Agricultural marketing research: A retrospective of domain and knowledge structure

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Abstract. Agricultural marketing research continues to grow and develop with the support of the entrepreneurial ecosystem. This study aims to visually study the mapping and trends of research in agricultural marketing through bibliometric analysis of domain and intellectual structure perspective. This study uses a bibliometric approach with secondary data from the Scopus database. The VOSViewer program and Scopus search results analysis function were used for data analysis and visualization. This work analyzed 704 scientific documents published from 1931 to 2022. The study results have revealed that the United States of Agricultural (USDA) was the conservation agency most active in agricultural marketing publications. Agricultural science and biology were the most productive fields of study. Based on the assistance of a collection of knowledge created from 91 years of scientific publications, this study suggests a classification of the conceptual themes for agricultural marketing studies: Food, Agriculture, Agribusiness, Marketing, and Economics, abbreviated as the FAAME research theme.

1 Introduction

Marketing activities play an essential role in the agricultural industry sector. Agricultural marketing is marketing agricultural products from farmers to consumers or other businesses [1]. Agricultural marketing aims to ensure that consumers can find agricultural products, increase competitiveness, and increase farmers' income in the entrepreneurship mindset [2]. The agricultural sector provides fiber, food, and fuel for human life [3]. Some marketing methods have been developed to enhance many countries' economic, social, and agricultural development [4]. Some countries have developed electronic vehicles [5], marketing cooperatives [6], and apps [7] to develop a holistic view of agricultural sustainability.

The shift from conventional marketing practices to marketing that utilizes information and communication technology can improve the country's social, economic, and agricultural situation [9] because it can connect producers with consumers directly [5]. There are several problems with agricultural marketing activities. Few countries are still adapting to the marketing digitization transition [10]. Farmer participation in marketing cooperatives is still minimal [11] to form industrial scale [12] and marketing networks [7] to reduce the risk of price fluctuations [13] and market demand [14]. Many farmers are still unfamiliar with digital marketing literature [15] with labour dominance [4]. There is a need for more commitment to stakeholder cooperation on agricultural marketing access [1] and agricultural marketing training [16] for a better agricultural industry in the entrepreneurial ecosystem [17].

A study on agricultural marketing has been conducted along with business, management, and entrepreneurship growth over the past few years. However, in general, previous research related to agricultural marketing is still limited to reviewing the level of an organization [14]; a country [13]; a period [5]; or a specific topic [17]. Although several studies explored agricultural marketing, research gaps still need to be answered. Not many studies have comprehensively examined agricultural marketing across countries, research institutions, time, and fields to look at trends and maps. Also, there are not many studies in the field of agricultural marketing that exhaustively review the correlations between researchers and keywords. One method used to look at the general research picture is the bibliometric method.

The bibliometric method can be viewed from the domain and intellectual structure perspective. Many studies often use bibliometric methods to present the relationship of a research area with a quantitative approach. From a domain and intellectual structure
This study retrieved the Scopus result metadata in CSV and PUBYEAR < 2023 and retrieved 704 publications. "agriculture marketing" OR "marketing of agriculture") TITLE-ABS-KEY ("agricultural marketing" OR "marketing of agriculture")

This research aims to visually study the mapping and trends of research in agricultural marketing through bibliometric analysis of domain and intellectual structure perspective. Therefore, this function counts the number of yearly publications, researchers' publications and institutions. Additionally, this research proposes a classification consisting of agricultural marketing publications to classify the body of knowledge created from 91 years of academic publications such as food, agriculture, agribusiness, marketing, and economy, which are abbreviated into FAAME research themes. As a practical implication, identifying critical themes in agricultural marketing contributes to the awareness of further research to clarify the context and common topics and research gaps. All this will lead to new research that addresses the lack of specialized studies and expertise in the discipline.

