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Review

Shaping Sustainable Leadership in Agriculture Through Artificial Intelligence: Analytical and Bibliometric Perspectives

Inna Balahurovska[1]

[1] Department of Management, Sumy State University, 2, Rymskogo-Korsakova st., 40007 Sumy, Ukraine; i.balahurovska@management.sumdu.edu.ua

Joint Doctoral School, Silesian University of Technology, 44-100 Gliwice, Poland Department of Applied Social Sciences, Faculty of Organization and Management, Silesian University of Technology, 26 Roosevelt 26 Street, 41-800 Zabrze, Poland

* Correspondence: i.balahurovska@management.sumdu.edu.ua (Ukraine)

Abstract: The article is devoted to the study of the impact of artificial intelligence on the concept of sustainable leadership in agriculture. The purpose of the study is to analyze the role of artificial intelligence in the development of sustainable agriculture and its impact on leadership strategies in the agricultural sector. The study used literature review and predictive analysis methods used in agricultural activities, where technologies are integrated into their management strategies. The main results show that the implementation of artificial intelligence contributes to increasing the efficiency of management decisions, reducing environmental impact, and optimizing resource use. Specific data show that farmers who use intelligent systems to monitor and forecast yields achieve increased productivity while reducing costs. The greatest effect is observed in strategic decisions regarding adaptation to climate change and sustainable use of land resources. The conclusions indicate that artificial intelligence has significant potential to support the sustainable development of the agricultural sector, forming new approaches to leadership and management.

Keywords: leadership, artificial intelligence, sustainable development, sustainable impact

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1. Introduction

Agriculture has traditionally been considered the basis of economic development in many countries, ensuring food security and maintaining socio-economic stability. However, the modern agricultural sector faces numerous challenges, namely climate change, degradation of natural resources, urbanization, and increasing demands for environmental responsibility. Such factors determine the need to implement innovative management approaches simultaneously solving environmental, economic, and social problems.

From this point of view, the concept of sustainable leadership is highly relevant. It offers a systemic approach to management that considers long-term perspectives and the relationship between

economic, social, and environmental activity issues. It is also oriented towards preserving resources for future generations. Although many studies focus on the environmental and financial aspects of sustainable development, insufficient attention is paid to the role of leadership as a driving force for agricultural transformations.

An essential component of technological transformation is the introduction of artificial intelligence (AI), which allows for solving resource optimization problems, reducing the human factor's impact, and predicting risks. AI technologies, such as machine learning, precision agriculture, and automated monitoring systems, already demonstrate significant potential for increasing productivity and sustainability of agricultural production. However, their impact on management approaches and the formation of leadership strategies in the context of sustainable development is still insufficiently studied.

Scientific discussions in this area reflect different points of view on the integration of AI into agriculture. Some researchers emphasize its role as a powerful tool for reducing environmental impact (Kale et al., 2024), while others point to potential social risks, particularly job losses in traditional industries. (Liu et al., 2024) In addition, there are still controversies regarding the effectiveness of AI in the long term, particularly in the context of climate change adaptation (Nishant et al., 2020).

This paper aims to identify the role of artificial intelligence in shaping sustainable leadership in the agricultural sector. The paper analyses how AI technologies influence decision-making, resource management, and the achievement of long-term sustainable development goals. Particular attention is paid to sustainable impact, integrating innovative, economic, environmental, and social components. The study's main findings indicate that artificial intelligence is a key factor in transforming the agricultural sector, contributing to the transition to environmentally responsible, socially oriented, and cost-effective practices. The paper highlights the importance of an interdisciplinary approach to sustainable leadership, combining modern technologies with social responsibility principles.

2. Materials and Methods

This study investigates the role of artificial intelligence (AI) in shaping sustainable leadership in agriculture by combining several methodological approaches. The research design integrates a systematic literature review, bibliometric analysis, and predictive analytics, providing a theoretical and empirical foundation for the study.

