

Application Research of Artificial Intelligence and Big Data Technology in the Field of Digital Marketing

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Abstract: In the era of digital economy, the strategic value and application prospects of digital marketing are increasingly obvious, and it has become the frontier and focus of theoretical and practical exploration. In recent years, artificial intelligence and big data technology have developed rapidly and have been widely used in many industries. People began to try to apply artificial intelligence and big data technology to digital marketing to reduce the work pressure of marketers, improve the work efficiency of marketers, and at the same time ensure the accuracy of marketing. The introduction of artificial intelligence and big data makes data no longer just simple items, and these intelligent technologies fully tap the potential behind these data. However, due to the short history of application of artificial intelligence in the field of digital marketing, there are still problems such as lack of systematic integration of research results, unclear research hotspots and development directions. In view of this, this paper sorts out and defines the connotation of artificial intelligence and big data technology, compares traditional marketing and intelligent digital marketing, further summarizes and reviews the literature in terms of theory, theme and methodology, sorts out the application measures of artificial intelligence and big data technology in digital marketing, and finally forecasts the future research direction.

Keywords: Digital marketing, Artificial intelligence, Big data, Digitalization.

INTRODUCTION

With the promotion and application of Web4.0, Internet of Things (IoT), blockchain, artificial intelligence (AI), and big data analysis, the marketing model of enterprises, consumer consumption and lifestyle are undergoing important changes, and digital marketing is increasingly valued by managers and researchers. On the one hand, when more and more enterprises carry out digital marketing activities, digital sales interaction has become an important way for enterprises to contact consumers (Bharadwaj and Garrett, 2020) [1], and digital marketing capability is even more favored by enterprises than

traditional marketing capability (Homburg and Wielgos, 2022) [2]. On the other hand, theoretical research on digital marketing is also emerging, but scholars' understanding of AI technology

is often based on scattered knowledge and different perspectives, coupled with the disciplinary barriers between the field of computer science and the field of marketing, resulting in a certain gap between the development of academic research and practice. With the development of social economy, the marketing work of enterprises has become more important, and the marketing activities of enterprises have begun to move towards the direction of innovative development. However, the traditional marketing model has drawbacks and can no longer meet the development needs of enterprises. Therefore, the realization of digital marketing has become the work that many enterprises need to implement. At present, there is a literature that attempts to integrate the relevant applications of AI in the field of marketing, but it is usually conceptual or limited to marketing segments such as customer service (Wirtz et al., 2018; Xiao and Kumar, 2019), Technology Marketing (Kose

and Sert, 2016; Yadav and Pavlou, 2020) or sales link (Syam and Sharma, 2018; Singh et al., 2019). At present, China has entered the Internet era, enterprises can integrate into the Internet background, strengthen the application of artificial intelligence and big data technology, innovate marketing methods, build a new model of digital marketing, give full play to the commercial value of digital marketing, improve the marketing efficiency of enterprises, and lay a solid foundation for promoting the innovation and development of enterprises.

1. Artificial Intelligence and Big Data Technology:

1.1 Artificial Intelligence Technology

Artificial intelligence technology is a new type of science and technology, which can simulate and expand all aspects of content, and there are more theories, technologies and application systems of artificial intelligence. Through artificial intelligence technology, we can analyze people's thoughts and behaviors, design and develop artificial intelligence products. Artificial intelligence technology, pay attention to training computers to learn people's thoughts and behavior patterns, through long-term training, we can strengthen the computer's learning ability and action ability, and store new knowledge and new technology. The application of computer language can optimize and perfect the storage knowledge and technology, and enrich the computer system skills. Through the application of artificial intelligence technology, computer systems can permanently store data information, while improving their own applications, improve the performance of each application. In

