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Bibliometric Analysis of Agricultural Entrepreneurship

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ABSTRACT

This study aims to systematically map the intellectual structure, thematic evolution, and collaborative patterns of research on agricultural entrepreneurship through a bibliometric approach. Bibliographic data were collected from the Scopus and Web of Science databases, covering peer-reviewed articles published over multiple decades. Using VOSviewer, the study applied performance analysis and science mapping techniques, including keyword co-occurrence, co-authorship, institutional collaboration, and country network analyses. The results reveal that entrepreneurship constitutes the central conceptual foundation of the field, strongly interconnected with themes such as sustainability, innovation, agribusiness, and rural development. Temporal analysis indicates a clear shift from early research emphasizing institutional support, productivity, and government intervention toward more recent studies focusing on sustainability-oriented and technology-driven entrepreneurial models, including digital agriculture and agricultural robotics. Collaboration analysis shows a globally interconnected yet uneven research landscape, with scholarly output concentrated among a limited number of authors, institutions, and countries, particularly the United States, China, and India. This study contributes to the literature by providing a comprehensive overview of the evolution and current state of agricultural entrepreneurship research, offering valuable insights for scholars, policymakers, and practitioners, and identifying opportunities for future research and international collaboration in advancing sustainable and inclusive agricultural development.

Keywords: *Agricultural Entrepreneurship, Agripreneurship, Bibliometric Analysis, Sustainability, VosViewer*

1. INTRODUCTION

Agriculture has long been recognized as a fundamental pillar of economic development, food security, and rural livelihoods across the world. In recent decades, however, the sector has undergone profound transformations driven by globalization, technological advancement, climate change, and shifting consumer demands [1], [2]. These changes have expanded the traditional boundaries of agriculture beyond subsistence and primary production, giving rise to innovative, market-oriented, and value-added activities. Within this evolving landscape, agricultural entrepreneurship has emerged as a critical mechanism for enhancing productivity, fostering innovation, and promoting sustainable rural development [3]. Scholars widely acknowledge that entrepreneurial approaches in agriculture enable farmers and agribusiness actors to respond proactively to market opportunities, manage risks, and integrate modern technologies into production and distribution systems [4].

Agricultural entrepreneurship encompasses a wide range of activities, including farm diversification, agribusiness start-ups, agro-processing, agri-tourism, and the adoption of digital and climate-smart technologies [5]. These entrepreneurial initiatives contribute not only to income generation but also to employment creation, poverty reduction, and economic resilience in rural areas. As governments and international organizations increasingly promote entrepreneurship as a strategy for achieving sustainable development goals, academic interest in agricultural entrepreneurship has grown substantially [6]. Research in this field spans multiple disciplines, such as agricultural economics, rural sociology, business management, and development studies, reflecting the complexity and multidimensional nature of entrepreneurial processes in agricultural contexts [7], [8].

The growing body of literature on agricultural entrepreneurship has produced diverse theoretical frameworks, empirical findings, and policy recommendations. Studies have examined factors influencing entrepreneurial behavior among farmers, including access to resources, education, institutional support, and socio-cultural norms [9]. Other research streams have focused on innovation systems, value chain development, gender and youth entrepreneurship, and the role of entrepreneurship in enhancing sustainability and climate adaptation. While this expanding literature demonstrates the increasing relevance of the topic, it also reveals fragmentation, with varying research focuses, methodologies, and geographical emphases [10], [11]. As a result, it becomes challenging for scholars and policymakers to obtain a comprehensive overview of the intellectual structure and evolution of agricultural entrepreneurship research [12].

In this context, bibliometric analysis has gained prominence as a systematic and quantitative approach for evaluating scientific literature. Bibliometric methods apply statistical techniques to bibliographic data in order to identify publication trends, influential authors, core journals, collaboration networks, and thematic developments within a research field. Unlike traditional narrative literature reviews, bibliometric analysis allows for objective mapping of large volumes of scholarly output, thereby revealing patterns and relationships that may not be immediately evident. This approach has been increasingly applied across disciplines such as management, environmental studies, and agricultural sciences to assess research performance and knowledge dynamics [13].