The data collection process was based on a systematic search in the Scopus database using the keywords "artificial intelligence," "sustainable," and "leadership" within the subject area of agricultural sciences. The search covered the period from 2015 to 2025 and resulted in the identification of 977 scientific publications. These publications examined various aspects of AI implementation in sustainable agriculture. To further analyze the data, the SciVal analytics platform was employed to visualize keywords, reveal research trends, and identify the most cited authors and influential contributions in the field.

In addition, a complementary search strategy was applied in Scopus using the query (TITLE-ABS-KEY (artificial AND intelligence) AND TITLE-ABS-KEY (sustainable) AND NOT TITLE-ABS-KEY (leadership)) AND PUBYEAR > 2014 AND PUBYEAR < 2026 AND (LIMIT-TO (SUBJAREA, "AGRI")). This approach also confirmed the identification of 977 relevant publications addressing AI's application in the agricultural sector's sustainable development, focusing on effective resource management, optimization of agro-technological processes, productivity enhancement, and environmental sustainability. The analysis of these works made it possible to trace the main trends in AI adoption for tackling current challenges in agriculture and to identify research gaps requiring further scientific investigation.

The analytical framework of the study was developed in three interconnected stages. First, a conceptual analysis of sustainable leadership in agriculture was conducted to define the concept's theoretical foundations and determine its key attributes. Second, the role of AI in sustainable agriculture was assessed, with particular emphasis on identifying AI-driven solutions that enhance

environmental and economic sustainability. Third, the influence of AI on leadership strategies was evaluated by exploring how digital technologies are reshaping decision-making processes, risk management practices, and stakeholder engagement.

To illustrate AI's cyclical and systemic influence on agricultural leadership, a model was developed that synthesizes findings from the literature review and bibliometric studies. This model establishes the relationship between AI-driven technologies, sustainable farming practices, and leadership decision-making processes. It demonstrates how artificial intelligence supports environmentally responsible, socially oriented, and economically efficient management strategies, fostering long-term sustainability in the agricultural sector.

In addition to qualitative analysis, the study employed descriptive and predictive methods to quantify the impact of AI. Predictive analytics was used to evaluate the contribution of key AI technologies to resource optimization, productivity growth, and environmental sustainability. Bibliometric analysis further complemented this approach by examining the level of research activity, citation impact, and the influence of leading authors and institutions.

It should be noted that the study has certain limitations, primarily related to its reliance on secondary data. While bibliometric and predictive methods provide valuable insights, empirical validation through case studies and field experiments remains necessary. Therefore, future research should focus on the practical implementation of AI in agricultural enterprises and assessing its socio-economic effects on rural communities.

3. Results

3.1. Trends in artificial intelligence research in the agricultural sector

Modern research in agriculture is increasingly focused on integrating artificial intelligence, which is becoming a key tool for increasing efficiency, ensuring food security, and supporting sustainable development. Theoretical analysis of scientific publications shows that researchers focus on technologies that can optimize resource management, improve the accuracy of agro-technological processes, and reduce environmental risks. In this context, artificial intelligence is considered not only a tool for automation but also a means of forming new approaches to leadership in the agricultural sector, where economic efficiency, social responsibility, and environmental sustainability are combined. Figure 1 presents a visualization of key concepts that reflect the main research areas related to the application of artificial intelligence in agricultural sciences in 2014-2023.