1950, Alan Turing asked the question "Can machines think?" This question presents one of the earliest assumptions about the nature of AI: machines and thinking. In 1956, the Dartmouth Conference formally introduced the concept of "artificial intelligence". Stuart and Peter (2016) summarize the past definitions of AI into four categories: human-like thinking, human-like behavior, rational thinking, and rational behavior. Of these, the first two are human-centered (more used for hypothesis testing and empirical research), and the second two are rational-centered (more used in mathematics and engineering). Based on this division standard, we will define AI into two perspectives: the humanoid perspective and the rational perspective. Table 1 lists typical definitions of AI in computer science and marketing. It is worth noting that the two defining perspectives are not mutually exclusive and completely separated, but each has its own focus and complements each other. Much of the research on the intersection of marketing and AI is based on various algorithms and mathematical models for implementing AI. In order to reduce professional barriers and promote AI research in the field of marketing, it is necessary to understand and distinguish the types and scope of technologies that AI technologies enable. Table 2 summarizes and describes the main types of technologies that implement AI. The existing literature clearly points out that basic tools such as predictive models and machine learning methods are not equal to AI, because AI solutions should be able to independently learn, express knowledge, predict or plan (Wirth, 2018). Therefore, subsequent research should conceptually distinguish AI solutions from these AI technology implementations

Table 1 Representative definition of artificial intelligence

Defining perspective	Defining standard	definition
Humanoid perspective	Defined by how closely a machine simulates a human	It's the ability of machines to mimic human intelligent behavior
Humanoid perspective	Defined by how closely a machine simulates a human	It's a machine that can demonstrate some human intelligence
Rational perspective	Defined by the idealization of what a machine can do	An agent that senses its surroundings
Rational perspective	Defined by the idealization of what a machine can do	Have the ability to learn and adapt

Table 2 Main technology types of artificial intelligence

Technology	Instructions
Machine learning	Machine learning can extract knowledge from data and perform optimization tasks with minimal human intervention; This approach has been adopted in many fields as an effective data mining tool to uncover "interesting" non-obvious patterns or knowledge hidden in databases (Cui et al.,2006).
Natural language processing	Natural language processing (NLP) is a way for computers to analyze, understand, and derive meaning from human language (Lopez and Kalita,2017).
Computer vision	Image recognition can help advertisers understand the pictures and videos people share on social media and "show" real consumer behavior (Forsyth and Ponce,2002)
Speech recognition	Speech recognition allows AI to analyze the meaning of words. For example, call center service provider Sayint uses AI voice recognition to monitor and analyze customer calls, a technology that helps Sayint understand customer needs and improve customer satisfaction (Kietzmann et al., 2018).

1.2 Big Data Technology

Big data technology belongs to data information assets, and through new processing modes, data analysis capabilities and optimization capabilities can be strengthened. Through big data technology, different information data can be processed efficiently. Traditional applications cannot efficiently collect and store large amounts of data. Data is a kind of diversified and continuously updated asset, and only by applying big data technology can scientific analysis and processing be realized. Big data technology is different from the traditional sampling survey method and random analysis method, and has the characteristics of high speed, high density and authenticity. Through the application of big data technology, we can scientifically analyze and process massive data information, combine historical data and real-time data, and carry out in-depth analysis and processing of FFOC is conducive to the development of new data models.

2. Traditional Marketing Model and Intelligent Digital Marketing

2.1 Problems Existing in the Traditional Marketing Model of Enterprises

2.1.1 Lack of correct business values and business concepts

The society is developing, The Times are progressing, and enterprises are facing new opportunities and challenges in the Internet era. If enterprise managers can't keep up with the

development trend of The Times, establish correct business values and business concepts, and still carry out marketing management in accordance with traditional ideas, it will often hinder the development of enterprise marketing. Through the investigation of the current enterprise managers, it is found that in the new era, some enterprise managers still carry out management work according to the traditional operation and management mode, and the application of data only stays on the surface, and they do not realize the huge impact of artificial intelligence and big data technology on traditional marketing, so they cannot effectively predict the enterprise data. It is also not conducive to effectively analyzing and controlling the market competitive environment of enterprises (Gan Shilu, 2022).

