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The evolution of agribusiness incubation: Insights from a bibliometric analysis

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Abstract

This study examines the evolution of research on agribusiness incubation through a bibliometric analysis aimed at mapping its conceptual structure, thematic progression, and emerging research areas. Using data visualization tools such as VOSviewer, three types of maps—co-occurrence, overlay, and density visualizations—were generated to explore patterns in keyword relationships and temporal trends. The co-occurrence network revealed three major thematic clusters: entrepreneurship and incubation ecosystems, policy and growth linkages, and regional development with a focus on youth empowerment. The overlay visualization demonstrated a temporal shift from early studies on agricultural policy and food security (2020-2021) to more recent emphases on agripreneurship, skill development, and enterprise incubation (2022-2023). The density map identified *growth*, *enterprise*, and *support* as central themes, while topics such as sustainability, gender inclusion, and resilience remain underexplored. Overall, the findings suggest that agribusiness incubation research has evolved from policy-oriented discussions to enterprise-centered, innovation-driven perspectives. However, gaps persist in comparative regional analyses, long-term impact assessment, and integration of sustainability frameworks. The study recommends strengthening policies that link incubation centers with research, finance, and industry, fostering inclusive participation, and promoting empirical evaluations to enhance the effectiveness and sustainability of agribusiness incubation ecosystems.

Keywords: Agribusiness incubation, bibliometric analysis, VOSviewer

Introduction

The term Agribusiness was originally coined by Harvard economist Johan Davis and Ray Goldberg in 1957. They defined Agribusiness as, "the sum total of all operations involved in the manufacture and distribution of farm supplies; production operations on the farm; and the storage, processing and distribution of farm commodities and items made from them (Hassanzoy *et al*. 2019) [9].

Agribsuiness plays an important role in shaping global economy, acting as a key actor that connects agriculture to the wider economy through processing, distribution and retail. It can contribute to sustainable development by bringing innovations in agricultural technologies, boosting the supply chains, supporting grassroot economies through job creation and infrastructure development (Estekov *et al*. 2025) [6]. It can play a pivotal role in the transformation of the food production system (Gadanakis *et al*. 2024) [8]. However the agribusiness sector faces several challenges.

Kyfyak *et al*. 2022 [11], have reported that agribusiness faces several challenges due to fluctuation in world food prices, import dependence on certain types of goods and the raw material nature of exports of certain agricultural commodities.

A study by Boehlje *et al*. 2011 [4], highlighted the strategic uncertainties in various aspects of agribusiness management. The areas include, people and human resources, market prices and terms of trade, competitors and competition customer relationship, technological change, business partners, political, regulatory and legislative climate. (Boehlje *et al*. 2011) [4].

Muthomi 2017 [12], have reported that the various challenges faced by youth who venture into agri-business are, challenge of accessing to affordable employees, agricultural inputs, markets, agricultural machinery, technical assistance, capital, extension services, information about agribusiness and access to education on agriculture/agribusiness as well as access to mentors.

To tackle these problems, agribusiness incubation has emerged as an effective solution.

It can be defined as the process of nurturing the innovative, early-stage enterprises that have high potential for growth and can become competitive agribusinesses by serving, adding value and linking to the farmer producers (Thirumal 2023) [1].

Agribusiness incubation open-up the windows for customisation of products based on local need, creates employment opportunities, brings out entrepreneurial talent and leadership that have significant consequences for emerging economies (Chaturvedi *et al*. 2022) [5].

A study by Ashwini *et al*. (2025) [21], in the fisheries sector, shows that entrepreneurs who have completed incubation had a higher rate of successes regardless of their business size.

Sutrisno *et al*. 2024 [20], reported that business incubators play a very significant role in enhancing the human resource competence through its various programmes such as training and mentoring. It also fosters entrepreneurship by creating a conducive environment for the innovative ideas. In addition

to this they also act as a crucial link between various components of the entrepreneurial ecosystem and have a positive impact on the local economy and society.

Several studies have also highlighted the importance of agribusiness business incubation in technology commercialisation, income, employment generation and promotion of Agri-entrepreneurship. (Singh 2014, Arya 2025, Ozor 2013, Etela *et al* 2017) [17, 2, 14, 7].

Given the importance of Agribusiness incubation, the current study endeavours to explore the evolution of this specific domain using bibliometric analysis as a tool. The findings of the study would be helpful in identifying the key areas of focus of agribusiness incubation, its growth and evolution over the past decades, and gaps in the knowledge regarding agribusiness incubation.