2 Methods of research

This study uses bibliometric methods with a domain and intellectual structure perspective. Data was collected from 1931 to 2022 with information sources from the Scopus database. The use of the Scopus database in this study was determined by considering the productivity of researchers' publications and institutions. Additionally, this function counts the number of yearly publications, publication citations, subject area, and document sources [19]. To search and find related papers in the Scopus database worldwide, this study has identified essential keywords connected to agricultural marketing research.

This research uses the keyword "agricultural marketing" in the title, abstract, and author keywords to obtain the data from the Scopus database. Data mining was limited to annual data to get complete published data for twelve months each year. Table 1 shows the variables and indicators used in this study.

Data mining used the following search query option TITLE-ABS-KEY ("agricultural marketing" OR "agriculture marketing" OR "marketing of agriculture") AND PUBYEAR < 2023 and retrieved 704 publications. This study retrieved the Scopus result metadata in CSV dataset format.

<table>
<thead>
<tr>
<th>No</th>
<th>Variables</th>
<th>Indicators</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>Trend Research</td>
<td>Number of documents per year</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Number of individual researcher publications</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Number of publications affiliated with research institutions</td>
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<tr>
<td></td>
<td></td>
<td>Number of document citations</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Number of country publications</td>
</tr>
<tr>
<td>2</td>
<td>Mapping Research</td>
<td>Network of keywords or publication themes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Researcher collaboration network</td>
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</tbody>
</table>

In the next stage, researchers analyzed the documents collected using VOSviewer ver. 1.6.19 for co-occurrence and co-authorship analysis. This research applies co-authorship analysis with the author's unit of analysis and a systematic technique of complete calculation using VOSViewer to obtain a research network of researcher collaboration. This research conducts in-depth co-occurrence analysis with keyword relation analysis and a full methodical calculation technique using VOSViewer to generate a keyword map network. Simple statistics and tables were calculated and tabulated using Microsoft Excel [20]. The outcomes were summed up and triangulated.

3 Research Results and Discussion

In agricultural marketing studies, an assessment was conducted by outlining the data results that developed based on industry and country affiliations, researchers, annual documents, citations, publication themes, and researcher collaboration networks in agricultural marketing.

3.1 Number of Publications of the Most Productive Research Institution Affiliates

A total of 962 affiliated research institutions were found to have publications on agricultural marketing. Figure 1 shows that the most productive research institution affiliated with agricultural marketing publications is the United States Department of Agriculture (United States), with 30 documents. This is followed by the USDA Agricultural Research Service (United States) with a total of 16 papers, Kansas State University (United States) with a total of 10 documents, USDA Agricultural Marketing Service (United States), and the University of Illinois Urbana-Champaign (United States) with each institution having eight documents. There were three affiliates with seven publications each, namely Newcastle University (UK), Wageningen University & Research (Netherlands), and Iowa State University (USA). Next, Purdue University (United States) with six documents.
The results showed that the United States Department of Agriculture (USDA) took first place as the most productive research institution affiliation in agricultural marketing studies. The USDA is a federal executive department of the United States government responsible for advancing scientific knowledge relevant to agriculture, forestry, and food. The four cross-cutting strategic objectives of the USDA are to promote social justice, fairness, access to opportunity, and rural wealth, to create more and better market opportunities, and to address healthy food insecurity. These goals aim to strengthen humanity and enhance lives. The seriousness of these priorities is demonstrated by USDA’s 2022-2026 strategic plan [21], annual performance plan [22], and 2023 evaluation plan [23].

### 3.2 Number of Individual Publications of Most Productive Researchers

There were about 1,323 individual researchers who published research in the field of agricultural marketing. Among these 1,323 researchers, ten individual researchers have written the most in agricultural marketing studies. As shown in Table 2, William Stanley Anthony from the USDA Agricultural Research Service and Ranjan Vaidya from Auckland University of Technology have seven agricultural marketing publications. While Narciso Arcas-Lario, Richard K. Byler, Euan M. Fleming, Miguel Hernandes-Espallardo, Michael David Myers, Carl M. Schroeder, and Pradeep Kumar Suri have five publication documents with different institutional affiliations, as shown in Table 2.