2.1.2 Data has huge security risks

In the Internet era, some enterprise managers begin to apply artificial intelligence and big data technology to marketing, but artificial intelligence and big data technology are built on the basis of data, and big data has a large capacity and a wide range, and these data are complex, some data can directly reflect the marketing status quo and problems of enterprises, and the other part of the data is also lack of effectiveness. Therefore, enterprise managers can not really ensure the quality of data, which increases the security risks of enterprise data information. If worthless data information is applied in enterprise digital marketing, it will often affect

consumers' trust in enterprises, and even lose part of customer groups, which will have a huge negative impact on the marketing management mode of enterprises and damage the reputation of enterprises (Wang Lin, 2022).

2.1.3 The professional quality and ability of enterprise marketing personnel need to be improved

Marketers play an important role in enterprises, especially in the context of the widespread application of artificial intelligence and big data technology in digital marketing, enterprises have higher requirements for marketers. As an excellent digital marketer, in addition to having basic marketing knowledge, you also need to have the ability to flexibly apply modern information technology to carry out digital marketing. However, through the investigation of the current enterprise marketing personnel, it is found that although some marketing personnel have rich work experience and master certain marketing knowledge, the application level of information technology is not high, and the overall information literacy needs to be improved, resulting in artificial intelligence and big data technology can not play a greater role in digital marketing.

2.2 Features of Intelligent Digital Marketing

According to the definition of the American Marketing Association, the so-called digital marketing is the marketing activities, mechanisms and processes facilitated by digital related technologies to create, disseminate and deliver value to customers and other stakeholders. Similarly, Kannan and Li(2017) define digital marketing as "an adaptive technology enabling process in which companies collaborate with customers and partners to create, communicate, deliver, and sustain value for stakeholders." It can be seen that digital marketing is actually a marketing activity, process or mechanism based on digital-related technology, which can generate and deliver value, and then create, maintain and develop relationships in the digital technology. However, whether it is digital marketing practice or theoretical research, it still faces a series of urgent problems: First, Whether digital marketing can actually bring profits to companies is uncertain. For example, does boosting your digital capabilities across a wide range of digital marketing activities (e.g., social media marketing, mobile marketing, content marketing) really pay off as expected? The empirical evidence is still very limited (Homburg and Wielgos, 2022). Secondly, the huge literature scale makes many scholars more inclined to comb the digital marketing research from a single perspective when sorting out relevant studies, such as customer customization (Wang Yonggui et al., 2023), algorithm marketing (Chen Changdong and Jiang Ruochen, 2021), artificial intelligence marketing (Lin

Zhiyun et al., 2021), social media influencers (Vrontis et al., 2021). 2021), customer privacy (Scarpi et al., 2022), digital platforms (Rietveld and Schilling, 2021), online and offline retail (Ratchford et al., 2022), digital consumer behavior (Gungor and Cadirci, 2022), etc., But digital marketing, which aims to use digital-related technologies (often combined with other communication channels) to create value for stakeholders and achieve organizational goals (Felix et al., 2017), is an interdisciplinary concept that involves many fields such as business management, digital technologies, artificial intelligence, and more.

With the help of network technology, computer technology, interactive technology and multimedia technology, digital marketing can be realized. The biggest goal of digital marketing is to maximize the consumer market through the use of various information technologies. Nowadays, marketers basically use various multimedia such as Weibo, wechat, short videos and emails to carry out accurate marketing to target users in the database. Digital marketing has a number of advantages, such as efficiency, timeliness, customizability and high user relevance. The use of digital marketing means for product marketing, can establish a good network relationship with consumers, and can sell goods through communication. The famous management master proposed that the ultimate goal of marketing is to deepen the user and get familiar with the user, and realize the rapid promotion of products. With the rapid development of artificial intelligence technology and big data technology, enterprises apply big data technology and artificial intelligence technology to marketing work, can fully understand users, and provide users with a high level of service work, in this way can also effectively enhance the status of enterprises in the hearts of users. The digital marketing industry uses artificial intelligence technology to record the behavioral data of each user, and at the same time, it can also analyze the needs of users and consumer behaviors, and ultimately provide users with more perfect services. For example, one day Xiao Wang buys a pair of Nike shoes on Taobao, at this time his purchase record will be recorded in Taobao database. Through the analysis of Taobao background big data system, it can be clearly known that Xiao Wang has a certain interest in sneakers, and at this time the system will automatically push some socks, sports pants and other goods that can be matched with sneakers for Xiao Wang. Therefore, it can be seen that after the application of big data technology and artificial intelligence technology, the use of digital marketing can collect and analyze the user's behavioral data, and mine a series of actions after a user's action, so that it can be targeted, resonate with customers, and finally effectively improve marketing efficiency. It can be seen that digital marketing has great potential. The marketing

