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Agribusiness Innovation Research Trends Based on Scopus Database for the Period 2013–2024

Loso Judijanto
IPOSS Jakarta

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ABSTRACT

This study aims to map the research trends on agribusiness innovation indexed in the Scopus database during the period 2013–2024 using a bibliometric approach. Data were collected from Scopus and analyzed using VOSviewer to examine publication growth, co-authorship networks, institutional and country collaborations, as well as keyword co-occurrence and thematic evolution. The findings indicate a significant increase in publications over the last decade, reflecting growing academic attention to agribusiness innovation. The keyword network reveals that agribusiness functions as the central theme, closely linked to sustainable development, food security, agroindustry, and agricultural economics. Overlay visualization shows a recent shift toward digital transformation topics such as internet of things (IoT), big data, and smart agriculture, highlighting the increasing integration of Industry 4.0 technologies within agricultural systems. Collaboration analysis identifies Brazil, India, the United States, and several European countries as major contributors to the global research network. The study demonstrates that agribusiness innovation research has evolved from a productivity-oriented perspective toward a systemic, sustainability-driven, and technology-enabled paradigm. These findings provide a comprehensive overview of the intellectual structure and future research directions in agribusiness innovation.

Corresponding Author:

Name: Loso Judijanto
Institution: IPOSS Jakarta
Email: losojudijantobumn@gmail.com

1. INTRODUCTION

Agriculture and agribusiness are the backbone of both global and local economies, particularly in developing countries such as Indonesia. Agribusiness encompasses not only agricultural production but also downstream activities such as processing, marketing, distribution, and complex supply chain management. With the evolving global landscape, the agribusiness sector is increasingly vulnerable to challenges such as climate change, commodity price volatility, and the growing demand for technologies to meet the world's expanding food requirements [1]. Therefore, agribusiness innovation becomes a key element in improving productivity, competitiveness, and the resilience of food systems to meet global dynamics. Over the last few decades, agribusiness research has seen significant growth, marked by an increasing number of

academic publications year after year [2]. Bibliometric studies based on Scopus have shown that agribusiness research covers themes such as rural entrepreneurship, the use of digital technologies in agriculture, and the development of value-added agricultural products, which have gained increasing attention from researchers worldwide. These studies not only reflect the quantitative growth of publications but also highlight thematic developments that reflect the challenges and opportunities in modern agribusiness [3].

Furthermore, technological advancements such as the Internet of Things (IoT), big data, artificial intelligence, and precision farming systems have become central topics in agribusiness innovation literature in the last decade. The implementation of such technologies is believed to drive production efficiency and enhance the quality of agricultural products through real-time data usage and automation processes [4]. This indicates that agribusiness research is no longer solely focused on traditional aspects such as production and marketing but also on technological innovations and digitalization that are fundamentally transforming the way the sector operates. Moreover, research trends indicate a growing focus on interdisciplinary approaches, including the integration of agricultural technology, business, and social sciences, to understand how innovations can be effectively applied in different contexts. For instance, sustainability issues, community involvement, and the role of public policy in supporting agribusiness innovation have become significant themes in academic studies. These findings emphasize the complexity of contemporary agribusiness systems, where social, economic, and technological aspects interact in shaping innovative practices [5].

Globally, the mapping of research trends also indicates substantial contributions from countries like the United States, India, China, and other developing nations in agribusiness literature. These scientific contributions not only reflect academic efforts to understand agribusiness phenomena but also indicate the efforts of these countries to strengthen the knowledge base that can be used for formulating policies and developing more resilient agribusiness practices. Thus, Scopus-based research provides a broad overview of the dynamics of agribusiness innovation that have unfolded over more than a decade and serves as the foundation for future research to understand the direction and focus of future studies.

Based on an initial review of the agribusiness literature, there is a knowledge gap regarding the mapping of innovation research trends in agribusiness from 2013 to 2024. Specifically, there is a lack of bibliometric studies that comprehensively analyze the thematic development, contributions of countries and institutions, and the relationship between agribusiness innovation research and global issues such as digital technologies, sustainability, and public policies. The main question that arises is: How do the trends in agribusiness innovation research published in the Scopus database from 2013 to 2024 reflect the direction of agribusiness knowledge development globally, and what are the implications for future agribusiness practices and policies? This study aims to map the trends in agribusiness innovation research based on publications indexed in Scopus from 2013 to 2024.

