

An Overview and Guide to Bibliometric Analysis for Digital Business

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Abstract

Bibliometric analysis is a research technique that examines and quantifies the quantitative traits of scientific publications using bibliographic information and bibliometric measures. To identify patterns, trends, and links between academic publications within a study topic or on a more general level is the primary goal of bibliometric analysis. This study looks into research gaps in digital business that are given as qualitative data in numerous research articles. The systematic literature review (SLR) method is used in this study to assess qualitative data. To investigate the research gap, three stages are taken: Data collection, bibliometric data analysis, and visualization are the first two steps. Data collecting, bibliometric data analysis, and bibliometric data visualization are the three procedures done to investigate the research gap. The outcomes of this SLR study are: (1) topic trends with relevant words are tracked; (2) popular themes are obtained and the research's direction is determined; and (3) statistical analysis results are obtained on research subjects.

Keywords: Bibliometric, SLR, Gap, Visualization

1. Introduction

In many different industries, business model innovation is seen to be made possible by digital technologies (Jiang et al., 2023). In many different businesses around the world, the quick growth of digital technologies has made significant changes in plans and operations possible. The effort to survive the existential threat of digital disruption has been characterized as the current era of digital transformation (Ciulli & Kolk, 2023). Clear digital strategies backed by leaders that encourage a culture of change and reinvention are a key factor in a company's capacity to digitally redefine itself. The distinctive aspect of the digital transformation is the cultural shift toward risk-taking as increasingly technologically proficient businesses seek higher levels of competitive advantage (Chen & Kim, 2023). Markets are changing due to significant digital advances, and businesses can adapt digital business models to deal with these shifts. Looked at relationship marketing and business networking from a business marketing perspective. These approaches are clearly based on conflicting theoretical premises and cannot be included into the general relationship marketing theory, according to a thorough meta-analysis (Möller, 2013). The researcher looked at a novel business strategy called Q-marketing that was used by PT Unionfam Azaria Berjaya, a company that sells cosmetics and has only been around for two years but has already achieved an amazing sales turnover (Sutamaji, 2018). Hannibal

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investigated the effects of adding a mobile commerce platform as just another tool in the marketing toolkit of a traditional sales-oriented organization through a longitudinal case study (Hannibal & Rasmussen, 2018). how each of these digital business models fits into the conceptual framework (Verhoef & Bijmolt, 2019), discuss the relevance of digital business models, propose a conceptual framework, and discuss how digital business models affect firms, firm performance, and markets in the editorial. Investigates what Hänninen knows and what prospects lie ahead for increasing the theoretical and empirical understanding of digital transaction platforms through a thorough and comprehensive evaluation of research on digital transaction platforms in marketing journals (8). The questions and hypotheses established by Dwivedi can contribute to the advancement of knowledge in the fields of social and digital marketing (Hänninen, 2020). The livestock industry is highlighted, along with relevant aspects of supply chain integration and digital marketing perspectives, in this article, which is based on the supply chain management philosophy (Ariffin et al., 2021).

Omnichannel Selling, Affiliate Business, Content Creation, and many more digital business trends will be prevalent in 2023 in addition to the marketing sector. A content analysis literature review was carried out using a variety of academic papers (Hole et al., 2019). Address the relevance of digital business models in their editorial, offer a conceptual framework, and discuss how these models impact businesses, business performance, and markets (Verhoef & Bijmolt, 2019). Each of these digital business models is compared to the conceptual framework (Verhoef & Bijmolt, 2019). The usage of digital (electronic) economic tools in business is on the rise, and examine both these trends as well as the key challenges that must be overcome when integrating new technologies and tools (Vorokhobina et al., 2019; Wang et al., 2021). To identify and illustrate the key social perspectives connected to the creation of a successful digital business model in railroad enterprises (R. Enterprises, 2020). Contribution consists of presenting the hotel industry's potential and perspectives for digital transformation as a crucial tool for economic growth and for catering to the needs of the new digital generation of consumers (Ivanov, 2020). Key goal is to define and characterize the concept of digital leadership (de Araujo, 2021). Customer experience (CX) omnichannel research is still in its infancy. To describe the empirical evidence surrounding omnichannel CX and its management is the goal (Gerea et al., 2021). Examining consumer perceptions of multichannel fashion department store shopping channels was the goal of (Kopot & Cude, 2021; Shahriar, 2020; El Sawy et al., 2016) are two other important works.

The transition to digital distribution systems, which is possibly the most difficult technological transformation in network history, is currently being faced by networks. The numerous technical, operational, and economic/business challenges that networks will consider as they construct their plans for the digital migration are reviewed in (Stranathan, 2015). Hypotheses drawn from a control and coordination viewpoint on expatriation as well as from a focus on knowledge creation and learning both received support (Belderbos & Heijltjes, 2005). Investigated whether the function of business groups in promoting affiliate firm innovation differed by nation and time period using a comparative institutional viewpoint (Chang et al., 2006). When confronted with the integration-differentiation problem, companies from emerging markets can adopt one of four configurations (Wöcke et al., 2007). Seeks to understand the factors that lead independent hotels to affiliate and give up their highly prized independence (Carlbäck, 2012). By exploring the value-adding potential of two distinctive characteristics of business groups diversified portfolios and multi-entity organizational forms Broadened the "institutional void" approach on business groups (Popli & Ladkani, 2020). Concentrated on examining the influence of customer social networks on cashback websites from two various angles (Ballestar et al., 2016). Established a conceptual model based on the Unified Theory of Acceptance and Use of Technology 2 (UTAUT2) to identify the elements that influence customers to sign up for cashback programs. The "value-limiting" perspective, which emphasizes principal-principal agency conflict and organizational inertia theory, and the "value-enabling" perspective, which emphasizes the role of enterprise groups in minimizing institutional voids, have been advanced in the literature as two contrasting theoretical

perspectives regarding the governance structure of enterprise groups (Christino et al., 2019). They created hypotheses to examine the post-acquisition performance of linked firms in comparison to stand-alone enterprises based on these two opposing viewpoints (Popli & Ladkani, 2020).

