Research on Big Data Network Marketing Model

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Abstract. With the rapid development of information technology, all kinds of data have achieved explosive growth, and human society has entered the era of data explosion. Big data plays an increasingly critical role in online marketing, and online marketing based on big data has become an important means of marketing, and further sublimated in the era of big data. According to BI theory, this paper tries to build a big data network marketing model, which mainly includes five parts: data source layer, data layer, data analysis layer, marketing application layer and user layer. The model evaluation criteria are proposed, and its value is explained, and the effective fitting of big data and network marketing is realized.

Keywords: big data; network marketing

Introduction

With the rapid development of the Internet and mobile network, network marketing has become an indispensable and important part of the enterprise marketing system. Enterprises must use network marketing methods to promote brands, enhance popularity, and achieve online sales. China Internet Network Information Center released the "Statistical Report on Internet Development in China" (hereinafter referred to as the "Report") on March 22nd. The "Report" explains that as of December 2023, the number of Internet users in the country has reached 1.092 billion, an increase of 24.8 million from December 2022, and the Internet penetration rate has reached 77.5%. With the accelerated integration of digital technology and the real economy, the country has become the world's largest online retail market for 11 consecutive years. The number of online shopping users in China has reached 915 million, accounting for 83.8% of the total Internet users. The online shopping industry continues to develop healthily[1].

The continuous expansion of the network consumer market also promotes the further integration of network marketing and information technology to adapt to a more flexible and changeable consumer market. With the application of big data technology in online marketing, online marketing is gradually developing in the direction of intensification and refinement. Online marketing channels are also more inclined to the mobile Internet. Big data uses all data for analysis and processing, making online marketing have stronger decision-making power, insight and discovery power, and process optimization capabilities

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I. Theoretical Basis

A. Big Data Concept

In recent years, top foreign academic newspapers and periodicals have successively published columns on big data. Nature launched a special issue of "big data" in 2008, discussing the research on big data from the aspects of Internet technology, supercomputing and biomedicine. There is no unified and clear definition of big data. On the basis of sorting out the research status at home and abroad, this paper tries to define big data as: big data, also known as massive data or huge data, refers to the inability to use traditional data processing technology to obtain and store its content within a certain period of time., manage and analyze data sets. Compared with traditional small data, big data has the characteristics of large data scale (volume), fast processing velocity (velocity), data diversity (variety) and low value density (value)[2]. The specific content is shown in Table I.

TABLE I CHARACTERISTICS OF BIG DATA

Characteristic	Content
Volume	In the era of big data, the data generated by various channels continues to increase, and the scale of data sets has expanded from GB and TB to PB, EB and even ZB.
Velocity	The processing velocity of data should reach the second-level response, so that valuable information can be found and extracted from various types of data in time
Variety	In terms of data storage forms, data types include structured, semi-structured, unstructured and other formats; In terms of the form of data expression, data types include text, pictures, audio, video, etc.
Value	Low value density is the core feature of big data. Requires in-depth analysis and mining to obtain valuable information

B. Big Data Marketing

In the era of big data, online marketing tends to be diversified, personalized, and accurate. Big data online marketing is an inevitable development trend of online marketing, and an online marketing method applied to the Internet advertising industry on the basis of big data technology based on a large amount of data on multiple platforms. It can make the marketing advertisements of enterprises more accurate and effective, and bring higher return on investment to enterprises. The core of big data marketing is to tap new customers and maintain old customers. However, changes have taken place in the way data is used. It is manifested in the following three aspects:

1) The collection methods of user data are more abundant. In the era of big data, enterprises can more conveniently collect potential user information in different ways, such as using web crawlers and system log collection.

2) User data collection channels are more diverse. Enterprises can collect user information through different channels, such as Weibo, WeChat and other social platforms.

3) Visualization of marketing effect. With traffic analysis tools, businesses are able to visually view marketing effects.

II. Network Marketing Model in Big Data Environment

A. Big Data and BI System Analysis

Business Intelligence (BI) refers to the use of modern data warehouse technology, online analysis and processing technology, data mining and data presentation technology for data analysis to achieve business value. The concept was first proposed by Gartner Group in 1996. BI provides the technology and method that enables enterprises to analyze data quickly, including collecting, managing and analyzing data, transforming these data into useful information, and then distributing them to all parts of the enterprise. The implementation involves software, hardware, consulting services and applications. The basic architecture includes data warehouse, online analytical processing and data mining.

The key to the success of online marketing for enterprises is to analyze the activities that enterprises are best at with the help of the potential of information technology, so as to occupy a favorable position in the value chain, and fundamentally readjust the process of value creation, so as to realize the multi-win of enterprises, partners and customers. In the information age, the ability of information processing and utilization can increasingly determine the success or failure of enterprises. Therefore, enterprises are more pursuing the knowledge and business value contained in enterprise information data, and BI is an ideal choice to take on this important task.

In the era of big data, enterprises have accumulated a large amount of data, and the storage and processing of complex and diverse data has become a huge problem faced by traditional BI systems. However, big data technologies (such as parallel processing technologies such as MapReduce, Chukwa collection technology based on Hadoop, Tableau visualization technology, etc.) can access and use these valuable, large-scale data sets to cope with increasingly complex data analysis and better business decision-making. The development of big data does not replace the BI system, it is an extension and extension of the BI system. Big data can make the BI system more powerful and better support enterprise decision-making[3].

