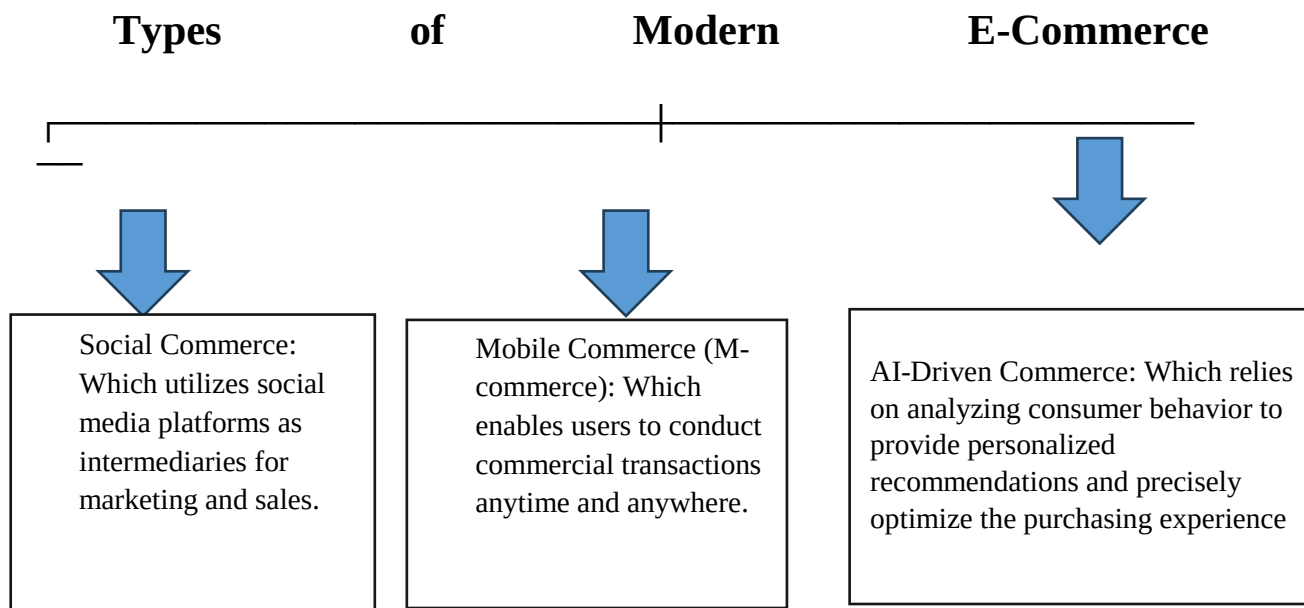
This model represents electronic transactions between individuals and government institutions through official digital platforms. It includes paying fees, obtaining official documents and services, and completing various administrative procedures.

This model has contributed to the development of e-government systems, improving public service efficiency, facilitating access, and reducing the time and costs associated with traditional administrative procedures.

The Evolution of E-commerce in the Digital Environment

E-commerce has witnessed rapid and remarkable development over recent decades, coinciding with the widespread proliferation of the internet and the shift toward a digital economy that has reshaped various economic and social activities. E-commerce has evolved from mere simple transactions of buying and selling goods via websites into integrated digital ecosystems. These systems rely on advanced technologies such as artificial intelligence (AI), big data analytics, cloud computing, and smart electronic payment systems, making them more efficient and flexible in meeting consumer and market needs (Sandu et al., 2025, p. 320).

With this rapid technological advancement, new forms of e-commerce have emerged, reflecting the depth of digital transformation in both consumer and productive behavior. Most prominent among these are:



These transformations have significantly enhanced the efficiency of commercial operations by accelerating buying and selling procedures, reducing operational costs, improving supply chain management, and expanding access to both domestic and international markets. Furthermore, they have fostered direct interaction between producers and consumers, thereby narrowing market gaps and improving transactional transparency.

In the same context, e-commerce has become a pivotal element within the modern digital economy due to its ability to reorganize economic relations in a more dynamic and flexible manner. It provides an interactive environment that connects various economic actors, supports innovation, and accelerates the transition toward a knowledge- and data-driven economy. Additionally, it contributes to boosting economic competitiveness by granting small and medium enterprises (SMEs) the opportunity to enter markets without the need for costly traditional infrastructure.

Thus, it can be argued that the evolution of e-commerce is no longer merely a technological advancement. Rather, it represents a profound structural shift in the nature of the global economy, reflecting a transition toward a new economic model founded on digitization, information integration, and real-time interaction between supply and demand. This positions e-commerce today as one of the most vital pillars of the contemporary digital economy (OECD, 2025, p. 11).

