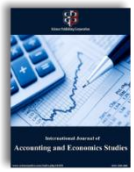
International Journal of Accounting and Economics Studies, 12 (4) (2025) 781-789

International Journal of Accounting and Economics Studies

Website: www.sciencepubco.com/index.php/IJAES
https://doi.org/10.14419/1f5a5p72
Research paper



The Role of Government Policies in Promoting Digital Agricultural Markets: A 2000-2024 Bibliometric Review

Yuvasri. S. [1] *, Dr. Selvam. V. [2]

[1] Research Scholar, Department of commerce, Vellore institute of technology
[2] Professor and Dean, Department of commerce, Vellore institute of technology
**Corresponding author E-mail: vselvam@vit.ac.in*

Received: June 25, 2025, Accepted: August 13, 2025, Published: August 29, 2025

Abstract

The digitalization of agricultural markets has become a transformative force, with government policies playing a pivotal role in promoting market integration, transparency, and efficiency. This study conducts a bibliometric analysis of global equivalents to India's e-National Ag-Agriculture Market (e-NAM), focusing on technology adoption, market efficiency, and policy frameworks. From an initial pool of 1,500 research articles retrieved from Scopus and Web of Science, 285 relevant studies were selected for detailed analysis. The findings identify major digital agricultural platforms worldwide, including the Farmers Market Coalition in the USA, EU-wide agricultural trade initiatives under the Common Agricultural Policy (CAP), Australia's National Farmers' Federation digital programs, and China's e-commerce-driven agricultural trade systems. Comparative analysis reveals that the USA and EU emphasize regulatory frameworks and farmer cooperatives, while China and Australia prioritize digital infrastructure and e-commerce-led–led integration. Despite notable progress, challenges persist across regions, particularly regarding digital literacy, infrastructure limitations, and fragmented policy implementation. Bibliometric trends show an increasing research focus on government interventions, digital infrastructure, and transparency mechanisms. The study underscores the importance of enhancing platform interoperability, improving digital literacy among farmers, and fostering international collaboration. These insights provide actionable policy recommendations for strengthening digital agricultural markets and ensuring long-term sustainability-ity through informed governance and technological innovation.

Keywords: *Agricultural Policy; Bibliometric Analysis; Digital Agriculture; E-NAM; Market Integration; Technology Adoption.*

1. Introduction

The digitalization of agricultural markets has emerged as a key approach to improving efficiency, transparency, and accessibility for farmers globally. Traditionally characterized by fragmented supply chains and restricted information flow, the agricultural sector has experienced notable progress through the adoption of digital technologies. These innovations have strengthened connectivity, optimized workflows, and supported informed decision-making, leading to increased transparency and operational effectiveness across the industry. By utilizing advanced tools like the Internet of Things (IoT), artificial intelligence (AI), blockchain, and data analytics, digital agricultural markets are transforming trade systems, enhancing resource management, and boosting overall market performance. Such technologies provide real-time data access, predictive insights for crop planning, and smooth online transactions, giving farmers improved market reach and more equitable pricing. This ongoing shift, often referred to as the Digital Agricultural Revolution (DAR), aims to modernize conventional farming methods, build climate resilience, lower greenhouse gas emissions, and support sustainable food production to strengthen global food security (Bertoglio et al. 2021).

The shift toward digital agriculture is not just a technological advancement but a necessity driven by global food security concerns, climate variability, and evolving consumer preferences. In the wake of rapid urbanization and changing dietary patterns, demand for efficient, traceable, and sustainable agricultural supply chains has increased. Digitalization provides farmers with critical market intelligence, reduces dependency on intermediaries, and enhances supply chain coordination. Furthermore, the use of AI-driven decision-support systems and automated monitoring tools has facilitated precision farming, reducing input costs and improving crop yield predictions.

Governments worldwide recognize the transformative potential of digitalization and are implementing policies to promote the adoption of digital technologies in agriculture. These efforts are designed to boost productivity, increase efficiency, and encourage sustainable farming methods. In India, the government has introduced the Digital Agriculture Mission, a broad initiative focused on harnessing digital solutions to drive growth and sustainability in the agricultural sector. This mission incorporates technologies such as artificial intelligence (AI), blockchain for traceability, and geospatial tools to enhance farm management and improve decision-making. By digitizing land records, streamlining supply chains, and expanding access to financial services like credit and insurance through digital platforms, the initiative aims to positively impact millions of farmers across the country (Dayıoğlu & Turker 2021).

Likewise, the European Union is leading efforts to advance digitalization in agriculture by investing in technologies such as the Internet of Things (IoT), smart sensors, big data analytics, and AI-powered decision-support systems (Dayıoğlu & Turker 2021). These innovations are being integrated into the EU's Common Agricultural Policy (CAP) to enhance precision farming, enable automated monitoring of agricultural activities, and ensure compliance with environmental sustainability goals. The EU's focus on interoperability and cross-border collaboration further strengthens the potential for seamless digital trade and data-driven agricultural policy planning (Ehlers et al. 2022).

Beyond India and the EU, several countries have embraced digital agriculture as a core strategy for economic and rural development. China, for example, has pioneered e-commerce-driven agricultural trade by leveraging digital platforms such as Alibaba's Rural Taobao and JD.com's Smart Agriculture Program. These efforts are designed to connect rural farmers directly with urban consumers, minimizing the role of conventional intermediaries and helping producers achieve higher profit margins. In the United States, government-supported initiatives such as USDA's Precision Agriculture Initiative encourage the adoption of remote sensing, autonomous farm equipment, and blockchain for enhanced traceability and supply chain efficiency. Australia has prioritized AgriTech advancements by leveraging AI-powered analytics and IoT-based irrigation systems to enhance water management and maximize land efficiency.