industry should be aware of the important role of digital influence, make reasonable use of digital marketing means, effectively improve marketing efficiency, and promote the rapid development of the marketing industry (Wang Jia, 2021).

3. Relevant Theories, Themes and Methodology of Artificial Intelligence Research in the Field of Digital Marketing

3.1 Relevant Theories

Since AI research in the field of marketing is still in its infancy, future research should strive to broaden and deepen the theoretical basis of related research. Next, we'll look at 5 theories that are currently involved in AI research in marketing.

3.1.1 Anthropomorphic theory

Anthropomorphism is the tendency to attribute human-like characteristics, motives, intentions, or emotions to real or imagined non-human entities (Epley et al., 2007). Tussyadiah and Park (2018) found that people will evaluate AI with human characteristics, but people's evaluation of AI in different jobs is affected by the degree of anthropomorphism. For example, the evaluation of the AI responsible for check-in is more susceptible to anthropomorphism, while the evaluation of the AI responsible for room delivery is less susceptible to anthropomorphism. While anthropomorphism and AI are not the same, marketing researchers can further explore the positive and negative effects of AI anthropomorphism and study how to appropriately leverage AI's anthropomorphic characteristics.

3.1.2 Uncanny Valley effect

When a person comes into contact with a humanoid robot (very human-like but not actually human), their response to the robot will suddenly shift from empathy to disgust, a state of uncanny feeling known as the "uncanny valley" (Mori et al., 2012). Although human-like AI increases people's perceived warmth towards it, it decreases people's affection (Mathur and Reichling, 2016; Kim et al., 2019). The theoretical background for much AI research stems from the Uncanny Valley effect. This part of the theory is not directly linked to marketing practice, and the anthropomorphic theory is an extension of the Uncanny Valley theory. Based on this, existing research has mainly explored why human-like AI is troubling.

3.1.3 Social existence theory

Social presence refers to "the feeling of being with another person" (Biocca et al., 2003). Early studies of social presence focused on face-to-face interactions between people and linked them to indirect interactions such as teleconferencing (Biocca and Harms, 2003). However, as technology evolves, humans are increasingly involved in

"quasi-social relationships with new forms of AI organisms," such as computers (van Doorn et al., 2017). Such technologies are often intentionally designed to create a sense of social presence, conceptualized as a rich perception of another being or intelligence (Biocca and Nowak, 2001). Van Doorn et al. (2017) applied the existing social presence theory to extend the new concept of automated social presence. By building a theoretical model of the impact of automated social presence on service results, they found that functions performed by humans before AI agents would affect service results (customer satisfaction, loyalty, engagement, and happiness). Considering the continuous development of technology, future research can be conceptually extended in the direction of AI on the basis of existing theories.

3.1.4 Social cognitive theory

Social cognition is concerned with how humans encode, store, retrieve, and process information about members of the same species (Fiske and MacRae, 2012) and encompasses two dimensions: warmth and competence (Fiske et al., 2007). This distinction stems from the evolutionary rationale that perceivers want to know the positive or negative intentions of others, and their ability to effectively pursue that intention (van Doorn et al., 2017). A large number of psychological studies have proved the mediating role of warmth and competence (Cuddy et al., 2008), which can affect consumers' evaluation of AI services (customer love, satisfaction, loyalty, engagement, happiness, and ability to resist trust collapse), or directly serve as evaluation indicators for consumers (Lee et al., 2012; van Doorn et al., 2017; Kim et al., 2019). Social cognitive theory could be used to explain other outcomes of human-computer interaction in the future.

