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How Artificial Intelligence Brought a Paradigm Shift in the Digital Marketing Landscape: A Scientometric Mapping and Future Research Directions

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ABSTRACT

This bibliometric and scientometric research aims to comprehensively analyze the application of Artificial Intelligence (AI) in digital marketing. The study uses the Scopus database to identify 355 research papers published between 2000 and 2025. This research intends to provide an overview of the research landscape, including the most cited articles, authors, and journals, to identify the trending topics of the research, and to determine the thematic development in this domain. The findings reveal that research in this field depicts exponential growth after 2017 and will continue to grow in the future and the Journal of Marketing is the most contributing journal. The most commonly used AI technologies in digital marketing include machine learning (ML), natural language processing (NLP), predictive modeling, and chatbots with tools such as ChatGPT, OptiMonkAI, Jasper, Midjourney, Manychat, Zapier, ElevenLabs, and OpusClip. The findings further synthesize that these AI tools and technologies enable marketers to collect and analyze large amounts of real-time data (structured, unstructured, and semi-structured) and are applied to achieve multifold strategic and tactical marketing objectives: To make improved customer segmentation, behavior prediction, and targeting, to enhance customer service, experience, and satisfaction, to ensure marketing efficiency through automation, to create and personalize content, and to efficiently manage social media and personalized email marketing and e-commerce website. However, there are concerns about the potential for the sustainable implication of AI considering data privacy and security and ethical issues. Future research should focus on the application of AI to ensure and enhance sustainable societal well-being (society 5.0) through marketing 5.0.

Keywords: Artificial Intelligence, Digital Marketing, Technology Adoption, Machine Learning, Bibliometric Analysis, Systematic Literature Review
JEL Classifications: M31, M37, 033, C63

1. INTRODUCTION

Today is the age of data, chatbots, and ChatGPT, and people (customers) are generating humongous amount of data, 402.74 million terabytes every day (Fabio Duarte, 2024). According to Bala and Verma, (2018) astute marketers can effectively harness the benefits of this solid data by analyzing it and using it to provide better customer service and experience and to deliver improved customer value.

Artificial intelligence (AI) has rapidly emerged as a revolutionary technology in various fields (Ali et al., 2023; Dwivedi et al., 2022; Haefner et al., 2021; Saura et al., 2021), digital marketing is also

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blessed to capitalize on the benefits of this powerful technology (Faruk et al., 2021; Frank, 2021; Mikalef et al., 2021). With the advent of AI, businesses are now able to collect, analyze, and use data more effectively than ever before (Paschen et al., 2020), thus gaining a competitive edge. According to Verma et al. (2021) Artificial intelligence (AI) was first coined in 1956 at "Dartmouth Conference" and Haefner et al. (2021) identified it as the ability of machines to perform tasks that typically require human intelligence, such as understanding natural language, recognizing objects and patterns, and making decisions. AI systems use algorithms and statistical models to analyze large amounts of data and identify patterns, allowing them to learn and improve their performance over time without being explicitly programmed (Uzir et al., 2021). AI encompasses a wide range of technologies, including machine learning, natural language processing (Fernández-Rovira et al., 2021; Polas et al., 2022), computer vision, and robotics (Darmody and Zwick, 2020; Dumitriu and Popescu, 2020). Rusthollkarhu et al. (2022) have argued that the goal of AI is to create intelligent machines that can perform complex tasks and make decisions with minimal human intervention, ultimately making our lives easier and more efficient.

In recent years, there has been an increasing interest in the application of AI in digital marketing, leading to a significant amount of research in this area (Aziki and Fadili, 2022; Citak et al., 2021; Krafft et al., 2020; Rehman Khan et al., 2022; Theodoridis and Gkikas, 2019). With the vast amount of data available and the need to deliver personalized content to consumers, AI has become a valuable tool for marketers (Frank, 2021; Johnson et al., 2022; Ma and Sun, 2020). Anderson and Narus (2023) have claimed in a Harvard Business Review article that providing superior customer value is the supreme concern of digital marketers and AI has assisted significantly in this task of digital marketers. The ability of AI to analyze vast amounts of data, identify patterns (Chae and Goh, 2020; Kopalle et al., 2022), and generate insights enables marketers to personalize customer experiences (Chintalapati and Pandey, 2022; Mariani et al., 2023) and optimize marketing campaigns for better results (Ianenko et al., 2022; Rabby et al., 2021).

Due to its potential to improve marketing effectiveness and efficiency, the application of artificial intelligence (AI) in digital marketing has gained considerable attention from digital marketing researchers in recent years (Wirth, 2018). Hence, several empirical as well as other types of research have been conducted in this domain of scholarly knowledge by different scholars (Aziki and Fadili, 2022; Chintalapati and Pandey, 2022; Dellaert et al., 2020; Haleem et al., 2022; Hoekstra and Leeflang, 2022; Lee and Cho, 2020; Saura et al., 2021; Terho et al., 2022). However, although several studies have been already conducted on this topic, no study concentrated on analyzing the most influential works, and authors in this research domain. In addition to that, the research dimension that has emerged within the last few decades in this domain is also missing. In other words, the authors have not found any bibliometric analysis focusing on this research domain; thus, a clear research gaps exists (Collins et al., 2021; Dumitriu and Popescu, 2020).

Therefore, this study aims to contribute to fulfilling this research gap by conducting a bibliometric analysis of the published articles concerning the subject "application of artificial intelligence in digital marketing" on the Scopus database from 1999 to 2025 and identifying the most contributing articles and authors in this research domain, trends and growth in the research relating to this subject and determining the underlying research themes that have emerged from these researches. By analyzing the existing research, this study will provide insights into the potential of AI in digital marketing and highlight the challenges and limitations that need to be addressed. The paper will provide insights into how AI can be utilized to improve various aspects of digital marketing, such as content creation, customer targeting, and conversion optimization.

In this way, the research questions that the authors intend to investigate in this study are:

1. What are the most influential authors and articles that have contributed to the field of artificial intelligence application in digital marketing and how this research has grown over time?
2. What are the research themes that have emerged over time in this field?
3. What do these prominent researchers point out about the application of AI in digital marketing?
4. What should future researchers focus on regarding the usage of artificial intelligence to better encapsulate the strategic and continuously changing digital marketing landscape?

2. METHODOLOGY

This research employs widely known, since the 1950s, bibliometrics analysis method (Donthu et al., 2021) with the biblioshiny package of R programming software. Bibliometrics analysis is predominantly used to find out the intellectual structures or themes that exist among the published research works in a field of study (i.e digital marketing and AI) (Binh Nguyen et al., 2023; Donthu et al., 2021; Faruk et al., 2021; Gurzki and Woisetschläger, 2017).

The authors have adopted an objectivist research philosophy in this analysis as proposed by Saunders et al. (2019) since bibliometric analysis is predominantly a quantitative technique (Donthu et al., 2021) which is based on co-citation analysis and meta-analysis (Faruk et al., 2021). This study has considered the SALSA approach to conduct the analysis. This approach is now widely used as a tool for bibliometric analysis. SALSA stands for the Search, Appraisal, Synthesis, and Analysis developed by Grant and Booth (Anwar et al., 2023). This approach has been recommended by other previously conducted bibliometric studies (Binh Nguyen et al., 2023; Donthu et al., 2021; Gurzki and Woisetschläger, 2017; Perez-Vega et al., 2022). In this approach, the datasets are carefully collected from the Scopus database.