Applying bibliometric analysis to the field of agricultural entrepreneurship offers significant potential to synthesize existing knowledge and guide future research directions. By examining publication growth, citation structures, and keyword co-occurrence, researchers can identify dominant themes, emerging topics, and underexplored areas within the literature. Moreover, bibliometric insights can highlight the contribution of different countries, institutions, and research networks to the development of the field. Such analysis is particularly valuable given the global relevance of agricultural entrepreneurship and the diverse socio-economic contexts in which it is studied. A systematic bibliometric assessment can therefore serve as a foundation for advancing theoretical development, improving research coherence, and informing evidence-based policy formulation.

Despite the increasing volume of scholarly work on agricultural entrepreneurship, there remains a lack of comprehensive, systematic analysis that maps the intellectual landscape of this research domain. Existing studies are often limited to narrative reviews or focus on specific subthemes, regions, or methodologies, which restricts their ability to capture broader trends and interconnections within the literature. Consequently, researchers face difficulties in identifying influential works, major research clusters, and emerging themes, while policymakers and practitioners lack a clear understanding of how academic knowledge in agricultural entrepreneurship has evolved over time. This gap underscores the need for a rigorous bibliometric analysis that consolidates dispersed research outputs and provides an integrated overview of the field. The objective of this study is to conduct a bibliometric analysis of scholarly publications on agricultural entrepreneurship in order to systematically evaluate the development, structure, and thematic evolution of the field.

2. METHODS

This study employed a bibliometric research design to systematically analyze the scientific literature on agricultural entrepreneurship. Bibliometric analysis was chosen due to its ability to

quantitatively assess large volumes of academic publications and to reveal patterns in research productivity, impact, and intellectual structure. The bibliographic data were retrieved from reputable academic databases that index peer-reviewed journals in agriculture, economics, and management. Relevant publications were identified using carefully constructed search strings combining keywords such as "agricultural entrepreneurship," "agripreneurship," "farm entrepreneurship," and related terms. To ensure data quality and relevance, only scholarly articles and review papers published in English were included, while conference papers, editorials, and non-peer-reviewed documents were excluded. The time span of the analysis covered multiple decades in order to capture the historical development and recent trends of the research field.

After data collection, the retrieved records were cleaned and standardized to eliminate duplicates and inconsistencies in author names, institutional affiliations, and keywords. Bibliometric indicators such as publication counts, citation frequencies, and h-index values were used to assess research productivity and impact. In addition, performance analysis was conducted to identify the most influential authors, journals, institutions, and countries contributing to agricultural entrepreneurship research. Citation analysis enabled the identification of highly cited works that have shaped the theoretical and empirical foundations of the field. These quantitative indicators provided an objective basis for evaluating the growth and influence of scholarly output over time.

To explore the intellectual structure and thematic evolution of agricultural entrepreneurship research, science mapping techniques were applied. Co-authorship analysis was used to examine collaboration patterns among researchers and across countries, while co-citation and bibliographic coupling analyses helped identify key research clusters and knowledge networks. Furthermore, keyword co-occurrence analysis was conducted to uncover dominant research themes and emerging topics within the literature. VOSviewer was utilized to generate network maps that facilitate interpretation of complex relationships among publications, authors, and concepts. Through this systematic methodological approach, the study offers a comprehensive and replicable overview of the knowledge landscape of agricultural entrepreneurship.