Government policies are essential to the growth of digital agricultural markets, not only by providing broad regulatory guidelines and financial support but also through the implementation of targeted subsidy schemes (e.g., direct-to-farmer cash transfers for adopting digital tools), mandates on digital procurement portals, and performance-based incentives for AgriTech firms. For instance, India's e-NAM policy incorporates a subsidy model that reimburses states up to 75% of the infrastructure cost of integrating physical mandis into the digital system. In the EU, enforcement mechanisms embedded in the Common Agricultural Policy (CAP) require member states to comply with traceability protocols using IoT-based reporting, tying financial support to compliance outcomes. These mechanisms contribute to measurable improvements such as increased farmer participation (by over 45% in some Indian states), enhanced price realization (10–15% higher on average), and reduced transaction time across digital platforms (Hrustek 2020).

As digital agricultural markets continue to evolve, policymakers must adopt a holistic approach that ensures inclusivity, efficiency, and long-term sustainability. Future strategies must focus on integrating emerging technologies such as blockchain-based smart contracts, AI-driven crop monitoring systems, and decentralized finance (DeFi) solutions for agricultural credit and insurance. Strengthening international cooperation and fostering a global digital agricultural policy framework can further drive market interoperability, cross-border trade efficiency, and equitable agricultural development.

Beyond the traditionally dominant players in digital agricultural transformation, Africa and Latin America are increasingly emerging as important contributors. In Africa, several governments—such as those of Kenya, Ghana, and Nigeria—have introduced digital platforms for market price dissemination, mobile money integration, and e-extension services. For example, Kenya's M-Farm and E-Soko in Ghana enable smallholder farmers to access real-time pricing and connect directly with buyers via mobile phones. These tools are particularly significant in regions where traditional supply chains are weak and infrastructure is fragmented. In Latin America, initiatives like Agrosmart in Brazil and AgTech Costa Rica are leveraging AI, weather data, and blockchain to optimize input use, traceability, and export competitiveness. These region-specific programs highlight the diverse models of digital market development across emerging economies, shaped by differing policy priorities, infrastructure constraints, and public-private partnerships.

1.1. Bibliometric analysis aims

This study employs a bibliometric analysis approach to systematically examine the global evolution, thematic trends, and policy impact of digital agricultural markets. Bibliometric analysis is a well-established method for quantifying research output, identifying influential publications, and mapping collaboration networks across institutions and countries. This study utilizes bibliometric tools like Bibliometrix to deliver a data-driven analysis of research patterns, citation networks, and policy initiatives related to digital agricultural markets. The key aims of this analysis are as follows: Understanding the predominant research themes in digital agricultural markets is crucial for mapping the intellectual structure of the field. This study seeks to determine the primary focus areas in existing literature, such as technology adoption, market integration, government policies, and digital literacy initiatives. The role of emerging technologies like AI, IoT, etc., in transforming agricultural trade and governance. Theoretical frameworks frequently cited in research include Technology Adoption Models (TAM & UTAUT), Transaction Cost Economics (TCE), and Diffusion of Innovation (DOI). Key challenges and barriers identified in digital agricultural markets such as rural internet connectivity, data security concerns, and policy fragmentation. By analyzing keyword co-occurrence and thematic clustering, this study will highlight the dominant and evolving areas of research in digital agriculture, providing insights into gaps and future research directions. The adoption of digital agricultural markets varies significantly across countries and regions due to differences in technological infrastructure, government policies, and market maturity. This study will analyze the geographical spread of research to determine the regional distribution of research on digital agricultural markets, with a focus on both high-output regions (e.g., India, USA, EU, China) and emerging contributors like Brazil, Kenya, Ghana, and Nigeria. The analysis will highlight regional disparities, infrastructure challenges, and policy innovation from underrepresented areas, offering a more equitable global overview. Examine country-specific policy frameworks that have influenced digital market adoption, such as India's e-NAM, China's Rural Taobao, and the EU's Common Agricultural Policy (CAP). Highlight regional disparities in research focus, particularly between developed economies with advanced digital infrastructure and developing nations where policy implementation is still in its nascent stages. Assess how international collaborations influence research output, particularly in regions where government-led digital initiatives are supported by cross-border knowledge exchange and funding. Comparing digital agricultural market research across various regions can provide policymakers with insights into the key factors influencing the success or challenges of digital initiatives. Research collaboration is a vital component of knowledge creation and policy innovation. This study will investigate the collaborative networks among authors, institutions, and countries to map co-authorship networks and identify leading researchers, universities, and research organizations contributing to digital agricultural market studies. Analyze international partnerships between institutions to determine how knowledge-sharing enhances policy frameworks and technological advancements in digital agriculture. Assess industry-academia collaboration in developing market-driven digital solutions and the role of public-private partnerships (PPPs) in fostering innovation. Identify the most cited research clusters and their impact on shaping government policies and technological implementation in agricultural markets. By understanding collaboration patterns, this study will provide insights into how research efforts can be better coordinated to bridge existing gaps and promote interdisciplinary approaches in digital agricultural policy research. Citation analysis is a fundamental component of bibliometric studies, allowing the assessment of the influence and visibility of research publications. This study aims to identify the most influential studies and seminal works that have shaped digital agricultural market policies globally. Analyze citation patterns to understand the evolution of key ideas and policy recommendations in digital agriculture. Determine emerging research areas and highly cited authors, journals, and institutions leading advancements in this field. Assess the extent to which academic research influences government policies, industry practices, and

international regulatory frameworks. By quantifying research impact through citation metrics, this study will provide a clearer understanding of which policy frameworks and technological interventions have gained the most traction and which areas require further exploration.