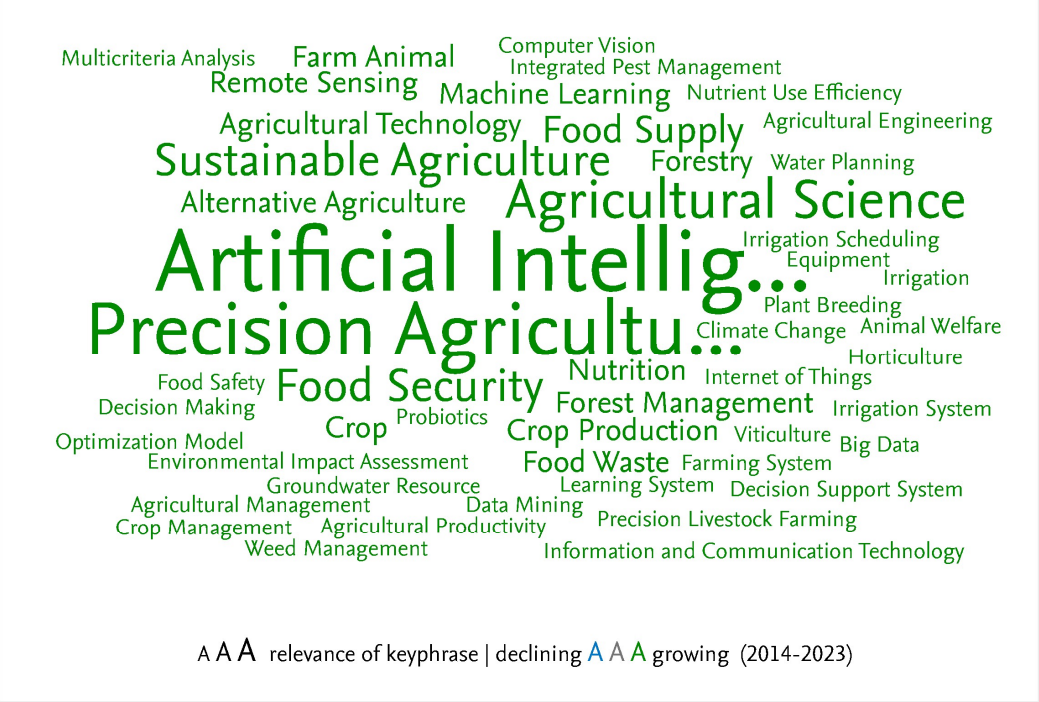

Figure 1. Visualization of key concepts in research on artificial intelligence in agricultural sciences (2014-2023) (Source: SciVal, based on Scopus data)
Abbreviations: Artificial Intellig… - Artificial Intelligence; Precision Agricultu… - Precision Agriculture.

The graphical representation allows us to trace the relationships between key concepts, including Artificial Intelligence, Agricultural Science, Precision Agriculture, Sustainable Agriculture, and Food Security, which are most frequently encountered. (Table 1)

Table 1. Top 5 Keyphrases by Scholarly Output (Source: SciVal, based on Scopus data)

Keyphrase	2019	2020	2021	2022	2023	2024	2025	2019 - >2024
Artificial Intelligence	15	27	48	68	132	131	1	422
Agricultural Science	3	11	23	30	29	41	0	137
Precision Agriculture	1	3	9	20	29	29	0	91
Sustainable Agriculture	3	4	10	15	13	22	1	68
Food Security	1	3	8	7	15	25	0	59

This trend indicates the high attention of the scientific community to the use of artificial intelligence in ensuring sustainable agricultural development and food security. The visualization also illustrates the role of technologies such as Machine Learning, Remote Sensing, Data Mining, Decision Support Systems, and the Internet of Things in developing digital approaches to agricultural processes. Overall, the keyword analysis demonstrates the growth of scientific interest in integrating AI into agrarian production, optimizing resource use, increasing yields, and adapting to climate change.
The analysis of publication activity allows us to identify authors who significantly contribute to developing research on artificial intelligence and sustainable leadership in agricultural and biological sciences. Table 2 presents the top authors for the period 2014–2023 based on Scopus data, taking into account the number of publications, citations, and h-index.

Table 2. Top authors in the field of artificial intelligence and sustainable leadership (2014-2023, Scopus) (Source: SciVal, based on Scopus data)

Name	Scholarly Output	Most recent publication	Citations	h-index
1. Manna, Piero	5	2023	125	15
2. Terribile, Fabio	5	2023	125	31
3. Langella, Giuliano	5	2023	125	17
4. Basile, Angelo	5	2023	125	26
5. Neethirajan, Suresh	5	2023	69	43
6. Tedeschi, Luís Orlindo	5	2023	80	46
7. Barba, Francisco J.	4	2023	354	96
8. Mileti, Florindo Antonio	4	2023	104	11
9. Hassoun, Abdo	4	2023	333	31
10. Kussmann, Martin	3	2023	54	39