3. RESULTS AND DISCUSSION

3.1 Network Visualization

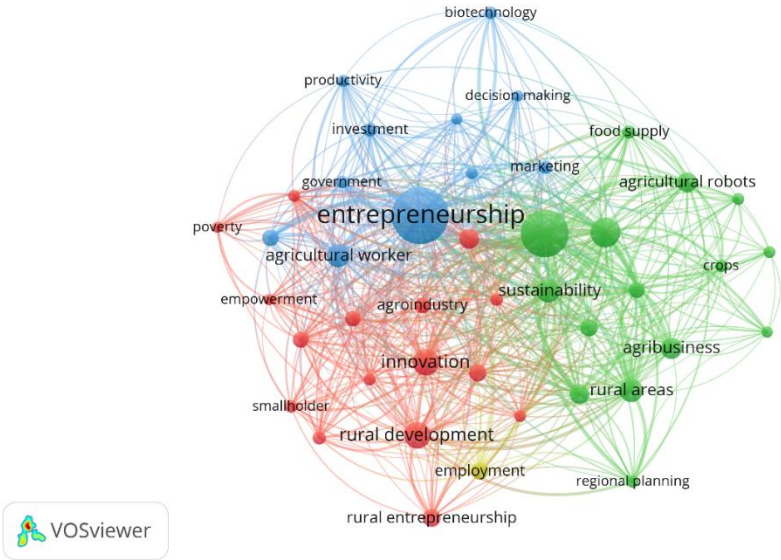

Figure 1. Network Visualization
Source: Data Analysis Result, 2026

Figure 1 reveals entrepreneurship as the central and most influential keyword, indicating its role as the core conceptual anchor of agricultural entrepreneurship research. Its prominent position

and dense linkages to multiple clusters suggest that entrepreneurship functions as a unifying framework connecting technological, economic, and social dimensions within the agricultural context. This centrality reflects a scholarly consensus that agricultural challenges—ranging from productivity to rural livelihoods—are increasingly approached through an entrepreneurial lens rather than purely agronomic or policy-based perspectives.

The green cluster emphasizes themes related to agribusiness, sustainability, rural areas, crops, food supply, and agricultural robots, highlighting a strong orientation toward technological innovation and sustainable production systems. The presence of terms such as agricultural robots and decision making suggests an emerging focus on precision agriculture, automation, and data-driven farming as entrepreneurial opportunities. This cluster reflects the growing integration of digital technologies and sustainability principles into agricultural business models, positioning agripreneurship as a driver of modern, resilient food systems. The blue cluster focuses on investment, productivity, government, biotechnology, marketing, and decision making, reflecting the institutional and strategic dimensions of agricultural entrepreneurship. This cluster highlights the importance of policy support, access to finance, and technological capability in enabling entrepreneurial success. The linkage between government and investment suggests that public policy and institutional frameworks play a crucial enabling role, particularly in facilitating innovation adoption and scaling entrepreneurial agricultural ventures.