Among these affiliations, two researchers are under the United State Department of Agriculture (USDA) research service unit, William Stanley Anthony and Richard K. Byler, while Carl M. Schroeder is from the USDA Agricultural Marketing Service.

William Stanley Anthony and Ranjan Vaidya have been the most productive researchers, with seven publications on agricultural marketing. William Stanley Anthony has published 127 documents and has been cited in 423 [24]. With the publication of his article entitled "Yield, quality, and profitability of cotton produced at varying plant densities," the most cited 75 citations. The article discussed fibre properties' influence on cotton fibre quality [25]. Meanwhile, Ranjan Vaidya has ten scientific publication documents [26].

### Table 2. Number of Individual Publications of Most Productive Researchers

<table>
<thead>
<tr>
<th>No</th>
<th>Name</th>
<th>Number of Publications</th>
<th>Institutional Affiliations</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>William Stanley Anthony</td>
<td>7</td>
<td>USDA Agricultural Research Service</td>
</tr>
<tr>
<td>2</td>
<td>Ranjan Vaidya</td>
<td>7</td>
<td>Auckland University of Technology</td>
</tr>
<tr>
<td>3</td>
<td>Narciso Arcas-Lario</td>
<td>5</td>
<td>Universidad Politecnica de Cartagena</td>
</tr>
<tr>
<td>4</td>
<td>Richard K. Byler</td>
<td>5</td>
<td>USDA Agricultural Research Service</td>
</tr>
<tr>
<td>5</td>
<td>Euan M. Fleming</td>
<td>5</td>
<td>University of New England</td>
</tr>
<tr>
<td>6</td>
<td>Miguel Hernandes-Espallardo</td>
<td>5</td>
<td>Universidad de Murcia</td>
</tr>
<tr>
<td>7</td>
<td>Michael David Myers</td>
<td>5</td>
<td>The University of Auckland Business School</td>
</tr>
<tr>
<td>8</td>
<td>Carl M. Schroeder</td>
<td>5</td>
<td>USDA Agricultural Marketing Service</td>
</tr>
<tr>
<td>9</td>
<td>Pradeep Kumar Suri</td>
<td>5</td>
<td>Uttaranchal University</td>
</tr>
</tbody>
</table>

### 3.3 Number of Publication Documents Per Year

The development of agricultural marketing studies can be seen in annual publications. The number of world publications that carry agricultural marketing studies has grown annually. This can be seen in Figure 2.

Research on agricultural marketing began in 1931, according to Scopus database records. From Figure 2, it can be seen that agricultural marketing studies can be divided into four stages based on annual publication productivity, namely the initial stage, development stage, maturity stage, and growth stage.

- **Initial stage (1931-1970)**
  The initial stage started from 1931 to 1970. In this initial stage, publications related to agricultural marketing began to be made. Between 1931 and 1970, there were 62 documents published during this period. The number of articles published averaged two documents per year, and each year's publication was at most seven documents. There were years when there were no publications on agricultural marketing, namely 1933, 1935, 1936, 1939, 1944, 1951, 1960, 1964, 1966, and 1970. But since 1971,
there have been publications every year. This means that publications at this stage have not been established stably and sustainably.

- Developmental stage (1971-1996)
  The number of document publications in the developmental stage began to increase significantly, with an average of eight documents per year. Annual publications were, at most, 24 documents. The years 1971 to 1996 showed significant publication growth, with 198 papers. During this period, the agricultural marketing research field entered its early stages of formation and became increasingly recognized.

  At this stage of maturity, there was a decline in the number of documents from various countries. From 1997 to 2003, the decline in published articles was 150, decreasing to 48 documents. Annual publications were no more than 12 documents. The average number of publications at this stage was eight documents per year.

