



Rethinking Agribusiness in the Digital Era

Apostolos Goulas^{1*}, Ilias Tsotsas², Zacharias Papanikolaou³, Maria Gianni⁴

¹Economist, Agricultural Economics, PhD, University of Thessaly, Greece

²Economist, Service design, PhD, International Hellenic University, Greece

³Agricultural Economics, PhD, Postdoctoral Researcher, Democritus University of Thrace, Greece

⁴Operations Management, PhD, Adjunct Lecturer, Hellenic Open University, Greece

✉ ***Corresponding author:**
goulasap@yahoo.com



This work is licensed under CC BY-NC-ND 4.0.
To view a copy of this license, visit
<https://creativecommons.org/licenses/by-nc-nd/4.0>

ABSTRACT: The global agri-food system is under a significant transformation due to various factors, such as digital transformation, climate change, sustainability goals, technological innovation and consumer demands. The extensive use of technologies and innovations in agriculture, such as Artificial Intelligence, the Internet of Things, the Metaverse, robotics, and drones, is completely reshaping agriculture and traditional agribusiness models, value chains, and production practices. This change is going beyond specific technological modernisation and application. It is about a structural redefinition of how agricultural products are produced, distributed, managed and consumed. The present study aims to identify issues in agriculture and present best practices from Europe.

KEYWORDS: agribusiness, sustainability, agri-food systems, digital era, digital transformation.

How to cite: Goulas, A., Tsotsas, I., Papanikolaou, Z., & Gianni, M. (2025). Rethinking Agribusiness in the Digital Era. *International Conference on Economic Sciences and Management in the Changing World 2025*, (pp. 199-204). Futurity Research Publishing. <https://doi.org/10.5281/zenodo.17539191>

Introduction

Agricultural production and the agri-food system worldwide are currently facing many challenges (Goulas and Papachatzis, 2024). Rapid technological developments, the pressures of climate change, the need for sustainability and the growing global demand for food make it necessary to reconsider the way we understand and practice agribusiness. Climate change and environmental degradation are challenges that our world is facing today (Goulas et al., 2025a). As Annosi et al. (2024) point out, the development and diffusion of digital technologies are radically transforming productive

sectors, including agri-food, which is experiencing significant changes in the context of the so-called “digital agriculture”. Moreover, Tsotsas et al. (2025) emphasise the importance of adaptation for companies to adopt new and innovative approaches, thereby gaining a competitive advantage and enhancing their sustainability performance. It is crucial to understand that rural businesses play a key role in the economy and local resilience, as they are one of the main contributors to local resilience in both direct and indirect ways (Steiner & Atterton, 2015; Goulas et al., 2025b). Comparable evidence from regional economies shows that localised, community-driven initiatives can reinforce territorial resilience and diversify income structures (Gkarane, Vassiliadis, & Gianni, 2022).

Although digital technology is not a new phenomenon in agriculture (Shepherd et al., 2018), in recent years, there has been an intensification of the discussion around its impact on the formation of new business models and the reorganisation of agri-food value chains. Rethinking Agribusiness in the Digital Era is not just about introducing new tools, but a total redefinition of the way agricultural products are produced, managed, distributed, and consumed. It is a continuous process of transformation, based on production practices, business strategies, the organisation of agri-food value chains, and the relationship between producers and consumers (Goulas, 2022). Similar sustainability-driven restructuring pressures have been extensively documented in regions which face severe tourism seasonality and are vulnerable to climate change, where destination models are forced to adapt for regional resilience (Gkarane & Vassiliadis, 2020).

According to Li et al. (2023), digital technology has increased the willingness of many farmers to engage in entrepreneurial activities, providing them with access to new information, markets, and partnerships. The digital era has begun to radically transform the face of agriculture, opening new pathways for sustainable development and providing critical tools to address global challenges, such as food security and environmental protection (Xu et al., 2024).