2. METHOD

This study employs a bibliometric analysis to map the trends in agribusiness innovation research over the period from 2013 to 2024. The primary data source for this analysis is the Scopus database, which is recognized as one of the most comprehensive and reliable sources for academic publications. The study uses VOSviewer, a widely-used bibliometric tool, to visualize

and analyze the relationships between research articles, authors, institutions, and keywords. VOSviewer enables the creation of maps based on co-authorship, co-citation, and keyword co-occurrence networks, which helps to identify key themes, trends, and influential scholars in the field of agribusiness innovation. The data extraction process involves searching for relevant articles published in the field of agribusiness, followed by data cleaning and processing to ensure only high-quality and pertinent publications are included.

In order to gain a comprehensive understanding of the development of agribusiness innovation, the study focuses on key bibliometric indicators such as the number of publications, citation counts, keyword frequency, and author collaboration patterns. The use of VOSviewer facilitates the identification of thematic clusters, trends in research focus, and the evolution of topics within agribusiness innovation over the past decade. By examining the relationships between authors and institutions, the analysis also highlights the international collaboration and contributions of major research hubs. This approach allows for a detailed examination of the research landscape, providing insights into the major drivers and challenges of agribusiness innovation and offering a foundation for future research in the field.

3. RESULT AND DISCUSSION

Co-Author Analysis

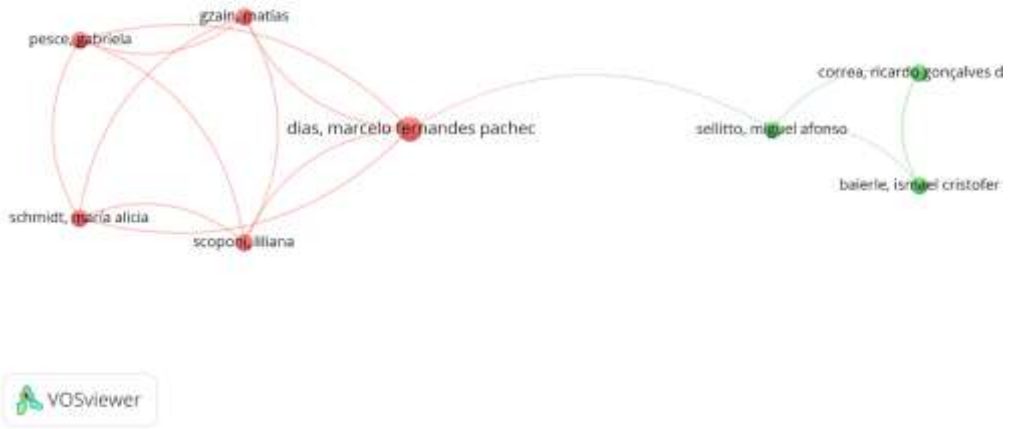

Figure 1. Author Visualization
Source: Data Analysis

Figure 1 reveals two distinct research clusters within the agribusiness innovation literature. The red cluster appears more densely interconnected, centered around Dias, Marcelo Fernandes Pachec, who functions as a key collaborative hub linking several authors such as Gzain Matías, Pesce Gabriela, Schmidt María Alicia, and Scoponi Liliana. The strong and multiple linkages among these authors indicate an established and cohesive research group with frequent internal collaboration. In contrast, the green cluster consists of a smaller collaboration network, including Sellitto Miguel Afonso, Correa Ricardo Gonçalves, and Baierle Ismael Cristofe, suggesting a more focused or specialized partnership structure. The limited connections between the red and green clusters imply relatively weak cross-group collaboration, indicating that research on agribusiness innovation may still be segmented across collaborative communities rather than fully integrated at the global level.