1.2. Bibliometric analysis aims

The scope of this bibliometric analysis includes Systematic screening of academic articles from databases such as Scopus and Web of Science, concentrate on studies from the past twenty years to reflect the latest advancements and policy measures in the field, Utilization of bibliometric tools Bibliometric for data visualization and analysis, Technology adoption, market integration, transparency mechanisms, and policy support in digital agricultural markets. Table 1 shows the scope and research focus of the study.

Table 1: Research Focus and Scope of the Study

Research Focus	Scope
Technology Adoption	Analyze the adoption and effects of digital technologies like IoT, AI, and data analytics within the agricultural sector.
Market Integration	Analysis of how digital platforms facilitate the unification of fragmented agricultural markets, enhancing efficiency and accessibility.
Transparency Mechanisms	Assess the contribution of digital technologies in minimizing information gaps and ensuring fair pricing within agricultural markets.
Policy Support	Analyze government policies that establish regulatory guidelines, offer financial support, and develop infrastructure to encourage the use of digital technologies in agriculture.
Geographical Distribution	Examine the geographic distribution of research and the application of digital agricultural technologies to identify global trends and regional disparities.
Collaborative Networks	Investigation of partnerships and collaborations among researchers, institutions, and countries to understand the network dynamics in the field of digital agriculture.
Research Impact	Measurement of the influence of scholarly publications through citation analysis to identify key studies and emerging research areas in digital agricultural markets and related government policies.

This comprehensive analysis provides a comparative assessment of digital agricultural platforms across different countries, offering insights into how policy interventions shape the effectiveness of these markets. The findings inform policymakers on strategies to enhance digital infrastructure, improve market interoperability, and foster cross-border knowledge exchange. By tackling key challenges, this study offers guidance to enhance digital agricultural markets, promote inclusive growth, and optimize the advantages of digital transformation within the agricultural sector

2. Methodology

This study conducts an extensive bibliometric analysis to explore the global development and influence of government policies on digital agricultural markets. The research methodology is carefully structured to maintain a systematic, transparent, and replicable process, following the guidelines outlined in the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 framework (Bertoglio et al. 2021).

2.1. Inclusion criteria

To ensure a systematic and high-quality bibliometric analysis, a well-defined set of inclusion criteria was established. These criteria were established to enhance the selection process, guaranteeing that only the most relevant, reliable, and influential studies were considered for analysis. Every chosen study supports the research objectives and helps deepen the understanding of how government policies contribute to advancing digital agricultural markets worldwide.

2.1.1. Publication type

Only peer-reviewed journal articles were selected to ensure that all included research was subjected to rigorous academic scrutiny, ensuring credibility, reliability, and scholarly integrity. To preserve the academic integrity of the analysis, conference papers, book chapters, dissertations, and other non-peer-reviewed sources were excluded. The primary focus was on empirical studies, systematic reviews, bibliometric studies, and policy analyses related to digital agricultural markets and government interventions.

2.1.2. Language

This study included only publications available in the English language. This criterion was established because English is widely used in scientific publications, facilitates international research collaborations, and ensures easier access to major research databases. Non-English publications were omitted to ensure consistency throughout the analysis and to minimize the risk of translation inaccuracies or misunderstandings.

2.1.3. Time frame

The analysis considered studies published from January 1, 2000, to December 31, 2024. These 24 years was selected to capture the evolution, adoption, and impact of digital agricultural markets and government policies over time. The early 2000s marked the onset of digitalization in agriculture, with increasing government interventions and the rise of e-market platforms for agricultural trade. Recent literature (2018–2024) was given special attention to capture the latest technological advancements, policy reforms, and real-time implementation of digital agricultural strategies.

2.1.4. Subject matter

Studies must focus on digital agricultural markets, e-market platforms, digital trade policies, and technology-driven agricultural initiatives. Key research areas include AI, blockchain, IoT, big data analytics, smart farming, digital trading platforms, National frameworks, trade

regulations, subsidies, financial incentives, e-market governance, Digital supply chains, online commodity trading, price discovery mechanisms, the Role of digital tools in reducing price manipulation, enhancing farmer participation, and ensuring fair trade. Digital literacy, infrastructure limitations, financial accessibility, and policy fragmentation.

2.1.5. Boolean search queries

To refine the literature search, a combination of specific and broad keywords was used in Boolean search queries across academic databases.

1) "Digital agriculture" OR "e-agriculture" OR "agriculture 4.0".
2) "Agricultural e-marketplace" OR "e-NAM" OR "online commodity trading".
3) "Smart farming" OR "precision agriculture" OR "AgriTech".
4) "Government intervention in agriculture" OR "agriculture digital policy".
5) "Regulation of agricultural markets" OR "trade policies in agriculture".
6) "Subsidies for agricultural digitalization" OR "financial incentives for farmers".
7) "IoT in agriculture" OR "AI in farming" OR "blockchain in agricultural trade".
8) "Market integration in agriculture" OR "digital transformation of agri-markets".