3.2 Overlay Visualization

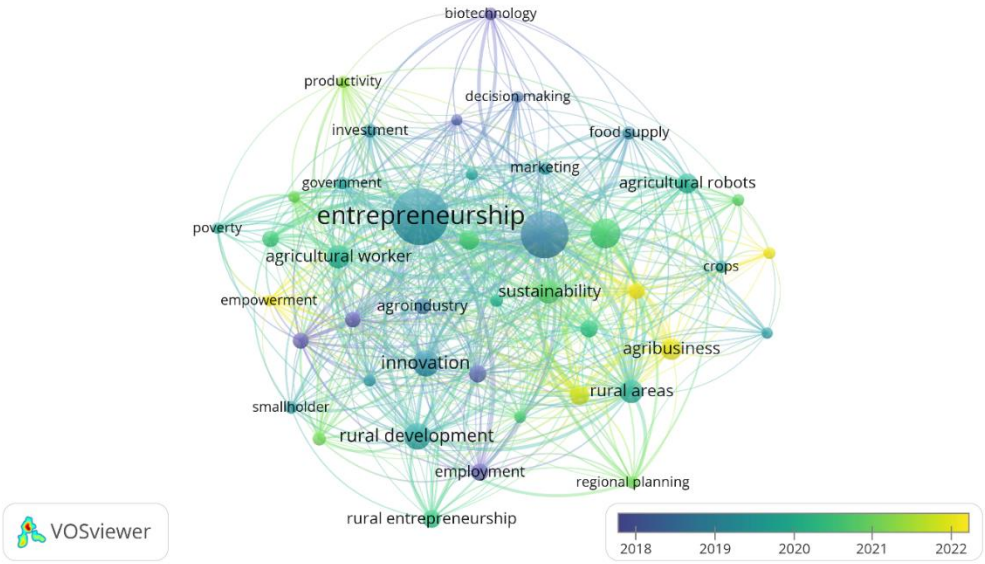

Figure 2. Overlay Visualization
Source: Data Analysis Result, 2026

Figure 2 illustrates the temporal evolution of research themes in agricultural entrepreneurship, with entrepreneurship remaining the most central and enduring concept across the study period. Its consistent prominence indicates that entrepreneurial perspectives have continuously framed scholarly discussions on agriculture, linking economic activity with innovation, sustainability, and rural transformation. The dense interconnections surrounding this node suggest a mature research core that integrates multiple disciplinary viewpoints rather than fragmented thematic silos. Earlier research streams, indicated by cooler colors, are largely associated with institutional and productivity-oriented themes such as government, investment, productivity, biotechnology, marketing, and decision making. These topics reflect an initial focus on policy support, technological inputs, and efficiency improvement as foundational drivers of agricultural

entrepreneurship. This phase highlights how early scholarship emphasized structural enablers and formal mechanisms to enhance agricultural performance and entrepreneurial capacity.

More recent research, shown in warmer colors, shifts toward sustainability, agribusiness, rural areas, crops, and agricultural robots, signaling a growing interest in sustainable and technology-driven entrepreneurial models. This transition reflects the field's response to contemporary challenges such as food security, climate change, and digital transformation in agriculture. The emergence of advanced technologies alongside sustainability concerns indicates a future-oriented research trajectory, positioning agricultural entrepreneurship as a key mechanism for achieving resilient, inclusive, and technologically enabled rural economies.

3.3 Citation Analysis

Table 1. The Most Impactful Literatures

Citations	Authors and year	Title
303	[14]	Why is diversification an attractive farm adjustment strategy? Insights from Texas farmers and ranchers
229	[15]	A new circular business model typology for creating value from agro-waste
213	[16]	Farm diversification, entrepreneurship and technology adoption: Analysis of upland farmers in Wales
212	[5]	Entrepreneurship in the agricultural sector: A literature review and future research opportunities
204	[17]	Gender and motivation for agri-tourism entrepreneurship
195	[18]	Self-Employment in the Developing World
177	[19]	The contribution of self-efficacy to the relationship between personality traits and entrepreneurial intention
175	[1]	What's new in the research on agricultural entrepreneurship?
147	[20]	Scaling agricultural mechanization services in smallholder farming systems: Case studies from sub-Saharan Africa, South Asia, and Latin America
147	[21]	Reassessing Portfolio Entrepreneurship