Figure 2. Institution Visualization
Source: Data Analysis

Figure 2 illustrates several interconnected clusters dominated by universities in Latin America and Europe. The Universidade de São Paulo appears as a central hub, linking with Universidade Federal de São Carlos and Universidade Estadual de Campinas, indicating strong national collaboration within Brazil. These institutions also connect with Universidad de Buenos Aires, reflecting cross-country academic partnerships in South America. Fundação Getulio Vargas shows a more peripheral but still connected position, suggesting participation in broader collaborative networks. On the European side, CIRAD (Paris, Île-de-France) forms a distinct node linked to the Latin American institutions, highlighting international research cooperation, particularly between Brazil, Argentina, and France.

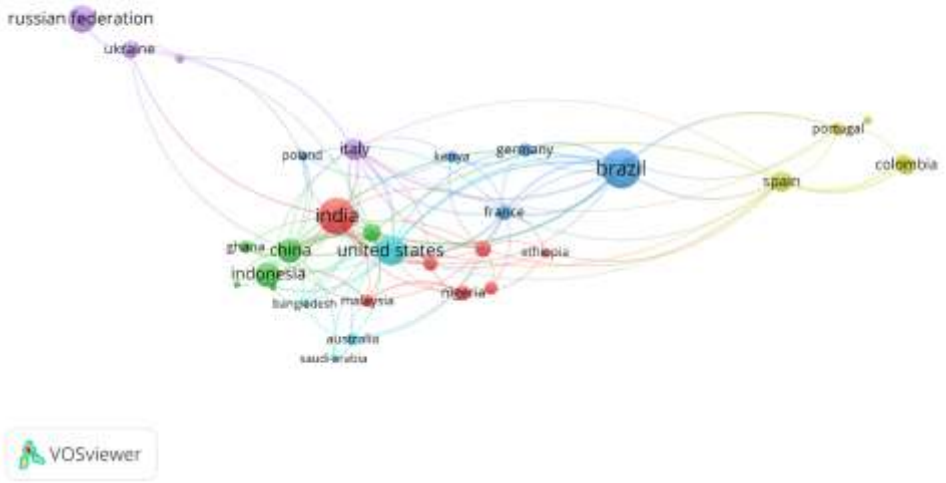

Figure 3. Country Visualization
Source: Data Analysis

Figure 3 demonstrates that agribusiness innovation research is strongly interconnected across multiple regions, with Brazil emerging as one of the most central and influential nodes. Brazil shows extensive collaboration links with Spain, Germany, France, and several developing countries, indicating its strategic role as a bridge between Europe and emerging economies. India and the United States also function as major hubs, maintaining dense collaborative ties with countries in Asia, Africa, and Oceania, including Indonesia, China, Malaysia, Australia, Nigeria, and Ethiopia.

European countries such as Spain, Italy, Germany, and France form an integrated sub-network, while Russia and Ukraine appear more regionally clustered but still connected to broader collaborations

Citation Analysis

Table 1. Top Cited Literature

Citations	Authors and Year	Title
213	[6]	Who drives the digital revolution in agriculture? A review of supply-side trends, players and challenges
177	[7]	The ethics of big data in big agriculture
151	[8]	Analysis of Corporate Social Responsibility in Spanish Agribusiness and Its Influence on Innovation and Performance
149	[9]	The digital divide: Implications for agribusiness and entrepreneurship. Lessons from Wales
146	[10]	Mechanization in Ghana: Emerging demand, and the search for alternative supply models
137	[11]	Intellectual capital and firm performance in the global agribusiness industry: The moderating role of human capital
111	[12]	How does artificial intelligence affect the environmental performance of organizations? The role of green innovation and green culture
99	[13]	A bibliometric and thematic approach to agriculture 4.0
90	[14]	The role of green process innovation translating green entrepreneurial orientation and proactive sustainability strategy into environmental performance
86	[15]	Proximity as determinant of business cooperation for technological and non-technological innovations: a study of an agribusiness cluster