Objectives of the study

To analyse the publication trends on agribusiness over the previous years to understand the key focus areas.

Methodology

The bibliometric analysis was conducted using Dimensions.ai data base and VOSviewer software.

Data collection

To collect the data from the Dimensions.ai data base, keywords such as, "Agribusiness incubator" OR "Agri-business incubator" OR "Agribusiness incubation" OR "Agri-business incubation" OR "Agri tech incubator" OR "Agri tech incubation" were used.

Following this string, a total number of 384 publications were found in the database. The publications spans from 2010 to 2025.

Co-occurrence analysis

The data set was exported in the form of a. csv file into excel and VOSviewer software was used to create thematic maps after applying certain filters. While applying the filters caution was exercised that only the relevant terms are included while creating the co-occurrence visualisation map. Threshold for the terms was set to 10 occurrences (only the terms appearing in at least 10 documents were included). Of the 9851 terms, 207 terms met threshold limit. Based on the calculation of default 60 percent of relevance score among 207 terms, 124 terms were identified and finalized (top 60 percent) as the most relevant terms for creating visualization maps.

Results and Discussion

The results of the network, overlay and density visualization analysis are presented and discussed below.

Detailed analysis of the network visualization for bibliometric analysis

The network visualisation shows a map of co-occurrence of terms in the domains of Agribusiness incubation. The co-occurrence terms are the important words that have appeared together in the literature regarding agribusiness incubation. In the VOSviewer software they have been grouped into three thematic clusters. Each cluster (in figure 1) represents a coherent research theme, providing insight into the current state of knowledge and emerging trends.

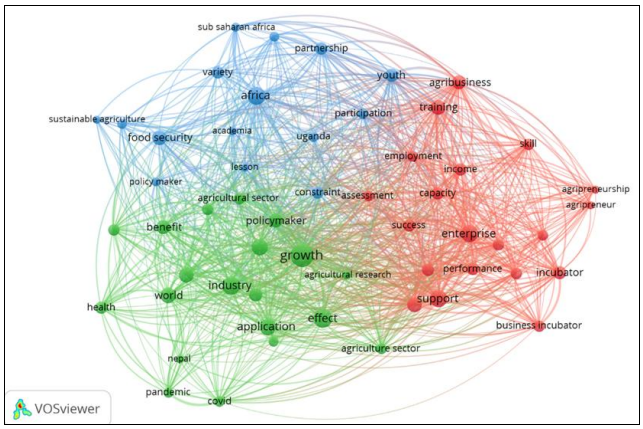


Fig 1: Network visualization of keyword co-occurrence terms, illustrating the formation of four distinct thematic clusters.

Discussion of clusters in the network visualisation

Cluster 1 (Red): Agribusiness incubation and entrepreneurship ecosystem

The key terms appearing under this cluster include Enterprise, Support, agripreneur, agripreneurship, performance, incubator, business incubator, agribusiness, training, skill, capacity etc.

It emphasises research focusing on:

- The role of incubation programmes in nurturing agribusiness start-ups.
- Focus on Entrepreneurial performance, capacity building, training and skill development.
- Support systems that such as financial, advisory and infrastructural that enhance enterprise success.

This cluster highlights the core focus of agribusiness incubation research — how incubation fosters entrepreneurship, performance, and enterprise growth

Cluster 2 (Green) - Growth, policy, and application dimension

The key terms appearing under this cluster include growth, application, industry, effect, covid, pandemic, world, sustainability,

This cluster represents

- Broader discussions on economic growth, policy frameworks, and sectoral impact of agribusiness initiatives.
- Studies linking agricultural innovation and policy interventions to sustainable development.
- Post-pandemic reflections on the resilience and transformation of agribusiness models.

This cluster connects agribusiness incubation to policy, growth, and sustainability outcomes, showing a macro-level perspective.

Cluster 3 (Blue) - Regional development and youth empowerment

The key terms arising in this cluster include Africa, Sub-Saharan Africa, agribusiness, food security, sustainable agriculture, training, partnership, Uganda.

The cluster emphasises on:

- Regional studies, especially in African contexts.

- The role of youth entrepreneurship and training in agribusiness.
- Links between incubation, food security, and sustainability.
- Collaborative partnerships between academia, industry, and government

This cluster reflects the developmental and regional dimension, emphasizing how agribusiness incubation supports youth-led enterprises and sustainable agriculture, particularly in Africa.