In the SALSA approach, the first step is to search for the dataset. The authors have retrieved the bibliometric data from "Scopus" database which is considered the largest database for business and social science (Binh Nguyen et al., 2023).This resource provides an extensive range of scientific publications, encompassing content from over 3,300 meticulously chosen publishers and spanning more than 12,000 influential journals. Only the Scopus database is considered because authors have authorized access to this database.

Therefore, future researchers can take other powerful and relevant databases such as Web of Science, JSTOR, PubMed, ProQuest, etc. into consideration for a more comprehensive study.

Regarding the keyword selection, the author started with "Artificial Intelligence AND Digital Marketing" as the seed keyword, and then the top 20 most cited articles were manually reviewed to identify other relevant keywords. The complete search criteria and keywords used are presented in Table 1.

After putting the detailed keywords in the Scopus database, it has produced a huge number of documents of the subject area in the search process. This is because for a specific searched word Scopus database shows all the documents that contain these keywords. It will not be a wise option to work with the whole database as it may include documents outside of the study theme. This is why there is a requirement to filter the data set with specifications to be more precise on the documents that we are interested in.

Table 1: Detailed keyword searched in the database

Search Conditions	Search terms
Field Tag: Title (TI)	TI= ("AI" OR "Artificial Intelligence" OR "Machine Learning" OR "ChatGPT" OR "Big Data" OR "Deep Learning*" OR "Text Mining" OR "Natural Language Processing" OR "Data Mining")
Boolean:	AND
Field Tag: Topic (TS)	TS=("Digital Marketing" OR "Online Marketing" OR "E-Marketing" OR "Content Marketing" OR "Digital Consumer Behavior*" OR "Social Media Marketing" OR "Mobile Marketing")
Field Tag: Research Area (SU)	SU=(Business and Economics)

Asterisks (*) are used to capture plural forms

Table 2: Overview of the dataset analyzed

Description	Results
Documents	355
Sources (Journals, Books, etc.)	107
Keywords plus (ID)	336
Author's keywords (DE)	534
Period	2000-2025
Average citations per document	15.48
Authors	495
Author appearances	512
Authors of single-authored documents	31
Authors of multi-authored documents	464
Single-authored documents	31
Documents per author	0.313
Authors per document	3.19
Co-Authors per documents	3.3
Collaboration index	3.74
Document types	
Article	288
Book chapter	52
Review	15

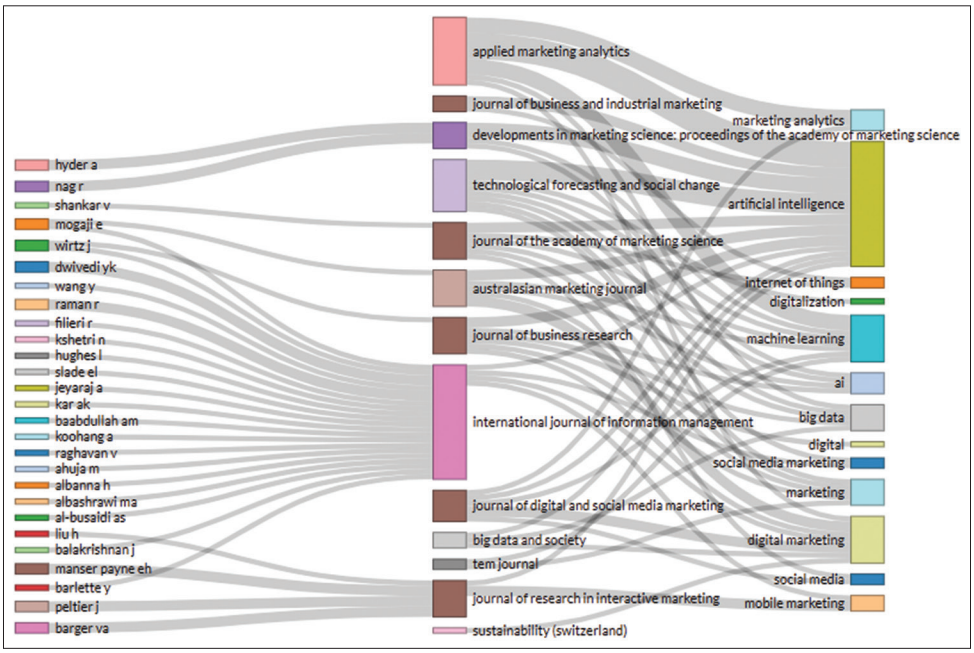
This study stepped into the second step which is appraisal which is narrowing down the obtained dataset to make sure the absence of any irrelevant data set. In this study, we have gone through this process in four stages. First of all, this study has taken into account the documents that were written on 'social sciences; or 'economics, econometrics, and finance' or 'business, management and accounting' and only 'articles' or 'review articles or 'book chapters'. This specification has given us a data set of 587 documents. In the next step, this study filtered the data set with English language only which produced 393 papers. Other languages have not been considered, since the authors do not have proficiency in other languages such as Chinese, Russian, or German. In addition to that the result because of the language filter does not reduce the sample paper size too much which in turn means that this filtration has a minimal effect on the sample. Then, the period is limited to 2000-2025 only which produced 355 documents. This period is considered since previous researchers have claimed (Haque et al., 2023; Kelly et al., 2023; Mariani et al., 2022; Saura et al., 2021; Uzir et al., 2021) that the proliferation of AI has begun in this period and is expected to receive paramount momentum within next decade (Chintalapati and Pandey, 2022; Saura et al., 2021a; Shank et al., 2021). These 355 research papers were then finally analyzed in the study. In the third stage of SALSA, this study has gone through a synthesis process. This stage is examining the dataset with the standard visualization and mapping tools. This study has used the biblioshiny package with R programming and VoS viewer to observe the dataset with various visualization and mapping tools like bibliographic coupling or three-field plots.

After having the mapping and visualization of data this study has stepped into the fourth step of the process which is an analysis that is a bibliographic analysis of the dataset based on the mapping, visualization, and information.

Table 3: Most global cited sources

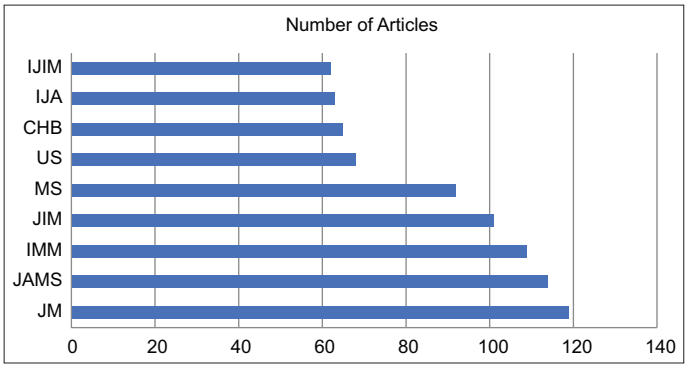
Paper	DOI	Total citations	TC per year
Dwivedi, 2021, Int J Inf Manage	10.1016/j.ijinfomgt. 2020.102168	382	127.33
Popkova, 2020, J Intellect Cap	10.1108/JIC-09-2019-0224	187	46.75
MA, 2020, Int J Res Mark	10.1016/j.ijresmar. 2020.04.005	123	30.75
Almeida, 2020, IEEE Eng Manage Rev	10.1109/EMR.2020.3013206	113	28.25
Coglianese, 2017, Georget Law J	NA	113	16.14
Rust, 2020, Int J Res Mark	10.1016/j.ijresmar. 2019.08.002	109	27.25
Mustak, 2021, J Bus Res	10.1016/j.jbusres. 2020.10.044	77	25.67
Yigitcanlar, 2020, J Open Innov: Technol Mark Complex	10.3390/joitmc6040187	60	15.00
Wirth, 2018, Int J Mark Res	10.1177/1470785318776841	57	9.50
Manser Payne, 2021, J Res Interact Mark	10.1108/JRIM-10-2020-0214	54	18.00