Source: Scopus, 2025

3.4 Density Visualization

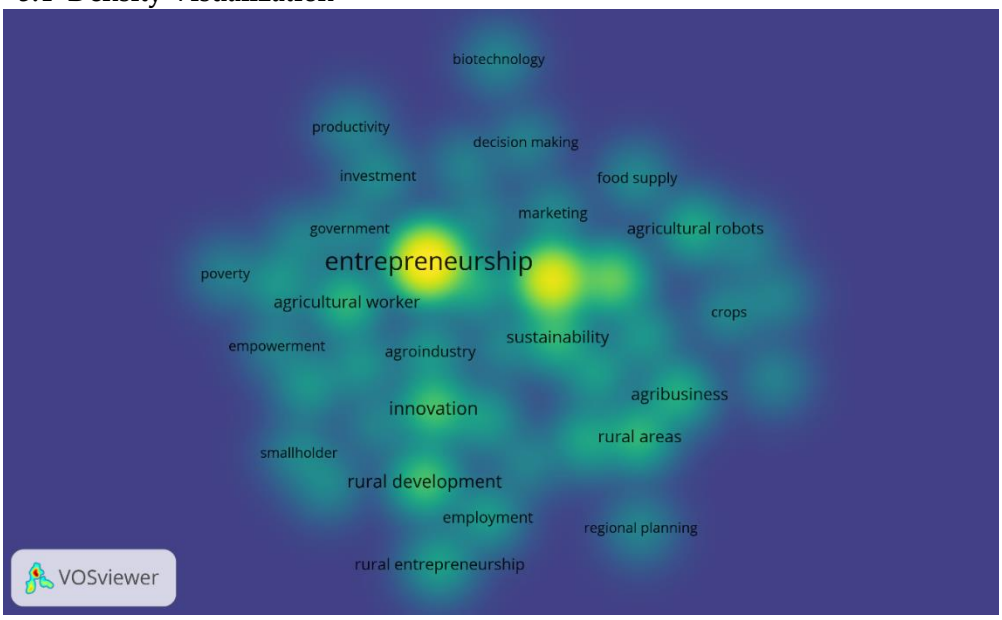

Figure 3. Density Visualization

Source: Data Analysis Result, 2026

Figure 3 highlights entrepreneurship as the most intensively researched concept in the agricultural entrepreneurship literature, as indicated by the highest concentration of activity at the center of the map. Closely surrounding this core are key themes such as sustainability, innovation, agribusiness, agricultural workers, and rural development, suggesting that these topics form the dominant knowledge base of the field. The high-density areas reflect sustained scholarly attention to how entrepreneurial practices intersect with sustainable agricultural production, value creation, and socio-economic development in rural contexts. In contrast, themes such as biotechnology, agricultural robots, crops, regional planning, employment, and food supply appear in lower-density zones, indicating more specialized or emerging research streams. While these topics are connected to the core, their relatively dispersed density suggests that they are either niche areas or newer directions gaining momentum more recently. This pattern implies significant opportunities for future research to integrate advanced technologies and spatial planning perspectives more deeply into agricultural entrepreneurship studies, particularly in ways that strengthen sustainability and rural livelihood outcomes.