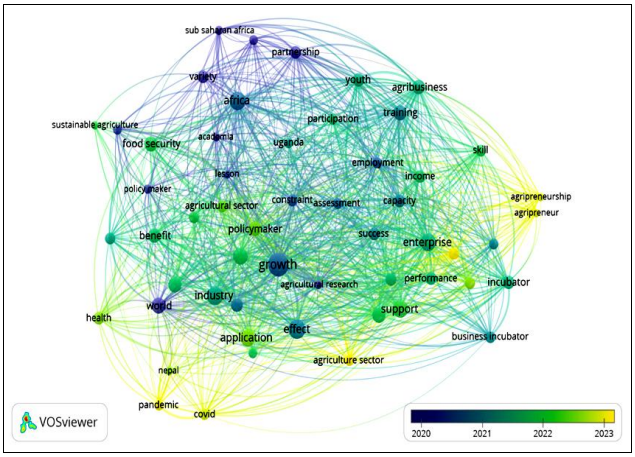
Cross cluster linkage

The red cluster (entrepreneurship and incubation) is closely linked to the blue cluster (training and youth) — indicating that capacity building and training are central to agribusiness incubation.

It also links with the green cluster (policy and growth) — showing that incubation outcomes contribute to broader economic and policy objectives.

Detailed analysis of the overlay visualization for bibliometric analysis

The overlay visualization map generated using VOSviewer offers a dynamic view of the bibliometric network by incorporating a time dimension. It shows how terms associated with Agribusiness incubation have evolved over time. This temporal dimension provides valuable insights into the trajectory of research focus and highlights emerging areas of interest. The colour scale ranges from purple to green to yellow, corresponding with studies from 2016 to 2025.



Key observations from each cluster

Fig 2: The overlay visualization map.

Older research focus (around 2020-2021):

Terms such as “Africa,” “sub-Saharan Africa,” “growth,” “industry,” “policy maker,” “food security,” and “sustainable agriculture” appear in blue to purple shades.

These represent the early thematic focus of agribusiness incubation research, which emphasized:

- Regional development and policy-driven approaches (particularly in Africa).
- The role of incubation in agricultural growth and food security.
- Broader economic and policy contexts rather than enterprise-level studies.

Transitional phase (2021-2022)

Terms like “training,” “employment,” “capacity,” “application,” “agricultural research,” and “support” appear in greenish tones.

This shows a shift in focus toward:

- Capacity building and skill enhancement for entrepreneurs.
- Integration of research, innovation, and policy.
- Growing recognition of incubation as a mechanism for agricultural transformation.

Recent and emerging focus (2022-2025)

Terms such as “agripreneur,” “agripreneurship,” “Startup”, “business incubator,” “incubator,” “enterprise,” and “covid” appear in yellow to light-green shades. These represent recent and emerging research themes, emphasizing:

- Entrepreneurship and incubation models specific to agribusiness.
- Start-up performance and innovation ecosystems.
- The post-pandemic context, where incubation has gained renewed relevance for resilience and digital transformation in agribusiness.

The older nodes (policy and regional terms) are interconnected with newer entrepreneurship-oriented nodes**,** showing an evolution from macro-level policy studies to micro-level entrepreneurial development research**.** The increasing prominence of terms like “agripreneurship” and “business incubator” indicates a conceptual maturation of the field — moving from general agricultural development to a structured incubation and innovation ecosystem.

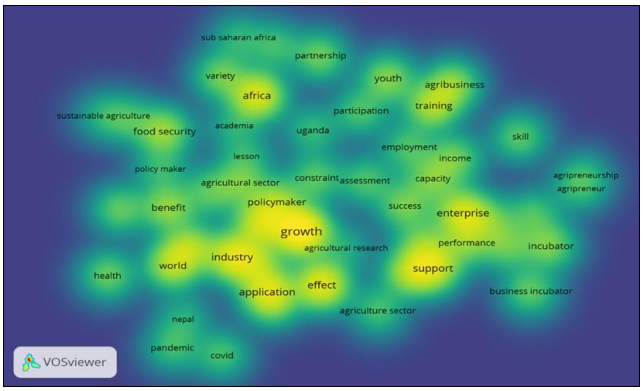


Fig 3: The density visualisation map

Density visualization map provides a clear picture of the intensity and concentration of research themes in the field of agribusiness incubation.