Figure 1: Three field plots (left field: Author-20, Middle field: Source, 15, Right Field: Keyword)



(Source: Output form Authors Own Bibliometric Analysis)

Figure 2: Most locally cited sources



(Source: Output from Authors Own Bibliometric Analysis)

3. BIBLIOMETRIC ANALYSIS AND FINDINGS

3.1. Overview of the Dataset

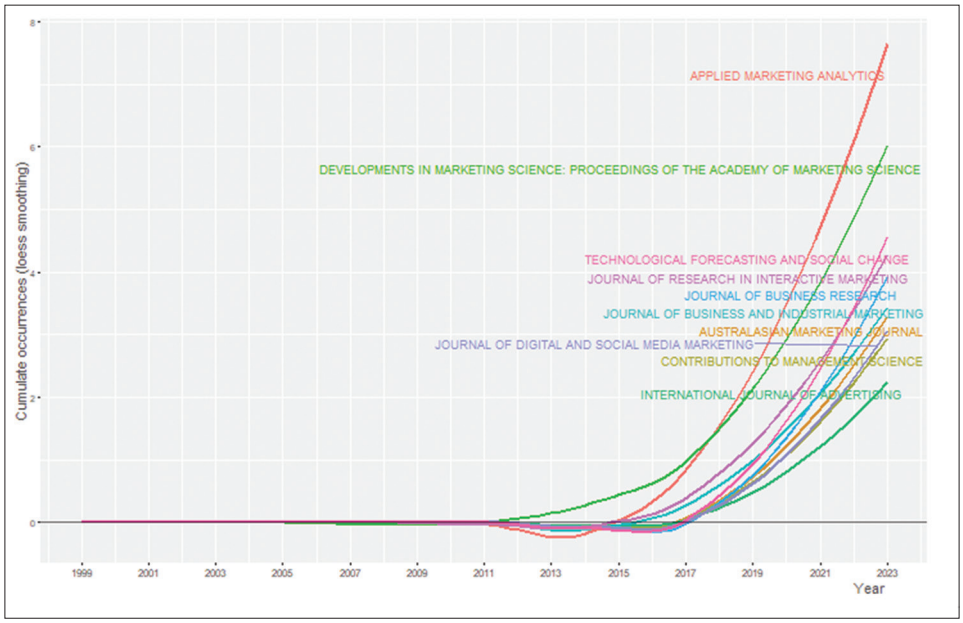
Before analyzing the documents; an overview of the overall dataset is presented in the following table 2 to make the picture clear regarding the contents of the papers. This will help readers to have an understanding of the basic aspects of the data.

This study has considered the Scopus dataset for 2000-2025 for the bibliographic analysis. 355 documents have been identified during this period on Artificial intelligence in digital marketing. This document has been found in 107 different sources. In All those sources 336 different keywords have been identified. In 512 appearances 495 different authors have been given their contribution in this area of research with an average citation of 15.48. Of all those documents written 31 documents were single-authored and 464 were multi-authored documents.118 of these documents were articles, 28 were book chapters and 9 of them were review papers.

It has been observed that from 2017 more documents were published on Artificial Intelligence and digital marketing-related fields. During 2021 and 2022 more than 40 documents have been documented in this field. It has reflected the idea that more importance is given to artificial intelligence for marketing, especially digital marketing purposes. Social sites, apps, and website-based businesses are growing day by day (Haleem et al., 2022; Mikalef et al., 2021) and it has got its required attention the researchers during the COVID-19 for the digital marketing and service marketing sector for changes and policy adaptation (Rusthollkarhu et al., 2022). Various papers were also written on the role of business data analytics during the COVID-19 period (Rehman Khan et al., 2022).

The three-field plot diagram in figure 1 is a graphical presentation of various fields that are related to each other. This diagram enables us to investigate prominent themes, sources, and authors. From the diagram above we can see that this field of study emphasizes market analysis, analytic techniques, and marketing platforms. Marketing analytics, the Internet of Things, machine learning, AI, big data, and artificial intelligence these topics are studied as marketing tools. Whether mobile marketing, social media, or digital marketing these topics represent the digital marketing platforms. This plot also reveals relevant journals. "Applied Marketing Analytics," and "Technological Forecasting and Social Change" these journals emphasize publications on marketing analytics, artificial intelligence, and machine learning. Whereas the International Journal of Information Management, Australasian Marketing Journal, Journal of Research in Interactive Marketing, and Journal of Digital & Social Media Marketing mainly emphasize digital marketing, mobile marketing, and social media marketing. International Journal of Information Management has covered a good list of author in their publications.

Figure 3: Source growth



(Source: Output from Authors Own Bibliometric Analysis)

3.2. Most Local Cited and Most Global Cited Sources

3.2.1. Most local cited sources

To investigate the most impactful sources of a particular field of research number of publications in a particular journal is a useful indicator. In the figure 2 it can be observed that in this field of research at the top we can see a Q1-indexed journal named Journal of Marketing (JM) has the greatest number of publications starting from 1936 this journal was published by the American Marketing Association has published a good number of documents in the marketing discipline. Journal of the Academy of Marketing Science (JAMS) by Springer New York is in the second position in this list. Industrial marketing management (IMM) with 109 journals published by Elsevier is in the third position. This is also a relatively old journal starting SCOPUS coverage in 1971. The other top journal on this list is the Journal of Interactive Marketing (JIM), Marketing Science (MS), US, Computers in Human Behavior (CHB), International Journal of Advertising (IJA), an International Journal of Information Management (IJIM)

3.2.2. Most global cited articles

While looking for the most impactful documents in this field, as presented in table 3, this study has identified a few documents that got interest from their reader and also cited for further research works as well. In this list the document titled "Setting the future of digital and social media marketing research: Perspectives and research propositions" is at the top with 382 citations (Dwivedi et al., 2021). This document was written on future research perspectives and propositions on digital and social media marketing research.

The document titled "Human capital and AI in Industry 4.0. Convergence and divergence in social entrepreneurship in Russia" is in the second position of this list with 187 citations which have been written basically on uses of human intellect and artificial intelligence by the entrepreneur of industry 4.0 (Popkova and Sergi, 2020). In the document "Machine Learning and AI in Marketing – Connecting Computing Power to Human Insights" researchers have attempted to compare the machine learning tasks with statistical and econometric approaches. The modern business world is going through massive changes because of AI-driven technologies. The study has reviewed the marketing research to leverage machine learning methods. It has shown the advantages of machine learning approaches to deal with large-scale data and also drawn some limitations. This document also gives a conceptual framework and a research agenda that is multi-faced.

COVID-19 has changed the global business scenario on a huge scale. The pre and post-pandemic business world has experienced large differences, especially in the use of technology and business digitalization. In the document titled "The Challenges and Opportunities in the Digitalization of Companies in a Post-COVID-19 World" authors have studied and explained the post-pandemic digital acceleration trends of the businesses. The study emphasizes three areas labor and social relations, technology, marketing, and sales. The digitalization process is expected to foster new digital products and will also create new markets through the technology of the products. To predict the future trends of marketing practices Ronald T. Rust in his work "The Future of Marketing" stated that the development of technology has an immense influence on marketing (Rust, 2020). This leads the way for the expansion of customer service and has broadened the service sector. In another document "Artificial intelligence in marketing: Topic modeling, scientometric analysis, and research agenda" authors conducted a literature review of the works written on artificial intelligence in marketing to identify topics, their diversity, and the evolution of topics over time.