Source: Scopus

Keyword Co-Occurrence

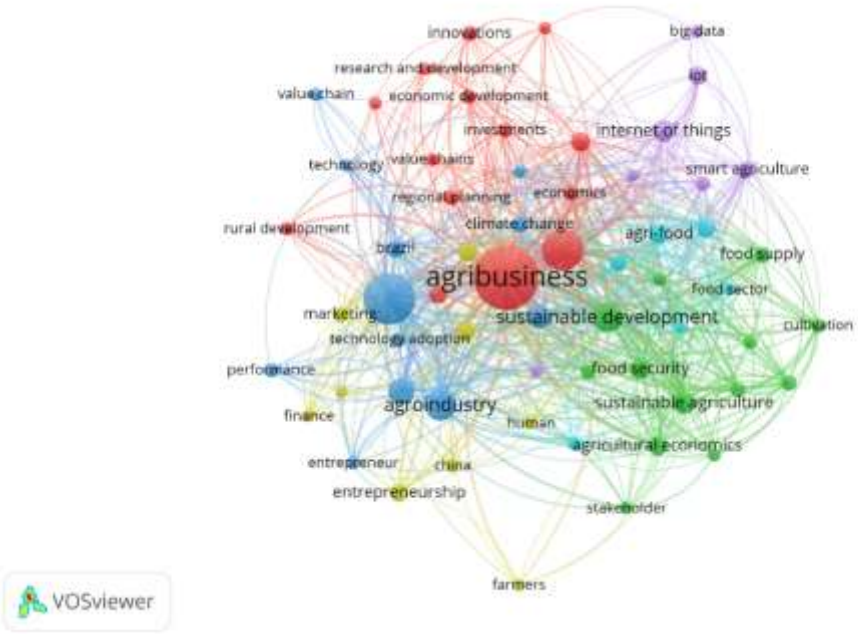

Figure 4. Network Visualization
Source: Data Analysis

Figure 4 reveals that agribusiness serves as the central and most dominant theme in the research landscape, indicated by its largest node and extensive connections to other concepts. Closely linked to it are terms such as sustainable development, agroindustry, food security, and agricultural economics, suggesting that innovation in agribusiness is strongly embedded within broader discussions of sustainability, economic performance, and food systems. The dense interconnections reflect a highly integrated body of literature where economic, environmental, and technological dimensions converge.

A prominent green cluster centers around sustainability-related themes, including sustainable agriculture, food security, food supply, cultivation, and agricultural economics. This indicates that much of the innovation discourse in agribusiness is aligned with global sustainability agendas, particularly ensuring food availability and environmentally responsible agricultural practices. The presence of stakeholder and human within this cluster further suggests attention to social dimensions, governance, and community engagement in agricultural innovation processes. Another significant cluster (red) highlights themes such as innovations, investments, economic development, regional planning, value chains, and climate change. This grouping reflects a macro-level perspective in which agribusiness innovation is analyzed as a driver of regional and national economic transformation. The linkage to climate change shows that innovation is increasingly framed as a response to environmental risks and the need for resilient agricultural systems.

The purple cluster emphasizes technological transformation, including internet of things (IoT), big data, and smart agriculture. This indicates the growing importance of digital technologies in agribusiness innovation research. The integration of IoT and big data with smart agriculture suggests a shift toward precision farming, data-driven decision-making, and automation. These themes represent more recent technological advancements shaping the modernization of agricultural value chains. The blue and yellow clusters incorporate managerial and entrepreneurial dimensions, including marketing, technology adoption, finance, entrepreneurship, farmers, and performance. This highlights that agribusiness innovation is not solely technological but also organizational and behavioral. The focus on adoption, entrepreneurship, and financial aspects suggests increasing recognition of SMEs, farmer capabilities, and business models as critical determinants of successful innovation implementation.