3.1.5 Psychological ownership theory

Psychological ownership refers to the sense of ownership that people have over objects (Pierce et al., 2003). It is mainly derived from three psychological needs of consumers: the need to form an attachment relationship with the target service, the need for self-understanding and self-identification, and the need to control the environment and have the ability to change. Jussila et al. (2015) believe that the need for belonging is closely related to acceptance ability, the need for self-identification is related to attraction, and the need for control is related to controllability. Therefore, psychological ownership is usually reflected in three aspects: acceptance, attractiveness and controllability, which are often used as evaluation indicators of AI. For example, psychological ownership (acceptance, attraction, sense of control) mediates consumers' evaluation of AI services (customer satisfaction, loyalty, engagement, happiness, attribution of responsibility) (van Doorn et al.,

2017). Future research could consider linking interdisciplinary theory with AI to examine how human presence alters the effects of automated social presence on social cognition, psychological ownership, and final service outcomes.

3.2 Topics

Research on AI applications in the field of marketing has grown significantly over the past few years, and this article provides a comprehensive and systematic analysis as possible of typical research in the field to date. There are two main reasons for this extensive review: First, an overall overview of AI-related research in the field of marketing helps to understand how AI research in the field has evolved; Secondly, a comprehensive review of the literature can find some valuable information in order to provide potential research directions. For example, which areas of research are hot and which areas of research need to be further broken through.

3.2.1 Service Interaction

Service interaction in the field of marketing is the main force of AI technology application. Service interactions at the marketing frontier include not only communication between market entities, but also activities related to exchange (e.g., healthcare, social media, AI-enabled environments, retail) (Yadav and Pavlou, 2020). There are three advantages to adopting AI in marketing campaigns: first, it can be used at any time; Second, the error rate is lower and more complex situations can be handled; Third, the deployment of AI can be flexibly adjusted as demand fluctuates (Davenport et al., 2020). AI applications in frontline service scenarios can be broadly divided into two categories.

The first type of AI application is more one-dimensional and can only play an assisting role. Relatively speaking, the more traditional AI technology is mainly used to assist the practice of managers or marketing workers. For example, stylists working at Stitch Fix, a clothing and styling service, use AI to identify which clothing styles are best suited to a particular customer segment (Davenport et al., 2020).

The second type of AI application is more functional and can basically play the role of replacing humans. In order to cope with the increasingly abundant interaction demand and the demand for labor liberation, Marinova et al. (2017) advocate improving service efficiency and effectiveness through the learning mechanism mediated by intelligent technology, and enhancing the interactive ability of the service frontier. Evolution from simple assistance work to complete replacement of relevant human employees is the development trend of AI technology in the future, and some enterprises and scholars have basically realized the goal of AI technology replacing human employees in certain marketing links. For

example, in the financial industry, AI technology can replace human employees in transferring data from email or call centers to record-keeping systems (updating customer files), replacing lost ATM cards, enabling simple market transactions, using natural language processing to "read" documents to extract key terms, and more (Davenport et al., 2020).

3.2.2 Product design

From demand analysis to implementation, scholars have further explored the possibility of AI application in product and service design, and relevant research mainly includes two categories.

The first type of research is to manufacture AI technology into actual products. For example, Doering et al. (2015) describe the design and evaluation process for a user-centric humanoid mobile shopping robot that provides assistance to customers in home furnishing stores. In a specific retail market, Zibafar et al. (2019) used a stylish social robot for state-of-the-art visual marketing, exploring the important criteria used in designing a robot to develop robots and enhance customer appeal in the fashion industry.

The second category of research is the use of AI technology to help with the development, design, and refinement of actual products. The traditional way of product design is for product designers, engineers and marketers to complete emotional design, engineering design and marketing respectively. With the deepening application of AI technology, Kumar et al. (2019) proposed a comprehensive framework to understand the application of AI in personalized marketing: enterprises can use this technology to analyze consumer information and provide personalized products and services; In the process, AI can continue to learn, helping managers improve the value proposition for customers; By designing and curating products in this way, the value of products to consumers can be increased, resulting in a sustainable competitive advantage.

