Artificial Intelligence Competencies and Marketing: A Bibliometric Approach

Maimoona Sajid Butt[1], Muhammad Shahbaz[2] and Humaira Erum[3]
[1&3]National University of Modern Languages, Lahore, Pakistan.
[2]University of Education, Lahore, Pakistan.

Correspondence:

Muhammad Shahbaz: shahbaz755@yahoo.com

Article Link: https://journals.brainetwork.org/index.php/ssmr/article/view/69

DOI: https://doi.org/10.69591/ssmr.vol03.no01/005

Volume 3 Issue 1, 2025

Funding
No

Citation:
Butt, M. S., Shahbaz, M. & Erum, H., (2025). Artificial intelligence competencies and marketing: A bibliometric approach, *Social Science Multidisciplinary Review, 3*(1), 88-112.

Conflict of Interest: Authors declared no Conflict of Interest

Acknowledgment: No administrative and technical support was taken for this research

Article History

Submitted: March 09, 2025
Last Revised: June 28, 2025
Accepted: June 30, 2025

An official publication of
Beyond Research Advancement & Innovation Network, Islamabad, Pakistan

Artificial Intelligence Competencies and Marketing: A Bibliometric Approach

Maimoona Sajid Butt, National University of Modern Languages, Lahore, Pakistan.

Muhammad Shahbaz (Corresponding Author), University of Education, Lahore, Pakistan.
Email: shahbaz755@yahoo.com

Humaira Erum, National University of Modern Languages, Lahore, Pakistan.

ABSTRACT

This paper employs statistical evaluation to investigate how AI competencies interact with marketing. The goal is to identify modern research, highlight flaws, and summarize implications for further research, which means improving one's understanding of transitional subjects. Explanatory methods and the application of big data principles are used to analyze a data collection of 2,180 daybooks acquired by a network of knowledge and an automated database. Moreover, the fact-finding procedure is aimed towards twofold: first, graphic investigation using R Studio focuses on identifying productive periods, authors, countries, and journals; second, correlation-based keyword analysis using VOSviewer helps identify thematic clusters along with prominent keywords. A few of the notable findings include the title of the nation, journals, and well-known authors, in addition to the emerging educational pathways. This examination refines upcoming trends and research themes through network analysis, recognizing five distinctive groups: i) "AI-based value co-creation and marketing," ii)"AI and supply chain," iii) "Artificial intelligence and digital culture," iv) "AI and strategic thinking," and v)"AI-powered data intelligence and analysis." By clarifying the association between AI competencies, innovation, and marketing, this study contributes to the field's growth and theoretical advancements. This understanding is important for policymakers.

Keywords: Artificial intelligence competencies, Marketing, Innovation, VOSviewer, Bibliometric analysis, Review article

JEL Classification Codes: M31

1. BACKGROUND

Artificial Intelligence (AI) has fundamentally reshaped the marketing landscape, transforming the ways in which businesses engage with customers, process information, and make strategic decisions (Strandhagenet al., 2017; Felsberger et al., 2020). Once considered an auxiliary tool, AI has now become a central component of modern marketing practices due to its ability to process large volumes of data, personalize customer experiences, and improve the precision of marketing strategies (Shamim et al., 2016; Anshari et al., 2019). Emerging technologies such as the Internet of Things (IoT) and big data analytics are deeply interwoven with AI, collectively redefining how value is created and delivered in marketing (Wang et al., 2017; Paschen, 2020a).

AI's transformative impact also extends to the financial sector, where it enables the refinement of existing business models and facilitates new growth opportunities (Davenport et al., 2020). By leveraging advanced analytics, organizations can extract actionable insights to optimize marketing operations and foster deeper customer engagement (Kot & Leszczyński, 2020; Dong et al., 2014). Despite AI's increasing role in marketing, the existing literature remains fragmented, with many studies relying on narrative reviews rather than systematic bibliometric analyses (Talwar et al., 2020; Vlačić, Corbo et al., 2021).

In the context of accelerating digital transformation, the demand for marketing professionals with both technical expertise and soft skills—such as creativity, problem-solving, and leadership—is intensifying (World Economic Forum, 2022). Although interest in AI capabilities within marketing is growing, comprehensive bibliometric analyses in this area remain limited (Ismagilova et al., 2020). To address this research gap, the present study conducts a bibliometric review focused on AI-related marketing competencies, identifying influential contributors and outlining emerging trends.

The study is guided by the following research questions:

1. What is the trajectory of scholarly research on AI competencies in marketing?
2. Who are the key contributors advancing this area of study?
3. Which countries and journals are leading in this research domain?
4. What are the emerging trends and future research directions?

Through a systematic bibliometric approach, this study offers a comprehensive overview of the intellectual landscape surrounding AI competencies in marketing, laying the foundation for future inquiry and innovation.

2. LITERATURE REVIEW

Artificial Intelligence (AI) refers to technologies that enable machines to mimic cognitive functions traditionally associated with human intelligence, such as learning, reasoning, and problem-solving (Russell & Norvig, 2016). With advancements in machine learning, deep learning, and data analytics, AI has evolved from an academic concept into a transformative force across diverse sectors, including marketing (Nguyen & Sidorova, 2018).

In marketing, AI technologies—such as natural language processing, neural networks, and machine learning algorithms—facilitate personalized communication and real-time customer interactions. For instance, AI-powered chatbots enhance customer service by providing immediate responses and resolving queries efficiently (Maxwell et al., 2011). Smart retailing benefits from AI through inventory optimization, behavioral analytics, and demand forecasting, enabled by IoT integration (Alegavi et al., 2019). Sentiment analysis tools powered by AI allow marketers to gauge customer perceptions, thereby enhancing brand loyalty and engagement (Chatterjee et al., 2019).

Strategic marketing functions, including segmentation, targeting, and positioning (STP), have also been revolutionized by AI. Marketers use AI-driven text mining and predictive analytics to identify customer segments, develop personalized campaigns, and refine product offerings (Dekimpe, 2020; Netzer et al., 2019). Furthermore, AI supports dynamic pricing strategies by incorporating real-time market data, consumer preferences, and competitive intelligence through Bayesian inference models (Simester et al., 2020). Logistics and distribution systems benefit from AI applications such as automated warehouse management and intelligent delivery solutions (Valls et al., 2018).

AI's role in digital marketing continues to grow, with applications including automated content creation, predictive lead scoring, and customer journey mapping. AI-driven tools empower marketers to make data-informed decisions, enhancing campaign effectiveness and return on investment (Tripathi & Verma, 2018). Emotional AI and service robots are being deployed to simulate human interactions and elevate customer experience (Huang & Rust, 2021).

