JOANNA WIŚNIEWSKA

University of Szczecin, Poland

ORCID iD: 0000-0002-1607-8721

SEBASTIAN MATYSIK

University of Szczecin, Poland

ORCID iD: 0009-0002-7264-0501

THE APPLICATION OF OPENAI TECHNOLOGY IN MARKETING ACTIVITIES - A SYSTEMATIC LITERATURE REVIEW

Abstract

Objectives: This article aims to assess empirical research papers on the application of OpenAI technology in marketing activities, with the goal of organizing current knowledge in this domain. To achieve this objective, the following questions were addressed:

1. Is there scientific interest in the application of OpenAI technology in marketing activities, and is it extensively discussed in researching works ?

2. What kinds and directions of the empirical researching works on this problem have been taken so far ?

Material and methods: A study of the popularity of OpenAI in marketing was conducted using Google Trends tools, while a systematic literature review based on Web of Science, Scopus and Elsevier Science Direct databases was conducted using Google Sheets and VOSviewer tools.

Results: The review highlights the insufficient attention given to application of OpenAI in marketing activities, despite the global interest and growing number of publications concernig that technology. An analysis of citations and co-citations found that the articles examined , although diverse in terms of subject matter and place of publication, had minimal impact on the observed research field.

Conclusions: The literature review reveals limited exploration of OpenAI technology in marketing activities despite growing interest. While publications vary widely in focus and venue, there is little evidence of significant impact on the research field. Existing literature offers fragmented insights and lacks comprehensive coverage of empirical studies, particularly in marketing. Further research is necessary to investigate specific applications like content creation, customer communication, brand enhancement, and market analysis.

Keywords: *OpenAI, OpenAI in marketing, AI, literature review, OpenAI technology*

Introduction

Although the history of artificial intelligence (AI) is long, with the field developing since at least the 1950s, the recent years have brought significant progress and growing utilization of artificial intelligence (AI) technology, exemplified by the global dissemination of the OpenAI chatbot in 2023. The evolution of OpenAI's GPT language models, starting from GPT-1 in 2018, through subsequent versions like GPT-2 and GPT-3, signifies dynamic advancement in this domain. Particularly noteworthy from the perspective of

OpenAI was the beginning of 2022 when the GPT-3.5 model was introduced (Kublik & Saboo, 2023, pp. 9-15), followed by the launch of the chatGPT application utilizing this model as a prototype in November 2022 (Rahaman et al., 2023, pp. 1-2). This application swiftly garnered the attention of millions of users due to its response-generating capabilities and easy, free accessibility. The public release of the GPT-4 language model in early 2023 ushered in new possibilities for AI technology, including its application in various business domains, particularly in marketing activities.

The application of AI technology in marketing encompasses personalized messaging to consumers, enhanced stakeholder communication, and the development of customer loyalty initiatives. Chatbots, serving as language processors, leverage consumer data to offer improved experiences, aiding in decision-making during the purchasing process. AI's capacity for data analysis enables accurate conclusions and targeted marketing messages (Haleem, 2022, pp. 119-132). OpenAI's ChatGPT technology facilitates automation of marketing tasks like content creation and data analysis, offering new perspectives for both application and research in this field (Rahaman et al., 2023, pp. 1-2). Analyses by Baber et al. (2023, pp. 45-72) and Pradana et al. (2023, pp. 1-11) suggest that research on the application of ChatGPT is still in its infancy. These studies primarily focus on its use in generating responses, natural language processing, and data analysis, as well as its application in fields like medicine and higher education. Thus, there remains a knowledge gap concerning the broader implementation of OpenAI technologies in marketing activities. Consequently, this study aims to delineate the current empirical research landscape on OpenAI's role in marketing, identifying potential research voids and laying the groundwork for future comprehensive investigations.

Taking this into account, the following research questions were formulated:
1. Is there scientific interest regarding problem of the application of OpenAI technology and is it widely discussed in the academic literature?
2. What directions and types of empirical research concerning the application of OpenAI in marketing activities have been conducted so far?

The research objectives and formulated questions determined the methodological approach and structural layout of the article, which includes a discussion of the research methodology in the first part, followed by a presentation of the most important results and conclusions.

Research Methodology

The research procedure included the following stages:

1. Identification of the popularity of issues related to the use of OpenAI technology in marketing activities, based on an analysis of searching trends using the Google Trends tool.
2. Systematic literature review based on 3 scientific publication databases: Web of Science, Scopus, Elsevier Science Direct.
3. Analysis and synthesis of the achieved research results.

The initial stage of the research involved trend analysis conducted with the Google Trends tool. This tool employs a popularity index derived from search term frequencies in a leading internet browser. The results obtained are normalized on a scale of 0-100, providing dynamic insights into temporal and geographical interest trends for the analysed topics.