While emphasizing making a tie with AI while thinking of marketing Norbert Wirth in the article "Hello marketing, what can artificial intelligence help you with?" indicates that people

are curious and at times confused regarding the use of AI. He also identifies three types of AI Narrow, hybrid, and strong in various cases. Another article named "Enhancing the Value Co-creation Process: Artificial Intelligence and Mobile Banking Service Platforms" investigates the association that influences the value co-creation process and customer comfort.

3.3. Source Growth and Trending Topics

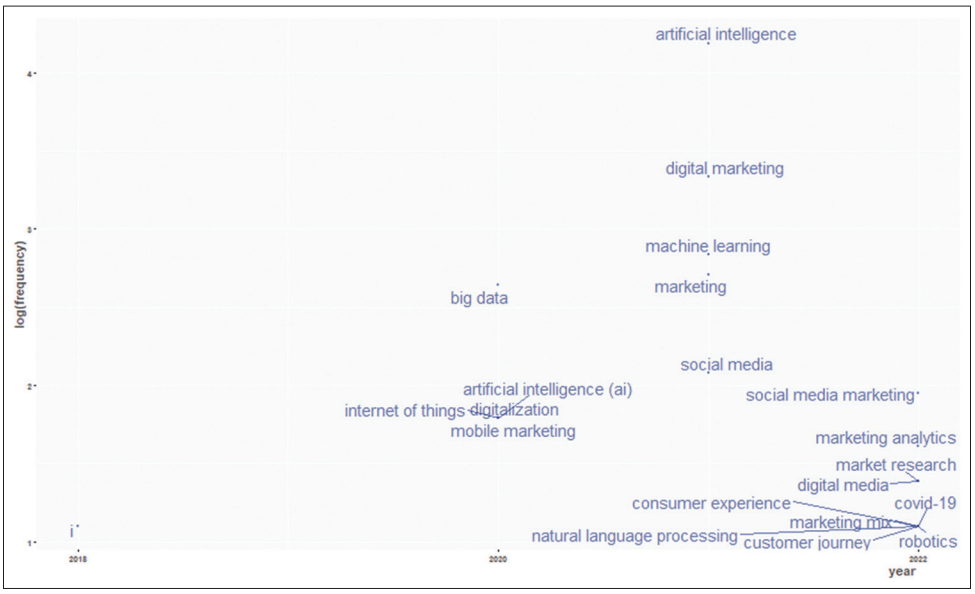
Figure 3 depicts the trend of source growth. Applied Marketing Analysis, a Q4 journal in marketing which is published by Henry Stewart publication from the United Kingdom has been identified as the source having the most growth since 2011 the upward pattern of this journal is much steeper than any other source. Followed by the journals of the academy of Marketing Science a Q1 journal by Springer. Another prominent journal in this list is Technological Forecasting and Social Change by Elsevier which is also a Q1 journal.

From Figure 4 it is evident that the trending topic in this field of research has evolved a lot. During 2020 big data, artificial intelligence, digitalization and Internet of Things and mobile marketing were the topics that were popular in that period. In recent years especially after the COVID-19 pandemic as the global market and, distribution channels all got disrupted topics like social media marketing, digital media, robotics marketing analysis, and marketing research have gained immense importance.

Recent studies such as Rabby et al. (2021) have identified that because of the proliferation and easier access to social media consumers are sharing their feelings and attitudes in these media. Hence, astute marketers are now leaning forward to AI tools to demystify the underlying meaning of these semi-structured and structured data. Amiri et al. (2023) have critically identified that with the help of machine learning customers in the health care industry can enjoy improved health care service since doctors can predict the behavior pattern of the diseases. Another recent study Gołąb-andrzejak (2023) focused on consumer experience and claimed that AI tools significantly improve online order process efficiency without compromising product quality and order fulfillment time.

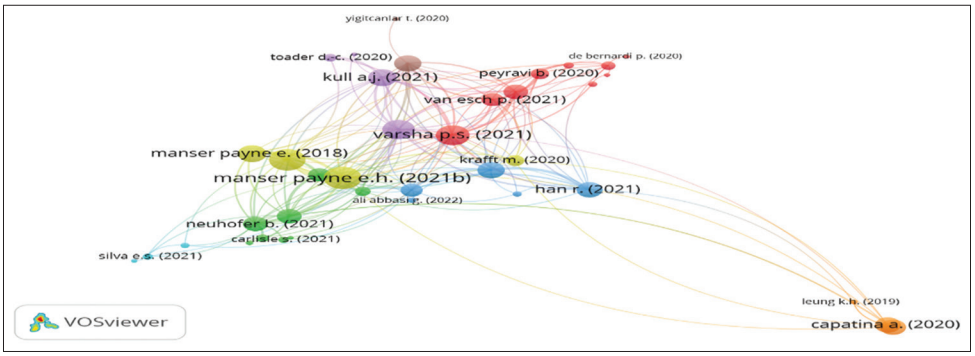
A few recent studies focus on the development of metaverse and AI. For example, Buhalis et al. (2023) have claimed metaverse

Figure 4: Trending topics



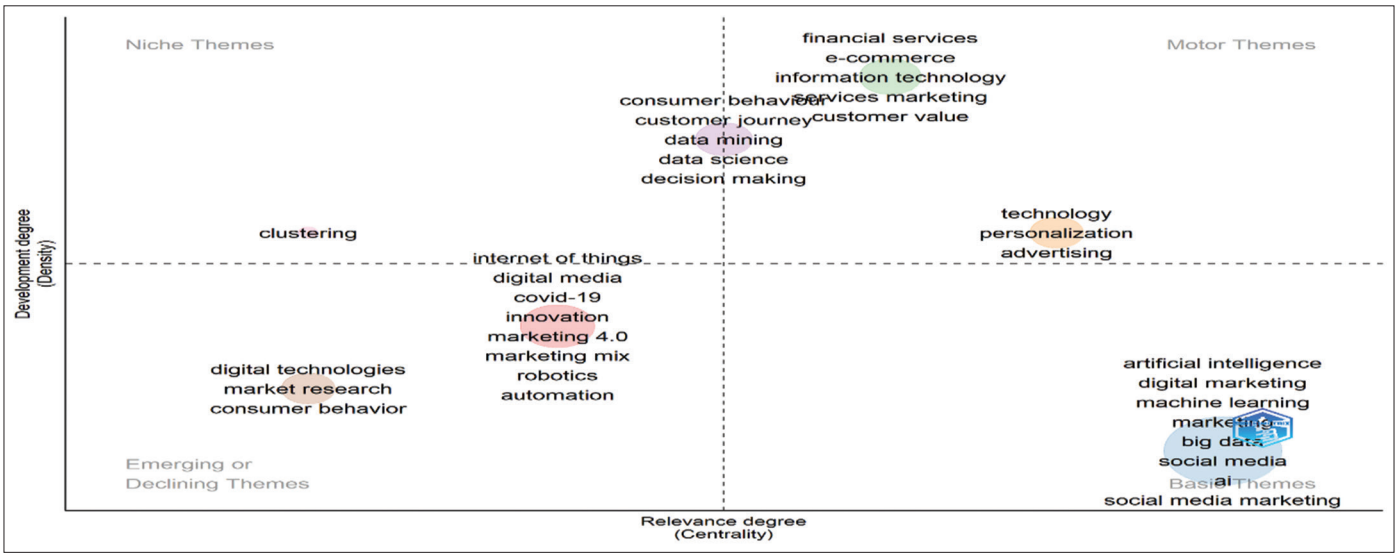
(Source: Output from Authors Own Bibliometric Analysis)