In sum, AI is redefining the marketing discipline by automating routine tasks, enabling hyper-personalization, and fostering strategic decision-making. Organizations aiming to remain competitive must invest in AI-driven innovations that enhance operational efficiency, stimulate creativity, and support customer-centric strategies.

3. RESEARCH DESIGN AND METHODOLOGY

This study adopts a structured bibliometric analysis approach, following the five-phase framework proposed by Aria and Cuccurullo (2017): exploration sketch, documentation, survey, presentation, and translation. These phases provide a comprehensive and systematic path for mapping the intellectual structure of a research domain. The method has been successfully applied in recent bibliometric research (Kalia et al., 2022; Mahmood et al., 2023; Zupic & Čater, 2015).

3.1. Research Design

The study design incorporates a combination of subject areas, activity indicators, and connection indicators to evaluate the intellectual, social, and conceptual structure of research on AI-enabled marketing competencies. This methodology draws from the scientometric tradition, originally conceptualized by Garfield (1988), which provides a quantitative foundation for tracking scientific progress. Scientometric tools are increasingly used by academics and strategic decision-makers to evaluate research performance and identify emerging trends (Asif et al., 2023).

To perform the bibliometric analysis, Biblioshiny (Aria & Cuccurullo, 2017), an R-based interface, was used for descriptive statistical analysis and visual exploration. Biblioshiny enables the processing, filtering, and display of large bibliographic datasets through a user-friendly dashboard. In parallel, VOSviewer (Van Eck & Waltman, 2017) was employed for network analysis, which facilitated the visualization of keyword co-occurrence networks, author collaborations, citation patterns, and thematic clustering.

3.2. Data Sources and Collection

A comprehensive literature search was conducted using two well-established academic databases: the Web of Science (WoS) Core Collection and Scopus. The search covered the period from 2001 to 2024, ensuring both historical depth and contemporary relevance. Keywords included a combination of “artificial intelligence,” “machine learning,” “deep learning,” “big data analytics,” and “business intelligence”, within the context of marketing.

To enhance relevance, results were filtered by titles, abstracts, and author keywords. WoS was selected for its curated, peer-reviewed content and recognized indexing quality (Leydesdorff et al., 2013; Ye et al., 2021), while Scopus was chosen for its broader disciplinary coverage, powerful analytical tools, and citation tracking capabilities (Abad-Segura et al., 2020; Brzezinski, 2015).

The initial search retrieved 3,592 documents from Scopus and 351 from WoS. During the data refinement process, non-research content—such as book chapters (137), conference proceedings (140), review papers (105), and books (51)—was excluded to maintain focus on peer-reviewed journal articles. Additionally, non-English publications in Arabic, Spanish, Portuguese, and Chinese were removed, resulting in a cleaner, more coherent dataset of English-language articles (Iliev, 2020; Ramos-Rodríguez & Ruíz-Navarro, 2004).

3.3. Data Cleaning and Validation

To ensure data integrity, the bibliographic records were standardized—author names, journal titles, and publication years were harmonized. Duplicate entries (53 records) were identified and removed using the built-in data cleaning features of Biblioshiny, minimizing redundancy and enhancing dataset consistency.

The final dataset formed the basis for two streams of analysis:

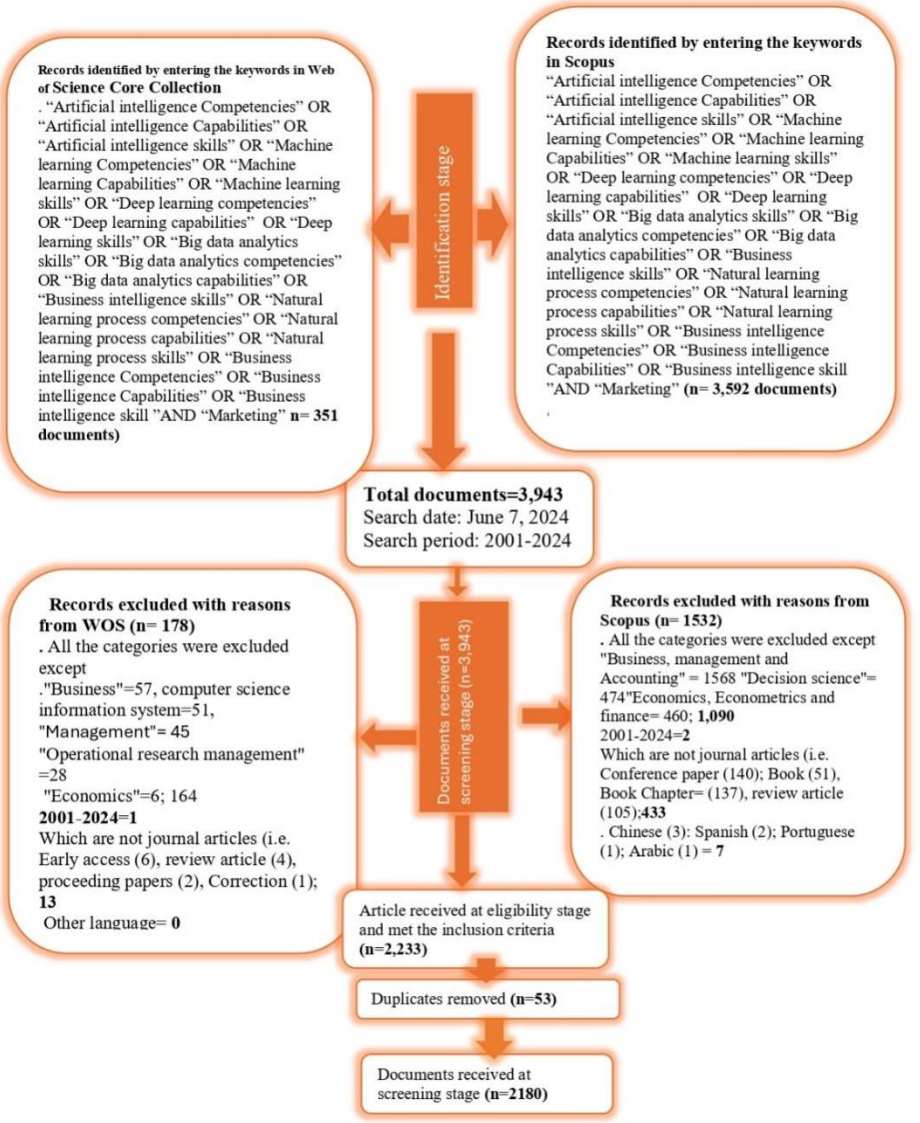
- Descriptive analysis, aimed at uncovering leading journals, countries, institutions, and authors in the field (Benckendorff & Zehrer, 2013).
- Network analysis, conducted to detect intellectual connections, identify dominant research themes, and visualize co-authorship and keyword co-occurrence networks (Del Gesso et al., 2024; Gao et al., 2021).