In the second stage of the research procedure was conducted, taking into account basic methodological recommendations regarding the selection of research subjects, i.e., defining the set of publications that are the subject of analysis, applied bibliometric analysis techniques, and content analysis. (Czakon, 2011, pp. 57-61) (Hanelt, Bohnsack, Marz, Antunes Marante, 2021, pp. 1159-1197). The basis for the aforementioned analysis was the 3 selected databases of scientific publications, i.e.: Web of Science, Scopus and Elsevier Science Direct. Due to the character of the topic researched (i.e. its dynamic development and growing interest), the time horizon of the analysis is important for the research results obtained. In the case of the results of the bibliometric analysis presented in this article, it covered the period from the launch of the oldest publication database to the date of the study, i.e. 21 June 2023.

The scanning of the records in the scientific databases was carried out using keywords, including single words and compound phrases (Table 1), which have a significant association with the studied issue.

Table 1. *List of keywords used for searching records in the scientific databases*

| Simple Phrases			
OpenAI	ChatGPT	GPT-3	GPT-4
Complex Phrases			
OpenAI GPT-3	AI in Advertising	Artificial Intelligence in Advertising	AI in Marketing
AI Generated Content	AI Marketing	Artificial Intelligence Marketing	Artificial Intelligence in Marketing
Machine Learning in Marketing		Machine Learning Marketing	

Source: Own elaboration.

Due to the general nature of search phrases, the use of headwords in inverted commas or the logical operator 'AND' was deemed appropriate. Vocabulary normalization, following the approach of Neef and Corley (2009, p. 660), was applied to account for hyphenated or unhyphenated words. Screening involved assessing titles, abstracts, keywords, and full article content, resulting in 20,347 records from the three scientific databases used. Records were selected based on predefined criteria, with the selection process depicted graphically using the PRISMA schema (Moher, Liberati, Tetzlaff, Altman, 2009) as shown in Figure 1.

The selection criteria comprised subject matter, language, publication type, and content scope (theoretical or empirical). The database was constructed using Google Sheets software, followed by the elimination of duplicates and subsequent filtering steps.

The largest number of records for the keyword set was obtained by scanning the Scopus database, totaling 15,709 records out of 20,347 across all three databases. After removing duplicates, 16,408 unique publications remained. Only studies published in English were included for further analysis, resulting in the elimination of 260 records in other languages. Another selection criterion involved removing reviews, conference notes, and publications of purely theoretical nature, i.e., those lacking empirical research results. Consequently, 11,030 records were qualified for the next screening stage.

Subsequently, publications unrelated to marketing activities were excluded, leaving 745 publications for analysis. After filtering out publications not related to OpenAI technology, 28 publications remained for the subsequent stage, with three monographs ultimately rejected.

Figure 1. *The process of searching and selecting records from scientific journals databases*
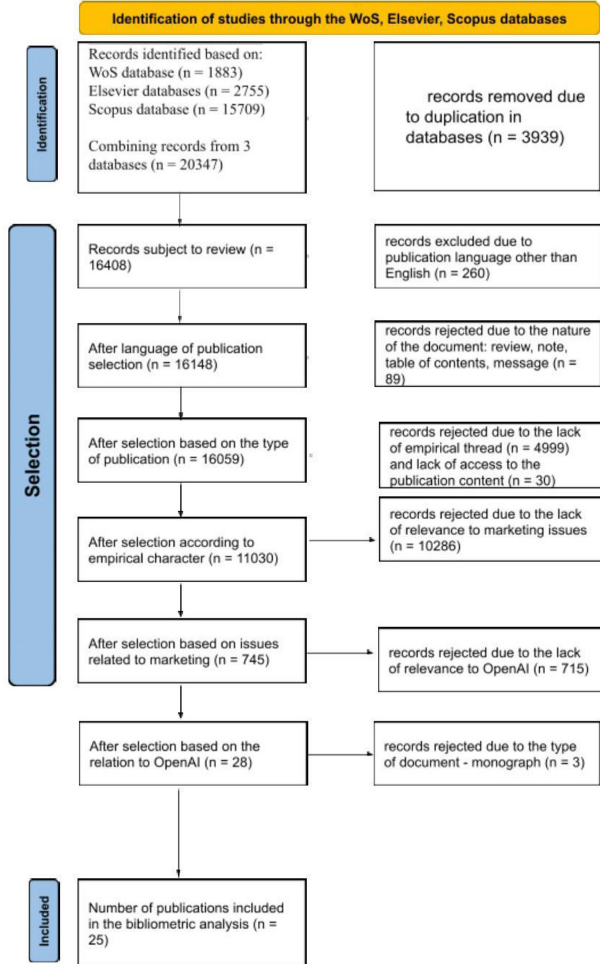
Source: Own preparation based on the PRISMA scheme.