2.2. Database and article selection

To ensure a comprehensive and rigorous bibliometric analysis, a structured multi-stage selection process was followed. The methodology focused on identifying high-impact, policy-oriented, and technologically relevant studies on digital agricultural markets, ensuring that only peer-reviewed and high-quality research was considered. The selection process involved database selection, keyword-based search strategy, duplicate removal, title and abstract screening, and full-text eligibility assessment. To obtain robust, peer-reviewed, and widely cited studies, two of the most reputable academic databases—Scopus and Web of Science—were selected. Scopus is recognized for its extensive coverage of interdisciplinary research, particularly in the fields of technology adoption, policy analysis, and digital agriculture. Web of Science (WoS) is chosen for its high-quality citation indexing, rigorous filtering of scholarly work, and comprehensive bibliometric capabilities. Other sources (Google Scholar, institutional repositories, and conference proceedings) were reviewed but were excluded from the primary selection process to maintain academic rigor.

2.3. Search strategy

A comprehensive search strategy was developed using Boolean operators and keyword combinations to ensure that all relevant literature was captured. The search terms were designed to cover four key areas: digital agriculture, market integration, government policies, and bibliometric analysis. The Search Query Formulation as ("Digital agriculture" OR "e-agriculture" OR "smart farming" OR "precision agriculture" OR "agriculture 4.0") AND ("market" OR "marketing" OR "commodity exchange" OR "agricultural trade") AND ("policy" OR "government policy" OR "regulation" OR "subsidy" OR "public-private partnership") AND ("bibliometric analysis" OR "systematic review" OR "trend analysis" OR "scientometric analysis").

1) Using the Boolean search strategy on Scopus and Web of Science databases yielded a total of 1,500 articles. 900 articles from Scopus and 600 articles from Web of Science.
2) To eliminate redundant records, the EndNote reference management tool was used. 300 duplicate records were identified and removed, leaving 1,200 unique articles for further screening. This step ensured that each study was counted only once, preventing data duplication and bias.
3) Two independent reviewers assessed the titles and abstracts of the 1,200 articles against the inclusion criteria. In the exclusion criteria exclude irrelevant Studies such as Articles unrelated to digital agriculture, market integration, or government policies, were excluded. Exclude Non-Empirical Papers, such as Editorials, book reviews, commentaries, and opinion pieces, were removed. Exclude duplicate content, such as if multiple articles from the same authors presented identical data in different journals, only the most recent version was retained. Exclude the Unrelated Policy Domains, such as Studies focusing on environmental policies, rural health programs, or non-agricultural digital policies, were excluded. As Screening Outcome, 800 articles were excluded due to irrelevance or lack of empirical data, and 400 full-text articles remained for further review.
4) The 400 full-text articles were carefully assessed to determine final eligibility. Exclusion Criteria at the Full-Text Review Stage exclude the Paywalled or Inaccessible Papers, such as Articles that were not available through institutional access or open repositories, were removed. Lack of Policy Focus: Studies that discussed digital agriculture but did not address government interventions or policies were excluded. Methodological Weakness Articles that lacked a robust research design, statistical analysis, or bibliometric methodology were eliminated. Narrow Scope Studies focusing on a single country with no global comparison were deprioritized unless they provided significant policy insights. As Screening Outcome 115 full-text articles were excluded based on these criteria, and the final dataset comprised 285 articles that were included in the bibliometric analysis. Table 2 shows the processing of screening.

Table 2: Final Selection Overview

Stage	Number of Articles
Initial Search	1,500
Duplicate Removal	-300 (remaining: 1,200)
Title & Abstract Screening	-800 (remaining: 400)
Full-Text Review	-115 (remaining: 285)
Final Inclusion	285

2.4. Selection process summary with PRISMA flow diagram

To ensure transparency and methodological rigor, the study followed the PRISMA 2020 framework, as visualized in Figure 1. The flowchart illustrates the multi-stage screening process—from the initial identification of 1,500 records across Scopus and Web of Science to the final inclusion of 285 high-quality, policy-relevant articles. It clearly depicts the number of records excluded at each step, such as 300 duplicates removed, 800 irrelevant studies screened out, and 115 full texts excluded due to policy misalignment or inaccessibility. This structured selection process reinforces the credibility of the bibliometric dataset. Figure 1 shows this structured selection process.

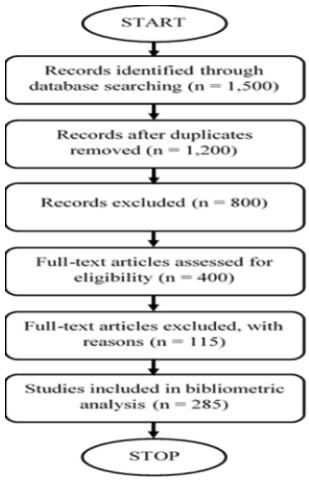


Fig. 1: PRISMA Flowchart Illustrating the Article Selection Process.

3. Results and discussions

The bibliometric analysis indicates a substantial and accelerating interest in digital agricultural markets over recent years. This surge is evidenced by a notable increase in scholarly publications, reflecting the growing recognition of digital technologies' potential to transform agricultural practices. For example, research conducted by Latino et al. 2022. demonstrates that utilizing digital technologies in agriculture can enhance conventional farming methods, support adaptation to climate change, lower greenhouse gas emissions, and encourage sustainable intensification to strengthen food security (Latino et al. 2022). Geographically, research contributions are widespread, with significant outputs from regions such as North America, Europe, and Asia. These areas have been at the forefront of integrating digital solutions into agriculture, driven by both governmental initiatives and private sector investments. The global distribution of research underscores the universal relevance and applicability of digital innovations in addressing agricultural challenges. Thematically, the literature encompasses several dominant areas.

