

Research Hotspot and Prospect of Artificial Intelligence in Marketing in China——Visual Analysis Based on CiteSpace

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Abstract. The artificial intelligence industry has developed rapidly and is now being used in a number of areas of integration, such as healthcare, education and agriculture. A comprehensive understanding of the research hotspots and prospect of artificial intelligence in marketing will be of great value to scholars and companies in their marketing work. Using the CNKI database as the data source, this study adopts a quantitative analysis research method and uses the visualization software CiteSpace 5.8 R3 to comb through the domestic AI marketing-related literature published during the decade 2001-2021, draw up a scientific knowledge map, and analyze it in terms of research hotspots, themes and evolutionary trends respectively. The results show that "big data", "precision marketing", "digital marketing", "advertising" and "smart marketing" are the hot keywords; The research focuses on five modules: "Smart Advertising", "Smart Media Marketing", "Precision Marketing", "New Retail" and "Short Video Marketing". Further analysis reveals that future research could start with AI marketing scenarios, data and carriers, with an eye towards deeper exploration of content scenarios, user profiling, new media marketing and other more segmented areas.

Keywords: AI marketing, hotspot, prospect.

1. Introduction

With the development of big data and artificial intelligence, the marketing field has experienced a leapfrog development. With the help of artificial intelligence technology, the development of the marketing field has been pushed to another climax[1]. Some companies have begun to use artificial intelligence for marketing. In April 2019, "MarTech" concept founder Scott Brinker released the "2019 global marketing technology ecology panorama" report at the spring marketing technology conference, pointing out that there are more than 7,000 MarTech enterprises worldwide. In China, Mob Research Institute released "2019 China MarTech White Paper" pointed out that the domestic marketing industry through the traditional marketing stage, "internet + marketing" stage, "technology + marketing" stage, is currently in the "AI+ marketing/intelligent marketing" stage, the future will be to the direction of MarTech iteration.

Although the research time of AI marketing is still short, more and more scholars begin to focus on the research in this field, and relevant theories and practical explorations in this field have also been accumulated. However, although the literature on AI marketing research has gradually increased, the research content is loosely distributed. Therefore, it is urgent to classify the literature in this research field, summarize and conclude its future development direction, in order to provide guidance for scholars. Based on the above research background, CiteSpace software was used in this study to take the lead in visual analysis of domestic literature in the field of AI marketing, clarify the research situation in the field of AI marketing, help scholars to sort out the research context, and dig out research hot issues and future development direction in the field of AI marketing.

2. Research methods and data sources

CiteSpace is a Java-based scientometric software developed by Professor Chaomei Chen, a Chinese American, that can be used to build disciplinary knowledge maps, analyze disciplinary hotspots and reveal frontier trends[2]. It overcomes the subjective nature of previous literature reviews and expert judgements. In order to ensure the representativeness and reliability of the analysis results, all the domestic literature data of this study are from the database of CNKI. In CNKI, select

the advanced retrieval, title, keywords and abstract = "artificial intelligence", and "marketing" or "intelligent advertising ", time span = 2011-2021, a total of 2308 articles, to manual cleaning of the retrieved literature, excluding conference report, news, and relevance to the theme of lower after the research literature, A total of 530 valid literatures were obtained.

The annual trend of literature publication can intuitively see the change of the research heat of a certain discipline in a specific period of time, which is an important indicator to measure the development trend of the discipline in this period, and is of great significance to analyze the development trend of the discipline and predict the future trend. In the past decade, many scholars have studied the related issues of artificial intelligence marketing, and they have played an important role in promoting the development of AI marketing. According to Figure 1, from 2011 to 2021, the number of articles on artificial intelligence marketing shows an obvious upward trend, and the research heat gradually increases, indicating that more and more scholars begin to pay attention to the research on artificial intelligence marketing related fields. Before 2016, the total number of articles published in China was about 118, especially during the three years from 2013 to 2015, the research on artificial intelligence marketing was in a relatively stagnant state. 2016 is a breaking point and turning point for the number of domestic literature. The country has issued many policies to encourage the development of artificial intelligence, such as *The Robot Industry Exhibition Plan (2016-2020)* issued in 2016. Since then, the literature on AI marketing has increased significantly, ushering in the culmination of research in the field of AI marketing in China.