The final stage of the research process involved conducting a comprehensive bibliometric analysis, considering factors such as date of publication, authorship, publication venues, author-provided keywords, bibliographic references, and citation rates. If the publication was indexed in multiple databases or showed discrepancies in citation counts, the highest reported value was utilized for analysis. Furthermore, the authors performed a content analysis on the complete set of 25 publications selected for the study to identify the primary research themes and methodology employed.
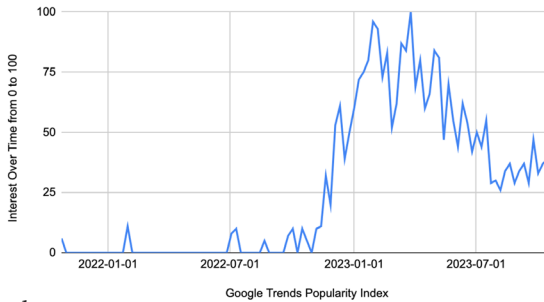
Bibliometric analyses

Attempting to identify interest in the OpenAI technology and its use in marketing activities, analyses were performed on the popularity trend of this technology based on searching for information about it in the Google web browser.

Taking into account the fact that the analysed technology is relatively new and made available to a wider group of users in 2022, it was expected that wider interest among Internet users has only emerged since then and is most likely to grow consistently. The analysis carried out confirmed these initial assumptions. The issue became popular when the ChatGPT application became public, i.e. at the end of 2022, and significantly increased in popularity with the arrival of the next language model GPT-4, i.e. at the beginning of 2023. It also turns out that during a similar period, there was an increase in interest in this technology in the context of its application in marketing activities, as shown in Graphic 1.

In this case, the greatest change in the popularity index also coincides with the public introduction of the ChatGPT chatbot and the GPT-4 language model. The identified interest in OpenAI technology as evidenced by the popularity index of searches for information about it on the internet, led the authors to analyse the number of scientific publications on artificial intelligence (AI) and machine learning that were included in the databases studied, with particular reference to the last four years, and then to adequately analyse the number of publications that refer to the use of OpenAI technology in marketing activities.

Graphic 1. *The evolution of Google Trends Popularity Index for the keyword: OpenAI marketing from 24.10.2021 to 22.10.2023*

Source: Own study.

As part of the bibliometric analysis carried out, after rejecting duplicate records, it was found that a total of 14425 scientific publications on artificial intelligence and machine learning were placed in the databases from 2020 to 21.06.2023, which represented nearly 88% of all publications on this topic placed in these databases since the start of their existence.

This leads to the conclusion that the dominant majority of the publications in this collection that deal with AI issues have been written in recent years. An analysis of the researched databases of scientific publications with a focus on identifying a set of scientific articles presenting the results of empirical research on application of OpenAI technology for marketing activities made it possible to identify only 25 such publications, a list of which is presented in Table 2. This means that in the large collection of scientific publications on AI and machine learning, a very small number relate to the use of this particular technology for marketing activities.

In this small collection, only one study was prepared before 2020. This was a paper prepared by Intel Corp. employees, which was published in 2018 in the conference proceedings of International Conference on Information and Computer Technologies (ICICT 2018). However, it should be noted that, for obvious reasons, it did not refer directly to the Chat GPT but to some OpenAI technology solutions that later became the starting point for the creation and launch of this technology. Further 24 scientific papers referring to an application of OpenAI technology in marketing activities were published between 2020 and 2023.