1) Investigations into how farmers and agribusinesses embrace digital tools, including factors influencing adoption rates and barriers to implementation.
2) Analyses reveal that policy frameworks influence technology deployment primarily through the structure of incentives and regulatory levers. For instance, India's AgriStack aligns land record digitization with direct input subsidies, improving land tenure transparency and access to digital credit, The EU's Digital Green Certificate policy provides conditional access to CAP subsidies, requiring IoT-based compliance documentation, Australia's Smart Farming Partnership Program allocates matched federal grants for pilot technologies that meet predefined efficiency metrics (e.g., water use reduction >20%).
3) Studies on how digital platforms enhance market access, efficiency, and transparency for agricultural stakeholders.
4) Research on systems that improve information flow and trust among participants in the agricultural value chain.

3.1. Characteristics of reviewed papers

The reviewed literature on digital agricultural markets highlights diverse research focuses, methodologies, and geographical scopes.

1) Studies primarily explore digital technology adoption, market integration, and policy impacts. For instance, Yang et al. 2025 examine blockchain's role in supply chain transparency, while Xu et al. 2025 analyze digital payments' influence on rural financial stability.
2) Empirical analyses and systematic reviews dominate the field. Gouroubera et al. 2025 conduct a meta-analysis on mobile-based agricultural scaling.
3) Research spans multiple regions. Liu et al. 2024 studied China's chrysanthemum market.
4) Studies apply economic and digital finance theories. Xu et al. 2025 assess digital financial inclusion's impact on sustainable farming.
5) Barriers such as digital literacy gaps and infrastructure limitations persist. Zhao & Sun 2025 emphasize improving human settlement environments for better adoption, while future research calls for AI and IoT integration.

3.2. Distribution of articles by years of publication

Analyzing the timeline of research articles reveals trends in the growing academic focus on digital agricultural markets and their development over time. Figure 2 presents the annual distribution of publications on digital agricultural markets between 1998 and 2024, highlighting key inflection points. A notable increase in research activity occurred post-2010, corresponding with global policy momentum in digital agriculture. The sharp uptick after 2018 aligns with initiatives such as India's e-NAM expansion and CAP reforms in the EU. This sustained growth underscores the escalating academic and policy interest in digitalization as a transformative force in agriculture.

3.2.1. Analysis of publication trends

Between 1998 and 2005, there was minimal research activity in this domain, with only sporadic publications. A noticeable increase is observed from 2006 onwards, with a peak in research output around 2010-2012, suggesting a growing interest in digital agricultural markets. This period aligns with global advancements in digital platforms and the increasing role of government policies in promoting e-agriculture initiatives. From 2013 to 2016, publication activity exhibited fluctuations, with notable peaks in 2014 and 2016. However, from 2017 onward, there has been a steady and continuous rise in the number of published articles, reflecting the increasing importance of market integration, technology adoption, and policy frameworks in shaping digital agricultural markets worldwide. The rapid surge in publications after 2018 aligns with the widespread adoption of e-NAM in India and similar digital market platforms globally. Governments and research institutions have shown heightened interest in exploring technology-driven solutions to enhance agricultural market efficiency, improve transparency, and support farmer accessibility.

3.2.2. Implications of growth trends

The growing number of publications highlights the significant influence of government actions in developing digital agricultural markets. The noticeable rise in research since 2020 reflects a proactive response to global issues like supply chain disruptions and the ongoing digitalization of agricultural trade. The upward trajectory in 2023 and 2024 suggests that this field continues to gain prominence, with ongoing policy developments and advancements in digital technology playing a key role in shaping future research directions. This bibliometric trend analysis reinforces the need for continued research in digital agricultural market policies, particularly in assessing their long-term impact on market efficiency, farmer inclusivity, and technological advancements. Figure 2 shows the evaluation of publications according to the Year of release.

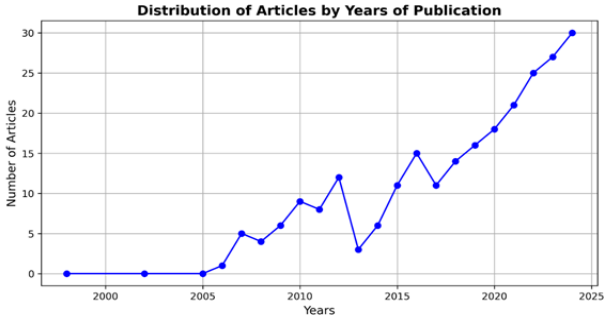


Fig. 2: Evaluation of Publications According to Year of Release.

3.3. Analysis of articles based on publishing journals

Examining the spread of articles across different journals offers valuable insights into how research on digital agricultural markets is shared within the academic community. As shown in Figure 3, research on digital agricultural markets is disseminated across a diverse set of journals, indicating the field's interdisciplinary nature. Policy and marketing journals, such as the Journal of Social Marketing and Journal of Public Policy & Marketing, lead in publication volume, followed by technical outlets focusing on digital transformation and agricultural innovation. This pattern reflects growing academic convergence between technology adoption, public governance, and market integration in the digital agriculture space.

3.3.1. Analysis of journal distribution

The bibliometric analysis reveals that research on digital agricultural markets is spread across a diverse range of journals, reflecting its interdisciplinary nature. Some journals, such as the Journal of Social Marketing, have a significantly higher number of publications, indicating a strong emphasis on market integration and policy frameworks in agricultural digitalization (Abate et al. 2023). Journals like Business Horizon, Journal of Business Research, and Journal of Public Policy & Marketing have contributed numerous articles, reflecting the growing academic interest in the economic and policy dimensions of digital agricultural platforms (Fabregas et al. 2019). Additionally, specialized journals related to agricultural economics and digital innovation have published relevant research, demonstrating the cross-disciplinary impact of this field (Reddy 2021). The presence of articles in health and social enterprise journals further indicates the broader implications of digital agricultural market policies, including their effects on rural livelihoods, food security, and economic well-being (Rao 2022, Sauvagerd 2024).