Argues that content providers must overcome three hurdles to establish a viable business model for monetizing copyrighted digital content on the Internet (Dwivedi et al., 2021). Argues that as digital content becomes increasingly important to business and society, it is important to seek a holistic perspective on the definition and nature of digital content marketing (DCM) (Dwivedi et al., 2021). Along the way, it became clear that a recurring theme in DCM is customer value, and this led to the second main contribution of this article, an exploration of the notion of customer value in digital content markets (Dwivedi et al., 2021). Proposed End-to-End Digital Rights Management (E2E DRM) which involves protecting content throughout the value chain (Büyükkidik, 2022). Provides an overview of the digital publishing situation in Europe starting from the insights provided by the Editech conference, an international day of advanced studies organized by the Italian Publishers Association and focused on trends, perspectives and applications of technological innovation in publishing at an international level (Mussinelli, 2010). Focused on the digital content market (DCM), which is usually seen as the biological child of technological and business innovation (Halttunen et al., 2010). This business model includes attempts to attract consumers by offering free downloads while relying on advertising as a source of revenue. Using latent class choice-based conjoint analysis (Verhoef & Bijmolt, 2019), we analyze the attractiveness of these business models from the consumer's perspective. Discussed insights for improving organizational performance offered in exemplary episodes of each series (Waddingham et al., 2022). The objective of is to detect relevant information concepts to establish their digital maturity level. Other influential works include (Zhao et al., 1998; Narang & Saini, 2013).

From some background regarding trends in digital business and from several references found regarding digital business, later a topic or theme of digital business will be found using bibliometric analysis. Bibliometric analysis has gained immense popularity in business research in recent years (Khan et al., 2021; Kamila & Jasrotia, 2023), and its popularity can be attributed to (1) the advancement, availability, and accessibility of bibliometric software such as Gephi, Leximancer, VOSviewer, and scientific databases such as Scopus and Web of Science, and (2) the cross-disciplinary pollination of bibliometric methodologies from information science to business research. More importantly, the popularity of bibliometric analysis in business research is not a fad but a reflection of its utility to (1) handle large amounts of scientific data and (2) generate high research impact. After conducting a search on digital business trends, there is still a lack of research in the field using bibliometric analysis. So the purpose of this research is to get an overview of trends in the field of digital business over the past 10 years, starting from 2014 to 2023. Literature or articles related to digital business trends are sought in the form of SCOPUS-indexed articles. The next stage will be an overview of bibliometric analysis consisting of Annual Scientific Production, Most Relevant Sources, Most Locally Cited Sources, Most Relevant Authors, Most Relevant Affiliations, Corresponding Author Countries, Most Frequent Words. After Bibliometric Data Analysis, the next stage is bibliometric data visualization, which includes a tree map, Topic Trend, Co-occurrence Network, Thematic Map, and clustering by Coupling.

2. The Bibliometric Methodology

This study with a systematic literature review aims to fill this gap by providing an overview of the different disciplines of DT research from a holistic business perspective (Hausberg et al., 2019). Identified gaps in the field of fintech research and identified challenges and trends for potential future research (Suryono et al., 2020). Investigate the corpus of literature on digital innovation in knowledge management systems (KMS) to understand its role in business governance (D'Amico et al., 2020). Introduced a broad survey of scientific literature on this topic to understand how digital innovation promotes new business models through the

optimization of new knowledge (Di Vaio et al., 2021). Identify gaps in the existing literature while providing a structured summary of existing knowledge in the field. Businesses, especially small and medium-sized enterprises (SMEs), in rural areas are often digitally disconnected due to lower digital connectivity and digital exclusion, including a lack of internet access and lower levels of digital literacy (Trabucchi & Buganza, 2022). Therefore, Provide a better understanding of the rural digital economy, highlighting key digital challenges and opportunities for rural businesses in the UK (Tiwasig et al., 2022).

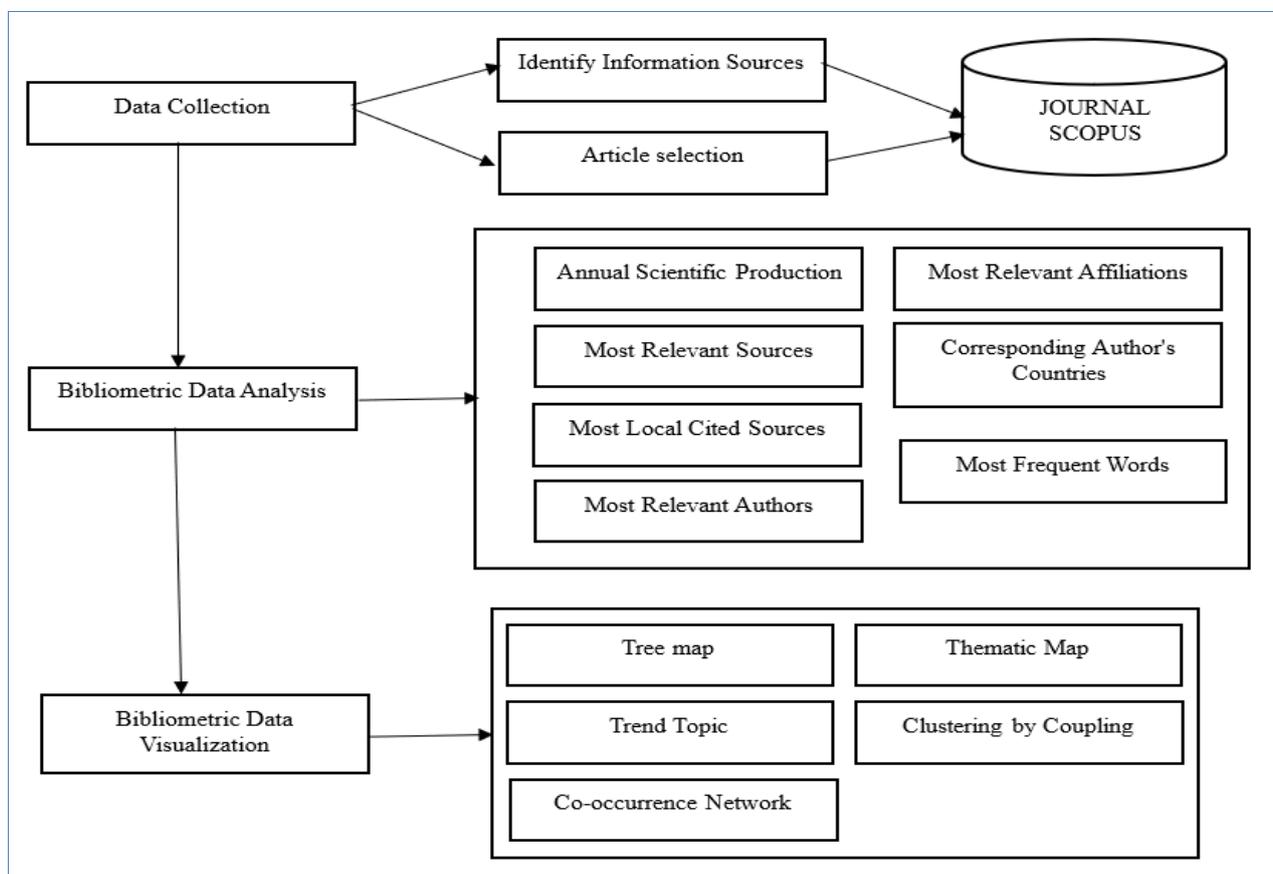


Fig. 1 Bibliometric Methodology

3. Results From Bibliometric Analysis

The stages in conducting a result of bibliometric analysis include 1) data collection obtained from the Scopus database; 2) the bibliometric analysis process; and 3) the visualization of the bibliometric analysis data. The following is a description of the stages involved in obtaining bibliometric analysis.