3.4. Mapping and Interpretation

The presentation and interpretation phases involved generating visual maps that highlighted influential publications, emerging topics, and collaborative research structures. VOSviewer was used to create cluster maps and keyword co-occurrence visualizations, while Biblioshiny provided temporal analyses (e.g., annual scientific production, citations per year).

Key clusters of keywords and author networks were interpreted in relation to the research objectives, offering insights into evolving trends, knowledge gaps, and future research directions. This multi-tool bibliometric approach enabled a nuanced understanding of how AI-enabled marketing capabilities have developed over time, across geographies and academic disciplines.

Figure 1: PRISMA Flowchart



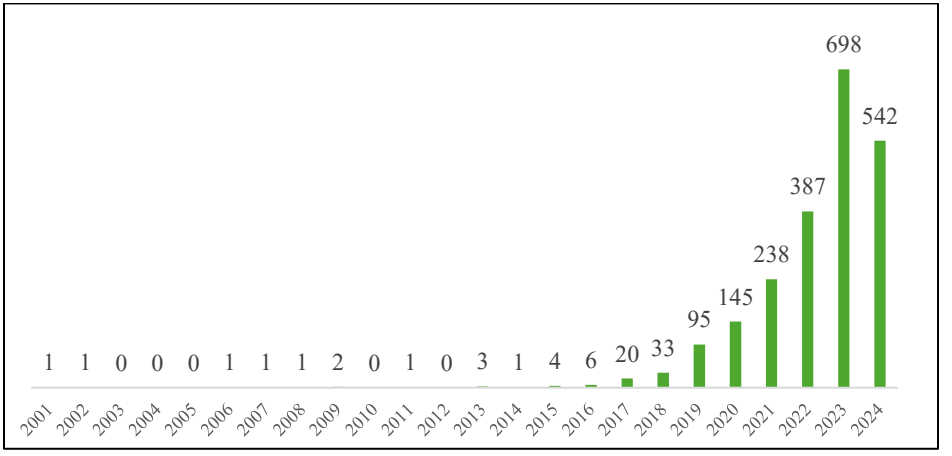
Source(s): Authors own creation.

4. FINDINGS

4.1. Descriptive Analysis

In response to the first research question, "*Is there growing research on the effects of artificial intelligence competencies on marketing?*", the annual scientific output clearly reveals a substantial upward trend. From 2001 to 2018, research activity remained modest and stable, averaging only 3.72% of the total output annually. However, starting in 2019, there was a marked acceleration: 62 articles were published that year, followed by 93 in 2022 (12% of total output), and peaking at 311 in 2023 (35%).

Figure 2: Annual Scientific Production



Source: Authors own Creation.

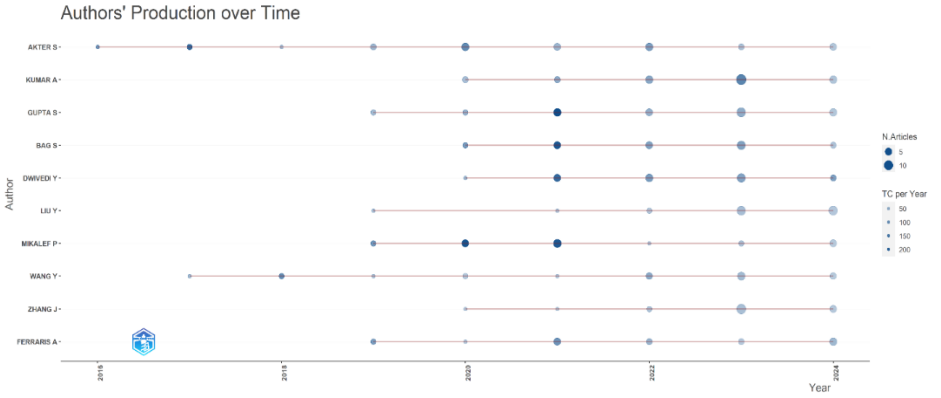
In 2024, the growth remained strong, contributing an additional 27% of the total articles. This surge reflects a heightened academic focus on AI-enabled marketing competencies (see Figure 2).

4.1.1. Influential Authors and Contributors

Addressing the second research question, "*Who are the leading scholars shaping this field?*", Figures 3 and 6, along with author productivity metrics, indicate that Akter, S. (9 publications) and Wang, Y. (8 publications) are the most prolific contributors. Other influential authors include Mikalef, P., Gupta, S., and Ferraris, A. (each with 6 articles), as well as Kumar, R., Liu, Y., Bag, S., and Dwivedi, Y. (5 each). These scholars represent thought leadership in the integration of AI and

marketing, and their recurring presence across publication outlets signifies sustained academic engagement in the field.

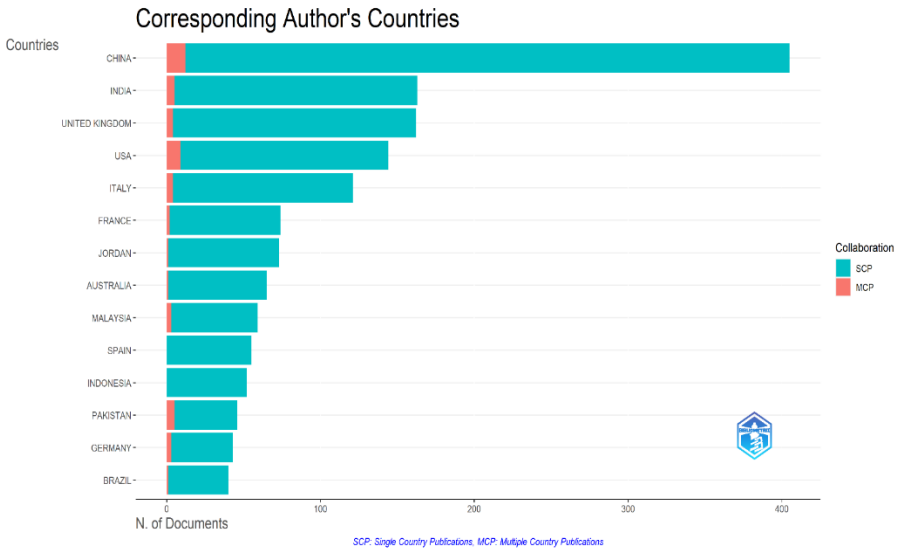
Figure 3: Authors' Production Over Time



Source (s): Authors own creation using RStudio.