- Growth stage (2004-2022)
  Publication of documents related to agricultural marketing topics with enormous growth, with an average of 22 documents. In 2004, 2 new papers were published, which increased in 2005 to 10 records. However, in 2006, the publication of articles on the theme of agricultural marketing decreased to four papers. In the following years, the number of scientific publications related to agricultural marketing experienced constant growth of 6, 18, 10, 18, 19, 25, 21, 21, 21, 19, 24, 26, 34, and 30, which were published regularly from 2007 to 2020. In 2021 was the highest peak of agricultural marketing publications with 47 articles. This shows that research on agricultural marketing continues to increase and has entered an age of rapid development.

In 2021, the publication year, it had the highest number of documents, with 47 publication documents. This is because, in 2021, there is a special event of the Covid-19 pandemic, which harms the marketing sector, including agricultural marketing. Thus, encouraging researchers to conduct agricultural marketing research intensively [27].

3.4 Number of Most Productive Research Publications by Country

Eighty-eight countries have committed to conducting studies on agricultural marketing topics, as seen in Figure 3. The highest position of agricultural marketing research countries is occupied by the United States (n=211), followed by India (n=87), the United Kingdom (n=49), China (n=29), Canada (n=24), South Africa (n=22), Australia (n=19), Germany (n=14), and Italy (n=13). Malaysia, New Zealand, Nigeria, Tanzania, Netherlands, and Spain had the same number of documents (n=10).

![Fig. 3. Number of Publications by Country](image)

3.5 Most Cited Documents

The implications of research in scientific development can be seen from the number of citations [30]. The publication of research by the author’s Bernard, T., Spielman, D.J. in 2009 entitled "Reaching the rural poor through rural producer organizations? A Study of agricultural marketing cooperatives in Ethiopia" became one of the most cited scientific publications by 220 documents. The paper uses the example of farmer cooperatives in Ethiopia to examine the inclusive concept of Rural Producer Organizations (RPOs) and how they can help farmers in specific indirect ways [31].

3.6 Publication Theme Map

A review that looks for agricultural marketing research according to keyword connections among publications is called a research topic map [32]. Construction was developed on the agricultural marketing keyword framework for publication theme maps with analysis and visualization of the VOSViewer program. The required threshold of keyword-related papers was five repetitions. Five keywords were the minimum requirement for each cluster. Thus, 91 keywords reached the threshold out of 2,630 available keywords.
Figure 4 shows five thematic clusters of relevant publications on the keywords of agricultural marketing studies by researchers in 88 countries. Agricultural marketing research can be grouped into five topic clusters: Food, Agriculture, Agribusiness, Marketing, and Economy, abbreviated as FAAME Research Themes.

a. Food (yellow cluster).
This food cluster includes keywords such as animal, cattle, food control, food microbiology, food policy, food safety, fruit, nutrition, and human. The keywords animal and cattle are directly related to food production from livestock resources, including agricultural marketing aspects such as selling live cattle or processed livestock products. Meanwhile, food control, microbiology, and food safety highlight the importance of food quality and safety in the food supply chain, focusing on marketing healthy and safe agricultural products. The keyword food policy also plays a vital role in agricultural marketing, as government regulations and policies on food can affect the market and demand for agricultural products. Fruit and nutrition demonstrate the role of food in human health, which can be a determining factor in consumer decisions and the marketing of healthy and nutritious agricultural products.

d. Marketing (green cluster).
Researchers found keywords with a marketing theme in this marketing cluster which contains the keywords agricultural markets, commerce, e-commerce, sales, and marketing. Marketing shows a direct link between agricultural marketing and marketing concepts. Marketing strategies used in agricultural marketing are often similar to those in other industries, such as proper pricing, effective promotion, and efficient distribution. Agricultural markets show a direct link between agricultural marketing and agricultural markets. A thriving agricultural marketing concept is highly dependent on effective agricultural market development. Agricultural market development includes market knowledge, market analysis, and the development of marketing strategies suitable for agricultural markets. Commerce shows the relationship between agricultural marketing and trade.

e. Economy (purple cluster).
This economy cluster includes keywords such as agricultural worker, economics, economic development, policy, and rural development. Agricultural marketing can be an essential factor in driving economic growth. The agricultural sector can grow and develop sustainably through the right policies, good information systems, and support for agricultural workers, thus contributing positively to the national economy.