3.1 Collecting Data

The stage of collecting the data that will be required for the bibliometric analysis has been selected on the Scopus databases. In this step, researchers need to define search terms in such a way that they produce search results that are large enough to warrant bibliometric analysis yet focused enough to stay within the specific research area or scope of study established in the first step. The data collection process used a public dataset that was obtained from the Scopus database. In the process of selecting articles in Scopus databases using boolean operators such as and or xor. The search process uses the word kucin digital business. The articles obtained are about 250 articles in the Scopus database. From the 250 articles obtained, a manual selection process is carried out by the researcher. From the results of the selection, about 134 documents, ranging from 2014 to 2023, were obtained. The 134 documents obtained are in the form of CSV files. From the csv file, the data that can be retrieved in the Scopus database is the title, abstract, keywords, and full text of the publication in the search results. After obtaining the data, it is entered into the bibliometric system, and the results can be seen in Fig. 2.

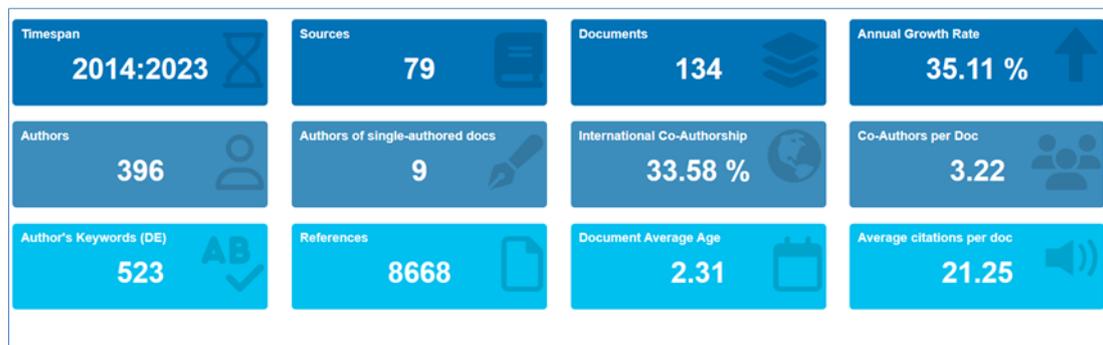


Fig. 2 Results of data extraction from CSV to Bibliometrix

From the results of data extraction from CSV to Bibliometrix, it can be seen the relationship between three variables in Bibliometrix: the name of the journal publication, the list of author names, and the theme or topic used. The three elements are then connected by gray plot lines that are related to each other. Based on the journal name, each journal shows which authors most frequently contribute to its publications, especially those with digital business themes. The size of the plot shows how many publications are related to the theme (Secinaro et al., 2020). Based on Fig. 3, there are 19 journals recorded in the first element, namely the name of the journal publication. There are field plots that publish digital business themes, and the most journals on digital business themes are journals of interactive marketing with the keyword omnichannel and the author Acquila Natali E.

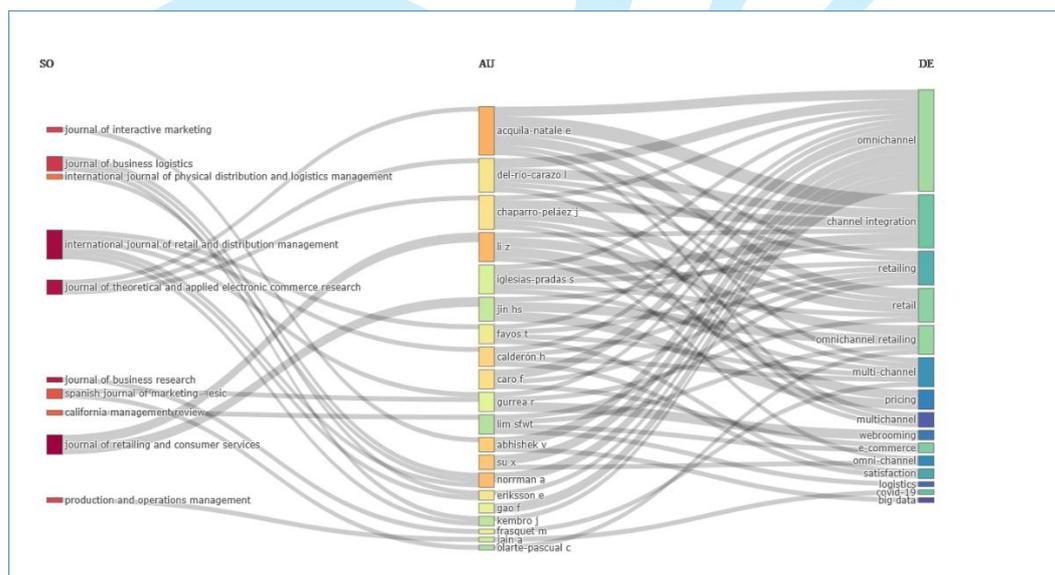


Fig. 3 Three variable relationship in bibliometrix

3.2 Bibliometrics analysis

The stages of bibliometrix analysis consist of Annual Scientific Production, Most Relevant Source, Most Locally Cited Source, Most Relevant Author, Most Relevant Affiliation, Corresponding Author Country, Most Frequent Word. The following is a description of each stage of the bibliometrix analysis.

3.2.1 Annual Scientific Production

Annual Scientific Production on Bibliometrix is a bibliometrix analysis method used for the process of mapping scientific publications based on several parameters. The usefulness of this Annual Scientific Production on bibliometrix is to get a trend and pattern of research, identify collaboration between researchers, and see scientific developments by knowing what the theme of digital business is currently up to. The number of keywords used is nine times greater than the number of items. At the same time, the keyword plus, which is the number of keywords that often appear in article titles, is four times higher than the number of articles

(Secinaro et al., 2020). The articles used started from 2014 to 2023, when the articles were analyzed over a 10-year period. In this 10-year period, the development of digital business was very rapid in 2022, when there were 29 articles discussing digital business.