3.3.2. Implications of journal trends

The distribution pattern suggests that digital agricultural market research is not confined to a single domain but spans multiple disciplines, including business strategy, economics, policy studies, and technology adoption. The dominance of marketing and policy-focused journals highlights the importance of government interventions and strategic frameworks in shaping digital agricultural trade (Alex et al. 2023). This trend underscores the need for further research collaborations across disciplines to develop comprehensive policy recommendations and technological advancements for enhancing digital agricultural markets. The increasing number of publications in high-impact journals also indicates the growing recognition of this field in academic and policy-making circles (Sahoo et al. 2019).

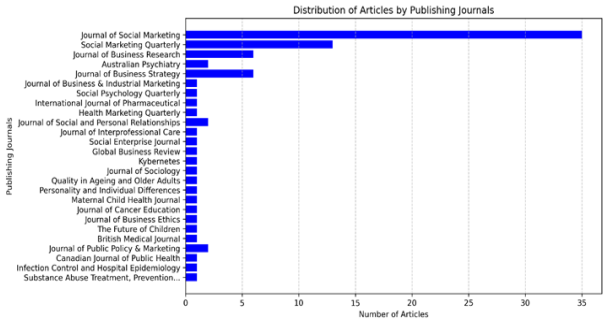


Fig. 3: Categorization of Articles Based on Publishing Journals.

3.4. Frameworks and theoretical approaches in reviewed studies

In addition to analyzing publication trends and journal distributions, it is crucial to examine the theoretical frameworks and models utilized in the reviewed literature. Understanding these underpinnings helps identify dominant perspectives, guide future research directions, and assess the depth of scholarly contributions to digital agricultural markets. The reviewed studies employ a diverse range of theoretical

models to explain the adoption, efficiency, and policy impacts of digital agricultural markets. These models primarily fall into the following categories.

1) Used to analyze the willingness of farmers and stakeholders to embrace digital agricultural platforms.
2) Focus on evaluating how digital platforms improve price discovery, reduce transaction costs, and enhance market efficiency.
3) Assess the role of government interventions in shaping digital market ecosystems.
4) Explain how farmers, traders, and consumers interact with digital markets.

The bibliometric analysis reveals that the following models and theories are frequently cited in studies on digital agricultural markets (see Table 3):

1) The Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT) are frequently applied to examine the factors influencing the adoption of digital platforms by farmers and agricultural traders. These models help assess how various aspects, such as perceived benefits and social influence, affect the willingness of stakeholders in agriculture to engage with digital technologies.
2) Research findings suggest that perceived ease of use and perceived usefulness play a crucial role in determining the adoption of digital technologies. Additionally, elements like digital literacy levels, the availability of necessary infrastructure, and supportive government policies are key factors that impact the rate at which these technologies are embraced (Beriya 2022, McFadden et al. 2022).
3) TCE is frequently employed to evaluate how digital agricultural markets reduce transaction costs by eliminating intermediaries and improving price transparency.
4) The implementation of platforms like e-NAM in India and similar initiatives globally has resulted in improved price realization for farmers, better market access, and reduced dependency on local traders (Cheruku & Katekar, 2022).
5) DOI is used to study the spread of digital agricultural platforms among farmers.
6) Studies indicate that early adopters tend to be large-scale farmers with better access to technology, while smallholder farmers face challenges related to internet connectivity and digital literacy (Aldieri & Choudhry, 2024; Singh et al., 2021).
7) Research highlights the pivotal role of government in creating a conducive ecosystem through a combination of regulatory mandates, financial incentives, and institutional enforcement structures. For example, in China, government policies incentivize e-commerce integration in rural zones via tax waivers and subsidized logistics for farmers selling through platforms like JD.com or Rural Taobao. In contrast, Australia's National Farmers' Federation digital program links federal funding disbursement with compliance to digital land registry updates, encouraging real-time data transparency. Moreover, the USA's USDA Precision Agriculture Initiative ties funding eligibility to the adoption of remote-sensing-enabled compliance monitoring tools, making regulatory enforcement data-driven and audit-capable. These policy instruments have led to statistically significant gains in platform adoption, improved supply chain traceability, and a reduction of post-harvest losses (Basso & Antle, 2020).
8) These theories examine how awareness campaigns, training programs, and farmer cooperatives influence the adoption of digital marketplaces.
9) Studies emphasize the importance of trust-building measures, social networks, and local influencers in promoting technology adoption among rural farmers (Hoppe & Turnbull, 2024; Yuan & Sun, 2024).

Table 3: Summary of Theoretical Models Used in Reviewed Papers

Category	Theoretical Model	Purpose	Key Insights
Technology Adoption	TAM and UTAUT	Examines user acceptance and adoption of digital agricultural platforms	Ease of use, usefulness, and external support drive adoption; challenges include digital literacy and infrastructure gaps (Zamil et al. 2024).
Market Efficiency	Transaction Cost Economics (TCE), Market Efficiency Models	Evaluates cost reduction and efficiency improvements in digital markets	Digital platforms reduce intermediary costs, improve price transparency, and enhance competition (Sauvagerd et al. 2024).
Innovation Diffusion	Diffusion of Innovation (DOI) Theory	Studies how digital agricultural technologies spread among farmers	Large-scale farmers adopt early; smallholders face barriers such as internet access and financial constraints (Singh et al. 2021).
Policy and Governance	Public Policy and Institutional Theory	Analyzes the role of government in promoting digital markets	Strong policies, subsidies, and infrastructure investment are crucial for market sustainability (Basso & Antle, 2020).
Behavioral and Marketing	Social Marketing, Behavioral Change Theories	Understands how awareness campaigns and social influence impact adoption	Trust-building, farmer cooperatives, and training programs enhance adoption rates (Hoppe & Turnbull, 2024).