2 .The Concept of Food Security

1. Definition of Food Security According to Literature and International Organizations

The concept of food security has continuously evolved due to its close correlation with global economic, social, and demographic transformations. It has shifted from a narrow

focus on merely supplying food to a broader emphasis on ensuring food access, utilization, and sustainability.

The Food and Agriculture Organization of the United Nations (FAO) defines food security as a situation that exists: "when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life" (FAO, 2008, p. 1).

Furthermore, contemporary literature views food security as a multidimensional concept. It is not solely linked to agricultural production, but also encompasses the efficiency of distribution systems, purchasing power, health-related food utilization, and the stability of these elements over time. In recent years, there has been a growing emphasis on the concepts of sustainability and resilience to crises (FAO, 2024).

2. Dimensions of Food Security

Food security is built upon four interconnected dimensions, and it cannot be achieved unless all of them are met simultaneously (FAO, 2008, p. 2):

A. Food Availability

This refers to the presence of sufficient quantities of food of appropriate quality to meet the population's needs, whether through domestic production, imports, or available food stocks. This dimension addresses the supply side of the food system and is influenced by levels of agricultural production, stock levels, and net trade (FAO, 2008, p. 2).

While food availability is the baseline for achieving food security, abundance at the national level does not necessarily guarantee that food reaches all individuals equitably.

B. Food Access

This dimension refers to the ability of individuals and households to acquire appropriate food through available economic and social resources, whether via purchase, self-production, or institutional support.

Food access is influenced by several factors, including income levels, prices, purchasing power, market efficiency, and transport and distribution infrastructure (FAO, 2008, p. 3). This dimension represents one of the most critical contemporary challenges, as food may be available in markets while segments of the population remain unable to access it.

C. Food Utilization

Utilization refers to the ability of individuals to achieve optimal nutritional and health benefits from the food consumed, ensuring that the body's physiological needs are met.

This dimension does not only pertain to food intake, but also includes dietary quality, access to clean water, healthcare, nutritional awareness, sanitation, and public health conditions (FAO, 2008, p. 3). Consequently, achieving food security extends beyond food quantity to encompass the quality of its utilization.

D. Food Stability

Food stability means ensuring the continuous availability, access, and utilization of food over time without exposure to sudden interruptions or crises.

This dimension is affected by multiple factors, such as economic fluctuations, climate change, health crises, conflicts, and global supply chain disruptions. Therefore, it is viewed as the dimension that ensures the sustainability of the other three pillars (FAO, 2024). It underscores that food security is not just about the present, but also about the capacity to secure continuous access to food in the future.

Axis Two: E-Commerce as a Modern Mechanism for Supporting Food Security

E-commerce has become one of the most prominent manifestations of digital transformation that has directly influenced modern economic and food systems. It is no longer limited to being a means of buying and selling; rather, it has evolved into an integrated mechanism that contributes to improving the efficiency of food supply chains and enhancing their sustainability. In light of challenges related to increasing food demand, market fluctuations, and global crises, e-commerce has emerged as a strategic option for supporting food security by improving the flow of food products and reducing gaps between producers and consumers.

The Contribution of E-Commerce to Enhancing Food Availability

Facilitating Access to Markets

E-commerce has brought about a fundamental transformation in food product marketing mechanisms by removing many geographical barriers that previously limited producers' access to markets. Digital platforms have enabled farmers and food enterprises to present their products directly to a broad consumer base without relying entirely on traditional channels.

1. This model has also expanded opportunities for marketing agricultural and food products, increased circulation efficiency, and reduced the time gap between production and consumption, which positively affects food availability and ensures a continuous flow of food within markets (FAO, 2022, p. 24).
2. From this perspective, e-commerce has become a tool for strengthening the connection between food production and consumption, especially in environments with limited access to traditional markets.

B- Reducing Intermediaries and Supply Chains

E-commerce relies on more direct distribution models by connecting producers directly with consumers without passing through numerous commercial intermediaries.

This transformation has reduced logistics and operational costs, lowered the risk of food spoilage during transportation and storage, increased transparency in commercial operations, and improved information flow within food supply chains (UNCTAD, 2024, p. 57). Furthermore, reducing distribution stages enhances the ability of small producers to enter markets and contributes to a more balanced distribution of food resources.

C- Improving Food Distribution

The use of digital platforms contributes to improving food distribution management through reliance on real-time data to determine demand levels and direct supplies to areas with greater need.