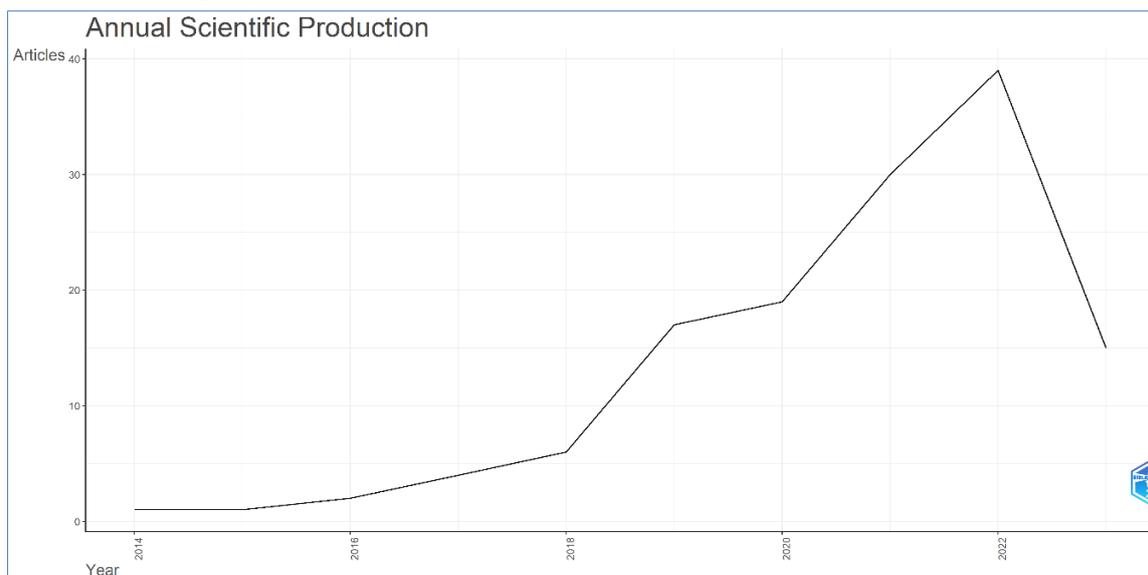


Fig. 4 Annual Scientific Production

Table 1 illustrates the development of articles on digital business from 2014 to 2023. In 2022, it is very clear that there will be around 39 articles with a Scopus reputation starting from Q1 to Q4 that discuss the development of digital business in that year. That year was also the year when COVID-19 was still recognized, so the process of buying and selling goods was carried out online.

Table 1 Article development by year

Year	Articles
2014	1
2015	1
2016	2
2017	4
2018	6
2019	17
2020	19
2021	30
2022	39
2023	15

3.2.2 Most Relevant Sources

Most Relevant Sources on Biblmetrix is a method that can identify and analyze relevant sources in a particular research field (Büyükkidik, 2022). Most Relevant Sources gives a better understanding of the most recognized sources on the topic of digital business. This section presents the findings of articles related to the topic being searched. Fig. 5 shows a visualization of the bibliometrix of articles related to digital business. Where articles related to digital business are published in the journal of retailing and consumer services (N = 11), the international journal of retail and distribution management (N = 9), the journal of theoretical and applied electronic communication (N = 8), the journal of business research (N = 4), cogent business and management (N = 3), industrial marketing management (N = 3), and finally the journal revista brasileira de marketing (N = 3).

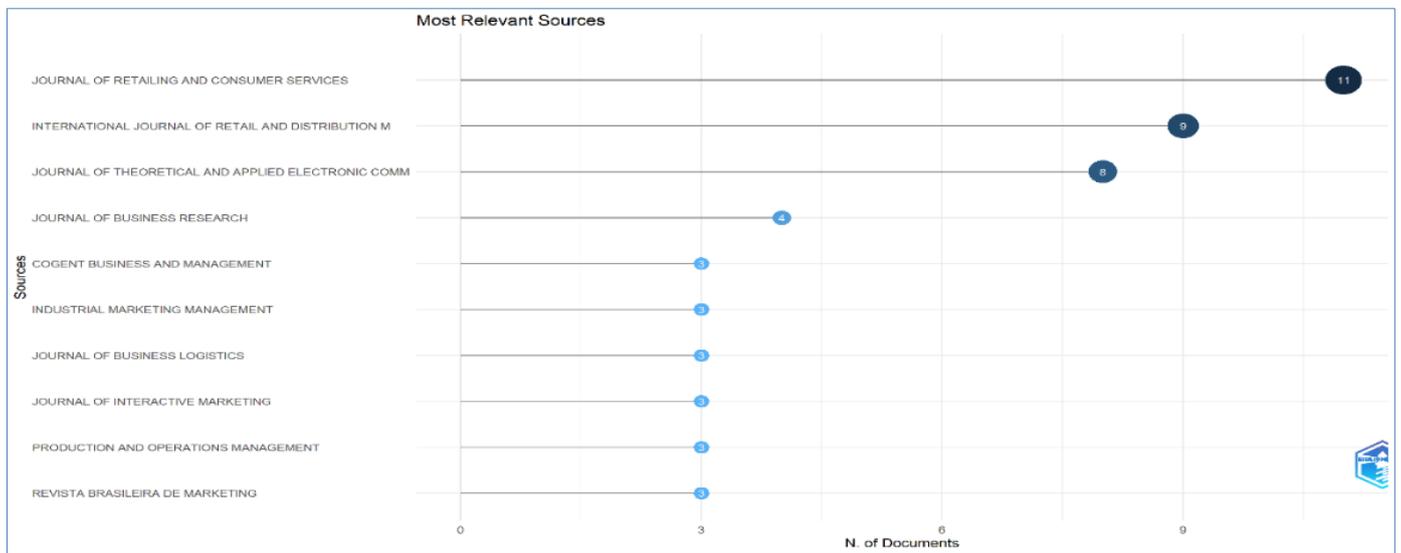


Fig. 5 Most Relevant Sources

3.2.3 Most Cited Local Sources

Most Locally Cited Sources on Bibliometrix depends on the context and purpose of its use; where the feature can help in understanding the contribution of local institutions in research, the evaluation of research quality and decision-making still requires broader consideration and a variety of other factors (Kajtazi et al., 2023). Fig. 6 presents the number of local citations of the 10 most cited journals. The most cited sources based on articles related to digital business are the journals of retailing (N = 342), retailing and consumer services (N = 194), business research (N = 183), marketing (N = 176), and management sciences (N = 86).