4.1.2. Geographical and Journal Contributions

Figure 4: Corresponding Author's Countries



Source (s): Authors own creation using RStudio.

In response to the third research question, "*Which countries and journals have made the most significant contributions?*", a bibliometric country analysis highlights China as the most productive nation with 405 articles, followed by India (182), the United Kingdom (163), the United States (162), and Italy (144) (see Figure 4). Collaboration patterns reveal that countries such as Germany exhibit high international collaboration ratios, whereas Indonesia and Pakistan demonstrate more localized research efforts.

Among journals, Technological Forecasting and Social Change lead with 112 publications, followed by the Journal of Business Research (106) and the Annals of Operations Research (52). These outlets reflect not only publication volume but also scholarly influence, as indicated by high citation counts and total link strength. The dominance of Dutch, U.S., and German journals illustrates the international reach and disciplinary diversity of AI marketing research (see Table 2).

Table 1: 15 Most Productive Countries

Country	No. of Articles	SCP	MCP	MCP Ratio
CHINA	405	393	12	0.03
INDIA	182	181	1	0.01
UNITED KINGDOM	163	158	5	0.03
USA	162	158	4	0.03
ITALY	144	135	9	0.06
FRANCE	121	117	4	0.03
JORDAN	74	72	2	0.03
AUSTRALIA	73	72	1	0.01
MALAYSIA	65	64	1	0.02
SPAIN	59	56	3	0.05
INDONESIA	55	55	0	0.00
PAKISTAN	52	52	0	0.00
GERMANY	46	41	5	0.11
BRAZIL	43	40	3	0.07

Source: Author's Own creation.

With 405 articles, China emerges as the most productive country in the study area, followed by India (182), the United Kingdom (163), the United States (162), and

Italy (144). The SCP (Single Country Publications) column reflects the output of national research, while the MCP (Multiple Country Publications) column indicates the extent of international collaboration. Germany shows a high collaboration ratio (0.11), indicating significant international co-authorship, whereas Indonesia and Pakistan report no international collaborations (MCP ratio = 0.00). This table offers valuable insights into global research productivity and collaboration trends in the field.

Out of the 116 journals examined, the U.S.-based journal Technological Forecasting and Social Change leads with 112 articles and 6,349 link points, highlighting its strong relevance to AI capabilities. The Journal of Business Research ranks second with 106 articles and 7,739 link points, emphasizing AI's growing role in marketing. The German journal Annals of Operations Research ranks third with a bibliographic coupling score of 790.

Notably, Dutch journals dominate the top 20, reflecting their significant contributions to AI research. Table 2 ranks the top 20 journals based on bibliographic connectivity, which indicates research similarity and intellectual interlinkages across publication sources.

Table 2: Most Contributing Journals

Ranks	Journal	NoA	TC	TLS
1	Technological forecasting and social change	112	6349	85680
2	Journal of Business Research	106	7739	81726
3	Annals of operations research	52	790	42900
4	Business Process Management Journal	48	612	39792
5	Journal of Cleaner Production	46	1737	38226
6	Industrial marketing management	43	1612	35862
7	Management decision	41	2044	34276
8	International journal of production economics	40	4443	33480
9	International journal of information management	38	1612	31882
10	European journal of innovation management	37	428	31080
11	IEEE transactions on engineering management	36	224	30276
12	Business strategy and the environment	35	814	29470
13	Information and management	34	3106	28662

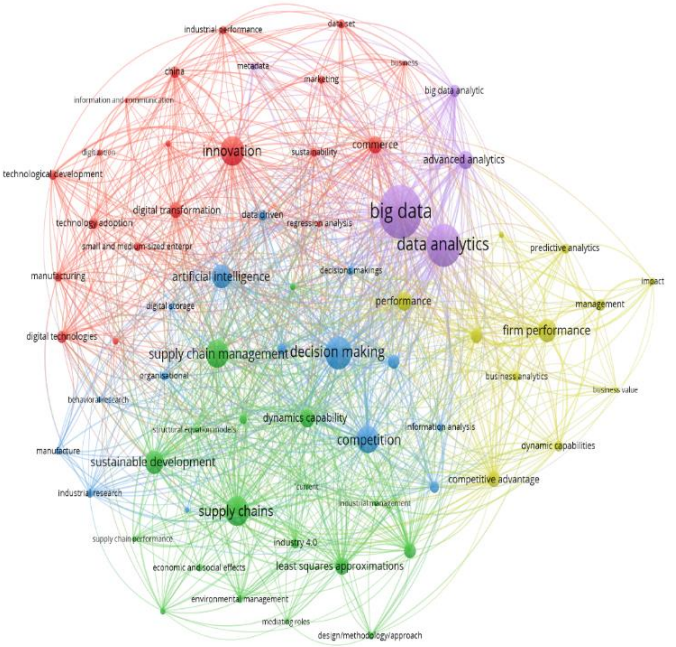
14	Industrial management and data systems	32	487	27040
15	Uncertain supply chain management	30	136	25410
16	Benchmarking	29	824	24592
17	Technology in society	29	621	24592
18	Technovation	25	625	21300
19	Production planning and control	24	1394	20472
20	International journal of logistics management	20	932	17140

Note: NoA: Number of articles TLS: Total link strengths TC: Total citations

Source: Authors' Creation.

4.2. Network Analysis

Figure 5: Co-occurance of Keywords Analysis



Source (s): Authors own creation.

Responding to the fourth research question, "What noteworthy patterns are apparent, hinting at potential avenues for future investigation?", we found that 67

out of 4,154 keywords exceeded the minimum threshold of 20 occurrences, as defined by the study. This highlights the prominence of topics such as user experience (UX) and advertising content creation.

Key research areas were represented by five thematic clusters, which emerged from the keyword co-occurrence analysis. A total of 630 links, illustrating the conceptual relationships among these themes, underscores their literary significance. Furthermore, the presence of 2,146 co-occurrence linkages reinforces the depth and interconnectivity of these topics, demonstrating that certain themes are not only widely researched but also closely connected in the scholarly discourse.