E-commerce also helps reduce spatial disparities in food distribution by allowing surplus food products to be redirected to less supplied markets, thereby supporting food system stability and reducing the likelihood of food shortages (World Bank, 2023, p. 41).

The Role of E-Commerce in Improving Access to Food

A- Digital Platforms and Online Purchasing

E-commerce has reshaped food acquisition behavior through the development of digital platforms that enable consumers to search, compare, purchase, and pay electronically.

This development has reduced search costs and increased the efficiency of food access, especially with the expansion of delivery applications and mobile commerce services (OECD, 2025, p. 18).

Digital platforms have also become capable of providing more accurate information regarding prices, quality, and product availability, supporting more efficient consumer decision-making.

B- Supporting Remote Areas and Reducing Geographical Gaps

Reducing spatial disparities is one of the most important contributions of e-commerce to food security, as it facilitates the delivery of food products to rural and underserved areas with weak traditional commercial infrastructure.

Digital systems provide opportunities to overcome geographical barriers through delivery solutions and smart logistics services, thereby increasing people's ability to access food more consistently (FAO, 2022, p. 31)

C- Expanding Consumer Choices

E-commerce allows consumers access to a wider variety of food products compared with traditional markets.

This diversity improves the quality of food choices and increases opportunities to obtain products that meet different health and cultural needs, while also strengthening competition that positively affects prices and quality (UNCTAD, 2024, p. 62).

3- E-Commerce and Supporting the Sustainability of Food Systems

A- Reducing Food Waste

Food waste is considered one of the major challenges associated with food security, and e-commerce contributes to reducing it through better coordination between supply and demand.

The more accurate the information related to sales and consumption becomes, the lower the probability of overproduction and inefficient storage, which contributes to reducing food loss and improving resource efficiency (FAO, 2024, p. 19).

B- Improving Inventory Management

Digital tools associated with e-commerce have provided advanced capabilities for managing food inventories through tracking product movement and analyzing demand levels in real time.

This leads to improved production and distribution planning and reduces cases of product shortages or excessive accumulation in markets (World Bank, 2023, p. 44).

C- Data Utilization and Demand Forecasting

Data has become a strategic element in supporting food security, as digital analytics and artificial intelligence technologies enable forecasting consumption patterns and anticipating market needs.

These mechanisms help improve production and distribution decisions and strengthen the ability of food systems to adapt to future changes (OECD, 2025, p. 22).

Axis Three: The Theoretical Analysis of the Relationship Between E-Commerce and Food Security

1- Theoretical Approaches Explaining the Relationship

A- Functional Theory

Functional theory views society as an integrated system whose components operate in an interconnected manner to maintain social stability.

Within this context, e-commerce is interpreted as a modern economic institution that performs functions supporting food security by improving production and distribution processes and increasing the efficiency of access to food resources, thereby contributing to maintaining the balance and stability of the social system (Parsons, 1951, p. 26).

B- Network Society Theory

According to Manuel Castells, modern society is built upon digital networks that constitute the fundamental structure of economic and social relations.

3. Based on this perspective, e-commerce becomes one of the manifestations of the network society, enabling the rapid flow of goods and information and helping connect producers with consumers within a more flexible and efficient food system (Castells, 2010, p. 500).

4. **C- Digital Transformation Theory**

This theory emphasizes that technology is no longer merely a supportive tool but has become a factor capable of reshaping economic processes entirely.

Accordingly, the integration of e-commerce within the food sector contributes to improving production and distribution systems and enables a faster response to consumer needs and changing market demands (Vial, 2019, p. 121).

D- Sustainable Development Approach

This approach links economic growth with the rational use of resources and the achievement of social justice.

From this perspective, e-commerce is considered a supportive mechanism for achieving sustainable food security through improving efficiency, reducing waste, and enhancing equitable access to food resources (United Nations, 2015, p. 14).

2- Mechanisms of Mutual Influence**A- Digital Transformation and Food Supply Chains**

Digital transformation contributes to improving the efficiency of food supply chains through the integration of tracking technologies, data analysis, and real-time communication systems, which enhances the flow of food products and reduces market imbalances.

These technologies support better coordination among production, storage, transportation, and distribution activities, increasing the flexibility and resilience of food systems.

B- Digitalization and Changes in Consumer Behavior

The digital environment has contributed significantly to changing consumer behavior by increasing dependence on online ordering, digital comparison of products and prices, and making more informed purchasing decisions.

As a result, consumers have become more active participants in market processes, with greater access to information that influences their food choices and consumption patterns.