Table 2. *List of identified publications subject to bibliometric analysis*

No.	Author(s)	Title	Year of Publication
1	Charmchi, M.R.H., Hassanpour, H., Cami, B.R.	Considering User Interests to Provid an Event Base News Stream Framework	2022
2	Leippold, M.	Sentiment spin: Attacking financial sentiment with GPT-3	2023
3	Bulut, A., Mahmoud, A.	Generating Campaign Ads & Keywords for Programmatic Advertising	2023
4	Gupta A., Das N.	ProdRev: A DNN framework for empowering customers using generative pre-trained transformers	2022
5	He, Y., Liao, L., Zhang, Z., Chua, T.-S.	Towards Enriching Responses with Crowd-sourced Knowledge for Task-oriented Dialogue	2021
6	Rosset, C., Xiong, C., Song, X., Campos, D., Craswell, N., Tiwary, S., Bennett, P.	Leading Conversational Search by Suggesting Useful Questions	2020
7	Perez-Castro, A., Martínez-Torres, M.R., Toral, S.L.	Efficiency of automatic text generators for online review content generation	2023
8	Feldman, P.G., Pan, S., Foulds, J.	The Keyword Explorer Suite: A Toolkit for Understanding Online Populations	2023
9	Taecharungroj, V.	What Can ChatGPT Do? Analyzing Early Reactions to the Innovative AI Chatbot on Twitter	2023
10	Schmälzle, R., Wilcox, S.	Harnessing Artificial Intelligence for Health Message Generation: The Folic Acid Message Engine	2022
11	Khalil, F., Pipa, G.	Transforming the generative pretrained transformer into augmented business text writer	2022
12	Lee, C., Kim, J., Lim, J.S.	How does fact-check labeling impact the evaluations of inadvertently placed brand ads?	2023
13	Bodas, A., Upadhyay, B., Nadiger, C., Abdelhak, S.	Reinforcement learning for game personalization on edge devices	2018
14	Day, M.-Y., Shaw, S.-R.	AI Customer Service System with Pre-trained Language and Response Ranking Models for University Admissions	2021
15	Dwivedi, Y.K., Pandey, N., Currie, W., Micu, A.	Leveraging ChatGPT and other generative artificial intelligence (AI)-based applications in the hospitality and tourism industry: practices, challenges and research agenda	2023
16	Karinshak, E., Liu, S.X., Park, J.S., Hancock, J.T.	Working With AI to Persuade: Examining a Large Language Model's Ability to Generate Pro-Vaccination Messages	2023
17	Bondielli, A., Passaro, L.C.	Leveraging CLIP for Image Emotion Recognition	2021
18	Bellan, P., Dragoni, M., Ghidini, C.	Extracting Business Process Entities and Relations from Text Using Pre-trained Language Models and In-Context Learning	2022
19	Marlow, R., Wood, D.	Ghost in the machine or monkey with a typewriter-generating titles for Christmas research articles in The BMJ using artificial intelligence: observational study	2021
20	Gao, X., Zhang, Y., Galley, M., Brockett, C., Dolan, B.	Dialogue response ranking training with large-scale human feedback data	2020
21	Roy, K., Goyal, P., Pandey, M.	Attribute Value Generation from Product Title using Language Models	2021
22	Asi, A., Wang, S., Eisenstadt, R., Geckt, D., Kuper, Y., Mao, Y., Ronen, R.	An End-to-End Dialogue Summarization System for Sales Calls	2022
23	Baldrati, A., Bertini, M., Uricchio, T., Del Bimbo, A.	Effective conditioned and composed image retrieval combining CLIP-based features	2022
24	Chen, W.Y., Huang, C.C., Lo, T.M., Yuan, W.C., Tsai, H.Y., Cheng, T.F., Chang, F.L.	The Research on Scent and Fragrance in Memory with Machine Learning	2020
25	Gao, Y.B., Gao, J.T., Ma, R., Yang, L.D.	Research on user granularity-level personalized social text generation technology	2022

Source: Own study

The 25 publications analysed were prepared by a total of 84 authors coming from different countries around the world and representing different economic and research entities. Among the identified articles, only 2 are prepared by one author and both were published in 2023. The first was prepared by Marcus Leippold, a representative of the University of Zurich. The second one is the work of a representative of Mahidol University International College, in Thailand and Manchester Metropolitan University – Viriya'i Taecharungroj. The ratio of the remaining number of authors to the number of 23 publications is 3.57 which means that, on average, each of these publications was prepared by a team of at least three authors, but often there were more team members. A summary of the data on the affiliations of the authors of the analysed publications is presented in Table 3.

Analysing the studied publications reveals a predominant interest in applying OpenAI technology to marketing activities among researchers from the USA (31 authors), various Far East countries (24 authors), and the Middle East (8 authors). Notably, nearly 65% of researchers affiliated with the USA are associated with large corporations such as Microsoft or Intel, while the remaining 35% represent academic institutions. Whereas the majority of researchers from Far and Middle East countries are affiliated with academic research centres. Taiwan emerges as the most represented, with 9 authors.

In Europe, the topic attracted 21 authors, with Italy being the largest contributor with 9 authors. It is worth noting that the majority of authors from European countries are affiliated with universities, constituting 19 out of the 21 authors.

Among the authors of the surveyed publications, Microsoft stands out as the most represented entity, underscoring its substantial investment in OpenAI's AI models. Employees associated with Microsoft contributed to a total of 3 studies included in the examined collection.