The top 20 most popular terms are listed in Table 3, which serves as a useful analytical tool. It helps readers quickly understand the primary concepts and topics addressed in the study by offering a succinct overview of key terminology. The co-occurrence analysis generated terms such as "big data," "data analytics," "decision making," "innovation," and "competition," all of which underscore the integration of creative problem-solving and innovation into commercial endeavors.

Table 3: Frequently Keywords

Rank	Keyword	Cluster	Links	Occurrences	Total link strength
1	Big data	5	66	189	927
2	Data Analytics	5	67	152	796
3	Decision making	3	64	117	516
4	Innovation	1	66	106	430
5	Supply chains	2	61	105	491
6	Supply chain management	2	57	99	423
7	Competition	3	64	96	492
8	Artificial intelligence	3	61	86	317
9	Firm performance	4	60	83	304
10	Sustainable development	2	61	82	381
11	Performance	4	64	67	292
12	Advanced analytics	5	57	65	398
13	Dynamics capability	2	63	65	343
14	Commerce	1	58	63	284

15	Least squares approximations	2	63	62	283
16	Digital transformation	1	59	56	250
17	Competitive advantage	4	58	55	304
18	Enterprise resource management	2	63	53	291
19	Information management	3	57	50	217
20	Resource-based view	4	60	49	224

Source: Authors' creation.

Table 4 presents relevant keywords according to their frequency, with a particular focus on themes related to AI-based value creation and marketing. "Innovation" (106 mentions) and "Commerce" (63 mentions) are the most frequently used terms, followed by "Digital Transformation" (56 mentions). The "Links" column further emphasizes the importance of these terms by showing their strong connections to other keywords—for instance, "Innovation" has 66 links, while "Commerce" has 58.

Table 4: AI-Based Value Co-Creation and Marketing

Rank	Keywords	Cluster	Links	Occurrences	Total link strength
1	Innovation	1	66	106	420
2	Commerce	1	58	63	278
3	Digital transformation	1	59	56	240
4	Digital technologies	1	59	46	212
5	China	1	49	43	170
6	Technology adoption	1	54	38	158
7	Manufacturing	1	54	35	185
8	Technological development	1	52	35	165
9	Sustainability	1	51	33	162
10	Data set	1	51	32	164
11	Small and medium-sized enterprise	1	54	32	142
12	Industrial performance	1	51	29	156
13	Marketing	1	44	29	128
14	Digitalization	1	52	28	117
15	Business development	1	46	24	115

16	Regression analysis	1	47	24	95
17	Digitization	1	43	22	110
18	Business	1	46	20	99
19	Information and communication technology	1	39	20	90

Source: Authors' creation.

This analysis enhances the understanding of strategic resource management, dynamic capabilities, and the emerging thematic streams at the intersection of marketing and AI competencies. Additional relevant terms—such as "Digitalization," "Firms," "Environmental Entrepreneurship," "Technological Development," and "Circular Economy"—are also highlighted in Table 4. While these keywords appear less frequently and have fewer links than the top-ranked terms, they nonetheless contribute to broadening the discourse on AI competencies. Their inclusion illustrates how businesses leverage AI to address challenges, set strategic goals, and drive transformation.

Ultimately, innovation and digital transformation emerge as critical drivers of competitiveness, growth, and sustainability in the evolving business landscape.

Key phrases such as "Digitalization," "Firms," "Environmental Entrepreneurship," "Technological Development," and "Circular Economy" are also featured in the table. Although these terms have fewer connections and appearances compared to the leading keywords, they play a significant role in broadening the discussion surrounding AI capabilities. Their inclusion illustrates how businesses utilize AI to tackle challenges, set strategic goals, and drive transformation. Ultimately, innovation and digital transformation emerge as key contributors to competitiveness, growth, and sustainability in the business arena.

In Table 5, AI, IoT, and robotics are identified as crucial components of Industry 4.0, enhancing intelligent factory operations and enabling predictive maintenance. AI-led innovation not only aligns with organizational goals but also enhances sustainability, efficiency, and competitiveness. In addition to strengthening supply chains by improving resilience, operational performance, and customer satisfaction, AI supports the circular economy and contributes to the advancement of industrial and human resource management.

Table 5: AI and Supply Chain

Rank	Keywords	Cluster	Links	Occurrences	Total Link Strength
1	Supply chains	2	61	105	470
2	Supply chain management	2	57	99	403
3	Sustainable development	2	61	82	371
4	Dynamics capability	2	63	65	333
5	Least squares approximations	2	63	62	272
6	Enterprise resource management	2	63	53	285
7	Industry 4.0	2	54	36	156
8	Technological innovation	2	50	32	137
9	Design/methodology/approach	2	41	28	96
10	Environmental management	2	49	28	134
11	Economic and social effects	2	43	27	97
12	Circular economy	2	46	25	112
13	Human resource management	2	50	24	123
14	Industrial management	2	51	23	138
15	Current	2	45	22	87
16	Mediating roles	2	43	21	84
17	Supply chain performance	2	45	20	113

Source: Authors' creation.

An extensive summary of "Artificial Intelligence and Digital Culture," including keyword correlations and frequency, is presented in Table 6. Based on data-driven insights and predictive analytics, the terms "Decision Making" and "Decisions Makings" dominate with 112 occurrences, highlighting AI's role in transforming strategic decision-making processes. "Competition" (96 occurrences) underscores AI's influence on productivity, innovation, and competitive advantage. A central theme within digital culture, "Artificial Intelligence" (86 occurrences) drives advancements in data analysis, automation, and machine learning.

AI also enhances "Sales Strategies" (43 occurrences) and "Information Management" (50 occurrences) by strengthening predictive analytics, improving customer relationship management, and extracting valuable insights from large

datasets. Furthermore, AI supports organizations in "Knowledge Management" (42 occurrences) by facilitating knowledge sharing and decision support systems.

In industrial contexts, AI contributes to "Industrial Research" (31 occurrences) through smart manufacturing and predictive maintenance, and to "Manufacturing" (24 occurrences) via automation, quality control, and efficiency improvements. AI is also applied in "Behavioral Research" (23 occurrences) to analyze consumer behavior, preferences, and market dynamics. Finally, the keyword "People" (21 occurrences) reflects AI's impact on workforce management through performance analytics, AI-driven recruitment, and personalized training programs that enhance both organizational performance and employee development.