Analyzing the list of top authors in artificial intelligence and sustainable leadership in agricultural and life sciences according to Scopus data (2014–2023) allows us to identify key trends in publication activity and scientific impact. Piero Manna, Fabio Terribile, Giuliano Langella, Angelo Basile, Suresh Neethirajan, and Luís Orlando Tedeschi have the most significant number of scientific papers (5), while their citations vary from 69 to 125. Suresh Neethirajan has the highest h-index among these authors (43), indicating his research's high recognition. The researcher Francisco J. Barbahaving four publications received the most significant number of citations (354) and demonstrates the highest h-index (96). Abdo Hassoun (333 citations, h-index 31) and Florindo Antonio Mileti (104 citations, h-index 11) also significantly influence the scientific community. The scientific experience of Martin Kussmann, who has only three publications but a high h-index (39), indicates a considerable citation rate and scientific impact of his works.

Research in sustainable agriculture, artificial intelligence, and environmental management shows significant progress in using digital technologies for resource optimization and decision-making.

Considerable attention is paid to developing geospatial decision support systems for natural resource and biodiversity management. For example, the LandSupport platform helps land users minimize natural resource degradation (Bancheri et al., 2023), and another system facilitates biodiversity planning (Mileti et al., 2024). A similar approach was used in the study by Mileti et al. (2022), where the geospatial system was used to develop ecotourism.

A significant contribution to the sustainable development of agriculture is made by the study of Bancheri et al. (2024), which offers a web-based tool for identifying the best agricultural practices in Europe. At the same time, Tedeschi et al. (2024) and Guarnido-Lopez et al. (2024) explore the possibilities of applying computer vision to livestock management. In particular, Guarnido-Lopez et al. (2024) propose computer vision algorithms to support decision-making in livestock farming, which increases the efficiency of livestock farming. Also, Neethirajan et al. (2024) emphasize the role of artificial intelligence in the interaction of people with farm animals, which improves their welfare. The importance of these studies is noted by the significant number of citations of Neethirajan, which confirms the relevance of his scientific achievements.

Another aspect of sustainable development concerns the use of agro-industrial waste. Salgado-Ramos et al. (2024) consider ecological methods for processing wine waste, and Aït-Kaddour et al. (2024) summarize various "Food Industry 4.0" technologies for transforming crop residues into valuable products.

A deeper understanding of the problem of rational use of soils is presented in the work of Terrible et al. (2024), which considers approaches to forming effective, sustainable land use policies. Finally, the importance of healthy nutrition in a global context is emphasized in the editorial article of Kussmann et al. (2024), which focuses on the relationship between food, health, and ecology.

Thus, the literature review demonstrates an integrated approach to research on sustainable development in agriculture, where digital technologies, ecological strategies, and artificial intelligence play a key role in shaping effective management decisions.

3.2. The concept of sustainable leadership in agriculture

Sustainable development has become one of the priorities for the agricultural sector, as agriculture plays a crucial role in ensuring food security, preserving environmental resources, and maintaining social stability in many regions of the world. (Godfray et al., 2014) Given the specifics of agriculture (Shahmohamadloo et al., 2021), where production processes depend on natural conditions and significantly impact the environment, sustainable leadership assumes that agricultural leaders should take responsibility for the sustainable use of resources and environmental safety.

Sustainable leadership is an approach to management that ensures the long-term effectiveness of organizations and communities, considering economic, social, and environmental issues. (Iqbal et al., 2020) A sustainable leader focuses on creating conditions for sustainable development, maintaining a balance between the interests of different parties, and preserving resources for future generations. The characteristic feature of sustainable leadership is systems thinking, which allows for considering the interrelationships between the activity's economic, socially and environmental parts and a long-term perspective aimed at making decisions and evaluating their impact on future generations. (Piwowar-Sulej et al., 2022) An essential component of sustainable leadership is ecological awareness, which provides a guideline for preserving the environment and rational use of resources. A sustainable leader also stimulates innovation to achieve sustainable results, promotes team involvement, develops talents, supports employees, and creates conditions for their professional realization.