C- E-Commerce and Equity in Food Distribution

E-commerce can contribute to achieving greater food equity by reducing geographical disparities and expanding access to food products across different regions.

However, achieving this objective remains dependent on the availability of digital infrastructure and inclusive access to digital services, ensuring that all social groups can benefit equally from technological advancements and food distribution systems.

Axis Four: Challenges of Employing E-Commerce in Achieving Food Security

Despite the significant potential that e-commerce offers in supporting food security and improving the efficiency of food systems, its effective utilization still faces a set of structural, technological, and economic challenges that may limit its effectiveness and reduce its ability to achieve development and food sustainability goals.

1- Digital Divide

The digital divide is considered one of the major challenges facing the use of e-commerce in achieving food security. It refers to inequality in access to the internet, digital technologies, and the skills required to use them. This disparity creates clear differences between urban and rural areas and between developed and developing countries in benefiting from digital services.

The digital divide directly affects food security because limited access to electronic platforms reduces the ability of producers and consumers to benefit from marketing, distribution, and food accessibility opportunities. Moreover, weak digital integration may exclude certain social groups from participating in the digital economy and benefiting from its advantages (World Bank, 2023, p. 67).

Weak Technological Infrastructure

E-commerce depends fundamentally on the existence of advanced digital infrastructure, including communication networks, high-speed internet, electronic payment systems, and modern logistics services. However, many countries and regions still suffer from limitations in these components, which reduces the efficiency of digital commercial activities.

Weak infrastructure affects the speed of information transfer, transaction completion, and food delivery processes, thereby limiting the ability of e-commerce to support continuity in food supplies and maintain market stability (UNCTAD, 2024, p. 81)

3- Cybersecurity and Data Protection

The expansion of e-commerce has increased dependence on data exchange and digital transactions, making cybersecurity one of the key challenges associated with sustaining this economic model.

Major risks include system breaches, theft of personal and financial data, manipulation of commercial information, and cyberattacks that may affect food supply and production systems. Therefore, building a secure digital environment has become essential for enhancing trust in e-commerce and ensuring its continued role in supporting food security (OECD, 2024, p. 102).

- Supply Chain Disruptions

Although e-commerce has contributed to developing food distribution systems, supply chains remain vulnerable to disruptions caused by economic crises, natural disasters, climate change, and geopolitical tensions.

These disruptions affect the flow and availability of food products in markets and may lead to price increases or shortages of certain food items. Furthermore, the growing dependence on digital systems makes supply chain stability closely linked to the readiness of technological and logistical infrastructure (FAO, 2024, p. 36).

5- Economic and Social Inequality

The benefits of e-commerce remain uneven across different social groups, as income levels, education, and purchasing power influence access to digital services.

This inequality leads to unequal opportunities to benefit from electronic markets and obtain food, which may widen food justice gaps rather than reduce them if digital transformation

is not accompanied by inclusive policies that consider different social groups (United Nations, 2023, p. 29).

Axis Five: Prospects for Enhancing the Role of E-Commerce in Food Security

In light of rapid digital transformations, strengthening the role of e-commerce in food security has become dependent on the ability of governments and institutions to build flexible digital systems capable of addressing challenges and achieving food sustainability.

1- Developing Digital Infrastructure

Developing digital infrastructure is one of the fundamental requirements for the success of e-commerce in supporting food security. This includes expanding internet networks, improving communication services, and developing electronic payment systems and logistics services.

Investment in digital infrastructure can improve the efficiency of food circulation, facilitate market access, and strengthen the integration of food systems within digital environments (World Bank, 2023, p. 73).

2- Supporting E-Commerce Legislation

The effective use of e-commerce requires a legal and regulatory framework that protects users and regulates digital commercial activities.

Such legislation includes regulations related to electronic signatures, digital consumer protection, data security, and electronic financial transactions, which increase trust and encourage the expansion of e-commerce use within the food sector (UNCTAD, 2024, p. 88)

3- Encouraging Agricultural and Logistics Innovation

Innovation has become a key element in strengthening the relationship between e-commerce and food security through the application of modern technologies in production, storage, transportation, and distribution.

The development of smart agricultural solutions and digital logistics contributes to improving food system efficiency, reducing losses, and increasing responsiveness to changes in demand and markets (FAO, 2024, p. 41).

4- Promoting Digital and Consumer Culture

The success of e-commerce depends not only on the availability of technology but also on the ability of individuals and institutions to use it effectively.