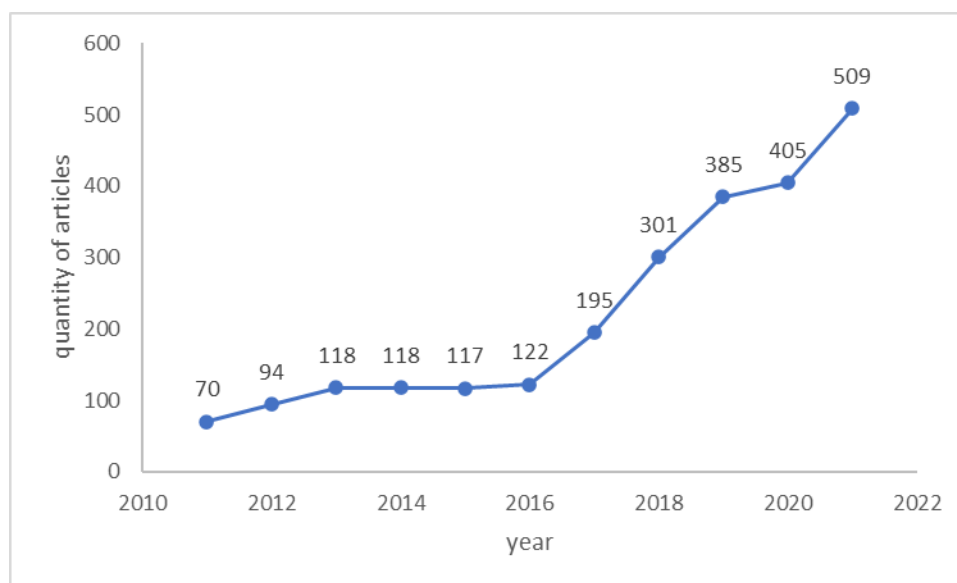


Figure 1. Annual trend of literature publication

3. Visualization analysis

3.1 Distribution of authors and institutions

CiteSpace author co-occurrence analysis can identify the cooperative and cross-cited relationships among key figures and researchers in a research field. The data was imported into CiteSpace to obtain the author collaboration network mapping (see Figure 2). As can be seen, AI marketing research in China is relatively fragmented. Zhibin Jiang is the scholar with the largest number of articles, with 7 articles. He has made great achievements in the research of intelligent advertising. Jidong Yu followed him in the number of articles published. He has rich experience in the field of artificial intelligence marketing and combines theory with practice. The most influential scholars are: Xiaotao Huangfu, Xuebing Qin, Yang Yang and Lu Wei. Among them, Xiaotao Huangfu and Xuebing Qin have presented their insights in the field of digital marketing intelligent advertising[3]. Yang Yang has analyzed the literature on big data marketing in the last decade, and sorted out the hot topics of

big data marketing[4]. Wei Lv has done in-depth research on consumers' purchase intention in artificial intelligence marketing[5].

Through the cooperation network analysis of document issuing institutions, the six institutions with a high number of domestic publications are obtained, as shown in Table 1. In the co-occurrence map of issuing institutions, the node is 201 and the number of links is 0. It can be seen that the research on AI marketing in China is still scattered, and no cooperative research network has been formed among institutions. As can be seen from Table 1, the institutions with a large number of publications are mainly Double-First-Class construction universities. The departments of the research institutions are also dominated by the School of Communication, mainly from the direction of marketing communication combined with the field of artificial intelligence research, such as intelligent push, intelligent advertising. Among them, IFlytek, a company engaged in intelligent language and artificial intelligence industry, has also contributed to the research in the field of AI marketing.