In recent years, however, the need to reshape the agricultural sector has become even more urgent due to the outbreak of zoonotic diseases, the climate crisis and growing consumer preferences for local products. Agribusinesses are also vulnerable to externalities, such as energy crises, climate change, and consumer preferences (Goulas, 2025). In addition, modern consumers are becoming increasingly sceptical about the origin, quality and environmental footprint of food, demanding transparency, traceability and ethical production practices (Goulas, 2022). In this light, the integration of digital technologies is not only a technological development, but a prerequisite for the re-legitimisation of agricultural production vis-à-vis society and the market. Palmi and Lezzi (2020) argue that agribusiness can develop innovative strategies rooted in tradition in the context of sustainability. Making it the main topic for the agribusiness sector and its companies, to balance innovation, tradition and sustainability (Goulas, 2025; Papanikolaou et. al., 2025).

This transformation is actively supported by a network of European and national policies, which aim to accelerate the green and digital transformation of agriculture. The Common Agricultural Policy (CAP) 2023–2027 emphasises smart and sustainable agriculture, promoting investments in digital technologies, innovation, research and farmer training (European Commission, 2023). At the same

time, the European Green Deal, particularly the “Farm to Fork” and “Biodiversity 2030” strategies, enhances the environmental sustainability and resilience of food systems. These policies are actual catalysts for the integration of technology, enhancing competitiveness and ensuring a just transition for producers.

New digital technologies, such as the Internet of Things (IoT), Artificial Intelligence (AI), blockchain, robotics and big data analytics, are recognised as factors that can enhance productivity, transparency and resilience throughout the agri-food chain (Bello, 2024).

Beyond the technological dimension, the digitalisation of agriculture entails a socio-economic transformation. Access to data and digital marketing platforms enhances transparency and the connection between producers and markets, facilitating direct communication with consumers and the creation of trust-based relationships. At the same time, digitalisation promotes new forms of agricultural cooperation and business ecosystems, where knowledge and innovation act as key drivers of growth.

However, the success of this transition depends on the existence of the necessary digital skills, infrastructure and an appropriate institutional framework. Small and medium-sized farmers, who form the backbone of the European agricultural sector, need support to effectively integrate new technologies and remain competitive in a rapidly changing environment. This process of internal transformation resembles the challenges faced by companies pursuing sustainable excellence through the integration of management systems, where internalisation becomes a key success factor for long-term sustainability (Gianni & Gotzamani, 2024).

Overall, digital agriculture is not just a technological innovation, but a new business logic based on sustainability, knowledge and connectivity. Rethinking the agri-food system in the light of the digital transition paves the way for greener, more resilient and equitable rural development, fully aligned with the objectives of the European Green Deal and the 2030 Agenda for Sustainable Development.

Research Aim and Research Questions

This study aims to explore the ongoing transformation of the global agri-food system driven by digitalisation, sustainability imperatives, and technological innovation. Specifically, it aims to explore how emerging technologies—such as Artificial Intelligence, the Internet of Things, robotics, drones, and the Metaverse—are transforming traditional agribusiness models, value chains, and production practices. The study will also highlight successful examples and good practices from Europe that demonstrate effective adaptation to this transformation. The study aims to answer the following questions through the presentation and examination of specific good practices in Europe. How are digital and technological innovations transforming traditional agricultural practices and agribusiness models? How are European countries implementing innovative technologies to enhance sustainability and efficiency in agriculture? What good practices and policy approaches can be identified from Europe that support the structural redefinition of the agri-food sector?

Research Results

For the present study, three good practices from Europe will be presented. Each of the cases is unique, but they are all focused on integrating innovation, new technologies and agribusiness. The cases presented are AgriTech Ireland Cluster (Ireland), Smart Agro Hub (Greece) and Smart Rural 21 (EU).