Table 3. *The number of Authors of the researched publications according to affiliation indicated*

| Country	Affiliation - name of the entity	Number of authors
USA	Carbon Health,	1
	Paul Bennett Microsoft AI AND Research	1
	Carnegie Mellon University	1
	Microsoft Corporation	4
	Microsoft Research	5
	Microsoft Azure	2
	Snowflake Inc.	1
	Michigan State University	2
	University of North Florida	2
	Syracuse University	1
	Intel Corporation	4
	Stanford University	3
	Synopsys Incorporated	1
	ASRC Federal	1
	College of Engineering and Information Technology	2
Taiwan	National Taipei University	1
	Tamkang University	1
	Chinese Culture University Taiwan	7
China	Information Engineering University China	1
	Tsinghua University	1
	Inner Mongolia University of Science and Technology	4
India	Think Evolve Consultancy Llp	1
	National Institute of Technology	1
	Indian Institute of Management Mumbai	1
	Indian Institute of Technology Kharagpur	2
Israel	Microsoft Dynamics	5
Iran	Shahrood University of Technology	2
	Mazandaran University of Science and Technology	1
Singapore	National University of Singapore	2
	Singapore Management University	1
Thailand	Mahidol University International College	1
Italy	University of Pisa	2
	Bruno Kessler Foundation	3
	University of Florence	3
	University of Macerata	1
UK	Swansea University	1
	Bristol Royal Hospital for Children	1
	Centre for Academic Child Health, University of Bristol	1
Spain	Universidad de Sevilla	3
Germany	Osnabrück University	2
France	Audencia Business School	1
Romania	Dunarea de Jos University of Galati	1
Switzerland	Universität Zürich	1
Turkey	Acibadem Mehmet Ali Aydinlar Universitesi	1

Source: Own study.

Out of the 25 publications in the entire collection, 23 are multi-author papers. Among these multi-author publications, only five involved authors from multiple countries. Notably, four of these studies were conducted by teams with at least one member affiliated with an institution in the USA. The remaining 18 papers were authored by teams based solely in one country. Specifically, six papers had affiliations in the USA, three in Italy, and two each in Taiwan, Iran, India, China, Singapore, Spain, Germany, and the UK.

The majority of analysed papers were disseminated through conference proceedings or academic journals associated with professional associations and organizations, such as IEEE (Institute of Electrical and Electronics Engineers), ACL (Association for Computational Linguistics), and ACM (Association of Computing Machinery Inc.). These organizations associate highly specialized experts in technical sciences and focusing their events on the engineering community. Only 9 papers were published without any connection to the participation of their authors in conferences or workshops and these were papers by representatives of the academic community. It is worth mentioning that all the publications from the analysed collection were published in very different journals and conference materials, which means that until the present research, the analysed topics were not of wider interest to the editors of a specific journal or conference.

A co-occurrence analysis of author keywords was conducted as part of the study. Out of 73 unique keywords identified in the dataset, 8 publications did not contain any author keywords. Among the remaining publications, 5 keywords appeared in at least 2 papers: ChatGPT, artificial intelligence, Twitter, GPT-3, NLP (Natural Language Processing). However, these keywords were found in only 10 out of 25 publications analysed, indicating a lack of consistency across the dataset. This suggests a high thematic dispersion and a lack of interconnections among the publications, indicating an early stage of development in the research field. This conclusion was supported by the results of cluster analysis based on keywords (Figure 2).

**Figure 2.** *Mapping of the examined set of publications according to keyword clusters*
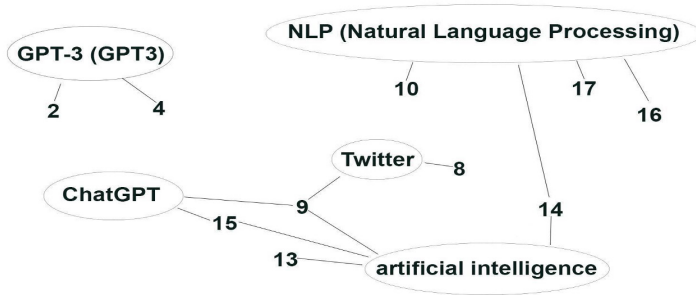
Source: Own study.

As illustrated in Figure 2, the examined dataset can be divided into 5 clusters. It is important to note that only in the case of two publications (i.e. number 9 and 15) there are two common keywords (*ChatGPT* and *artificial intelligence*), while in other instances, the articles are connected by at most one common keyword, or such connections do not exist.

Upon further analysis of the selected set of publications and a review of their bibliographic items, homogeneous elements were identified. Out of the 789 total referenced works, only 30 publications were cited in two or more works from the examined set. Additionally, it was observed that 10 items within the dataset lacked bibliographic connections with other publications. Among the remaining 15 publications, minor bibliographic links were identified, with four publications cited in at least 5 works within the dataset. These findings suggest that at the time of the study, the research field lacked a comprehensive and well-established bibliographic foundation to serve as a reference for further development and exploration.