Table 6: Artificial Intelligence and Digital Culture

Rank	Keywords	Cluster	Links	Occurrences	Total link strength
1	Decision making	3	64	117	500
2	Competition	3	64	96	478
3	Artificial intelligence	3	61	86	303
4	Information management	3	57	50	209
5	Sales	3	50	43	162
6	Knowledge management	3	55	42	171
7	Data driven	3	51	40	163
8	Decisions makings	3	48	33	173
9	Industrial research	3	54	31	157
10	Organisational	3	53	31	146
11	Information analysis	3	40	29	102
12	Digital storage	3	52	24	116
13	Manufacture	3	43	24	114
14	Behavioral research	3	40	23	86
15	Personnel	3	34	21	64

Source: Authors' creation.

By streamlining processes, reducing costs, and increasing productivity, AI enhances strategic thinking and overall business performance. Its contribution to automation and data-driven decision-making is highlighted by the keywords "Firm Performance" (83 occurrences) and "Performance" (67 occurrences). By enabling

faster innovation, personalized customer experiences, and more efficient operations, AI provides a notable "Competitive Advantage" (55 occurrences).

The Resource-Based View (RBV) (55 occurrences) emphasizes AI as a critical internal resource for achieving sustained competitive advantage. "Effective Management" (49 occurrences) is driven by the integration of business intelligence, predictive analytics, and AI-powered strategic decision-making. With real-time insights, AI strengthens dynamic capabilities (40 occurrences), allowing firms to respond swiftly to market shifts.

Long-term sustainability is supported by "Predictive Analytics" (36 occurrences) and "Business Analytics" (33 occurrences), both of which improve forecasting, mitigate risks, and enhance operational efficiency. AI's measurable impact is also seen in the keywords "Increased Productivity" (28 occurrences), "Cost Savings", and "Customer Satisfaction" (20 occurrences), which together drive revenue growth and market expansion.

Moreover, by deriving insights from large datasets, fostering innovation, and supporting continuous learning, all essential for maintaining competitive agility, AI contributes significantly to "Knowledge Management" (24 occurrences).

Table 7: AI And Strategic Thinking

Rank	Keywords	Cluster	Links	Occurrences	Total Link Strength
1	Firm performance	4	60	83	295
2	Performance	4	64	67	290
3	Competitive advantage	4	58	55	299
4	Resource-based view	4	60	49	221
5	Management	4	33	41	121
6	Dynamic capabilities	4	46	40	169
7	Predictive analytics	4	40	36	134
8	Business analytics	4	47	33	119
9	Impact	4	16	28	72
10	Knowledge	4	40	24	78
11	Business value	4	30	20	74

Source: Authors' creation.

AI-driven marketing is powered by Big Data (189 occurrences), which collects information from social media, online transactions, and customer reviews. While Advanced Analytics (65 occurrences) is used to forecast future trends and

consumer behaviors, Data Analytics (152 occurrences) transforms raw data into actionable insights.

Table 8: AI-Driven Data Intelligence and Analytics

Rank	Keywords	Cluster	Links	Occurrences	Total Link Strength
1	Big data	5	66	189	896
2	Data analytics	5	67	152	772
3	Advanced analytics	5	57	65	381
4	Big data analytic	5	52	45	261
5	Metadata	5	45	26	122

Source(s): Authors' creation.

Big Data Analytics (45 occurrences) specializes in marketing data analysis, enabling real-time strategies, personalized messaging, and customer segmentation. To manage and structure large datasets, enhance data retrieval, and support strategic marketing decisions, metadata (26 occurrences) plays a critical role.

5. DISCUSSION

As described in Section 3, this study used VOSviewer to perform a bibliometric analysis on data obtained from the Web of Science (WoS) and Scopus databases. The results presented in Section 4 provide comprehensive insights into the field. The analysis of 2,080 publications offered a detailed understanding of the key contributors, research trends, and emerging themes in AI-enabled marketing research.

Research publications in this domain have increased significantly over the past 24 years. The number of publications remained steady and modest between 2001 and 2014. However, a noticeable upward trend began in 2017, with research output growing sharply in subsequent years. The year 2023 recorded the highest number of publications, accounting for 34.59% of the total corpus. This pattern indicates that academic contributions to AI-driven marketing research have been consistently rising.

Knowledge in this field has progressed notably due to the efforts of several prolific authors. According to the analysis, Mikalef, P., Gupta, S., and Ferraris, A. each authored six publications, while Kumar, R., Liu, Y., Bag, S., and Dwivedi, Y. contributed five each. The most productive authors were Wang, Y. (eight publications) and Akter, S. (nine publications), whose scholarly output and expertise provide valuable insights into the thought leaders shaping this domain.

Journal analysis further identified key publication outlets for AI-enabled marketing research. Technological Forecasting and Social Change (United States) ranked first, underscoring its prominence in socio-technological studies. The Journal of Business Research (United States) also emerged as a significant contributor, particularly in business and management literature. Additionally, the Annals of Operations Research (Netherlands) demonstrated the interdisciplinary nature of research in this area, highlighting the convergence of technology, business, and operations within AI marketing studies.

China has the highest number of geographical contributions (405 publications), followed by India (182 articles). Both the United States and the United Kingdom also exhibit significant research output. The analysis of multiple-country publications (MCP) and single-country publications (SCP) provides insights into international collaboration trends. While Brazil demonstrates a high collaboration ratio—indicating strong cross-border scientific cooperation—countries such as Indonesia and Pakistan show low levels of international collaboration. These results highlight both the global reach of AI marketing research and the disparities in international engagement across different countries.

To identify emerging topics and future research directions, 2,180 articles were subjected to a keyword co-occurrence analysis. By applying a threshold of at least 20 keyword occurrences, the study identified 67 of the most relevant 4,154 keywords and grouped them into five thematic clusters. These clusters represent key research areas in AI-driven marketing, offering valuable insights into dominant themes and potential avenues for further investigation. The findings suggest that AI applications in marketing are still evolving, with several areas warranting deeper exploration.

Taking together, this study highlights the increasing scholarly attention to AI-enabled marketing competencies, identifies the leading research contributors, maps the geographic distribution of publications, and outlines the prevailing trends shaping future research in the field.

6. CONCLUSION AND IMPLICATIONS

To address the research questions, a comprehensive bibliometric analysis was conducted on publications from 2001 to 2024 that included keywords such as “Artificial Intelligence Competencies,” “Machine Learning Capabilities,” and “Big Data Analytics Skills” in relation to marketing. Data were retrieved from the Web of Science (WoS) and Scopus databases using a robust Boolean search strategy. In total, 2,180 relevant journal articles were included in the analysis after applying strict inclusion criteria. The evaluation, performed using VOSviewer, identified significant scholarly trends and thematic structures within the field.