A sustainable leader in agriculture acts not only as a manager who ensures the effective functioning of the organization but also as an agent of change in long-term prospects. (Tudi et al., 2021) Leadership is about developing strategies that reduce environmental impacts, promote sustainable resource use, and support the well-being of communities involved in the agricultural sector.

Agriculture is a sector that plays a critical role in ensuring food security and supporting sustainable development. (Harris et al., 2020) Its characteristics create complex challenges for organizations and managers in the agricultural sector.

In response to these challenges, sustainability offers a holistic approach based on the sustainability of social inclusion and environmental responsibility. This approach not only effectively addresses current issues but also creates the conditions for long-term development, balancing the needs of the present with the interests of future generations. Figure 2 shows the relationship between the characteristics of agriculture and the concept of sustainable leadership.

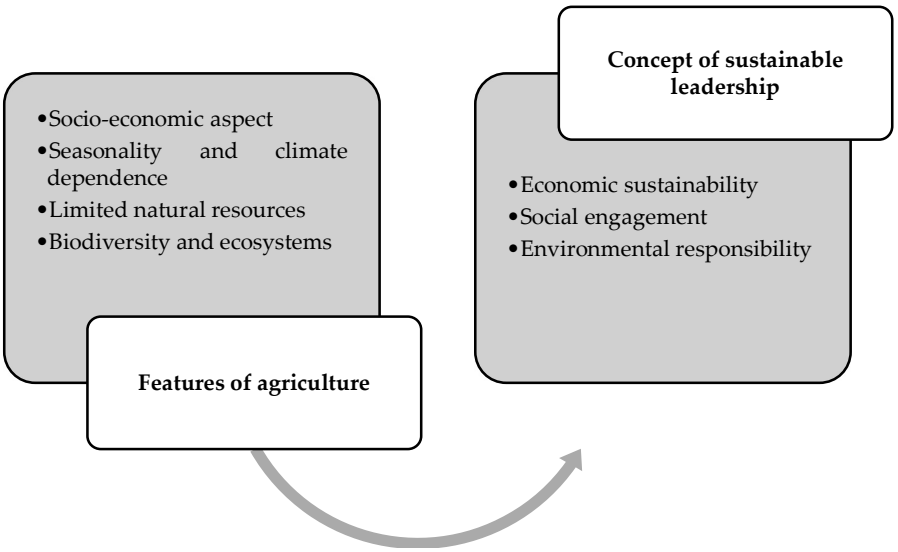

Figure 2. The relationship between the characteristics of agriculture and the concept of sustainable leadership (Source: compiled by the author)

Figure 2 depicts the relationship between the characteristics of agriculture and the concept of sustainable leadership, which ensures the long-term development of the agricultural sector. Several specific factors affect management approaches in agriculture. The socio-economic aspect of agriculture is related to providing income and development of rural communities, which requires considering their needs and promoting socio-economic development. (Nugraha et al., 2022) In connection with these features, sustainable leadership is focused on environmental, social, and economic sustainability. It involves using technologies that minimize environmental impact, contribute to the financial stability of farms, and support local communities. This includes the transition to environmentally friendly technologies, resource optimization, and the development of innovations, such as artificial intelligence, which help solve modern challenges. The seasonality and climate-dependent nature of agricultural operations complicates decision-making and resource planning, requiring consideration of long-term environmental risks such as climate change and water scarcity. The limited availability of natural resources such as soil and water highlights the need to implement sustainable practices, including precision agriculture, which optimizes the use offers and water. The role of biodiversity and ecosystems affected by agricultural activities is also essential, as their preservation is critical for ecosystem stability and long-term productivity. (Siankwilimba et al., 2023) A sustainable approach encompasses environmental responsibility, social inclusion, and economic sustainability, focusing on conserving biodiversity, supporting decent work, developing communities, and innovating to increase productivity. Thus, sustainable leadership in agriculture seeks to find a balance between the needs of the present and the interests of future generations, responding to the challenges of climate change, urbanization, and depletion of natural resources.