Cluster analysis based on cited literature revealed four distinct clusters, encompassing a total of 16 articles from the examined set of 25 publications. The bibliographic connections observed among the surveyed publications are limited, with closer ties apparent only between two papers (No. 6 and No. 25), which referenced three identical bibliographic sources. Notably, none of the papers served as a primary reference for another within the collection, indicating weak interconnection. This finding, combined with keyword linkage analysis, underscores significant fragmentation within the research field, suggesting an early stage of development in the application of OpenAI technology in marketing.

Figure 3. *Cluster Analysis of the Examined Set of Publications Based on Cited Literature*
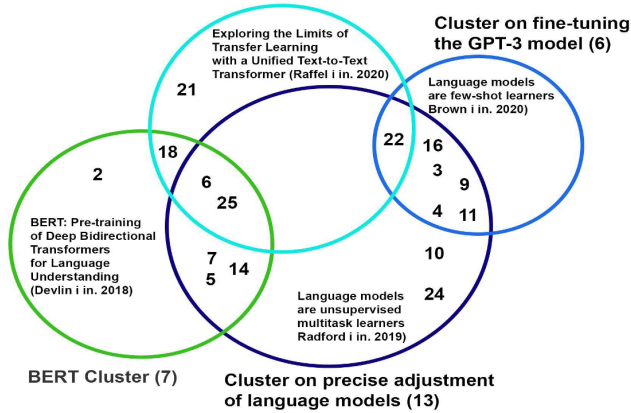
Source: Own study.

A content analysis of the full set of 25 publications leads to the conclusion that these papers focus primarily on the specific technical aspects of the technology under analysis, while the context of application for marketing purposes is secondary. The main research directions related to the application of Open AI technology for marketing purposes include:

1. Marketing data analysis – publications no: 9,11 i 18.
2. Personalization of offers and customer experience – publications no: 2;4;13;15;17;21;22;23;24.
3. Automating and streamlining marketing activities and processes – publications no: 1;3;5;6;7;8;10;12;14;16;19;20;25.

In addition, in the studied set, only one study presents the results of empirical research based on quantitative methods, while all the others present the results obtained with qualitative methods.

In an effort to evaluate the extent to which the surveyed collection of publications has had an impact on deepening or broadening the emerging research field, analyses were carried out based on citation and co-citation rates. As a result, 5 studies were identified in the surveyed collection that had been cited more than 10 times by the time of the survey (table 4).

Table 4. *The 5 most cited publications from the analysed database*

Title	Number of Citations
What Can ChatGPT Do? Analyzing Early Reactions to the Innovative AI Chatbot on Twitter	40
Leading Conversational Search by Suggesting Useful Questions	36
Extracting Business Process Entities and Relations from Text Using Pre-trained Language Models and In-Context Learning	28
Dialogue response ranking training with large-scale human feedback data	23
Ghost in the machine or monkey with a typewriter-generating titles for Christmas research articles in The BMJ using artificial intelligence: observational study	20

Source: Own study.

The top 5 most-cited articles in the surveyed set include 2 articles involving Microsoft employees. The most cited paper focuses on using the LDA topic modelling algorithm to analyse Twitter messages, aiming to assess ChatGPT's capabilities in this area. The second most cited paper explores using OpenAI technology with the GPT-2 language model to suggest questions for search engine users, enhancing system efficiency. In third place, a paper examines using OpenAI technology with the GPT-3 language model to study business relationships and extract relevant information. The fourth most-cited paper discusses using the GPT-2 language model to generate user responses from social media data. Finally, the fifth most cited paper explores using OpenAI technology with the GPT-3 language model to create compelling article titles.

Taking into account the analysis based on citation rate, co-citation rate and cited literature, it should be concluded that the publications analysed so far have had relatively little impact on deepening or broadening the research field, and that the penetration of knowledge about the application of OpenAI technology into marketing activities, among research entities still has limited scope and scale. The scope of co-citations regarding researched publications is limited to 9 articles, which in selected pairs are cited together by authors of 7 different articles external to the examined database.

Conclusions

The literature review indicates a lack of comprehensive exploration regarding the application of OpenAI technology in marketing activities despite increasing interest. While the total number of publications on this topic is limited, there is a progressive rise in research activity. Analysis reveals global interest in the subject, with Microsoft-affiliated specialists dominating authorship due to their expertise in technology development. The diversity of publishing venues and technical orientation suggests a broad thematic scope within the field. However, citation and co-citation analyses suggest minimal impact on the research field thus far. Knowledge transfer regarding OpenAI's marketing applications remains limited among research centres. The existing literature primarily offers fragmented insights, lacking comprehensive coverage of various empirical studies, particularly those focused on marketing aspects. Consequently, further research is needed to explore specific applications such as content creation, customer communication, brand strengthening, and market analysis.