Therefore, promoting digital literacy, developing technological skills, and raising awareness of responsible consumption are essential factors for maximizing the benefits of digital platforms and ensuring optimal use of food resources (OECD, 2025, p. 54).

5- Integrating Artificial Intelligence into Food Security Management

Artificial intelligence represents one of the most promising future directions in supporting food security through big data analysis, demand forecasting, and improving inventory and supply chain management.

It also enables the development of more accurate food decision-making models, crisis prediction mechanisms, and food waste reduction strategies, making food systems more flexible and sustainable in responding to future challenges (FAO, 2024, p. 48).

CONCLUSION

in light of the presented and analyzed information, it is clear that e-commerce has become one of the most prominent digital mechanisms that has imposed its presence across various economic sectors, including the food sector, which is witnessing rapid transformations due to digitalization and technological advancement. The study has shown that the relationship between e-commerce and food security is no longer limited to the commercial aspects of buying and selling food products. Rather, it now extends to improving the efficiency and enhancing the resilience of food systems through the development of mechanisms for production, distribution, storage, and access to food.

The results also demonstrated that e-commerce contributes to supporting food security at multiple levels by facilitating producers' access to markets, reducing the role of intermediaries, improving the distribution of food products, and expanding consumers' opportunities to access food more quickly and flexibly. Additionally, the role of digital tools in reducing food waste, improving inventory management, and leveraging data to forecast food demand—thereby enhancing the sustainability of food systems—has clearly emerged.

On the other hand, the study revealed that fully harnessing the potential of e-commerce is still contingent upon overcoming a range of challenges, most notably the digital divide, weak technological infrastructure, cybersecurity risks, disruptions in supply chains, and economic and social disparities that may limit equitable access to and benefit from digital services. This confirms that the success of e-commerce in supporting food security is not linked to technology alone, but requires a comprehensive institutional, legislative, and developmental environment.

Accordingly, it can be affirmed that e-commerce does not represent a substitute for national food policies or adopted agricultural and economic strategies. Instead, it serves as a supportive and complementary tool that contributes to increasing the efficiency of food resource management, improving access to them, and strengthening their ability to adapt to changes and crises. Consequently, achieving sustainable food security remains dependent on the integration of public policies with digital transformation and technological development. In this context, this study opens the door for more specialized future research that could address the impact of artificial intelligence on food security management, the role of e-commerce in developing local agricultural markets, the relationship between digital platforms and food justice, as well as the study of successful countries' experiences in employing the digital economy to achieve food sustainability. It is also possible to

expand into applied field studies that measure the actual impact of e-commerce on food security in Arab and developing environments.

References

1. Castells, M. (2010). *The Rise of the Network Society* (2nd ed.). Oxford: Wiley-Blackwell.
2. Food and Agriculture Organization (FAO). (2022). *The State of Food Security and Nutrition in the World 2022*. Rome: FAO.
3. Food and Agriculture Organization (FAO). (2024). *The State of Food Security and Nutrition in the World 2024*. Rome: FAO.
4. Kvasnii, L. (2022). Features of e-Commerce and Its Disadvantages. *European Scientific e-Journal*.
5. OECD. (2019). *Unpacking E-commerce: Business Models, Trends and Policies*. OECD Publishing.
6. OECD. (2024). *Digital Economy Outlook 2024*. OECD Publishing.
7. OECD. (2025). *The 2025 OECD definition of e-commerce and guidelines for interpretation*. OECD Publishing.
8. Parsons, T. (1951). *The Social System*. New York: Free Press.
9. Sandu, A., Cotfas, L.-A., Ioanăș, C., Cișmașu, I.-D., & Delcea, C. (2025). E-Commerce Meets Emerging Technologies: An Overview of Research Characteristics, Themes, and Trends. *Journal of Theoretical and Applied Electronic Commerce Research*, 20(4).
10. United Nations Conference on Trade and Development (UNCTAD). (2024). *Digital Economy Report 2024*. Geneva: United Nations.
11. United Nations. (2015). *Transforming Our World: The 2030 Agenda for Sustainable Development*. New York: United Nations.
12. United Nations. (2023). *Sustainable Development Goals Report 2023*. New York: United Nations.
13. Vial, G. (2019). Understanding digital transformation: A review and a research agenda. *Journal of Strategic Information Systems*, 28(2), 118–144.
14. Wang, S., & Archer, N. P. (2007). Electronic marketplace definition and classification: Literature review and clarifications. *Enterprise Information Systems*, 1(1), 89–112.
15. World Bank. (2023). *Digital Development and Food System Transformation*. Washington, DC: World Bank.