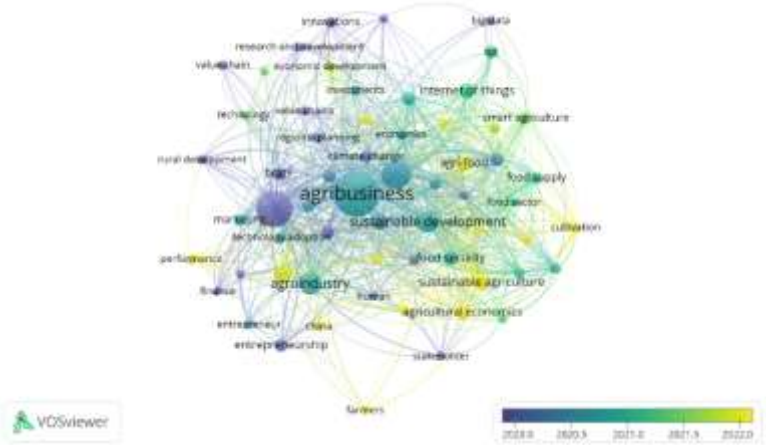

Figure 5. Overlay Visualization
Source: Data Analysis

Figure 5 illustrates the temporal evolution of research themes in agribusiness innovation from 2020 to 2022. Core terms such as agribusiness and sustainable development appear in mid-range colors (greenish tones), indicating their consistent prominence throughout the observed period. These themes function as the intellectual backbone of the field, linking economic, environmental, and technological discussions. Earlier-emerging topics (shown in darker blue tones), such as value chain, research and development, and rural development, reflect foundational discussions centered on structural and developmental aspects of agribusiness systems. More recent themes (highlighted in yellow tones) reveal a shift toward sustainability-oriented and stakeholder-focused discussions. Keywords such as sustainable agriculture, food security, agricultural economics, farmers, and cultivation indicate growing attention to resilience, inclusivity, and food system stability. This suggests that recent research increasingly emphasizes social and environmental dimensions, aligning with global sustainability agendas and post-pandemic concerns about food supply and agricultural vulnerability. Technological themes such as internet of things (IoT), big data, and smart agriculture appear in transitional colors (green to yellow), indicating their rising importance in the most recent years. This reflects an accelerating integration of digital transformation within agribusiness innovation research.