Methodological limitations, including database selection and publication scope, warrant caution in drawing conclusions. Nonetheless, the review highlights the evolving nature of OpenAI's potential in marketing research, promising further scholarly exploration in the future.

References

Asi, A., Wang, S., Eisenstadt, R., Geckt, D., Kuper, Y., Mao, Y., Ronen, R. (2022). *An End-to-End Dialogue Summarization System for Sales Calls*, 45-53. NAACL 2022 – 2022 Conference of the North American Chapter of the Association for Computational Linguistics: Human Language Technologies.

Baber, H., Nair, K., Gupta, R., Gurjar, K. (2023). *The beginning of ChatGPT–a systematic and bibliometric review of the literature.* Information and Learning Sciences.

Baldrati, A., Bertini, M., Uricchio, T., Del Bimbo, A. (2022). *Effective conditioned and composed image retrieval combining CLIP-based features*, 21434-21442. Proceedings of the IEEE Computer Society Conference on Computer Vision and Pattern Recognition.

Bellan, P., Dragoni, M., Ghidini, C. (2022). *Extracting Business Process Entities and Relations from Text Using Pre-trained Language Models and In-Context Learning*, 182-199. International Conference on Enterprise Design, Operations, and Computing 2022.

Bodas, A., Upadhyay, B., Nadiger, C., Abdelhak, S. (2018). *Reinforcement learning for game personalization on edge devices*, 119-122. 2018 International Conference on Information and Computer Technologies.

Bondielli, A., Passaro, L.C. (2021). *Leveraging CLIP for Image Emotion Recognition.* CEUR Workshop Proceedings.

Brown, T.B., Mann, B., Ryder, N., Subbiah, M., Kaplan, J., Dhariwal, P., Neelakantan, A., Shyam, P., Sastry, G., Askell, A., Agarwal, S., Herbert-Voss, A., Krueger, G., Henighan, T., Child, R., Ramesh, A., Ziegler, D.M., Wu, J., Winter, C., Hesse, C., Chen, M., Sigler, E., Litwin, M., Gray, S., Chess, B., Clark, J., Berner, C., McCandlish, S., Radford, A., Sutskever, I., Amodei, D. (2020). *Language models are few-shot learners.* Proceedings of the 34th International Conference on Neural Information Processing Systems.

Bulut, A., Mahmoud, A. (2023). *Generating Campaign Ads & Keywords for Programmatic Advertising*, 11, 43557-43565. IEEE Access.

Charmchi, M.R.H., Hassanpour, H., Cami, B.R. (2022). *Considering User Interests to Provid an Event Base News Stream Framework*, 1-5. Proceedings – 2022 8th International Iranian Conference on Signal Processing and Intelligent Systems.

Chen, W.Y., Huang, C.C., Lo, T.M., Yuan, W.C., Tsai, H.Y., Cheng, T.F., Chang, F.L. (2020). The Research on Scent and Fragrance in Memory with Machine Learning, 1-2. 2020 IEEE International Conference on Consumer Electronics – Taiwan.

Czakon, W. (2011). *Metodyka systematycznego przeglądu literatury*, 3 (854), 57-61. Przegląd Organizacji.

Day, M.-Y., Shaw, S.-R. (2021). *AI Customer Service System with Pre-trained Language and Response Ranking Models for University Admissions*, 395-401. Proceedings – 2021 IEEE 22nd International Conference on Information Reuse and Integration for Data Science.

Devlin, J., Chang, M.W., Lee, K., Toutanova, K. (2018). *BERT: Pre-training of Deep Bidirectional Transformers for Language Understanding*, 4171-4186. Proceedings of the 2019 Conference of the North American Chapter of the Association for Computational Linguistics: Human Language Technologies.

Dwivedi, Y.K., Pandey, N., Currie, W., Micu, A. (2023). *Leveraging ChatGPT and other generative artificial intelligence (AI)-based applications in the hospitality and tourism industry: practices, challenges and research agenda*, 36(1), 1-12. International Journal of Contemporary Hospitality Management.

Feldman, P.G., Pan, S., Foulds, J. (2023). *The Keyword Explorer Suite: A Toolkit for Understanding Online Populations*, 21-24. International Conference on Intelligent User Interfaces.

Gao, Y.B., Gao, J.T., Ma, R., Yang, L.D. (2022). *Research on user granularity-level personalized social text generation technology*, 2294(1). Journal of Physics: Conference Series.