The results reveal a notable increase in research output between 2018 and 2024, indicating growing academic and industrial interest in the role of AI within marketing. China emerged as the most prolific contributor to this research domain, while the journal Technological Forecasting and Social Change was identified as the most influential publication outlet. Keyword co-occurrence analysis uncovered dominant themes such as Big Data, Decision Making, Innovation, Competition, and Supply Chain Management, underscoring the interdisciplinary nature and strategic significance of AI-enabled marketing.

6.1. Conceptual and Practical Implications

From a theoretical standpoint, this study contributes to the Resource-Based View (RBV) and Dynamic Capabilities Theory by highlighting AI capabilities as strategic intangible assets that enable firms to sense, seize, and reconfigure in dynamic markets. The emergence of themes such as predictive analytics, competitive advantage, and firm performance confirms that AI functions not merely as a technological tool but as a critical enabler of sustainable competitive advantage.

From a practical perspective, the findings underscore the need for organizations, particularly public institutions and SMEs, to adopt a holistic readiness strategy when implementing AI systems. Beyond technological infrastructure, success depends on cross-functional collaboration, employee upskilling, and fostering a culture of innovation and risk tolerance. Training programs should bridge the gap between technical expertise and business acumen, enabling teams to effectively leverage AI for customer engagement, operational efficiency, and strategic marketing.

Moreover, the societal implications of AI adoption warrant careful consideration. As AI continues to reshape marketing practices, ethical issues such as data privacy, algorithmic bias, and consumer manipulation must be proactively addressed. Future research should explore governance frameworks and ethical guidelines that balance innovation with accountability.

6.2. Limitations

Despite its comprehensive approach, this study has several limitations. First, the analysis was restricted to publications indexed in Scopus and the Web of Science, which, although reputable, may exclude relevant studies from other academic databases such as IEEE Xplore, ACM Digital Library, or Google Scholar. Second, only peer-reviewed journal articles were included; conference proceedings, book chapters, and grey literature were excluded, potentially limiting insights from emerging or interdisciplinary domains. Third, the selected time frame of 2001–

2024 was intended to ensure historical depth, but very recent publications beyond this range or currently in press were not captured.

These constraints may affect the generalizability and completeness of the findings, although careful measures, such as filtering, deduplication, and metadata standardization, were taken to ensure data quality and reliability.

6.3. Directions for Future Research

Future studies can build upon these findings through several avenues. First, longitudinal studies investigating the evolution of AI-enabled marketing competencies over time can uncover trends, inflection points, and lasting impacts. Second, combining bibliometric analysis with qualitative techniques, such as expert interviews or case studies, can provide richer, more contextualized insights.

Third, theoretical development remains a promising direction. Scholars can further integrate AI into established frameworks such as Service-Dominant Logic, the Technology Acceptance Model (TAM), or Organizational Learning Theory to explore how AI transforms marketing mindsets and capabilities.

Fourth, ethical analysis should be expanded to assess the societal implications of AI, particularly in areas such as algorithmic transparency, inclusivity, and digital inequality.

Finally, contextual exploration is essential. Future research can examine how AI competencies differ across industries, cultures, and institutional settings, offering practical insights for localization and scaling of AI strategies.

REFRENCES

Abad-Segura, E., Castillo-Díaz, F. J., Batlles-delaFuente, A., & Belmonte-Ureña, L. J. (2024). Enhancing competitiveness and sustainability in Spanish agriculture: The role of technological innovation and corporate social responsibility. *Business Strategy & Development*, *7*(4), e70021.https://doi.org/10.1002/bsd2.70021

Alegavi, S., & Sedamkar, R. (2019). Research trends in hyperspectral imagery data. *International Journal of Computer Engineering and Technology, 10*(2), 67–73.

Anshari, M., Almunawar, M. N., Lim, S. A., & Al-Mudimigh, A. (2019). Customer relationship management and big data enabled: Personalization & customization of services. *Applied Computing and Informatics*, *15*(2), 94-101. https://doi.org/10.1016/j.aci.2018.05.004

Aria, M., & Cuccurullo, C. (2017). Bibliometrix: An R-tool for comprehensive science mapping analysis. *Journal of Informetrics*, *11*(4), 959-975. https://doi.org/10.1016/j.joi.2017.08.007

Asif, M. H., Zhongfu, T., Dilanchiev, A., Irfan, M., Eyvazov, E., & Ahmad, B. (2023). Determining the influencing factors of consumers' attitude toward renewable energy adoption in developing countries: A roadmap toward environmental sustainability and green energy technologies. *Environmental Science and Pollution Research*, *30*(16), 47861-47872. https://doi.org/10.1007/s11356-023-25662-w

Benckendorff, P., & Zehrer, A. (2013). A network analysis of tourism research. *Annals of Tourism Research*, *43*, 121-149. https://doi.org/10.1016/j.annals.2013.04.005

Chatterjee, D., & Sahasranamam, S. (2018). Technological innovation research in china and india: A bibliometric analysis for the period 1991–2015. *Management and Organization Review, 14*(1), 179–221. https://doi.org/10.1017/mor.2017.56

Davenport, T., Guha, A., Grewal, D., & Bressgott, T. (2020). How artificial intelligence will change the future of marketing. *Journal of the Academy of Marketing Science, 48*, 24–42. https://doi.org/10.1007/s11747-019-00696-0

Dekimpe, M. G., Geyskens, I., & Gielens, K. (2020). Using technology to bring online convenience to offline shopping. *Marketing Letters*, *31*, 25-29. https://doi.org/10.1007/s11002-019-09508-5

Del Gesso, C., Lodhi, R. N., Asif, M., & Cobanoglu, C. (2024). A bibliometric analysis of intellectual capital research in the hospitality and tourism business setting. *International Journal of Hospitality Management*, *119*, 103713. https://doi.org/10.1016/j.ijhm.2024.103713

Dong, X., Gabrilovich, E., Heitz, G., Horn, W., Lao, N., Murphy, K., ... & Zhang, W. (2014, August). Knowledge vault: A web-scale approach to probabilistic knowledge fusion. In *Proceedings of the 20th ACM SIGKDD international conference on Knowledge discovery and data mining* (pp. 601-610). https://doi.org/10.1145/2623330.2623623

Felsberger, A., & Reiner, G. (2020). Sustainable industry 4.0 in production and operations management: A systematic literature review. *Sustainability*, *12*(19), 7982. https://doi.org/10.3390/su12197982

Gao, J., Yao, L., Xiao, X., & Li, P. (2022). Recover from failure: Examining the impact of service recovery stages on relationship marketing strategies. *Frontiers in Psychology*, *13*, 852306. https://doi.org/10.3389/fpsyg.2022.852306

Iliev, S., Pesheva, N., & Iliev, P. (2020). Depinning regimes and contact angle hysteresis of a drop on doubly periodic microtextured surfaces. *Physical Review E, 101*(5), 052801. https://doi.org/10.1103/PhysRevE.101.052801

Ismagilova, E., Slade, E., Rana, N. P., & Dwivedi, Y. K. (2020). The effect of characteristics of source credibility on consumer behaviour: A meta-analysis. *Journal of Retailing and Consumer Services*, *53*, 101736. https://doi.org/10.1016/j.jretconser.2019.01.005

Kalia, P. (2022). Emerging technologies in insurance sector: evidence from scientific literature. *Big Data: A Game Changer for Insurance Industry*, 43-63.