3.7 Researcher’s Collaboration Network

Some researchers collaborate for agricultural marketing research [32]. The VOSViewer program performs construction by developing an agricultural marketing researcher framework for authorship collaboration network maps.

![Researcher’s Collaboration Network](image)

Fig. 5. Researcher’s Collaboration Network

Two documents were the minimum requirement for publication collection per author. Thus, 118 individual researcher names met the threshold that met criteria out
of 1,323. As shown in Figure 5, there is one network of research partnerships between researchers in agricultural marketing publications by US researchers. Hedberg, C.W. from Bethel University; Morris, C.A. from the University of Nevada School of Medicine; Schroeder, C.M. from the University of Missouri; Stone, W.A. from The Ohio State University; Vial, S.L. from School of Public Health; Doerscher, D.R. from USDA Agricultural Marketing Service; and Whisnant, S.J. from the University of Houston.

4 Conclusions

The results show that every year there are maps and visual patterns as an increasing trend in the number of international publications on agricultural marketing in various countries. The United States Department of Agriculture (USDA) was the most productive research institution, with 30 documents in agricultural marketing publications. The United States was the top research country in agricultural marketing publications. The peak of the highest number of scientific publications worldwide in agricultural marketing studies, with 47 papers, was in 2021. The most cited scientific publication by 220 documents in 2009 was titled "Reaching the rural poor through rural producer organizations? A study of agricultural marketing cooperatives in Ethiopia" by authors Bernard, T., Spielman, D.J. There is a network of research partnerships between researchers of US nationality in agricultural marketing publications. Based on identifying the pool of knowledge created from 91 years of scientific publications, this study suggests a classification of agricultural marketing studies themes, Food, Agriculture, Agribusiness, Marketing, and Economy, abbreviated as FAAME research themes.

The novelty of this research lies in using a bibliometric approach by combining analysis of domain structure and knowledge structure in agricultural marketing studies. This approach provides a more comprehensive and holistic understanding of agricultural marketing publication patterns and research developments. In addition, this research also contributes to mapping research collaboration by identifying partnership networks between researchers in agricultural marketing publications. This research offers an essential contribution to classifying agricultural marketing study themes. This approach can help researchers and practitioners understand the direction and focus of existing research and provide a foundation for future research.

This study has limitations using only data from the Scopus database. There may be several publications related to agricultural marketing that Scopus does not index. Based on the research that has been done, there are several recommendations for future research in agricultural marketing. The e-agricultural marketing bibliometric study uses combined Scopus and Web of Science data. The bibliometric agricultural marketing study uses an approach in the form of knowledge structure analysis, such as social structure, as well as domain levels of analysis, such as sources.

Acknowledgement

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References

1. N. Kumar, and M.S. Jaglan, Punjab Geographer 18, 3 (2022)
6. V. Shirima, Cogent Business & Management 9, 1 (2022)
8. X. Li, A. Sarkar, X. Xia, and W. H. Memon, Agriculture 11, 9 (2021)
11. A. G. Rwela, Development Studies Research 10, 1 (2023)
18. IGI Global, https://www.igi-global.com (2021)
21. USDA, USDA Strategic Plan Fiscal Years 2022-2026 (2023)
22. USDA, 2023 USDA Performance Plan (2023)
23. USDA, Evaluation Plan FY 2023 (2023)
26. Scopus, Ranjan Vaidya (2023)
29. US Senate, Senate and House of Representatives of the United States of America in Congress (2000)
31. T. Bernard and D. J. Spielman, Food Policy 34, 1 (2009)