3.2.3 Controversial issues

In the process of gradually realizing technological substitution, scholars in the field of marketing have also studied four types of controversial issues that the application of AI may cause.

The first category is information security and privacy issues. It is difficult to guarantee the privacy security of consumers in big data environment. In general, AI offers the potential to increase revenue and reduce costs: revenue can be increased by improving marketing decisions (e.g., pricing, promotions, product recommendations, increased customer engagement); Costs can be reduced through automation of simple marketing tasks, customer service and (structured) market transactions (Davenport et al., 2020). However, in order to achieve more accurate results, reduce more costs, and increase more revenue,

the acquisition and use of information by AI technology has significantly increased, posing a threat to consumers' personal information security and privacy. According to Redmond (2002), the prospect of consumers relying on human shopping agents to make shopping decisions has raised concerns about possible negative impacts on consumer welfare and market stability, as human shopping agents may greatly expand consumers' search and evaluation capabilities to change the e-commerce market in the future.

The second category is consumer happiness. Because AI systems often need to engage with users (employees and consumers), the issue of user acceptance of AI arises. Andre et al. (2018) believe that the promotion of AI in the service field has promoted precision marketing to a certain extent, making consumers' choices more simple and effective, but it also has a negative effect: it is easy to cause users' nervous emotions. Based on the perspective of consumer happiness, the intervention of AI may destroy the perceived autonomy of consumers, and the lack of autonomy may damage the happiness of consumers (Andre et al., 2018).

The third category is the panic about the impact of AI technology on human jobs. For example, are customer robots a useful complement to humans or an eventual replacement (Xiao and Kumar, 2019). Addressing this issue, Davenport et al. (2020) argue that AI will be more effective if it can assist (rather than replace) human managers. While occupations characterized by a strong need for empathy (e.g., teachers, psychologists, social workers), occupations requiring the development of original creative solutions (e.g., designers, engineers), and occupations requiring high levels of social intelligence (e.g., managerial positions) are less at risk of being displaced by AI technologies (van Doorn et al., 2017), But there

will be fewer and fewer low-intelligence jobs that are easily replaced by AI (Wright and Schultz, 2018).

The fourth category is the question of the responsible party. Who bears the risks involved in AI agents (e.g., insurance assessment, disease diagnosis) is yet to be discussed.

METHODOLOGY

Through literature review, it is found that although the number of literatures on AI is growing faster and faster, the total number of key literatures in this field is still small, which provides great potential space for future research. There are slightly more empirical studies than non-empirical studies. Among them, most of the empirical research is quantitative research, and few are qualitative research and mixed research. The non-empirical part is mostly conceptual literature, and the number of relevant reviews in this field is scarce, which shows that it is necessary to write review articles that can systematically and comprehensively outline the current development of AI literature. The method used in empirical research is mainly experimental, supplemented by survey, interview and secondary data, and the data collection method is relatively simple. In terms of data analysis methods, most empirical studies only include basic descriptive statistics and some simple quantitative models and quantitative comparison methods. Although AI technology is one of the new directions of information technology, there are few literatures that use computer methods such as machine learning to study the application of AI in the field of marketing, and it is only used as a tool to achieve a certain algorithm without in-depth analysis of the algorithm results, and few achievements can be put into practical application. See Table 3 for details.

Table 3 focuses on the data collection and analysis methods used in the study

Data collection method	frequency	Data collection method	frequency
Case study	1	Quantitative description	19
Secondary data	5	Qualitative method	3
Simulation model	2	Quantitative model	20
Interview method	6	Quantitative comparison	16
Experimental method	20	Quantitative association	11
Survey method	7	Machine learning	4
Observational method	3	Statistical quantization	4