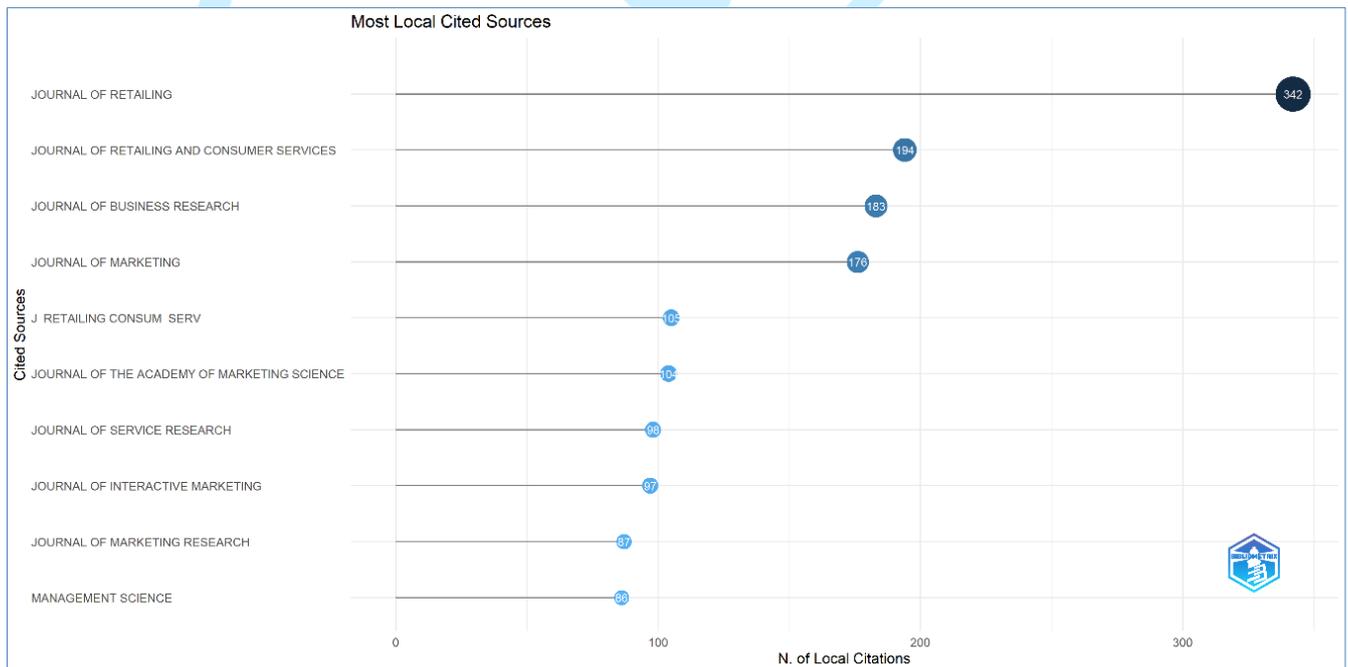


Fig. 6 Most Cited Local Sources

3.2.4 Most Relevant Authors

Most Relevant Authors on Bibliometrix is a feature that is often used to identify the most relevant and influential authors in a field of research (Smith & Sepasgozar, 2022). The findings of an analysis of the authors who have conducted research related to the most relevant digital businesses from each country are the most cited, including ACQUILA-NATALE E, who cited 83 of 3 articles, Li Z, who cited 67 of 3 articles, Normman A, who cited 117 of 3 articles, and Ballot E, whose article has been cited 33 times. For more complete data, see Table 2.

Table 2 Most Relevant Authors

Authors	Articles	Articles Fractionalized
ACQUILA-NATALE E	3	83
LI Z	3	67
NORRMAN A	3	117
SU X	3	117
ABHISHEK V	2	32
CALDERÓN H	2	67
CARO F	2	83
CHAPARRO-PELÁEZ J	2	50
DEL-RÍO-CARAZO L	2	58
ERIKSSON E	2	67
FAYOS T	2	67
FRASQUET M	2	67
GAO F	2	100
GURREA R	2	67
IGLESIAS-PRADAS S	2	58
JAIN A	2	53
JIN HS	2	50
KEMBRO J	2	67
LIM SFWT	2	100
OLARTE-PASCUAL C	2	50
ORÚS C	2	67
PAUWELS K	2	46
RODRÍGUEZ-TORRICO P	2	50
SAN JOSÉ CABEZUDO R	2	50
SAN-MARTÍN S	2	50
TRABOLD APADULA L	2	50
VERHOEF PC	2	27
VIEJO-FERNÁNDEZ N	2	58
WANG D	2	50
YANG W	2	50
ZHANG J	2	50
ADISANTOSO J	1	33
AKTAS E	1	33
AKTER S	1	25
ALAMANOS E	1	33
ALESANCO-LLORENTE M	1	25
ALEXANDER B	1	50
ALONSO-GARCIA J	1	33
ALOYSIUS JA	1	25
AMBEKAR SS	1	25
AMEEN N	1	25
ANDREWS M	1	7

Authors	Articles	Articles Fractionalized
ANNA WANG Y	1	17
ARIEL XU Q	1	17
AUINGER A	1	11
AYENSA EJ	1	25
AZUMA N	1	33
BABAI MZ	1	25
BAI H	1	33
BALLOT E	1	33

3.2.5 Most Relevant Affiliates

Most Relevant Affiliations on Bibliometrix is a feature that helps in analyzing the contribution and impact of certain affiliations or institutions in the research community (Nasir et al., 2020). The most relevant affiliations that are relevant to the topic of digital business can be seen in Fig. 7, where Universidad Politecnica de Madrid is at number one with 11 articles. The article has provided a strong foundation for the digital business process it is describing. In second place is Lund University with 8 articles, followed by Universidad de la Rioja with 6 articles, and at the bottom is the KMITL Business School affiliation with 4 articles.