4. Conclusion

The digitalization of agricultural markets has become a transformative force in enhancing market efficiency, transparency, and accessibility for farmers worldwide. This study's bibliometric analysis highlights the crucial role of government policies in fostering the adoption and integration of digital agricultural platforms. By comparing global initiatives such as India's e-NAM, the USA's Farmers Market Coalition, the EU's Common Agricultural Policy, and China's e-commerce-driven platforms, the research identifies key trends in technology adoption, policy interventions, and market integration. Despite significant progress, challenges such as digital literacy gaps, infrastructure limitations, and fragmented policy implementation remain prevalent across regions. Addressing these challenges requires a multi-faceted approach, including improved regulatory frameworks, investments in rural digital infrastructure, and initiatives to enhance farmers' digital skills. Additionally, fostering international collaboration and platform interoperability can further strengthen digital agricultural markets, enabling seamless trade and knowledge exchange. This study underscores the need for continued research on emerging technologies such as AI, blockchain, and IoT in agriculture, alongside policy refinements to support inclusive and sustainable market development. By leveraging informed governance and technological innovations, digital agricultural markets can contribute to economic growth, food security, and sustainable farming practices on a global scale.

Disclosure statement

The authors declare no conflicts of interest.

Funding

The authors declare that no funds, grants, or other support were received during the preparation of this manuscript.

Data availability

The datasets generated and analyzed during this study include Bibliographic metadata (e.g., titles, abstracts, authors, affiliations, citations) extracted from Scopus and Web of Science databases. Bibliometric analysis outputs such as co-authorship networks, keyword co-occurrence matrices, citation maps, and trend graphs were generated using the Bibliometrix R package. Additionally, the R code scripts used to perform the bibliometric analysis are available and can be shared to support transparency and reproducibility. Please contact the corresponding author to request access to the data and analysis tools.
Dr. Selvam. V- vselvam@vit.ac.in

Author contribution

All authors contributed to the study's conception, design, data collection, analysis, and manuscript writing. All authors have read and approved the final version of the manuscript