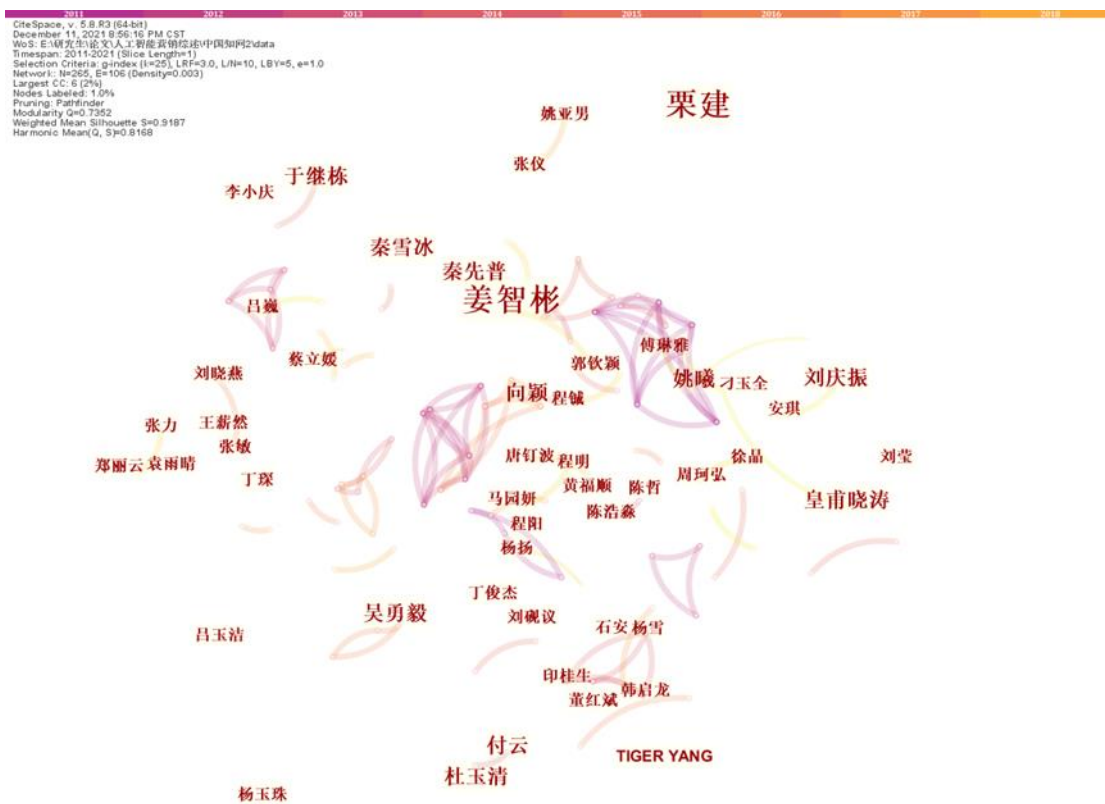


Figure 2. Author co-occurrence atlas

Table 1. Quantity of articles and institutions

Quantity of articles	Institutions
7	Communication University of China Advertising Institute
3	School of Journalism and communication, Wuhan University
3	School of Journalism and communication, SCUT
3	School of communication, ECNU
3	School of Journalism and communication, Henan University
3	IFlytek

3.2 Hotspot analysis

A research hotspot is a research issue that has been discussed in a large number of papers over a period of time. Cluster analysis of keywords is carried out by CiteSpace software to generate the key

word clustering knowledge map, which can clearly see the hot issues in this field in a certain period of time.

By analyzing the keywords in the domestic data, the Node Type was set to Keyword, the threshold value was set to $T=50$, and the rest of the defaults were obtained for AI marketing keyword co-occurrence mapping. The color and thickness of the tree rings in the figure 3 respectively represent the time and number of keyword occurrences, while the node size represents the frequency of keyword occurrences. By analyzing the keywords with high frequency of occurrence, we can understand the current research hotspots in a certain field and the previous research hotspots. As can be seen from the figure 3, keywords with high frequency in China are "artificial intelligence", "big data", "intelligent marketing", "precision marketing", "advertising" and so on. It is not hard to see that domestic research on artificial intelligence marketing is mainly focused on how to use artificial intelligence and big data and other emerging computer technologies to help marketing. Since 2001, with the rapid development of new media such as the Internet and smart phones, the focus of marketing has shifted to intelligent marketing.