4. Application Measures of Artificial Intelligence and Big Data Technology in Digital Marketing

4.1 Change Ideas and Establish Correct Business Values and Business Concepts

With the development of society, artificial intelligence and big data technology are more widely applied in enterprise

marketing, and at the same time, promote the arrival of the digital marketing era. Enterprise managers should keep up with the development trend of The Times, increase the importance of artificial intelligence and big data technology, establish the correct business value and business concept, so that artificial intelligence and big data technology can be fully applied in digital marketing, improve the level of digital marketing, and create greater value and wealth for the development of

enterprises. First, companies should build a digital culture. Through research, it can be found that digital culture is an indispensable part of enterprises, which can affect enterprises from different aspects and have a huge impact on the formation of value concepts of enterprise managers. Therefore, enterprises should build a digital corporate culture to lay a good environment and atmosphere for the application of artificial intelligence and big data technology in digital marketing. For example, enterprises can actively encourage and find departments or personnel with good application of artificial intelligence and big data technology in enterprises, strengthen the publicity and praise of department personnel, set up an image of corporate example, and promote the formation of an orderly digital corporate culture. Secondly, enterprises should strengthen publicity work. For example, business managers can use modern information technology and multimedia communication channels to present the importance of the application of artificial intelligence and big data technology in digital marketing to business personnel in different forms. Finally, enterprise managers should change their ideas, innovate ideas, and truly integrate into the era of data, so as to change the traditional marketing methods. With the help of artificial intelligence and big data technology, traditional marketing presents new characteristics, realizes digital marketing, and improves the marketing level of enterprises (Liu Xiangfeng, 2023). Concept change is a long process, so enterprise managers need to establish long-term thinking, only in the daily work and management to do a good job in concept guidance and value guidance, so that marketers can understand the positive significance of digital marketing, and then implement digital marketing.

4.2 Use Artificial Intelligence and Big Data to Achieve Intelligent Marketing Positioning

Through the analysis of enterprise marketing market, it can be found that most enterprises have some marketing data information in the marketing process. If we can fully understand the characteristics of these marketing information and master marketing data, we can provide data support for enterprises to carry out marketing work. However, these data information is too complex, if the traditional mode of marketing work, often can not be a more accurate grasp of the data information. Therefore, business managers and employees can use artificial intelligence and big data technology to position the current market. For example, enterprises can use computer and other software statistics and analysis of users' consumption habits and brand preferences, understand the actual product needs of users, and provide direction for corporate advertising. In addition, artificial intelligence technology can optimize the bidding process for pay-per-click advertising according to the content, click frequency and number of consumers' searches,

which can monitor the consumption dynamics of consumers in real time, and also tap potential customers in the market, thus expanding the marketing market scale of enterprises. In order to improve the gross product and sales of enterprises, in the future construction and development of enterprises should be based on intelligent marketing positioning, strengthen the application of artificial intelligence and big data technology, promote modern information technology can play a role in the traditional marketing work of enterprises, and promote the development of digital marketing.

4.3 Use Artificial Intelligence and Big Data Technology to Optimize Marketing Product Functions

With the development of society, the competition between enterprises is more intense, and the functional requirements of products are more comprehensive. To this end, in the Internet era, enterprises can use artificial intelligence and big data technology to optimize the functions of marketing products, so that product functions can better meet the needs of consumers, and then establish a broad user base, open the enterprise marketing market, and meet the purchase needs of consumers to the maximum extent. First, enterprises should strengthen the analysis of consumer demand. Different consumers have different requirements for product functions, so enterprises need to make full use of artificial intelligence and big data technology to investigate the needs of consumers in the Internet era, understand the requirements of different consumers for product performance and functions, establish consumer marketing product demand files, lock the development goals of enterprises according to the needs of consumers, and clarify the functions of marketing products. Provide conditions for subsequent product optimization. Secondly, enterprises should optimize marketing product functions with the help of artificial intelligence and big data technology. Through the analysis of consumer demand, enterprises have mastered the basic requirements of consumers for product functions. Thirdly, enterprises should strengthen the application of artificial intelligence and big data technology, use information technology to learn excellent functional design schemes of marketing products at home and abroad, and optimize and upgrade various functions of marketing products in combination with the actual situation of enterprises, so that product functions can better meet the consumption needs of consumers in the region and realize functional innovation of marketing products. Finally, enterprises need to use artificial intelligence and big data technology to evaluate product functions. For example, enterprises can use artificial intelligence and big data technology to evaluate the optimization process of current enterprise product functions and set evaluation goals. For another example, enterprise managers can take the process and function realization of product function

optimization as the main evaluation indicators to assess the level of product function optimization by enterprise marketing personnel using artificial intelligence and big data technology, and combine the assessment results with the salary and actual income of enterprise employees (Qiao Congjun, 2023).