Figure 5: Bibliographic coupling



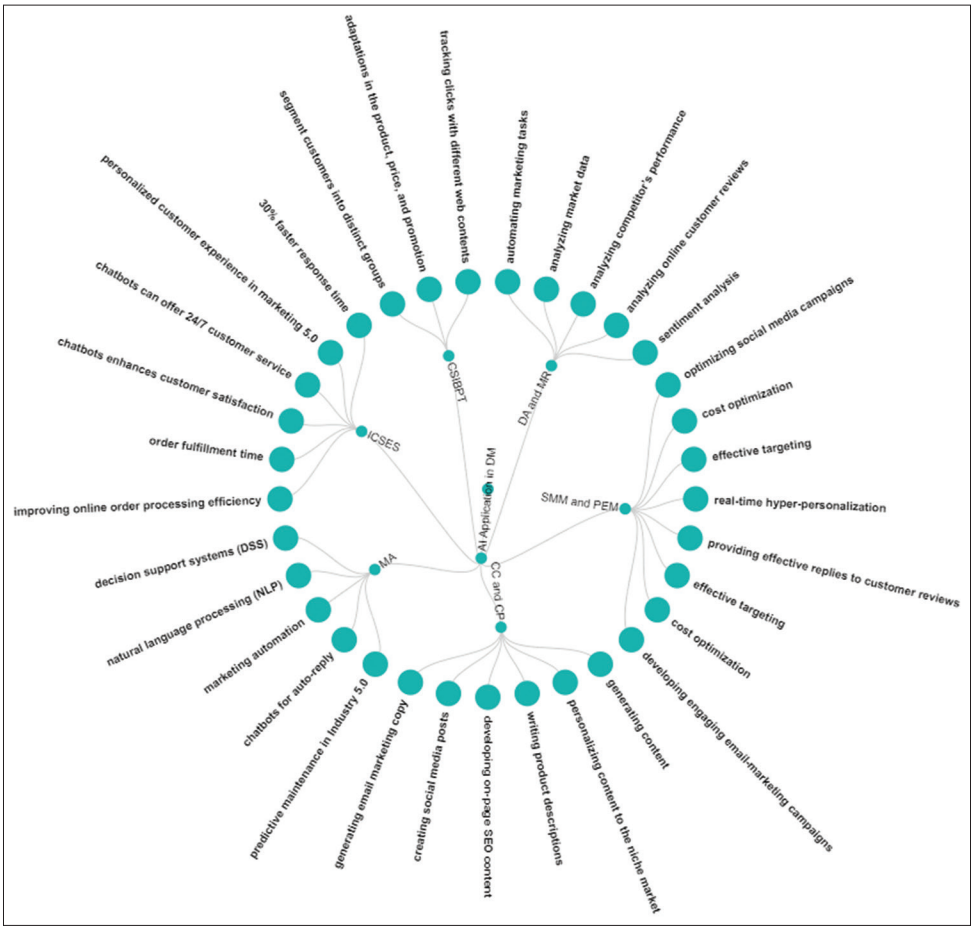
(Source: Output from Authors Own Bibliometric Analysis)

Figure 6: Thematic map



(Source: Output from Authors Own Bibliometric Analysis)

Figure 7: Framework for the application of artificial intelligence (AI) in digital marketing (DM)



Source (Authors' own contribution)

converges the physical world and virtual world; hence providing opportunities for seamless traversing experience to the consumers. This digital immersion, technically, unveils a new pathway for marketers to fulfill customers' needs, wants, and demands in a different way. However, another study conducted by Dwivedi et al. (2022) have shed light on the challenges that the concept of metaverse is going to create. Dwivedi et al. (2022) proved that this seamless interaction within real and simulated environments using augmented and virtual reality will pose risks related to trust, bias, privacy, and disinformation.

Some research focuses on the implications of AI in the B2B marketing process. To illustrate, as identified by Paschen et al. (2020) AI can help the personal selling process by assisting the salesperson such as interpreting prospect listings and verifying lead qualifications in the prospecting stage. In addition to that they emphasized that AI cannot replace human effort rather AI can add value to the decision-making activities of the salesperson. The recent study conducted by Faruk et al. (2025) demonstrated that metaverse marketing is the new frontier of digital marketing and artificial intelligence is increasingly playing a pivotal role in developing marketing strategies and tactics in the immersive world marketing.

3.4. Bibliographic Coupling

Bibliographic coupling, as shown in figure 5 is a document analysis where we can find two documents that have cited a third document in their works. Then there is a possibility that these two documents are related (Donthu et al., 2021). In this study, we have selected documents with at least 10 citations to analyze the bibliographic coupling. In the following diagram, we have presented the coupling analysis of the study we have conducted. Each node is weighted against the link strength. The highest link strength has been identified for the two documents of Elizabeth H. Manser Payne jointly written by other co-authors. With 66 links with other documents "Digital service value co-creation framework for AI services: A research agenda for digital transformation in financial service ecosystems" is the document with the highest links. Followed by another work by the same author "Enhancing the value co-creation process: artificial intelligence and mobile banking service platforms" with 62 link strength. These two documents have a link strength of 28 between them. This was very likely as both the documents have worked on the value co-creation process with AI and mobile banking. Another 10 links have been found between the later stated documents and "Mobile banking and AI-enabled mobile banking: The differential effects of technological and non-technological factors on digital natives perceptions and behavior" by the same lead author. These two documents also analyzed the concepts of mobile banking and the use of AI in mobile banking. So, we see that this document's themes were "value co-creation." Another area for works with a high frequency of link strength has been identified written on AI in B2B marketing. These two documents are "Setting B2B Digital Marketing in Artificial Intelligence-based CRMs: A Review and Directions for Future Research" and "Artificial Intelligence in business-to-business marketing: A Bibliometric Analysis of current research status, development and Future Directions." The first one has studied the several uses and techniques of using artificial intelligence-dependent CRMs in B2B digital marketing. While the latter studied the challenges of AI-enabled B2B marketing innovations and also described the various areas where AI can contribute.

Another high-frequency link has been established between the documents "Artificial Intelligence in Marketing: Topic Modeling, Scientometric Analysis, and Research Agenda" and "The Impact of Artificial Intelligence on Branding A Bibliometric Analysis (1982-2019)." Both documents are written on the various themes that have been identified by the researcher for artificial intelligence in marketing.

We can see eight clusters of themes have been plotted with the documents of this field. The first theme colored in yellow has discussed about value-co creation process using AI. The documents for this cluster are "Digital service value co-creation framework for AI services: a research agenda for digital transformation in financial service ecosystems," "Enhancing the value co-creation process: artificial intelligence and mobile banking service platforms," "Enhancing the value co-creation process: artificial intelligence and mobile banking service platforms."