Gao, X., Zhang, Y., Galley, M., Brockett, C., Dolan, B. (2020). *Dialogue response ranking training with large-scale human feedback data*, 386-395. EMNLP 2020 – 2020 Conference on Empirical Methods in Natural Language Processing.

Gupta A., Das N. (2022). *ProdRev: A DNN framework for empowering customers using generative pre-trained transformers*, 895-899. 2022 International Conference on Decision Aid Sciences and Applications.

Haleem, A., Javaid, M., Qadri, M. A., Singh, R. P., Suman, R. (2022). *Artificial intelligence (AI) applications for marketing: A literature-based study*, *3*(1), 119-132. International Journal of Intelligent Networks.

Hanelt, A., Bohnsack, R., Marz, D., Antunes Marante, C. (2021). *A systematic review of the literature on digital transformation: Insights and implications for strategy and organizational change*, *58(5)*, 1159-1197. Journal of Management Studies.

He, Y., Liao, L., Zhang, Z., Chua, T.-S. (2021). *Towards Enriching Responses with Crowd-sourced Knowledge for Task-oriented Dialogue*, 3-11. MuCAI 2021 – Proceedings of the 2nd ACM Multimedia Workshop on Multimodal Conversational AI.

Karinshak, E., Liu, S.X., Park, J.S., Hancock, J.T. (2023). *Working With AI to Persuade: Examining a Large Language Model's Ability to Generate Pro-Vaccination Messages*, 1-29. Proceedings of the ACM on Human-Computer Interaction.

Khalil, F., Pipa, G. (2022). *Transforming the generative pretrained transformer into augmented business text writer*, 9(1). Journal of Big Data.

Kublik S., Saboo S. (2023). *GPT-3: The Ultimate Guide to Building NLP Products with OpenAI API*. Packt Publishing.

Lee, C., Kim, J., Lim, J.S. (2023). *How does fact-check labeling impact the evaluations of inadvertently placed brand ads?*, 1-17. Social Science Journal.

Leippold, M. (2023). *Sentiment spin: Attacking financial sentiment with GPT-3*, 55. Finance Research Letters.

Marlow, R., Wood, D. (2021). *Ghost in the machine or monkey with a typewriter-generating titles for Christmas research articles in The BMJ using artificial intelligence: observational study*, 375. BMJ-British Medical Journal.

Moher, D., Liberati. A., Tetzlaff, J., Altman, D.G. The PRISMA Group. (2009). *Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement*, 6(7): e1000097. PLoS Med.

Neef, M.W., Corley, E.A. (2009). *35 Years and 160,000 Articles: A Bibliometric Exploration of Evolution of Ecology,* 80 (3), 657-682. Scientometrics.

Perez-Castro, A., Martínez-Torres, M.R., Toral, S.L. (2023). *Efficiency of automatic text generators for online review content generation*, 189. Technological Forecasting and Social Change.

Pradana, M., Elisa, H. P., Syarifuddin, S. (2023). *Discussing ChatGPT in education: A literature review and bibliometric analysis*, 10(2), 1-11. Cogent Education.

Radford, A., Wu, J., Child, R., Luan, D., Amodei, D., Sutskever, I. (2019). *Language models are unsupervised multitask learners*, 1(8). OpenAI blog.

Raffel, C., Shazeer, N., Roberts, A., Lee, K., Narang, S., Matena, M., Zhou, Y., Li, W., Liu, P.J. (2020). *Exploring the Limits of Transfer Learning with a Unified Text-to-Text Transformer*, 21, 1-67. Journal of Machine Learning Research, Microtome Publishing.

Rahaman, M.S., Ahsan, M.T., Anjum, N., Terano, H.J.R., Rahman, M.M. (2023). *From ChatGPT-3 to GPT-4: a significant advancement in ai-driven NLP tools*, 2(1), 1-11. Journal of Engineering and Emerging Technologies.

Rosset, C., Xiong, C., Song, X., Campos, D., Craswell, N., Tiwary, S., Bennett, P. (2020). *Leading Conversational Search by Suggesting Useful Questions*, 1160-1170. The Web Conference 2020 – Proceedings of the World Wide Web Conference.

Roy, K., Goyal, P., Pandey, M. (2021). *Attribute Value Generation from Product Title using Language Models*, 13-17. ECNLP 2021 – 4th Workshop on e-Commerce and NLP, Proceedings.

Schmälzle, R., Wilcox, S. (2022). *Harnessing Artificial Intelligence for Health Message Generation: The Folic Acid Message Engine*, 24(1). Journal of Medical Internet Research.

Taecharungroj, V. (2023). *What Can ChatGPT Do? Analyzing Early Reactions to the Innovative AI Chatbot on Twitter*, 7(1). Big Data and Cognitive Computing.