3.5 Co-Authorship Network

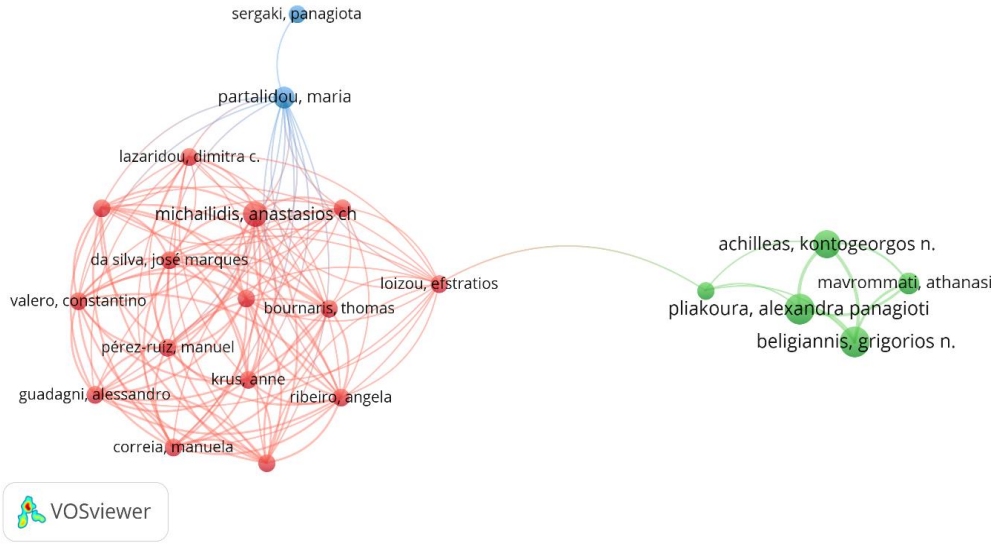

Figure 4. Author Visualization
Source: Data Analysis Result, 2026

Figure 4 reveals a highly clustered collaboration structure within agricultural entrepreneurship research, dominated by a large and densely interconnected author group centered around Michailidis, Anastasios Ch. and Bournaris, Thomas, indicating their central role in shaping collaborative scholarship in the field. This core cluster reflects strong, repeated co-authorship ties, suggesting the presence of an established research team or school of thought. In contrast, smaller peripheral clusters—such as the group involving Achilleas, Kontogeorgos N., Beligiannis, Grigorios N., and Plakoura, Alexandra Panagioti—exhibit more limited internal collaboration and fewer cross-cluster connections. The relatively sparse links between these clusters imply that agricultural entrepreneurship research remains collaboration-fragmented, with knowledge production concentrated in a few tightly knit research groups, highlighting opportunities for broader international and inter-group collaboration to enhance cross-fertilization of ideas.

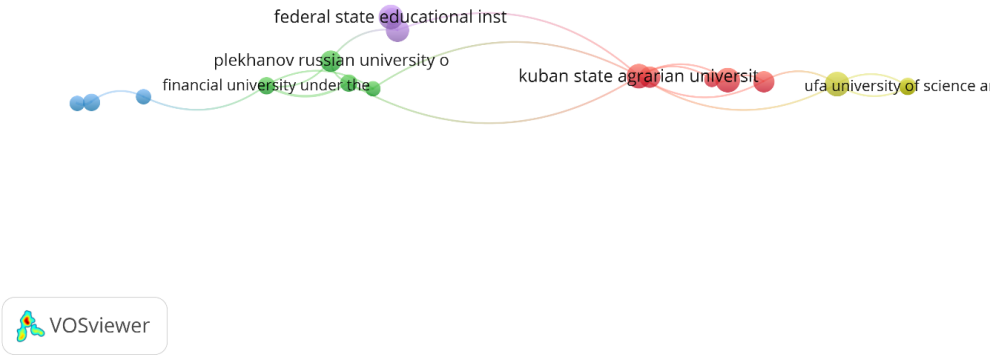

Figure 5. Affiliation Visualization
Source: Data Analysis Result, 2026

Figure 5 indicates a highly localized and segmented pattern of cooperation in agricultural entrepreneurship research, with collaborations concentrated among a small number of universities. Kuban State Agrarian University emerges as the central institutional hub, displaying the strongest and most frequent collaborative links, particularly with Ufa University of Science and Technology and Plekhanov Russian University of Economics. Other institutions, such as federal state educational institutes and financial universities, appear more peripheral and weakly connected, suggesting limited inter-institutional integration.