AgriTech Ireland Cluster is a collaborative cluster designed to strengthen Ireland's agricultural technology sector. It provides a structured ecosystem where companies, universities, and policymakers cooperate to enhance innovation, training, and competitiveness. That specific cluster focuses on supporting small and medium-sized agribusinesses, promoting digital transformation, and accelerating the development of smart agricultural solutions. Automation, robotics and Internet of Things systems are among those solutions. It is worth noting that the inclusive and partnership-based approach serves as an example of how regional clusters can drive innovation in agri-food technology (<https://agritechireland.ie/>).

The Smart Agro Hub operates as a national centre of innovation and expertise in smart agriculture, connecting various research organisations with businesses and technological providers. Smart Agro Hub is based in Greece, with a primary goal of promoting digital and sustainable transformation within the Greek agri-food sector. The Smart Agro Hub strongly believes that this can be achieved through collaboration, applied research, and knowledge transfer. The union and collaboration of various stakeholders can bridge the existing gap between academic institutions and the market. That collaboration can lead to new business models, precision farming tools, and data-driven decision-making for modern agriculture (<https://smartagrohub.gr/>).

Smart Rural 21 is a European-supported initiative with the overall aim of promoting and inspiring villages to develop and implement smart village approaches and strategies across Europe. Additionally, the initiative aims to draw conclusions and support future policy interventions in smart villages. The Smart Rural 21 project is led by the E40 Group (Hungary). It includes the Institut für Ländliche Strukturforschung (IfLS, Germany), the Agricultural University of Athens (AUA, Greece), empirica (Germany), Innovatiesteunpunt (ISP, Belgium), and eConcepts (Ireland) as partners. The project was a two-and-a-half-year project, supported by the European Commission (DG AGRI), and ended in November 2022. The project provided mentoring, networking, and practical tools for the communities that participated in the project, enabling them to design and implement smart solutions tailored to their specific challenges. Through this process, Smart Rural 21 demonstrated how digitalisation and community engagement can lead to the creation of strong, vibrant and sustainable rural areas (<https://www.smartrural21.eu/>).

Conclusions

Text: The global agri-food system, as already mentioned, is under transformation. A transformation driven by globalisation, digital transition, technological innovation and sustainability initiatives. We are witnessing the daily application of emerging technologies in the agricultural sector,

including AI, IoT, robotics, drones, and the Metaverse. Those applications are reshaping the traditional agribusiness models, production methods, value chains, and even markets. As a result of those, there is the improvement of productivity, efficiency and environmental performance, precision farming and data-driven decision making. The various European initiatives, such as the European Green Deal and the Common Agricultural Policy, are leading the effort for a digital shift toward sustainability and resilience. The successful practices presented demonstrate how the adoption of smart technologies can support economic competitiveness while achieving ecological and social objectives. The digital transformation of agriculture demonstrates in action not only a technological revolution but also a structural and cultural change in the agribusiness and the agri-food sector in general.

References

- Annosi, M.C., Appio, F.P., Brenes, E.R., and Brunetta, F., (2024). Exploring the nexus of digital transformation and sustainability in agribusiness: Advancing a research agenda. *Technological Forecasting and Social Change*. Vol. 206, September 2024. <https://doi.org/10.1016/j.techfore.2024.123587>
- Bello, S. M., (2024). Digital transformation in agribusiness and agripreneurship. In book: *Agripreneurship and the Dynamic Agribusiness Value Chain*, p.p. 103 - 116. January 2024, https://doi.org/10.1007/978-981-97-7429-6_6
- European Commission, (2023). https://agriculture.ec.europa.eu/common-agricultural-policy_en
- Gianni, M., & Gotzamani, K. (2024). The internalisation of integrated management systems as a key for sustainable companies: empirical evidence. *Total Quality Management & Business Excellence*, 35(1-2), 273-296. <https://doi.org/10.1080/14783363.2023.2290659>
- Gkarane, S., & Vassiliadis, C. (2020). Selective Key Studies in Seasonality Tourism: A Literature Review. *Strategic Innovative Marketing and Tourism: 8th ICSIMAT, Northern Aegean, Greece*, 2019, 247-256.
- Gkarane, S., Vassiliadis, C. A., & Gianni, M. (2022). EXPLORING PROFESSIONALS' PERCEPTIONS OF TOURISM SEASONALITY AND SPORTS EVENTS: A QUALITATIVE STUDY OF KISSAVOS MARATHON RACE. *Enlightening Tourism. A Pathmaking Journal*, 12(3), 24-51. <https://doi.org/10.33776/et.v12i3.7175>
- Goulas, A., (2022). Special markets for local agro food products. *Annals of the university of Craiova, Biology, Horticulture, Food products processing technology, Environmental engineering*. Vol. 27, No. 63. <https://doi.org/10.52846/bihpt.v27i63.30>
- Goulas, A., (2025). Shaping agribusiness in the new digital era: Bridging tradition with innovation for the agribusiness in Thessaly Greece. *Economics and Business Quarterly Reviews*, 8(1), pp. 18 - 25. DOI: 10.31014/aior.1992.08.01.647