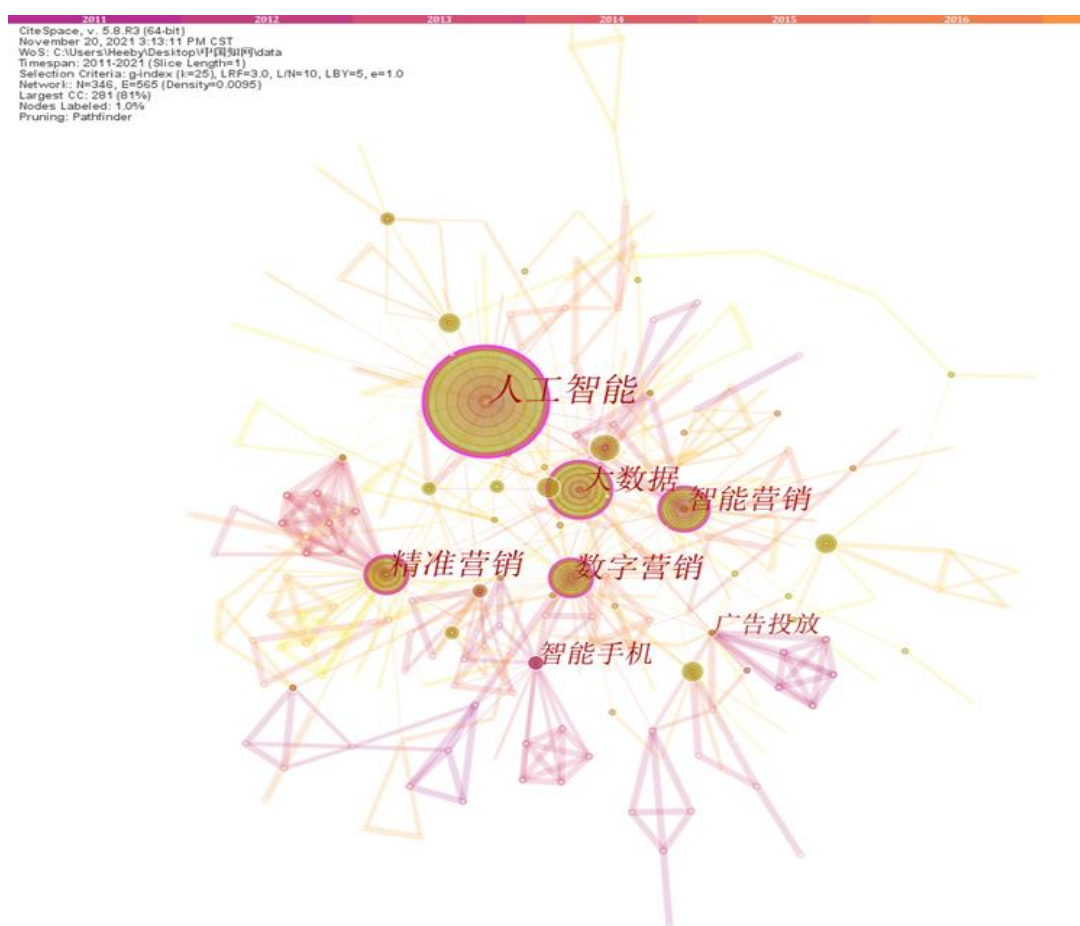


Figure 3. Keywords co-occurrence atlas

Then, the high-frequency keywords were clustered to obtain a cluster map of domestic AI marketing research hotspots, including 12 clusters, as shown in Figure 4. $Q=0.7352>0.3$, indicating significant clustering structure; $S=0.9187>0.7$, which means that the clustering is convincing. By removing the keywords and manually merging the clusters of the same theme, five AI marketing clusters are obtained: "intelligent advertising", "intelligent media marketing", "precision marketing", "new retail" and "short video marketing". Through the analysis of user preferences by big data, user portraits can be formed, and intelligent advertisements can be delivered to consumers to improve the intelligence of advertisements and the precision of marketing. At the same time, with the development of artificial intelligence, the retail industry began to transform to the direction of offline and online

development. Among them, the clustering topic worth noting is short video. Due to the impact of the COVID-19 pandemic, China's live streaming and short video industry has ushered in a period of rapid development. At the same time, research on short video intelligent marketing also appears. Guoming Yu et al. (2020) analyzed the overall impact of 5G on the video industry from three aspects: video content production, video content consumption and business model[6]. Qing Lai (2021) makes a comprehensive analysis of the characteristics of intelligent algorithm recommendation of short video, and further elaborates the social problems brought by the development of short video industry under intelligent algorithm recommendation system[7].