The second theme of this study colored in red has been identified as "uses of AI in marketing, research and business." This theme can be termed as the most important theme in this field of research. "The Impact of Artificial Intelligence on Branding A Bibliometric Analysis (1982-2019)" is a bibliometric review paper on AI in branding. "Artificial intelligence in marketing: A systematic literature review" has identified five different functional themes of marketing. "Artificial Intelligence (AI): Revolutionizing Digital Marketing" analyzes the revolutionary changes AI bringing to the marketing channels. A similar kind of study has been found in the document "Revolutionized Technology for Marketing: Theoretical Review with Focus on Artificial Intelligence."

The next theme colored in purple consists of the documents that have analyzed the importance of AI in marketing relationships. Documents in these themes studied branding, brand engagement, trust, and marketing relationships. Chatbot as a component of brand building and building customer relations has been studied in the document "How may I help you? Driving brand engagement through the warmth of an initial Chabot message." The consequences of erroneous responses from chatbots have been studied in the document "The Effect of Social Presence and Chatbot Errors on Trust." Ten research themes have been identified in the document "Artificial Intelligence in Marketing: Topic Modeling, Scientometric Analysis, and Research Agenda" where marketing can be offered exciting opportunities by AI.

The blue-colored document in the above image reflects the documents written on the theme of AI in b2b marketing. Techniques and processes of AI-based CRMs in b2b digital marketing have been studied in the document "Setting B2B digital marketing in artificial intelligence-based CRMs: A review and directions for future research." The use of AI has been categorized into five different domains for innovation in b2b marketing by the document "Artificial intelligence in business-to-business marketing: a bibliometric analysis of current research status, development, and future directions." The future of social media and digital marketing research has been studied in the document "Setting the future of digital and social media marketing research: Perspectives and research propositions."

The gray-colored documents have worked on the implementation of AI. "The implications of artificial intelligence on the digital marketing of financial services to vulnerable customers" is one of the documents in this field that studied the challenges for the business entity while implementing AI technologies into the marketing process of financial services.

The documents colored in orange mainly reveal a theme of AI for the business. In this theme, various requirements of digitalization by businesses have been studied. In the document "A B2B flexible pricing decision support system for managing the request for quotation process under e-commerce business environment" the researcher highlighted that a pricing decision support system may increase the efficiency and effectiveness in making pricing decisions. Using artificial intelligence can help to increase the efficiency and effectiveness of pricing decisions. "Matching the future capabilities of an artificial intelligence-based software for social media marketing with potential users" expectations' is another document that emphasizes the user perception of differentiating one product from other AI-based software.

The themes colored in sky blue explore the challenges of the digitalization of the market. "The Challenges and Opportunities in the Digitalization of Companies in a Post-COVID-19 World" has analyzed the challenges companies have faced during COVID 19 and how adopting digitalization and innovation in the technologies has helped to combat the situation even after the post-pandemic situation in three areas named labor and social relations, marketing and sales, and technology. "Digital humans in fashion: Will consumers interact?" studied the possible responses and several effects of consumer interaction on digital humans. Several possible shoppers' types and shopping journeys have been identified in the document "Clustering consumers' shopping journeys: eye tracking fashion m-retail."

The last theme colored in green has highlighted the documents that studied transformation in marketing. One of the important documents in this theme is "Machine Learning and AI in Marketing – Connecting Computing Power to Human Insights." This document has studied the leverage of machine learning in marketing research. In the document "Future of Marketing," the researchers stated that several patterns are reshaping marketing. These patterns are technological, socioeconomic, and geopolitical. The viewpoints of digital marketers about big data surveillance, automatic computational analyses, and algorithmic shaping of choice contexts have been studied in "Manipulate to empower: Hyper-relevance and the contradictions of marketing in the age of surveillance capitalism." How humans are driving and regulated by the technologies these days? How administrative efficiency can be achieved under digital intelligence instead of human judgment? Was the core concern in the document "Regulating by robot: Administrative decision making in the machine learning era."

3.5. Identification of Thematic Clusters for AI Usage in DM

This thematic map, presented in figure 6, distributed the themes of an area of study into four sections: the top right theme has been called the motor theme for this area. This is because this area is at the top of both axes which represents the density of themes and centrality of themes. As per the analysis of the theme financial services, e-commerce, information technology, service marketing, and customer value are one motor theme and personalization, technology, and advertising is another theme. Rabby et al. (2021) has mentioned in their study titled "Artificial intelligence in digital marketing influences consumer behavior: A review and theoretical foundation for future research" that AI increases both service quality and consumer trust. This study also further emphasizes understanding consumers' behavior online and providing a personalized solution which in other words termed micro marketing. Another research conducted in the area of consumer-firm interaction area evaluated and identified consumers are widely adopting Artificially Intelligent Voice Assistants (AIVAs) for better customer value (Dellaert et al., 2020).

The Basic themes of this study as it appears in the lower right portion which has high relevance but is lower in density are artificial intelligence, digital marketing, machine learning, marketing, big data, social media, and social media marketing.

Intuitively it appears that articles related to AI, digital marketing, data science, and social media marketing have worked as the seed research works in this domain. Mustak et al. (2021) in their scientometric analysis have identified 10 salient themes that encompass the application of AI in the marketing domain. In their own words, "*Ten salient research themes emerge: (1) understanding consumer sentiments, (2) industrial opportunities of AI, (3) analyzing customer satisfaction, (4) electronic word-of-mouth–based insights, (5) improving market performance, (6) using AI for brand management, (7) measuring and enhancing customer loyalty and trust, (8) AI and novel services, (9) using AI to improve customer relationships, and (10) AI and strategic marketing*" (Mustak et al., 2021). Later studies and a few previous studies have also confirmed these aspects of the application of AI in marketing; for instance, Wirth (2018) has mentioned that AI systems learn the associations between brand preference and customer profiles; thus it can provide dynamic attribution and the next best offer solution.

On the other hand, declining or emerging themes are digital technology, market research, and consumer behavior along with IoT, digital media, COVID-19, innovation, marketing 4.0, marketing mix, robotics, and automation.

Volkmar et al. (2022) has critically claimed that managers have low tolerance for AI failure because of their unrealistic expectations which gave birth to the AI-blame game; hence this becomes a barrier for the marketing manager to reap the full potential of the AI in marking marketing decisions. However, they advised further studies are required to make decisions regarding what would be the role of AI and humans in decision-making. Furthermore, Another study conducted an Indian perspective by Modgil et al. (2022) claimed that COVID 19 has created opportunities for new technology-based entrepreneurship where AI keeps a dominant role. For instance, they identified digital entrepreneurship opportunities in technology domains such as Fintech, Edtech, and cybersecurity which in turn will be powered by the application of AI.

Another research sub-theme has emerged which suggests the ethical practices and governance of using AI in the marketing field. The European Union and the European Parliament have contributed significantly to the development of governance regulations related to AI; for instance, the Data Governance Act has been initialized (González-Esteban y Patricia Calvo, 2022).

4. DISCUSSION ON THE APPLICATION OF ARTIFICIAL INTELLIGENCE (AI) IN DIGITAL MARKETING (DM)

Sustainable business growth is the ultimate objective of all marketing endeavors including digital marketing (Dumitriu and Popescu, 2020). To keep pace with technological advancement, customers' expectations as well as the model of service encountering evolved too, in turn pushing marketers to adapt to changing technologies and apply them for their business strategy development. The integration of artificial intelligence in digital marketing is so pervasive that now this is being termed "intelligent marketing." On the other side, a study conducted in US context by Zhan et al. (2024) underscored that in the case of B2B marketing, firms adopting AI have higher stock returns, and shareholders usually hold positive attitudes toward these firms. They also highlighted that enhanced operational effectiveness, increased competitiveness, and improved profitability are also ensured by AI in the B2B marketing sector. To ensure a sustainable society (society 5.0) with the help of Industry 5.0, as highlighted by Bakator et al. (2024) marketing through AI (marketing 5.0) is considered the foundation. Haleem et al. (2022) spotlighted that AI can be applied to marketing in the following segments: Product, price, place, promotion (4ps) management, strategy and planning, fluctuating demand management, and product design.