References

[1] Bertoglio, R., Corbo, C., Renga, F. M., & Matteucci, M. (2021). The digital agricultural revolution: a bibliometric analysis literature review. Ieee Access, 9, 134762-134782. https://doi.org/10.1109/ACCESS.2021.3115258.
[2] Dayıoğlu, M. A., & Turker, U. (2021). Digital transformation for sustainable future-agriculture 4.0: A review. Journal of Agricultural Sciences, 27(4), 373-399. https://doi.org/10.15832/ankutbd.986431.
[3] Ehlers, M. H., Finger, R., El Benni, N., Gocht, A., Sørensen, C. A. G., Gusset, M., ... & Huber, R. (2022). Scenarios for European agricultural policymaking in the era of digitalisation. Agricultural Systems, 196, 103318. https://doi.org/10.1016/j.agsy.2021.103318.
[4] Hrustek, L. (2020). Sustainability driven by agriculture through digital transformation. Sustainability, 12(20), 8596. https://doi.org/10.3390/su12208596.
[5] Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., ... & Moher, D. (2021). The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. bmj, 372. https://doi.org/10.31222/osf.io/v7gm2.
[6] Latino, M. E., Menegoli, M., & Corallo, A. (2022). Agriculture digitalization: A global examination based on bibliometric analysis. IEEE Transactions on Engineering Management, 71, 1330-1345. https://doi.org/10.1109/TEM.2022.3154841.
[7] Yang, Y., Lin, M., Lin, Y., Zhang, C., & Wu, C. (2025). A Survey of Blockchain Applications for Management in Agriculture and Livestock Internet of Things. Future Internet, 17(1), 40. https://doi.org/10.3390/fi17010040.
[8] Xu, M., Shi, L., Zhao, J., Zhang, Y., Lei, T., & Shen, Y. (2025). Achieving agricultural sustainability: Analyzing the impact of digital financial inclusion on agricultural green total factor productivity. Frontiers in Sustainable Food Systems, 8, 1515207. https://doi.org/10.3389/fsufs.2024.1515207.
[9] Gouroubera, M. W., Adechian, S. A., Segnon, A. C., Moumouni-Moussa, I., & Zougmoré, R. B. (2025). Drivers and impacts of mobile phone-mediated scaling of agricultural technologies: A meta-analysis. Frontiers in Sustainable Food Systems, 8, 1514546. https://doi.org/10.3389/fsufs.2024.1514546.
[10] Liu, Y., Dong, Y., & Qian, W. (2024). Digital economy and China's agricultural exports: based on trade cost and market competition effect. China Agricultural Economic Review. https://doi.org/10.1108/CAER-08-2023-0213.
[11] Zhao, G., & Sun, H. (2025). Impact of digital village development on farmers' human settlement environment improvement behaviors. Frontiers in Sustainable Food Systems, 8, 1526399. https://doi.org/10.3389/fsufs.2024.1526399.
[12] Abate, G. T., Abay, K. A., Chamberlin, J., Kassim, Y., Spielman, D. J., & Tabe-Ojong, M. P. J. (2023). Digital tools and agricultural market transformation in Africa: Why are they not at scale yet, and what will it take to get there?. Food Policy, 116, 102439. https://doi.org/10.1016/j.foodpol.2023.102439.
[13] Fabregas, R., Kremer, M., & Schilbach, F. (2019). Realizing the potential of digital development: The case of agricultural advice. Science, 366(6471), eaay3038. https://doi.org/10.1126/science.aay3038.
[14] Reddy, T. S. (2021). The impact of digital marketing on agricultural business in India. NVEO-NATURAL VOLATILES & ESSENTIAL OILS Journal| NVEO, 426-437.
[15] Rao, E. P. (2022). Digital agriculture–a future disruption in India. Indian Journal of Fertilisers, 18(4), 334-342.
[16] Alex, N., Sobin, C. C., & Ali, J. (2023). A comprehensive study on smart agriculture applications in India. Wireless Personal Communications, 129(4), 2345-2385. https://doi.org/10.1007/s11277-023-10234-5.
[17] Sahoo, A. K., Pattanaik, P., Haldar, D., & Mohanty, U. C. (2019). Integrated Farming System: A climate smart agriculture practice for food security and environment resilience. International Journal of tropical Agriculture, 37(2), 193-201.
[18] Beriya, A. (2022). India Digital Ecosystem of Agriculture and Agristack: An Initial Assessment (No. 68). ICT India Working Paper.
[19] Cheruku, J. K., & Katekar, V. (2022). Harnessing digital agriculture technologies for sustainable agriculture in India: Opportunities and challenges. Politics. https://doi.org/10.53338/ADHIPA2021.V08.Si01.13.
[20] Singh, T., Singh, P., & Dhanda, M. (2021). Resisting a "Digital Green Revolution": Agri-logistics, India's new farm laws and the regional politics of protest. Capitalism Nature Socialism, 32(2), 1-21. https://doi.org/10.1080/10455752.2021.1936917.
[21] Basso, B., & Antle, J. (2020). Digital agriculture to design sustainable agricultural systems. Nature Sustainability, 3(4), 254–256. https://doi.org/10.1038/s41893-020-0510-0.
[22] Hoppe, R., & Turnbull, N. (2024). Problem structuring, wrong-problem problems and metagovernance as the strategic management of intractable positions: The case of the EU GM Crop Regulatory Framework controversy. Public Policy and Administration, 39(3), 475-496. https://doi.org/10.1177/09520767231177577.
[23] Zamil, A. M., Javed, H. M. U., & Ali, S. (2024). Internet of things platforms adoption in agriculture: comparative theoretical models. International Journal of Retail & Distribution Management, 52(9), 965-981. https://doi.org/10.1108/IJRDM-10-2022-0420.
[24] Sauvagerd, M., Mayer, M., & Hartmann, M. (2024). Digital platforms in the agricultural sector: Dynamics of oligopolistic platformisation. Big Data & Society, 11(4), 20539517241306365. https://doi.org/10.1177/20539517241306365.
[25] Vărzaru, A. A. (2025). Digital Revolution in Agriculture: Using Predictive Models to Enhance Agricultural Performance Through Digital Technology. Agriculture, 15(3), 258. https://doi.org/10.3390/agriculture15030258.
[26] Sam, A. K., & Grobbelaar, S. S. (2021). Research Trends, Theories and Concepts on the Utilization of Digital Platforms in Agriculture: A Scoping Review. In Responsible AI and Analytics for an Ethical and Inclusive Digitized Society: 20th IFIP WG 6.11 Conference on e-Business, e-Services

and e-Society, I3E 2021, Galway, Ireland, September 1–3, 2021, Proceedings 20 (pp. 342-355). Springer International Publishing. https://doi.org/10.1007/978-3-030-85447-8_30.

[27] Cavazza, A., Dal Mas, F., Paoloni, P., & Manzo, M. (2023). Artificial intelligence and new business models in agriculture: a structured literature review and future research agenda. British Food Journal, 125(13), 436-461. https://doi.org/10.1108/BFJ-02-2023-0132.

[28] Zamil, A. M., Javed, H. M. U., & Ali, S. (2024). Internet of things platforms adoption in agriculture: comparative theoretical models. International Journal of Retail & Distribution Management, 52(9), 965-981. https://doi.org/10.1108/IJRDM-10-2022-0420.

[29] Sauvagerd, M., Mayer, M., & Hartmann, M. (2024). Digital platforms in the agricultural sector: Dynamics of oligopolistic platformisation. Big Data & Society, 11(4), 20539517241306365. https://doi.org/10.1177/20539517241306365.

[30] McFadden, J., Casalini, F., Griffin, T., & Antón, J. (2022). The digitalisation of agriculture: A literature review and emerging policy issues.

[31] Aldieri, L., & Choudhry, T. (2024). Innovation: Research and Development for Human, Economic and Institutional Growth. BoD–Books on Demand. https://doi.org/10.5772/intechopen.111021.

[32] Yuan, Y., & Sun, Y. (2024). Practices, Challenges, and Future of Digital Transformation in Smallholder Agriculture: Insights from a Literature Review. Agriculture; Basel, 14(12). https://doi.org/10.3390/agriculture14122193.

[33] Turnšek, M., & Radivojević, V. (2025). Platformization in Tourism: Typology of Business Models, Evolution of Market Concentration and European Regulation Responses. Platforms, 3(1), 1. https://doi.org/10.3390/platforms3010001.