3.3. The role of artificial intelligence in the development of sustainable agriculture

Sustainable development of agriculture is a challenge of our time (Singh et al., 2022) due to the need to ensure food security, preserve natural resources, and reduce the negative impact on the environment. In this context, artificial intelligence (AI) is an innovative tool that optimizes the production process and the transformation of approaches to sustainable leadership in the agricultural sector. Figure 3 shows the direction of artificial intelligence's influence on sustainable agriculture development.

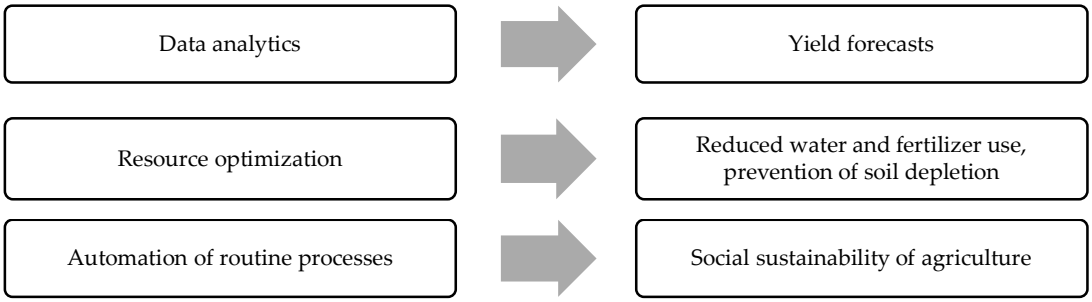

Figure 3. Use of artificial intelligence in sustainable agriculture (Source: compiled by the author)

One of AI's primary roles is analyzing large volumes of data, including climate, soil, and economic data. (Hernandez et al., 2024) This allows agricultural leaders to make informed decisions considering long-term environmental and social risks. With the help of machine learning algorithms, yield prediction, optimal timing of sowing and harvesting, and identification of risk areas to reduce product losses are possible.

AI promotes the rational use of natural resources by implementing precision farming methods. In particular, technologies based on artificial intelligence allow you to accurately determine the required

amount of water, fertilizers, and plant protection products. This approach reduces costs, minimizes the environmental impact, and contributes to preserving ecosystems and biodiversity.

In addition, artificial intelligence can significantly increase the social sustainability of agriculture. (Shankar et al., 2020) Automation of routine processes reduces the physical load on workers, allowing them to focus on strategic aspects of management. Also, thanks to intelligent systems, it is possible to create training programs for agricultural communities, which increases their awareness of modern methods of sustainable management.

AI promotes sustainable leadership by helping farmers implement environmentally and socially responsible practices. Leaders who use intelligent systems can be more transparent in their activities, report to society on implementing environmental standards, and ensure fair working conditions for employees.

Thus, artificial intelligence creates new opportunities for the development of sustainable agriculture. It optimizes agricultural processes and contributes to the transformation of management approaches, considering environmental, social, and economic aspects. (Sood et al., 2022) In the future, AI's role in forming a sustainable agricultural sector will only grow, helping to overcome global challenges and ensure the well-being of future generations.

The introduction of artificial intelligence will allow for the optimization of production processes and increase resource use efficiency. Thanks to this, the agricultural industry can reach a qualitatively new level of development, meeting modern challenges. According to forecasts, the retail industry's artificial intelligence market demonstrates significant growth potential.

According to the analytical company Market.us Scoop (Pangarkar, 2025), the use of artificial intelligence in the agricultural sector is growing steadily and dynamically. This is due to the active implementation of innovative solutions, which allows agrarian enterprises to increase production efficiency and adapt to modern challenges. Table 3 shows the forecasted market size by year. The table shows the growth dynamics of the agriculture artificial intelligence market for 2022-2032. The data illustrate the gradual increase in market volumes, which is a consequence of implementing innovative technologies to increase the efficiency of agricultural production, optimize resources, and reduce the impact of the human factor.