However, other papers have categorized AI applications in digital marketing in several other ways. Therefore, the authors have categorized AI applications in digital marketing by synthesizing published papers in this research domain in the following six (06) clusters as presented in the figure 7:

Cluster 1 - Data Analytics and Market Research (DA and MR): To design efficient marketing strategies, analyzing market data is necessary to understand customers' needs wants, and demands; according to the survey of Rebecca Riserbato (2024) 40% of marketers use AI for marketing data analytics, and market research. Furthermore, to get customer insights automate marketing tasks and decisions (Saura, 2021), and analyze the performance of a competitor's campaigns (Haleem et al., 2022) AI can be leveraged. Additionally, by analyzing online customer reviews and customer satisfaction with the help of sentiment analysis product ranking can be done (Ziakis and Vlachopoulou, 2023).

Cluster 2 - Social Media Management and Personalized Email Marketing (SMM and PEM): With the help of data mining techniques and predictive model development, AI can offer digital marketers an opportunity to optimize their social media campaigns in terms of cost optimization, targeting effectiveness, real-time hyper-personalization (Bala and Verma, 2018). Customers usually engage with brands through social media pages through product or brand reviews, positive or negative, and digital marketers can harness the power of AI to provide effective replies to these reviews. Various researchers have focused that digital marketers can use AI to develop engaging email marketing campaigns (Paschen et al., 2020)

Cluster 3 - Content Creation and Content Personalization (CC and CP): With the help of generative AI like ChatGPT and DALL-E digital marketers are extensively using this for generating content as well as to cater content to the niche market with different appealing versions (Kumar et al., 2024; Wilendra et al., 2024). Around 38% of the digital marketers, as spotlighted by (Rebecca Riserbato, 2024), are using AI for content generation. Terho et al. (2022) have spotlighted that digital marketing can use AI to create content for the following cases: Writing product descriptions for e-commerce websites, developing on-page SEO content, creating social media posts, and generating email marketing copy.

Cluster 4 - Marketing Automation (MA): Bakator et al. (2024) have mentioned that AI ensures cost effectiveness through marketing automation and predictive maintenance in Industry 5.0. Kandoth and Kushe (2024) claimed that natural language processing (NLP) and decision support systems (DSS) are the two most dominant AI sectors that gained the most attention in previous studies because of their capabilities in helping marketing automation. Chatbots are another significant development of AI that leads to e-commerce and social media automation by setting auto-reply to the customer's query (Kull et al., 2021).

Cluster 5 - Improving Customer Service, Experience, and Satisfaction (ICSES): In the study conducted on a Polish retailer, LPP, Gołąb-andrzejak (2023) claims that AI significantly improves the efficiency of online order processing without compromising the quality of products and order fulfillment time. Utilizing AI-based chatbots enhances customer satisfaction by responding to the customers' questions quickly as underscored by the study conducted by (Omeish et al., 2024). Furthermore, chatbots can offer 24/7 customer service or round-the-clock interaction. AI enhances personalized customer experience in marketing 5.0 (Bakator et al., 2024). Compared to conventional customer service models, AI-assisted service models show 30% faster response time and 15% higher customer satisfaction (Omeish et al., 2024). However, a contrary statement – if AI is not carefully managed and integrated with human expertise, this may significantly exasperate the user experience –is also developed by Volkmar et al. (2022).

Cluster 6 - Customer Segmentation, Behavior Prediction, and Targeting (CSBPT): Segmenting customers is one of the foundations of marketing and with the assistance of an AI-based algorithm digital marketers can easily segment customers into distinct groups by analyzing their online activities and movements (Salah and Ayyash, 2024). Moreover, as identified by Dellaert et al. (2020); Dumitriu and Popescu (2020) by capitalizing on the power of natural language processing (NLP) AI, customer reviews and sentiments can be analyzed effectively and necessary adaptations in the product, price, and promotion elements can be offered to the market to meet the differentiated needs of the heterogeneous customer groups. AI increases client demand by keeping track of their purchase behavior (what, where, when, and how) and track of the clicks (engagement) with different web contents (Haleem et al., 2022).

After analyzing these applications, the authors propose the following model for categorizing the application of artificial

intelligence (AI) in digital marketing (DM).

AI application tools for digital marketing: For supporting different aspects of digital marketing multiple AI application tools have been developed. According to the research of, the Digital Marketing Research Institute, the most significant AI tools for marketing are listed below with their application.

- OptiMonk AI (https://www.optimonk.com/ai/) is a CRO platform designed to process A/B testing and convert website visitors into real customers. This also helps with content personalization.
- ChatGPT (https://chat.openai.com/) is the most influential AI tool in creating content for both SEO and Social Media Management.
- Jasper (https://www.jasper.ai/) is the AI copilot built for marketing performance; especially this focuses on branding aspects.
- ElevenLabs (https://elevenlabs.io/) is the text-to-speech, AI voice generator, that helps marketers for developing storytelling for their brands and products.
- Opus Clip (https://www.opus.pro/) helps marketers create easily engaging professional video content for their marketing communication program.
- Midjourney (https://www.midjourney.com/) helps digital marketers create a picture that is imaginary in their mind and connect with digitally savvy customers about their brand and product.
- Zapier (https://zapier.com/) helps marketers to automate their workflow. It has been claimed that people who set up a zap save an average of 4 h their 1st week.
- Manychat (https://manychat.com/) provides an interactive customer experience using NLP to respond to customers on social platforms not withholding WhatsApp.

Ziakis and Vlachopoulou (2023) assured that Chintalapati and Pandey in their study titled, "Artificial Intelligence in Marketing: A Systematic Literature Review," have identified five core function themes regarding the application of AI in the digital marketing sector: Integrated digital marketing, content marketing, experiential marketing, marketing operations, and market research. In addition to that, they summarized the application of AI in digital marketing in seven categories: AI/ML algorithm, social media, consumer behavior, ecommerce, digital advertising, budget optimization, competitive strategies. But this study categorized the application in six different groups and a conceptual framework is proposed. On the other hand, the findings of the study conducted by Ma and Sun (2020) provide common machine learning tasks -- supervised, unsupervised, semi-supervised, and active learning -- methods (K-nearest neighbor, support-vector machine, decision tree, probabilistic graphical models, random forest, gradient-boosted trees, and many others). In addition, this study also identified the research trend as the use of machine learning in interactive and media-rich, personalization and targeting, real-time optimization and automation, and customer-journey focus while this study concludes that future research trend will be related to the metaverse marketing and neuro-marketing combined with advanced technology. None of the previous study clearly mentioned about the modern AI tools for digital marketing, but this study specifically identified several modern AI tools that can be used at tactical level to achieve strategic marketing objectives. Dwivedi et al. (2021) classified the digital marketing research on four groups - environment, company, outcomes, and marketing strategies – and offers a broader perspective. However, this study mainly focuses on the application of artificial intelligence in digital marketing.