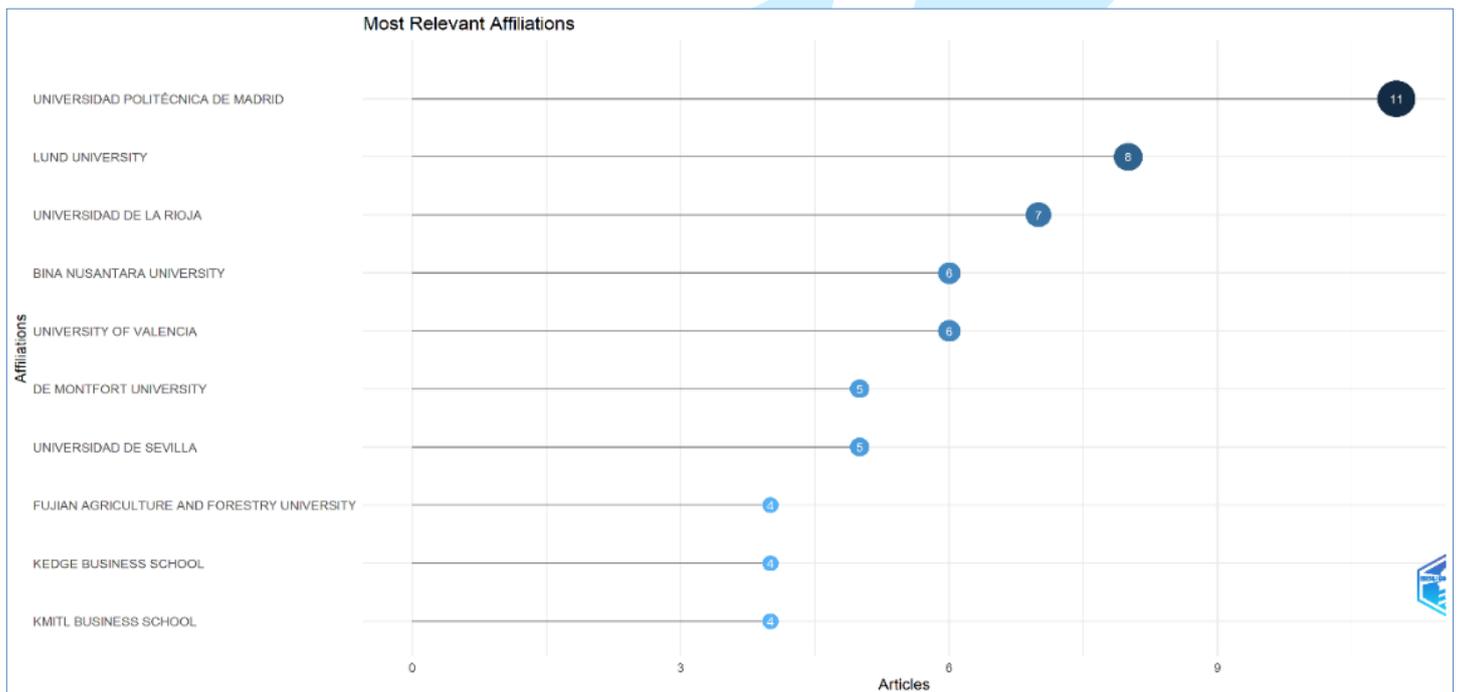


Fig. 7 Most Relevant Affiliates

3.2.6 Country of Corresponding Author

Corresponding Author's Countries on Bibliometrix is a feature used to analyze the country of the correspondence author. A correspondence author is an author responsible for communication related to publications (Botene et al., 2021). A country contribution analysis is used to evaluate the role and contribution of countries in research in the field of digital business. Fig. 8 and Table 3 show the scientific production in the countries with the most publications on digital business topics: Spain (39%), UNITED KINGDOM (9%), USA (9%), CHINA (6%), FRANCE (5%), SWEDEN (5%), GERMANY (2%), INDONESIA (2%), AUSTRALIA, FINLAND, INDIA, ITALY, KOREA, MALAYSIA, SOUTH AFRICA, THAILAND, AUSTRIA, BRAZIL (1%), CHILE (1%), GREECE (1%), IRAN (1%), JAPAN (1%), MEXICO (1%), MONACO (1%), NETHERLANDS (1%), NORWAY (1%), POLAND (1%), PORTUGAL (1%), SWITZERLAND (1%), and UNITED ARAB EMIRATES (1%).

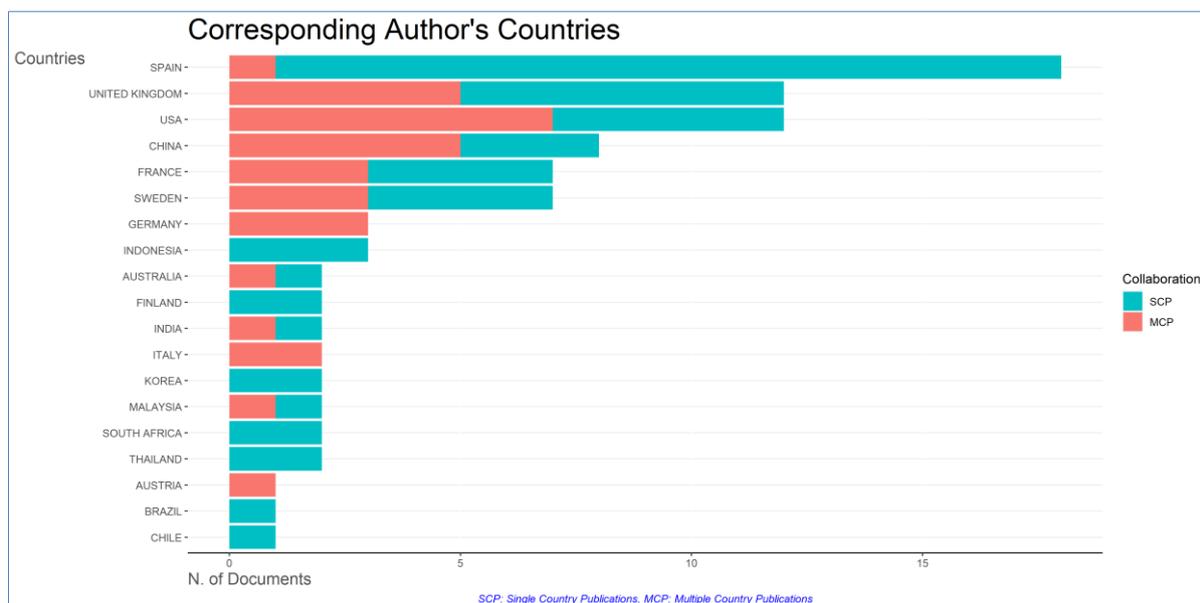


Fig. 8 Country of Corresponding Author

Table 3 Country of Corresponding Author (Country and Articles)