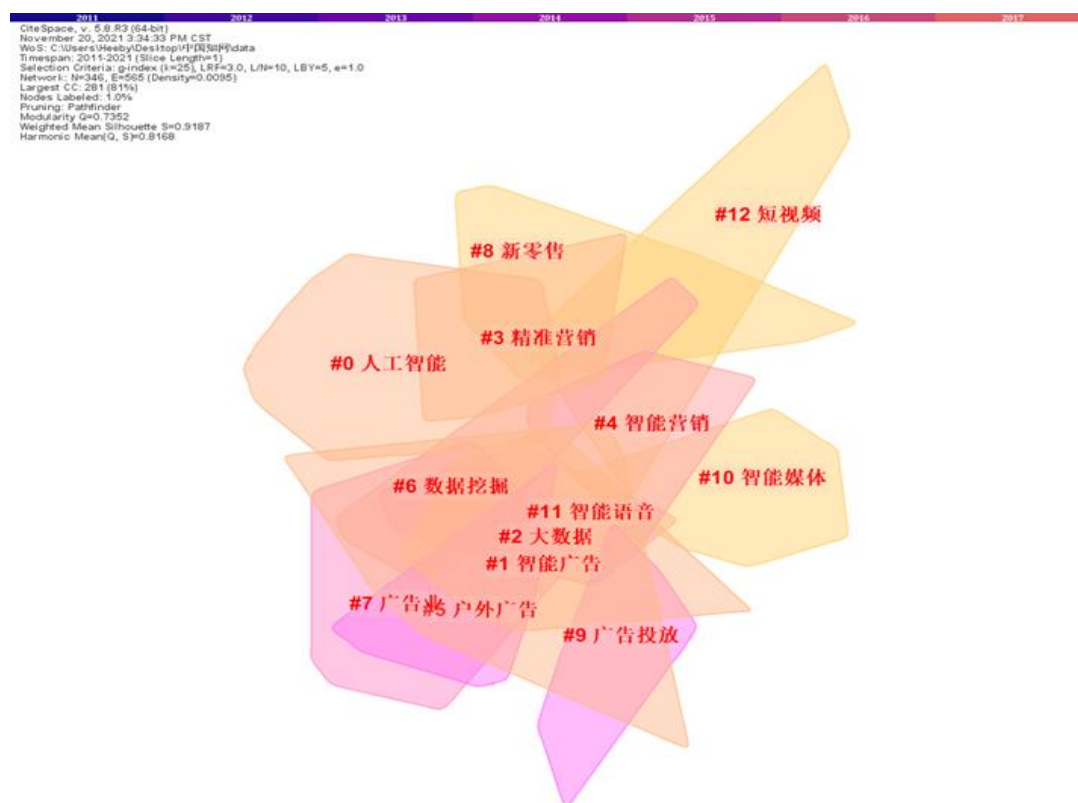


Figure 4. Hotspot cluster atlas

3.3 Development trend analysis

The identification and tracking of research trends can provide researchers with the latest trends of subject research and dig out valuable research directions. In this study, CiteSpace software is used to analyze the evolution trend of Keywords in the document set. The time span is 2011-2021, the time slice is one year, and the Node Type is Keywords. The time zone diagram of Keywords in the field of artificial intelligence marketing research from 2011 to 2021 is obtained (see Figure 5). As can be seen from Figure 5, with the emergence and application of big data and artificial intelligence technology, traditional marketing begins to transform. Since 2013, domestic researches on AI marketing have mushroomed, mainly focusing on precision marketing and digital marketing. From 2013 to 2017, target audience analysis will be carried out by using wireless network in mobile phones and tablets, and advertising will be implemented. The stage of artificial intelligence marketing is the exploration stage of AI marketing by using intelligent devices. From 2017, the research began to crystallize and develop into smart media marketing, smart advertising and new retail. AI marketing can be realized by integrating with media and content production in different scenarios. This stage is the development stage of AI marketing.[8] The research direction of AI marketing is constantly deepening, but the controversial issues about AI marketing such as ethics, privacy and trust gradually emerge. The direction of AI marketing in the next stage can start from the scene, data and carrier of

AI marketing, focusing on more subdivided directions such as cross-screen marketing, user portrait, scene marketing and so on. The landing of AI marketing needs to be based on a certain carrier, in sufficient data and specific scenarios to achieve[9].