5. LIMITATIONS AND FUTURE RESEARCH DIRECTIONS

5.1. Limitations of the Research

The study is limited to English-language publications only. This bias excludes potentially valuable insights from non-English research in countries like China, Germany, and Russia, where significant AI and digital marketing research is conducted. The study relies exclusively on the Scopus database only which is another fundamental limitation of the study however, other databases such as Web of Science, JSTOR, PubMed, and ProQuest could offer a broader spectrum of articles. Future research should consider utilizing multiple databases. The initial seed keyword selection and the process of identifying additional relevant keywords from the top-cited articles may introduce some degree of subjectivity and might not capture all relevant literature; this is also another major limitation of this paper AI and digital marketing are interdisciplinary fields, and valuable research could be published in journals outside traditional marketing or AI domains. The study might not capture these inter-disciplinary works.

5.2. Future Research Directions

Ziakis and Vlachopoulou (2023) pointed out that future research can address the long-term impact of AI on customer trust across diverse cultural contexts and real-time hyper-personalization in both online and physical retail environments. They further suggested that future research can also address managing and interpreting complex social media data for personalized marketing, the effectiveness of AI-driven advertisements on different social media, and privacy concerns of AI in social media marketing, and integration of virtual agents in retail and service industries and effectiveness of decision trees and genetic algorithms in predicting consumer behavior. The study of Bakator et al. (2024) mentioned that how does the consumer trend toward eco-friendly products influence future marketing strategies and how does the rapid advancement in AI contribute negatively to the digital divide and exacerbate economic and social inequalities can be analyzed. Prospects of AI for influencer-marketing and viral-marketing and future of metaverse for digital marketing could be explored (Haleem et al., 2022). How can AI adapt marketing strategies based on customers' emotional status, which is also termed emotional AI marketing and how marketers can balance personalized marketing with ethical data practices can further be investigated (Kumar et al., 2024). In addition, Nadlifatin (2024) focused on a SME dimension and suggested that how can micro-entrepreneurs integrate AI solutions into their marketing strategies and developing new performance metrics for AI-based marketing in SMEs, and comparative analysis between traditional MROI versus AI-based MROI should be performed for better understanding the

effectiveness of AI in marketing, which is also further supported by the study of (Salah and Ayyash, 2024). Zhan et al. (2024) have suggested to investigate the long-term sustainability of AI-based marketing strategies in B2B business contexts.

The study conducted by Mariani et al. (2023) has highlighted on a very crucial aspects and suggested to study the effects of auditory and visual design customization on conversational agents (CA)'s adoption and use and what anthropomorphic design factors enable the creation of effective human-bot communication and how human-AI collaboration influences the effectiveness of CAs in developing communication, and finally does communication style influence users' adherence to the advice received from the CA. Development of micro text and anaphora resolution for solving dynamic sentiment analysis and collaborative market intelligence, work on high-inflection languages, and emotional lexicons for big data sentiment analysis should get focus (Verma et al., 2021).

In addition to the above suggestions, future research may overcome the limitations (pointed out in the following section, 6.1) of our research. First of all, overcoming language limitations by conducting multilingual analyses is noteworthy; including articles from diverse linguistic backgrounds can provide a more comprehensive understanding of AI in digital marketing. Researchers should consider employing multiple databases to compile a more comprehensive dataset. This approach ensures that a broader range of articles, including niche or non-mainstream journals, is included. While this study offers quantitative insights, future research can complement it with qualitative analyses, such as content analysis or expert interviews. Qualitative research can provide deeper insights into the practical implications and challenges of AI adoption in digital marketing. Given the growing concerns about AI ethics and regulations in digital marketing, future research could focus on how these aspects are addressed in academic literature. Exploring the ethical implications of AI in marketing and the evolving legal landscape is crucial. Compare the adoption and impact of AI in digital marketing across different countries and regions. This approach can identify variations in research trends and industry practices. Researchers can shift their focus from theoretical reviews to more practical studies that provide guidelines and case studies on implementing AI in digital marketing effectively. Investigate how consumers perceive and interact with AI-driven marketing strategies. Understand consumer attitudes, behaviors, and privacy concerns related to AI in digital marketing.

Addressing these limitations and pursuing these future research directions will contribute to a more comprehensive and up-to-date understanding of the application of AI in digital marketing, benefiting both academics and practitioners in the field.

5.3. Implications and Contributions of the Study

The rapid growth of publications on AI and its various applications within digital marketing reflects the evolving landscape of this industry. This insight is invaluable for both academics and practitioners in recognizing the pivotal role AI plays in modern marketing strategies. The study successfully identifies several research themes within the realm of AI in digital marketing. These themes encompass value co-creation, AI in B2B marketing, personalization, technology, advertising, and more. Understanding these thematic clusters allows researchers to delve deeper into specific areas of interest, thereby fostering focused and specialized research. The analysis pinpoints the most influential journals, sources, and articles in the field. This information serves as a valuable resource for academics and researchers, enabling them to target high-impact publications and seminal works for further study and citation. The research highlights how the field has evolved. Specifically, it showcases that AI in digital marketing has seen significant growth in interest, particularly in the aftermath of the COVID-19 pandemic. This understanding can guide researchers and practitioners in aligning their work with contemporary developments and trends. The bibliometric analysis reveals collaborative networks and co-citation patterns, indicating that many researchers and authors are actively engaged in this field. This information can inspire collaboration opportunities and networking among researchers, leading to more robust and impactful research projects. By examining the themes, it becomes apparent that the application of AI in marketing presents both opportunities and challenges. Researchers and practitioners can use this knowledge to address the limitations and leverage the advantages of AI in digital marketing effectively.

Thus, this study contributes to fulfilling a distinct research gap that previously existed in the following way:

1. This study specifically identified the most contributing articles, journals, and authors in the field of AI in DM.
2. The growing trends and the research themes that have emerged in previous studies in the application of AI in DM are also clearly clarified in this study.
3. This study develops a framework by categorizing the application of AI in DM.
4. Finally, it presents a concrete future research direction in this field.

The findings of this study will be valuable for both academicians and practitioners who are interested in exploring the application of AI in digital marketing. The study will contribute to the current understanding of the role of AI in digital marketing and guide how to effectively implement AI techniques in marketing strategies for marketing practitioners. Furthermore, for the academicians and researchers, this study will serve as a foundation for conducting future research in this field and help to identify potential avenues for further exploration.

6. CONCLUSION

In the recapitulation, this is evident from this extensive research that artificial intelligence (AI) has undoubtedly significant implications in digital marketing (DM). Research on the use of AI in digital marketing received its proliferation after 2017 and continues to grow today. Journal of Marketing is found to be the most contributing journal in this domain while Professor Yogesh K. Digital Marketing and Innovation at Swansea University, Wales, UK is the most contributing author. However, as the technologies of AI have been continuously improving, the academic research conducted on the implications and theories of AI have also been

found branching out into different themes or clusters and these have been identified in this bibliometric research. It becomes clear that digital marketers can contribute significantly to improving marketing efficiency, cost-effectiveness, customer experience, and satisfaction by adopting this cutting-edge technology.

With the help of varied AI tools, digital marketers capitalize on this technology for customer segmentation, behavior prediction, and targeting, improving customer service, experience and satisfaction, marketing automation, content creation, content personalization, social media management, and personalized email marketing, and data analytics and market research. Finally, future research direction is synthesized and proposed by the author so that the researcher can further explore in these directions. Irrespective of its limitations this study contributes significantly to the advancement of existing knowledge in the subject field and hopes that future research will be conducted to cover the limitations.

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