Country	Articles
SPAIN	52
UNITED KINGDOM	12
USA	12
CHINA	8
FRANCE	7
SWEDEN	7
GERMANY	3
INDONESIA	3
AUSTRALIA	2
FINLAND	2
INDIA	2
ITALY	2
KOREA	2
MALAYSIA	2
SOUTH AFRICA	2
THAILAND	2
AUSTRIA	1
BRAZIL	1
CHILE	1
GREECE	1
IRAN	1
JAPAN	1
MEXICO	1
MONACO	1
NETHERLANDS	1
NORWAY	1
POLAND	1
PORTUGAL	1
SWITZERLAND	1
UNITED ARAB EMIRATES	1

3.2.7 Most Frequent Words

Most Frequent Words on Bibliometrix is a function on Bibliometrix that is used to identify the words that appear most often in a scientific publication in the field of digital business (Kamila & Jasrotia, 2023). In choosing a keyword in the search process, it must be optimized by looking at the abstract, title, or keywords in the publication. One of the important components of a search engine are keywords. Choosing the right keywords is very important to getting more contributions. The following is a list of top search terms where marketing responsibility is the main keyword. The keywords included in the top list of frequency of occurrence revealed through the analysis can be seen in Fig. 9. The term retailing has 11 articles, sales has 9 articles, consumption behavior has 8 articles, e-commerce has 6 articles, omnichannel has 4 articles, profitability has 3 articles, and offline channel has 3 articles.

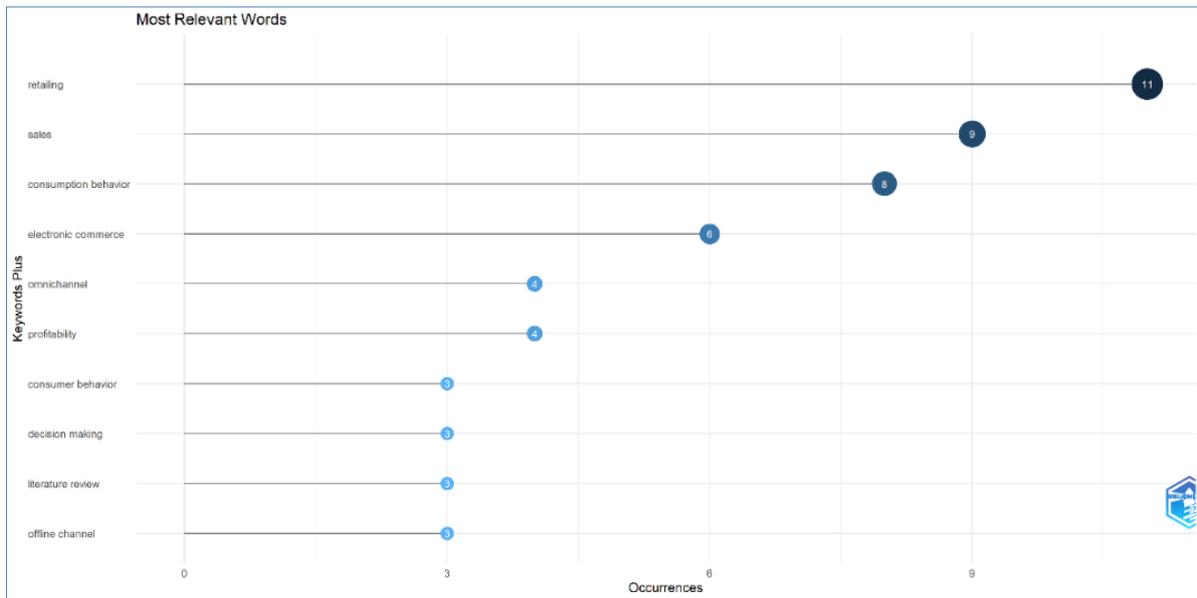


Fig. 9 Most Frequent Words

3.3 Bibliometric Visualization

3.3.1 Tree Map

Tree maps on bibliometrix are used to identify dominant topics by determining key terms or common phrases that track trends or changes over time, as well as by analyzing words relevant to digital business topics (Botene et al., 2021). In Fig. 10, it shows 10 years behind the topic of digital business in retailing (11%), which is very high in research. In this tree map, you can also see research trends that are rarely researched but can be researched for the following year. Like omnichannel in 2023, the topic of digital business on omnichannel can be researched because that year is already visible and suitable for implementation.



Fig. 10 Tree Map

3.3.2 Trend Topic

Trend Topic on Bibliometrix serves to track trends in emerging research topics in the field of digital business (Yardlbi et al., 2021). This feature provides insights into changes in research focus over time, helps you understand the direction of developments in the field, and supports more targeted decision-making and research development. Trend topics in digital business from the last 10 years are mostly about omnichannel, retail, retailing, experience, consumer, shopping, effect, customers, online, and supply.

Item	freq	year_q1	year_med	year_q3
Online	5	2019	2019	2022
Supply	5	2018	2019	2021
Consumer	9	2020	2020	2022
Effect	7	2019	2020	2022
Customers	6	2018	2020	2022
Omnichannel	76	2020	2021	2022
Retail	22	2019	2021	2022
Retailing	19	2020	2021	2022
Experience	9	2020	2022	2022
Shopping	8	2022	2022	2023

Fig. 11 Trend Topic

3.3.3 Co-occurrence Network

Co-occurrence A network in bibliometrix is a feature or method used to analyze the relationship between words, terms, or concepts that frequently co-occur in a particular scientific publication or text corpus. This feature forms a network that describes the relationship between these entities. The co-occurrence Network in bibliometry can visualize and analyze the relationship between entities in the literature. This feature helps you understand the structure of concepts, identify related keywords, map research topics, and build a conceptual framework in a particular research area. Some keywords have a greater impact on the co-occurrence network. An examination of these keywords based on their color codes shows that the larger keywords represented by their width are cohesively connected with other smaller keywords. For example, retailing is connected to modeling, technology adoption, and knowledge sharing, which belong to other clusters. The clusters shown in green and red are the most relevant to getting a clear picture of the keywords present in this study. The construction of the co-occurrence network in Fig. 11 allows one to search for and explore the conceptual structure of the research domain under study.