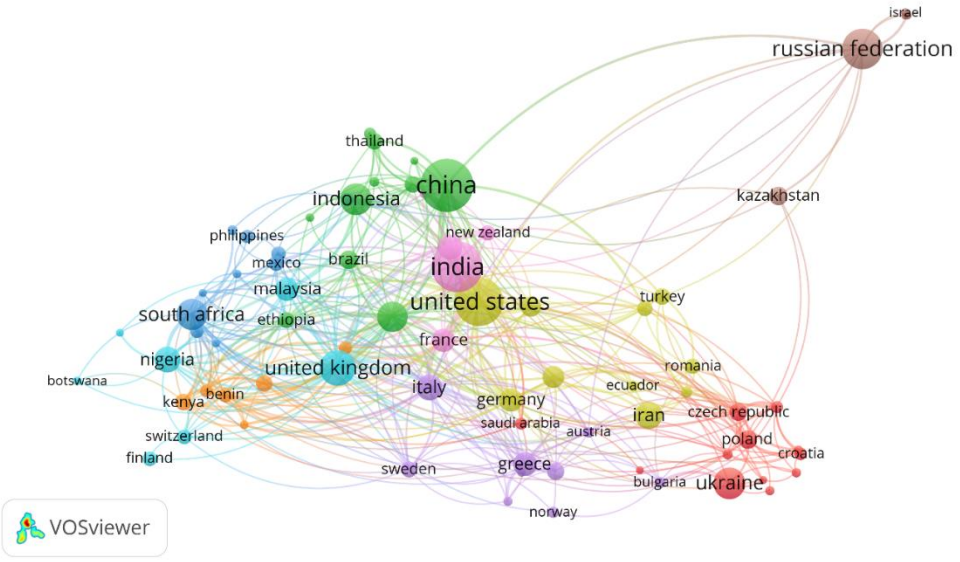

Figure 6. Country Visualization
Source: Data Analysis Result, 2026

Figure 6 demonstrates a globally interconnected yet uneven structure in agricultural entrepreneurship research, with the United States, China, and India emerging as the most influential hubs based on node size and extensive international linkages. These countries act as central

connectors linking both developed and developing regions, facilitating cross-regional knowledge exchange. Strong collaborative ties are evident between Asian countries (e.g., China, Indonesia, Thailand), as well as between European nations (e.g., United Kingdom, Germany, Italy, France), indicating well-established regional research networks. In contrast, countries such as those in parts of Africa and Eastern Europe appear more peripheral, though increasingly connected through collaborations with major hubs.

Discussion

The findings of this bibliometric analysis indicate that agricultural entrepreneurship has evolved into a well-established yet dynamically expanding research field, with entrepreneurship serving as the central conceptual anchor. The keyword co-occurrence and density analyses reveal that research has consistently integrated economic, social, and technological perspectives, with dominant themes surrounding sustainability, innovation, agribusiness, and rural development. This confirms that agricultural entrepreneurship is no longer viewed merely as farm-level business activity, but rather as a multidimensional mechanism for addressing broader challenges such as food security, environmental sustainability, and rural livelihoods. The strong interlinkages among these themes highlight the interdisciplinary maturity of the field, where economic performance and social impact are increasingly examined in tandem.

The overlay visualization further demonstrates a clear temporal shift in research focus. Earlier studies emphasized institutional support, productivity, investment, biotechnology, and government intervention, reflecting an initial concern with structural enablers of entrepreneurial activity in agriculture. More recent research has transitioned toward sustainability-oriented and technology-driven themes, including agribusiness development, rural resilience, digital agriculture, and agricultural robotics. This shift reflects global responses to climate change, technological disruption, and the demand for sustainable food systems. The growing prominence of these topics suggests that future agricultural entrepreneurship research will increasingly prioritize innovation-led and environmentally responsible business models, positioning agripreneurship as a strategic pathway toward resilient agricultural systems.

From a collaboration perspective, the co-authorship, institutional, and country-level analyses reveal a highly centralized yet uneven research network. Scholarly output and collaboration are concentrated within a small number of tightly connected author groups and regionally bounded institutions, while global collaboration is dominated by key countries such as the United States, China, and India. Although emerging economies in Asia, Africa, and Eastern Europe are increasingly visible, their roles remain largely peripheral within the global network. This fragmentation suggests substantial opportunities for expanding cross-institutional and cross-regional collaboration, particularly by integrating researchers from developing agricultural economies. Strengthening such collaboration would not only diversify theoretical perspectives but also enhance the practical relevance of agricultural entrepreneurship research in addressing global rural development and sustainability challenges.

CONCLUSION

This bibliometric study provides a comprehensive overview of the intellectual structure, thematic evolution, and collaborative landscape of agricultural entrepreneurship research. The findings demonstrate that the field has developed into an interdisciplinary and increasingly mature domain, centered on entrepreneurship as a key mechanism linking innovation, sustainability, agribusiness, and rural development. Over time, research has shifted from an initial focus on institutional support and productivity toward sustainability-oriented and technology-driven entrepreneurial models that address contemporary global challenges such as food security and climate change. Despite its growing global reach, scholarly collaboration remains concentrated within a limited number of authors, institutions, and countries, indicating the need for broader and

more inclusive research partnerships. This study contributes valuable insights into the evolution and current state of agricultural entrepreneurship research and offers a foundation for future studies to advance theoretical development, empirical diversity, and global collaboration in this vital field.

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