Kot, M. T., & Leszczyński, G. (2020). The concept of intelligent agent in business interactions is virtual assistant an actor or a boundary object?. *Journal of Business & Industrial Marketing*, *35*(7), 1155-1164. https://doi.org/10.1108/JBIM-10-2018-0291

Leydesdorff, L., Carley, S., & Rafols, I. (2013). Global maps of science based on the new web-of-science categories. *Scientometrics*, *94*, 589-593. https://doi.org/10.1007/s11192-012-0784-8

Mahmood, R., Zhang, L., & Li, G. (2023). Assessing effectiveness of nature-based solution with big earth data: 60 years mangrove plantation program in Bangladesh coast. *Ecological Processes, 12*(11). https://doi.org/10.1186/s13717-023-00419-y

Maxwell, A. L., Jeffrey, S. A., & Lévesque, M. (2011). Business angel early stage decision making. *Journal of Business Venturing*, *26*(2), 212-225. https://doi.org/10.1016/j.jbusvent.2009.09.002

Netzer, O., Lemaire, A., & Herzenstein, M. (2019). When words sweat: Identifying signals for loan default in the text of loan applications. *Journal of Marketing Research*, *56*(6), 960-980. https://doi.org/10.1177/0022243719852959

Nguyen, Q. N., & Sidorova, A. (2018). Understanding user interactions with a chatbot: A self-determination theory approach. In *Proceedings of the 39th International Conference on Information Systems (ICIS 2018)*. Association for Information Systems. https://aisel.aisnet.org/icis2018/hci/Presentations/5/

Pal, R., Yadav, U., Grover, S., Saboo, B., Verma, A., & Bhadada, S. K. (2020). Knowledge, attitudes and practices towards COVID-19 among young adults with Type 1 Diabetes Mellitus amid the nationwide lockdown in India: A cross-sectional survey. Diabetes research and clinical practice, 166, 108344.ector Marketing, *23*(1), e1589.

Paschen, J. (2020). Investigating the emotional appeal of fake news using artificial intelligence and human contributions. *Journal of Product & Brand Management, 29*(2), 223–233. https://doi.org/10.1108/JPBM-10-2019-2536

Ramos-Rodríguez, A. R., & Ruíz-Navarro, J. (2004). Changes in the intellectual structure of strategic management research: A bibliometric study of the

Strategic Management Journal, 1980–2000. *Strategic management journal*, *25*(10), 981-1004. https://doi.org/10.1002/smj.397

Russell, S. J., & Norvig, P. (2016). *Artificial intelligence: A modern approach* (3rd ed.). Pearson.

Shamim, S., Cang, S., Yu, H., & Li, Y. (2016, July). Management approaches for Industry 4.0: A human resource management perspective. In *2016 IEEE congress on evolutionary computation (CEC)* (pp. 5309-5316). IEEE. https://doi.org/10.1109/CEC.2016.7748365

Simester, D., Timoshenko, A., & Zoumpoulis, S. I. (2020). Targeting prospective customers: Robustness of machine-learning methods to typical data challenges. *Management Science*, *66*(6), 2495-2522. https://doi.org/10.1287/mnsc.2019.3308

Strandhagen, J. W., Alfnes, E., Strandhagen, J. O., & Vallandingham, L. R. (2017). The fit of Industry 4.0 applications in manufacturing logistics: A multiple case study. *Advances in Manufacturing*, *5*(4), 344-358. https://doi.org/10.1007/s40436-017-0200-y

Talwar, S., Talwar, M., Kaur, P., & Dhir, A. (2020). Consumers' resistance to digital innovations: A systematic review and framework development. *Australasian Marketing Journal*, *28*(4), 286-299. https://doi.org/10.1016/j.ausmj.2020.06.014

Tripathi, S., & Verma, S. (2018). Social media, an emerging platform for relationship building: A study of engagement with nongovernment organizations in India. *International Journal of Nonprofit and Voluntary S*

Valls, C., Bigné, E., Ruiz, C., & Aldás, J. (2018). Digital marketing strategies, online reviews and hotel performance. *International Journal of Hospitality Management, 72*, 47–55. https://doi.org/10.1016/j.ijhm.2018.01.003

Van Eck, N. J., & Waltman, L. (2017). Citation-based clustering of publications using CitNetExplorer and VOSviewer. *Scientometrics*, *111*, 1053-1070. https://doi.org/10.1007/s11192-017-2300-7

Vlačić, B., Corbo, L., e Silva, S. C., & Dabić, M. (2021). Corrigendum to "The evolving role of artificial intelligence in marketing: advanced topics and research agenda" [J. Bus. Res. 128 (2021) 187–203]. *Journal of Business Research*, *134*, 414-414.

Wang, Y., Bryant, S. H., Cheng, T., Wang, J., Gindulyte, A., Shoemaker, B. A., ... & Zhang, J. (2017). Pubchem bioassay: 2017 update. *Nucleic Acids Research*, *45*(D1), D955-D963. https://doi.org/10.1093/nar/gkw1118

World Economic Forum. (2022). *Global risks report 2022: 17th edition* (Insight Report). World Economic Forum

Ye, G., Hudders, L., De Jans, S., & De Veirman, M. (2021). The value of influencer marketing for business: A bibliometric analysis and managerial implications. *Journal of Advertising*, *50*(2), 160-178. https://doi.org/10.1080/00913367.2020.1857888

Zupic, I., & Čater, T. (2015). Bibliometric methods in management and organization. *Organizational Research Methods, 18*(3), 429–472. https://doi.org/10.1177/1094428114562629