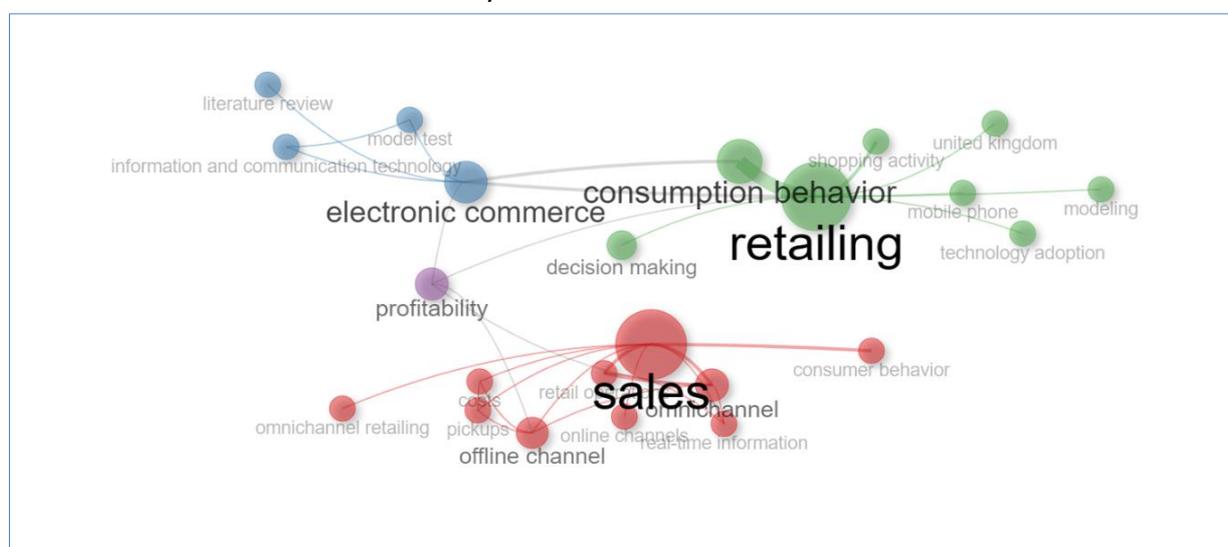


Fig. 12 Co-occurrence Network

3.3.4 Thematic Map

Thematic mapping on bibliometrix is a holistic analysis of research topics by understanding the research structure, identifying topic clusters, tracking research trends, and gaining deeper insights from the text corpus in digital business research. The thematic map consists of 4 quadrants consisting of special topics, main topics, emerging topics, and basic topics. Special topics refer to topics that are unique or specialized within a domain or field of study. They tend to be a special focus for a number of researchers or scholarly publications in the community. Main topics refer to topics that are the center of attention and the main drivers in a domain or field of study. Declining themes refer to topics that have experienced a decline in interest or research over time. Emerging topics refer to topics that are emerging or developing in a digital business domain or field. Declining themes refer to topics that have experienced a decline in interest or research over time. Basic topics refer to fundamental or general topics related to the digital business domain. These topics are usually the foundation for more specific research. Fig. 12 shows that the topics of sales, omnichannel, and profitability are included in the main topics. In the retailing topic, consumption behavior and shopping activity are topics that are in the middle of specific topics and main topics. The last is the topic of electronic commerce, literature review, and information and communication technology, which is a topic between the basic topic and the main topic.

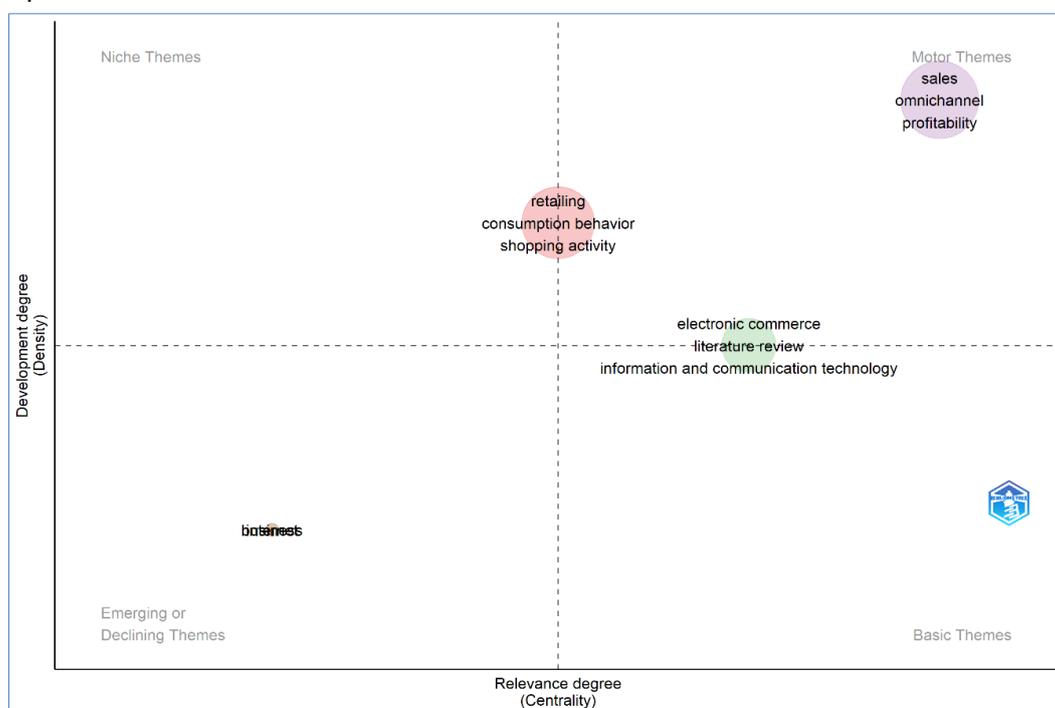


Fig. 13 Thematic Map

4. Conclusions

This study, with a systematic literature review, aims to fill this gap by providing an overview of the various disciplines of research from a holistic business perspective identifying gaps in the field of financial technology research and identifying challenges and trends for potential future research. One of the tools for conducting SLR is bibliometrix analysis. a result of bibliometrix analysis, which includes 1) data collection obtained from the Scopus database, 2) bibliometrix analysis processes, and 3) visualization of bibliometrix analysis data. The following is a description of the stages involved in obtaining bibliometrix analysis. The data collection process uses a public dataset, where the data is obtained from the Scopus database. In the process of selecting articles in Scopus databases using boolean operators such as and or xor. The search process uses the word kucin digital business. The articles obtained are about 250 articles in the Scopus database. From the 250 articles obtained, a manual selection process is carried out by the researcher. From the results of the selection, about 134 documents, ranging from 2014 to 2023, were obtained. The stages of bibliometrix analysis consist of Annual

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Declaration of Conflict

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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