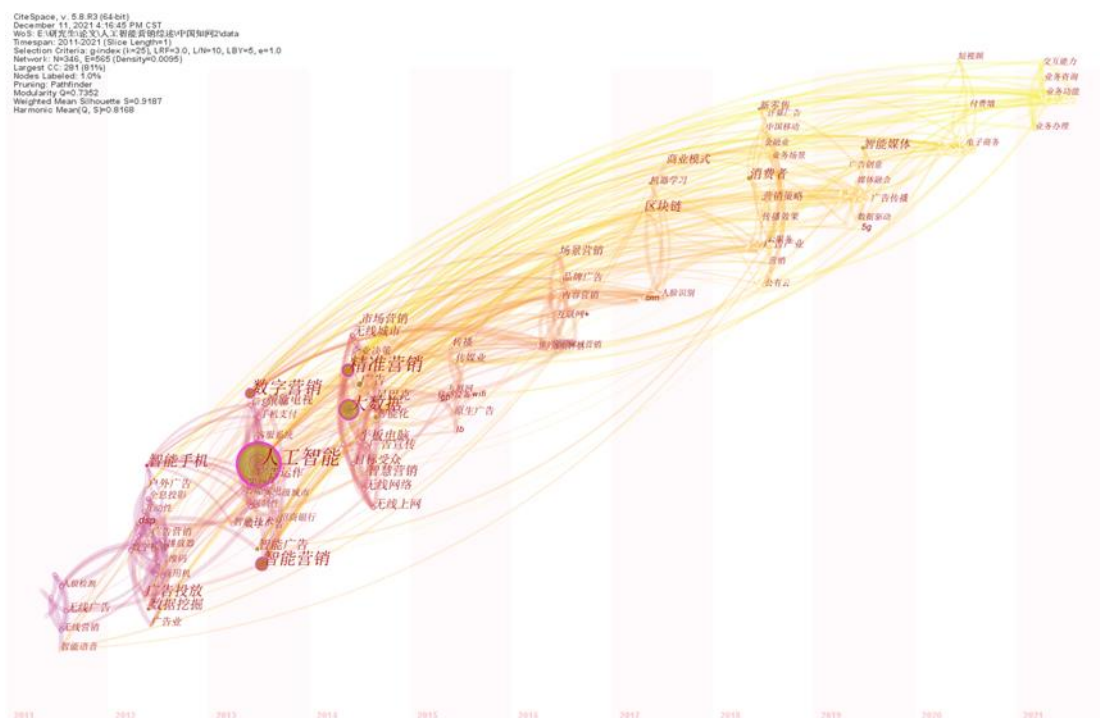


Figure 5. Keywords time zone

4. Conclusion

By using CiteSpace for visual knowledge mapping, we used the literature on AI marketing from 2011 to 2021 in the CNKI as a data sample to analyze author institutions, identify research hotspots and explore evolutionary trends. It can be concluded that there are no strong leading scholars in the field of AI marketing in China, and relevant researchers have not formed academic research cooperation teams, and academic cooperation networks between research institutions have not yet been formed. Communication University of China has the largest number of publications and occupies an important position. In terms of research content, it mainly focuses on five themes: "intelligent advertising", "intelligent media marketing", "precision marketing", "new retail" and "short video marketing". The pace of academic research keeps pace with the development direction of the times. In terms of research trends and prospects, the direction of ai marketing research has gradually become specific, and it is moving towards more subdivided fields, such as cross-screen marketing, user portrait, scene marketing, etc. At the same time, attention should also be paid to the ethics and trust issues brought by AI marketing. AI marketing, based on artificial intelligence and big data technology, is penetrating into all aspects of marketing. However, AI marketing research is still in the development stage, the research time is short, the research content is scattered, and scholars need to make more contributions in the field of AI marketing in the future.

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