Table 3. Forecast of growth of the artificial intelligence market in agriculture (2022-2032) (Source: Market.us Scoop)

Year	Market size (USD billion)
2022	1,2
2023	1,5
2024	1,8
2025	2,4
2026	3,0
2032	10,2

Table 3 provides an overview of the growth rate and the projected prospects for the development of this industry. The data analysis indicates a significant growth of the market for artificial intelligence in agriculture between 2022 and 2032. The increase in the market volume to 10.2 billion US dollars by 2032 emphasizes the importance of implementing AI solutions to ensure the sustainable development of the agricultural sector and increase its productivity.

According to research firm Mordor Intelligence, the agricultural AI market is expected to grow from US$2.55 billion in 2025 to US$7.05 billion by 2030 at a compound annual growth rate (CAGR) of 22.55% during the forecast period (Table 4).

Table 4. Forecast of growth of the artificial intelligence market in agriculture (2025-2030) (Source: Mordor Intelligence)

Year	Market size (USD billion)
2025	2,55
2026	3,13
2027	3,83

2028	4,69
2029	5,75
2030	7,05

The data obtained indicate the active development of innovative technologies in the agricultural sector, especially those based on artificial intelligence. The market's growth is explained by the need to optimize resources, increase productivity, and implement sustainable approaches in agricultural production. This opens up new opportunities for agribusiness and investors, contributing to the digital transformation of the industry.

3.4. The sustainable impact of artificial intelligence on leadership strategies in the agricultural sector

Sustainable impact can be defined as a long-term, balanced impact on the social, economic, and environmental aspects of development, which ensures harmony between the current needs of society and the preservation of resources for future generations. (Abbasi et al., 2022) In agriculture, sustainable impact involves implementing practices and technologies that simultaneously promote productivity, reduce negative environmental impacts, and improve the quality of life of local communities.

Sustainable impact results from the synergy between sustainable leadership principles and modern technologies, particularly artificial intelligence (AI). Leaders who focus on sustainability play a central role in creating environmentally responsible and socially oriented growth conditions. The implementation of AI in agriculture allows you to achieve not only short-term results but also lay the foundation for long-term development.

Recent research highlights that the application of AI is not limited to improving technical efficiency but encompasses changing management strategies, systems thinking, and stakeholder engagement. In particular, solutions based on computer vision and geospatial decision support systems (Terribile et al., 2024; Bancheri et al., 2024) help agricultural leaders minimize soil degradation, develop biodiversity conservation policies, and make more informed long-term decisions. This expands the role of AI in shaping a strategic vision for sustainable development.

Figure 4 presents a scheme of the interaction of the main components that form a holistic approach to management in the agricultural sector. Its structure reflects processes that contribute to economic efficiency, environmental sustainability, social progress, and integrating modern technologies into sustainable leadership. The scheme is presented as a circle, reflecting the cyclical nature of the sustainable impact, where each component is closely linked to the next and ensures their interaction. The proposed approach demonstrates that sustainable impact in agriculture is a constantly recurring process, where achievements in one aspect create conditions for improving others.

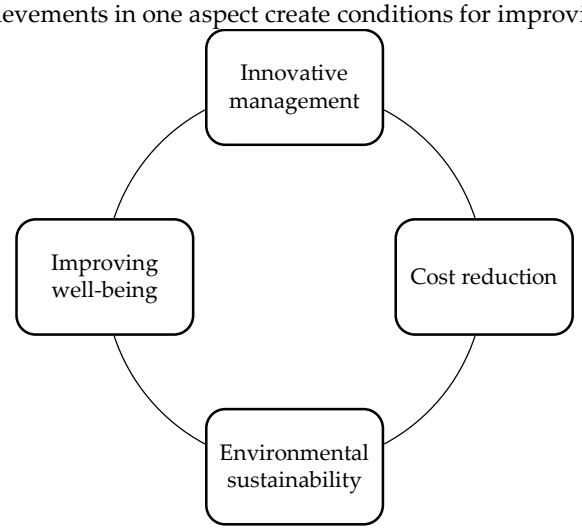

Figure 4. Scheme of the sustainable impact of artificial intelligence on leadership strategies in the agricultural sector (Source: compiled by the author)

The sustainable impact of artificial intelligence on leadership strategies in the agricultural sector is a multidimensional process that encompasses innovative management, cost reduction, environmental sustainability, and increased well-being. In the first stage, innovative management approaches (Füller et al., 2022) and artificial intelligence technologies, such as machine learning, predictive analytics,s and the Internet of Things, allow for decisions based on analyzing large volumes of data. This contributes to optimizing all processes, from soil preparation to logistics planning, creating the basis for a flexible and adaptive response to external challenges.