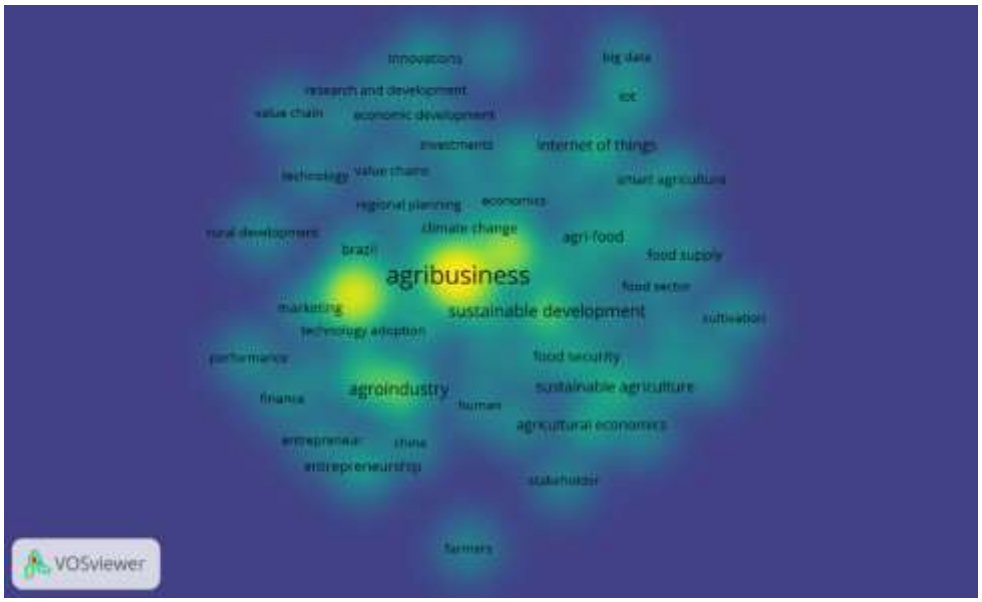

Figure 6. Density Visualization

Source: Data Analysis

Figure 6 highlights agribusiness as the most dominant and intensively studied keyword, shown by the brightest (yellow) concentration at the center of the map. Surrounding this core are closely related high-density themes such as sustainable development, agroindustry, food security, and agricultural economics, indicating that the literature strongly integrates economic performance with sustainability concerns. The clustering of these terms suggests that agribusiness innovation research is primarily framed within discussions of sustainable growth, food system resilience, and value creation across agricultural sectors. Moderate-density areas (green to light blue) reveal supporting but still significant themes, including internet of things, smart agriculture, big data, value chain, economic development, and entrepreneurship. These topics indicate expanding research attention toward digital transformation, technological adoption, and

business model innovation within agribusiness. Meanwhile, more peripheral and lower-density terms such as farmers and stakeholder suggest emerging or specialized subtopics that are gaining attention but remain less central compared to sustainability and economic themes.

Discussion

The bibliometric findings reveal that agribusiness innovation research has evolved into a highly integrated and multidimensional field. The dominance of agribusiness as the central keyword confirms that the literature is strongly structured around economic value creation within agricultural systems. However, the close association between agribusiness and sustainable development, food security, and sustainable agriculture indicates a significant conceptual shift. Innovation in agribusiness is no longer framed solely as productivity enhancement or profit maximization, but increasingly as a strategic instrument for ensuring long-term environmental sustainability and food system resilience. This reflects the growing influence of global agendas such as the Sustainable Development Goals (SDGs), climate change mitigation strategies, and sustainable supply chain frameworks.

The cluster analysis further demonstrates that sustainability themes form one of the most cohesive knowledge domains in the field. Keywords such as food supply, agricultural economics, cultivation, and stakeholder show that innovation discussions extend beyond technological change toward governance, institutional arrangements, and social inclusion. The increasing prominence of these themes in recent years suggests that agribusiness innovation research is responding to global challenges such as climate volatility, post-pandemic food insecurity, and rural vulnerability. Rather than focusing only on technological breakthroughs, recent studies emphasize systemic transformation—integrating environmental responsibility, farmer welfare, and inclusive growth.

At the same time, the overlay visualization indicates a strong rise in digital transformation themes, including internet of things (IoT), big data, and smart agriculture. These topics appear as emerging or rapidly growing areas within the 2020–2022 period. This trend signals a technological acceleration in agribusiness innovation research, driven by precision agriculture, data-driven decision-making, automation, and digital supply chain monitoring. The integration of IoT and big data with sustainable agriculture themes suggests that digitalization is increasingly perceived as a solution to improve efficiency while simultaneously addressing environmental and food security concerns. In this context, innovation is positioned at the intersection of sustainability and Industry 4.0 technologies.

The co-authorship and institutional collaboration networks reveal that research productivity is geographically concentrated, particularly in Brazil, India, the United States, and several European countries. Brazil emerges as a key hub, functioning as a bridge between Latin American and European collaborations. This pattern suggests that agribusiness innovation research is strongly shaped by countries with significant agricultural sectors and active policy engagement in sustainable development. The presence of both South–South and North–South collaborations indicates a relatively balanced global research structure, although cross-cluster collaboration among author groups remains somewhat fragmented. Strengthening intercontinental collaboration may further enhance theoretical integration and methodological diversity.

4. CONCLUSION

This bibliometric study demonstrates that research on agribusiness innovation during the 2013–2024 period has evolved into a dynamic and multidimensional field

characterized by the integration of sustainability, digital transformation, and economic development perspectives. The findings confirm that agribusiness remains the core theme, but it is increasingly interconnected with concepts such as sustainable development, food security, smart agriculture, and the Internet of Things. The temporal analysis indicates a clear shift from traditional value-chain and development-focused discussions toward technology-enabled and sustainability-oriented innovation frameworks. Moreover, international collaboration patterns highlight the strategic role of countries such as Brazil, India, the United States, and several European nations in shaping the global research agenda. The study concludes that agribusiness innovation research is transitioning toward a systemic and digitally driven paradigm that emphasizes resilience, inclusivity, and long-term sustainability in agricultural systems.

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