- Goulas, A., and Papachatzis, A., (2024). Farm to Fork Strategy: A sustainable solution for rural communities. *Annals of the University of Craiova, Biology, Horticulture, Food products processing technology, Environmental engineering*. Vol. 29, No. 54, pp. 209 - 214
<https://doi.org/10.52846/bihpt.v29i65.143>
- Goulas, A., Papanikolaou, Z., and Tsotsas, I., (2025). European Green Deal: Creating a New Agricultural Production Model. *International Conference on Next - Generation Innovations and Sustainability 2025*. Futurity Research Publishing. <https://doi.org/10.5281/zenodo.15099887>
- Goulas, A., Tsotsas, I., Gkarane, S., and Papanikolaou, Z., (2025b). Management Approaches of Agricultural Enterprises in Mountainous Disadvantaged Areas: The case of Agrafa. *World Conference on Emerging Science, Innovation and Policy 2025*. Futurity Research Publishing. <https://doi.org/10.5281/zenodo.15844867>
- Li, F., Zang, D., Chandio, A.A., Yang, D., and Jiang, Y., (2023). Farmers' adoption of digital technology and agricultural entrepreneurial willingness: Evidence from China. *Technology in Society*, Vol. 73, May 2023. <https://doi.org/10.1016/j.techsoc.2023.102253>
- Palmi, P., and Lezzi, G., E., (2020). How authenticity and tradition shift into sustainability and innovation: evidence from Italia agritourism. *International Journal of Environmental Research and Public Health*, 2020, (17)15, 5389, <https://doi.org/10.3390/ijerph17155389>
- Papanikolaou, Z., Karelakis, Ch., Polymeros, K., Goulas, A., and Theodossiou, G., (2025). Export motivation and clustering of Greek yogurt firms. *International Journal of Sustainable Agricultural Management and Informatics*, Vol. 11, No. 3.
- Shepherd, M., Turner, J.A., Small, B., and Wheeler, D., (2018). Priorities for science to overcome hurdles thwarting the full promise of the 'digital agriculture' revolution. *Journal of the Science of Food and Agriculture*.
- Steiner, A., and Atterton, J., (2015). Exploring the contribution of rural enterprises to local resilience. *Journal of Rural Studies*, 40, pp. 30 - 45.
- Tsotsas, I., Papanikolaou, Z., and Goulas, A., (2025a). Emerging trends in business sustainability: A bibliometric analysis in innovation practices. *International Conference on Next - Generation Innovations and Sustainability 2025*. Futurity Research Publishing. <https://doi.org/10.5281/zenodo.15098298>
- Xu, J., Li, Y., Zhang, M., and Zhang, S., (2024). Sustainable Agriculture in the Digital Era: Past, Present, and Future Trends by Bibliometric Analysis. *Heliyon*, 10(7): e34612. <https://doi.org/10.1016/j.heliyon.2024.e34612>
- <https://agritechireland.ie/>
- <https://smartagrohubs.gr/>
- <https://www.smartrural21.eu/>