Each term (word) represents a keyword that has appeared in the literature. The color intensity (from blue → green → yellow) indicates how frequently a term occurs and how strongly it is connected (co-occurs) with other terms.

High-density (core) research areas - Yellow zones

Key terms: growth, industry, application, effect, enterprise, support, incubator.

These areas represent the central focus of agribusiness incubation research.

- They reflect studies that explore how incubation influences enterprise growth, industry development, and innovation applications.
- The prominence of "support" and "incubator" indicates that the service and support mechanisms of incubation programs form the conceptual nucleus of the field.

Research has been primarily concentrated on understanding the role of incubation in enterprise performance, business development, and overall agribusiness growth.

Moderate-density areas - Green zones

Key terms: food security, sustainable agriculture, policymaker, agricultural sector, training, employment, agribusiness, performance.

- These indicate interconnected but secondary research themes.
- They show that agribusiness incubation is often discussed in relation to sustainability, policy frameworks, and employment generation.
- The inclusion of training and employment suggests a growing interest in capacity building and human capital development within incubation ecosystems.

These topics show how agribusiness incubation contributes to broader developmental goals such as sustainability, youth empowerment, and rural employment.

Low-density areas - Blue zones

Key terms: pandemic, covid, nepal, health, sub-Saharan Africa.

- These represent context-specific or emerging topics, often studied in limited or localized contexts.
- The presence of covid and pandemic reflects recent attention to the resilience of agribusiness incubation during crises.
- Regional identifiers like *Africa* and *Nepal* suggest geographically focused studies examining local incubation experiences.

These areas represent niche or emerging directions, indicating potential for future exploration, such as how incubators can enhance resilience, health linkages, or regional agricultural innovation.

The density map shows that:

- Research on agribusiness incubation is centered around enterprise growth, incubation support, and innovation-driven industry development.
- There is a strong linkage between incubation and policy, sustainability, and skill development.
- New themes like agripreneurship, youth training, and pandemic resilience are emerging but not yet dominant.

Conclusion

The bibliometric analysis of agribusiness incubation research reveals a dynamic and evolving field that has transitioned from policy-oriented beginnings to a more enterprise-centered and innovation-driven domain. The co-occurrence network highlights three primary thematic clusters: (i) incubation and entrepreneurship ecosystem, (ii) policy, growth, and economic impact, and (iii) regional development and youth empowerment. Together, these clusters portray agribusiness incubation as a multifaceted concept—integrating entrepreneurial support, capacity building, and sustainable agricultural development. The strong interlinkages among terms such as *incubator*, *enterprise*, *growth*, and *support* suggest that the scholarly discourse now centers on the tangible role of incubation in fostering agripreneurship and strengthening the rural innovation ecosystem.

The overlay visualization further demonstrates the temporal evolution of research themes. Earlier studies (2020-2021) focused on regional and policy perspectives, emphasizing agricultural growth and food security, especially in Africa and other developing regions. Over time, the research focus shifted toward entrepreneurship development, skill enhancement, and start-up incubation models (2022-2023). Emerging keywords such as *agripreneurship*, *business incubator*, *training*, and *employment* signal the increasing emphasis on youth engagement, innovation diffusion, and the role of incubation in achieving inclusive rural transformation. The recent inclusion of terms such as *covid* and *pandemic* also reflects a growing concern with resilience and adaptability within incubation systems in the face of global disruptions.

The density visualization corroborates these trends, identifying *growth*, *enterprise*, and *support* as high-density themes, while areas like *sustainability*, *policy integration*, *training*, and *resilience* remain moderately explored. Low-density regions, particularly *health*, *pandemic*, and *regional incubation models*, indicate potential research frontiers. These findings reveal critical gaps: the need for longitudinal studies on the long-term impacts of incubation, comparative analyses across regions, and deeper exploration of gender-inclusive and climate-resilient incubation approaches.

From a policy standpoint, strengthening agribusiness incubation demands a more integrated and ecosystem-based approach. Policymakers should focus on building robust linkages between research institutions, financial organizations, and private sector actors to ensure holistic incubation support. Targeted policies must encourage the participation of youth and women, facilitate access to finance and technology, and promote sustainability-oriented incubation models. Furthermore, the establishment of impact assessment frameworks and knowledge-sharing platforms can enhance accountability and learning. Future research should thus move beyond descriptive analyses to empirically evaluate incubation outcomes, thereby guiding evidence-based policymaking for inclusive and sustainable agribusiness transformation.

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