4.4 Use Artificial Intelligence and Big Data Technology to Achieve Intelligent Sales

In the Internet era, more and more information technology begins to replace traditional human resources. For example, in the sales work of enterprises, artificial intelligence customer service has gradually replaced the traditional manual customer service, saving the cost input of enterprises in the marketing process, and improving the quality of sales service of enterprises. Artificial intelligence customer service is based on the development of artificial intelligence technology, and can effectively replace manual phone calls. Therefore, enterprises should make use of artificial intelligence and big data technology to realize intelligent sales in digital marketing, replace traditional human resources with artificial intelligence technology, provide customers with better services, and provide targeted services according to consumers' consumption needs and preferences, so as to improve consumers' satisfaction with services and establish a broader user base. Increase business sales.

4.5 Use Artificial Intelligence and Big Data Technology to Realize Brand Crisis Monitoring

In the Internet era, more and more enterprise platforms begin to be disturbed by the Internet market, and some enterprise brand products are facing unprecedented risks. If enterprises can not effectively monitor the crisis of these brand products, it will bury security risks for the development of enterprises. Therefore, enterprise managers can give full play to the advantages of artificial intelligence and big data foundation, timely track and alert the relevant information of products, and at the same time according to the needs and views of consumers on brand products management, so that enterprises can maintain their own brand product image, so that more consumers rely on brand products, and promote the sustainable development of enterprises. It should be noted that when using artificial intelligence and big data technology to monitor the crisis of brand products, enterprises should establish a sense of crisis, understand the risks and hidden dangers of enterprise brand products in the Internet era, strengthen the analysis of brand product crises in future management, control brand product crises at the source, and improve the safety of enterprise brand products (Li Jun et al., 2020).

4.6 Use Artificial Intelligence and Big Data Technology to Improve User Experience

At present, users are paying more and more attention to their own consumer service experience. If the user lacks a good experience of the consumer behavior or the brand service of the enterprise in the consumption, it will often affect the development of the enterprise. Therefore, in the era of big data, enterprises should use artificial intelligence and big data technology to improve user experience, so that more users can get more satisfaction in consumption behavior. For example, taking automobile sales as an example, enterprise managers can use artificial intelligence and big data technology to collect the data information of each part of the enterprise automobile in operation and understand the problems existing in the operation of the enterprise automobile. When the owner has a problem in the process of using the vehicle, it can be timely feedback to the owner, which can help the owner grasp the operating status and situation of the car while driving, and repair and adjust the bad condition of the car, so as to protect the life safety of the owner. Improving user experience is an issue that enterprises need to pay close attention to in digital marketing, and artificial intelligence and big data technology pay close attention to users' needs and product experience, so it is necessary for enterprises to strengthen the application of modern technology, so that users can feel the services and corporate culture of enterprises in consumption (Shi Fan, 2023). Users are the key to the development of enterprises, especially in the increasingly fierce competition, enterprises need to pay attention to the user experience, and artificial intelligence and big data technology to analyze and understand users to provide help, enterprise managers need to give full play to technical advantages, understand user needs and experience, and provide better services for users.

CONCLUSION

In general, the development prospects of big data technology and artificial intelligence technology are good, and the reasonable application of big data technology and artificial intelligence technology can effectively improve the level of social and economic development, so as to effectively promote the stable improvement of national economic strength. Therefore, all walks of life, especially the digital marketing industry, should timely realize the important role of big data technology and artificial intelligence technology, and actively apply these two technologies to daily production management work, effectively improve the overall management level of enterprises, and promote the rapid development of social economy.

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