In addition, using AI in social sustainability is changing the approach to working with communities and personnel. For example, Neethirajan et al. (2024) prove that intelligent systems improve human-animal interactions, reduce physical loads on workers, and contribute to increased well-being. Shankar et al. (2020) emphasize that innovations in plant protection not only mitigate environmental risks but also strengthen food security, which directly affects the social stability of regions. Such examples prove that AI shapes new standards of socially oriented leadership in the agricultural sector.

Another significant trend is the growing role of AI in shaping sustainable development policies at the global level. Data from a bibliometric analysis (Mileti et al., 2024) indicate a sharp increase in scientific publications dedicated to precision agriculture, food security, and environmental management. This means that AI is moving from an auxiliary tool to a strategic driver of agricultural transformation. This creates new demands for agrarian leaders to implement the technology at the farm level and in national and international food security strategies.

Innovative resource management based on artificial intelligence allows for significant cost reductions (Wu et al., 2022) by optimizing water, fertilizer, and crop protection products, reducing production costs and dependence on traditional resources.

Environmental sustainability (van Wynsberghe, 2021) consists of reducing the use of chemicals and improving resource conservation, which positively impacts the environment, helping to minimize greenhouse gas emissions, avoid soil degradation, and preserve biodiversity.

Economic efficiency and environmental responsibility contribute to creating new jobs, improving working conditions, and ensuring stability in communities related to agriculture. (Nazareno et al., 2021) As a result, artifice intelligence's sustainable impact shapes regions' harmonious developments, ensuring their socio-economic balance. Integrating innovative approaches to management, responsible use of resources, environmental sustainability, and social progress is creating a new paradigm for sustainable leadership in the agricultural sector.

Thus, the sustainable impact of AI is manifested in three main directions: increasing resource efficiency, reducing environmental burden, and strengthening social responsibility. The interaction of these components forms a new management culture, where priority is given to long-term goals and harmonious development of communities.

In the future, the role of AI in shaping leadership strategies in the agricultural sector will grow, as it provides the basis for a comprehensive digital transformation of the industry. This applies not only to technological solutions, but also to changing approaches to leadership: from a command-and-administrative style to an innovative, data-based, and sustainability-oriented one. In summary, it can be argued that integrating AI and the principles of sustainable leadership opens the way to a new management paradigm in the agricultural sector - adaptive, inclusive, and able to respond to global challenges. This creates the basis for long-term socio-economic development, which simultaneously maintains ecological balance and ensures the needs of future generations.

4. Conclusions

The study's results indicate a significant impact of artificial intelligence on developing sustainable leadership in the agricultural sector. Implementing AI technologies increases the efficiency of management decisions, optimizes resource use, and reduces environmental burden. It has been proven that using intelligent systems in monitoring and forecasting yields allows increased productivity and reduced costs, which is especially important for long-term sustainable development.

Artificial intelligence significantly affects strategic decisions in the field of adaptation to climate change and rational use of land resources. Thanks to AI analysis of large volumes of data, managers of agricultural enterprises can implement environmentally responsible and economically sound management strategies. In addition, the automation of routine processes contributes to improving working conditions and involving employees in strategic management.

The proposed scheme of sustainable impact demonstrates the relationship between innovative management, rational use of resources, environmental sustainability, and social progress, which forms a new paradigm of sustainable leadership in the agricultural sector. Thus, AI optimizes agricultural processes and changes management approaches, making them more focused on long-term sustainability.

In the future, the role of AI in shaping sustainable agriculture will only grow, contributing to overcoming global challenges and ensuring the well-being of future generations. Further research can focus on practical use cases of AI in sustainable leadership and on assessing the socio-economic impact of such technologies on agricultural communities.

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