TABLE II BI SYSTEM CHANGES UNDER BIG DATA

Element	Traditional BI system	BI System under Big Data
Data structure	Mainly structured data, a small amount of unstructured data	Large transaction data and large interaction data, mainly unstructured data
Data source	Enterprise business system data	Multiple databases such as social networks, mobile internet and sensor data
Data level	TB level	PB and even EB/ZB levels
Data storage mode	Hierarchical database, mesh database and relational database	Hadoop Distributed File System (HDFS)
Data processing techniques	ETL tools	Distributed Hadoop
Analysis time	A few months or more	Real-time analysis
Support business	Provide reports quickly and accurately and provide decision-making basis	Reveal the hidden historical laws and future development trends in the data

B. Construction of Network Marketing Model under Big Data Environment

With the rapid development of the Internet, Internet of Things, mobile Internet and cloud computing, data circulation has grown very rapidly[4]. Enterprises urgently need to analyze data efficiently and accurately to support decision-making. Introduce big

data technology and characteristics into the traditional BI structure, and design a big data-based online marketing model. According to the direction of information flow, the model is divided into five layers, namely data source layer, data layer, data analysis layer, marketing application layer and user layer. As shown in Fig.1.

1) Data source layer: The development of information technology and the Internet has continuously increased the types of data and the ways of generation, and unstructured data has become the mainstream data. In the era of big data, enterprises use multiple databases such as social networks, RFID radio frequency data, and sensor data to receive structured, semi-structured, and unstructured data from clients. Just as the starting point and destination of online marketing is the needs of consumers, enterprises must deeply understand the value that data can bring to enterprises, and clearly understand the market and users.

2) Data layer: Large amount of data is the main feature of big data. Big data processes the data information of all target customers. Considering the huge amount of data, the distributed storage method of big data must be adopted. After data storage, it is necessary to integrate and extract appropriate data that is valuable to enterprise marketing. When data is integrated and extracted, it usually contains a lot of meaningless information or wrong information. Especially, the proportion of unstructured data in all databases is getting higher and higher, and there are more and more noisy, redundant or missing data, so it is necessary to clean the data and convert them into data needed by network marketing data mining. The data of "removing the rough and storing the refined" and "removing the false and preserving the true" can velocity up the velocity of online marketing analysis, improve the quality of data, and meet the requirements of industries and individuals for online marketing data mining.

3) Data analysis layer: In the era of big data, the real-time update of data generated by consumers through social media is particularly fast and the amount is very large. Big data mining can just meet the requirements of fast processing and real-time update. It is a process of searching for hidden information from a large amount of data through algorithms. According to the marketing goals and requirements of enterprises, the processed customer data is converted into useful information and knowledge that can support enterprise marketing decisions. In this process, information is presented to decision makers in the form of visualization, which helps enterprises formulate dynamic strategies, meet consumer needs at any time, and carry out personalized marketing.

4) Marketing application layer: The decision-makers of network marketing enterprises formulate marketing strategies through visual information, analyze and find customers' consumption laws and consumption behavior patterns, determine customers' consumption ability, consumption characteristics and consumption potential, and enrich personalized service information. In order to make necessary product or service adjustments. The application of online marketing based on big data includes social media marketing, mobile marketing, user behavior analysis marketing, personalized recommendation marketing, association mining marketing and other forms.

5) User layer: Consumers, data providers and other subjects receive corporate marketing information through a series of tools such as mobile APP, website, and email, and report the response results to the data layer and store them in the data warehouse to judge customer satisfaction with the services provided by the website. The strategy and strategy of network marketing are improved to provide products or services that better match customer needs. The use of big data technology can enable enterprises to quickly and accurately obtain various information, adjust marketing strategies in real time, and have an immediate impact on customers

C. Model Evaluation Criteria

In order to examine the value scale and boundaries of the big data network marketing model and determine its excellence, it can be evaluated from the following five aspects:

1) Simplification of information content: Excessive information content often contains more interfering information, which leads to a decrease in the efficiency of information processing by enterprises. Streamline information content and reduce interference information, thereby reducing unnecessary information feedback and improving the quality of decision-making factors.

2) Value of extracting information: What enterprises need for marketing is to extract valuable information from numerous data. One is to choose an effective new social media platform under the media trend of the digital age, and the other is to choose an appropriate social media platform channel from the aspects of communication accuracy, interactivity, and leader "word-of-mouth" effect.

3) Accuracy of consumer needs: On the one hand, listen to consumers' discussions, evaluations, hobbies and needs of products or services through social media. On the other hand, information is fed back to enterprises through data to manage and monitor consumer needs.

4) Effectiveness of user communication: Establish effective communication with target groups, build a good user experience, and at the same time let consumers become disseminators of the enterprise. It is necessary to choose a personalized dialogue mode, establish a specific group communication, gain insight into the psychology of users, and establish a complete after-sales service system.

(5) Real-time performance of effect evaluation: Big data is mixed and cannot be accurately processed. It is necessary to check the appropriateness of marketing strategies in real time, and strengthen the inspection of the delivery effect of online marketing methods such as video advertisements.

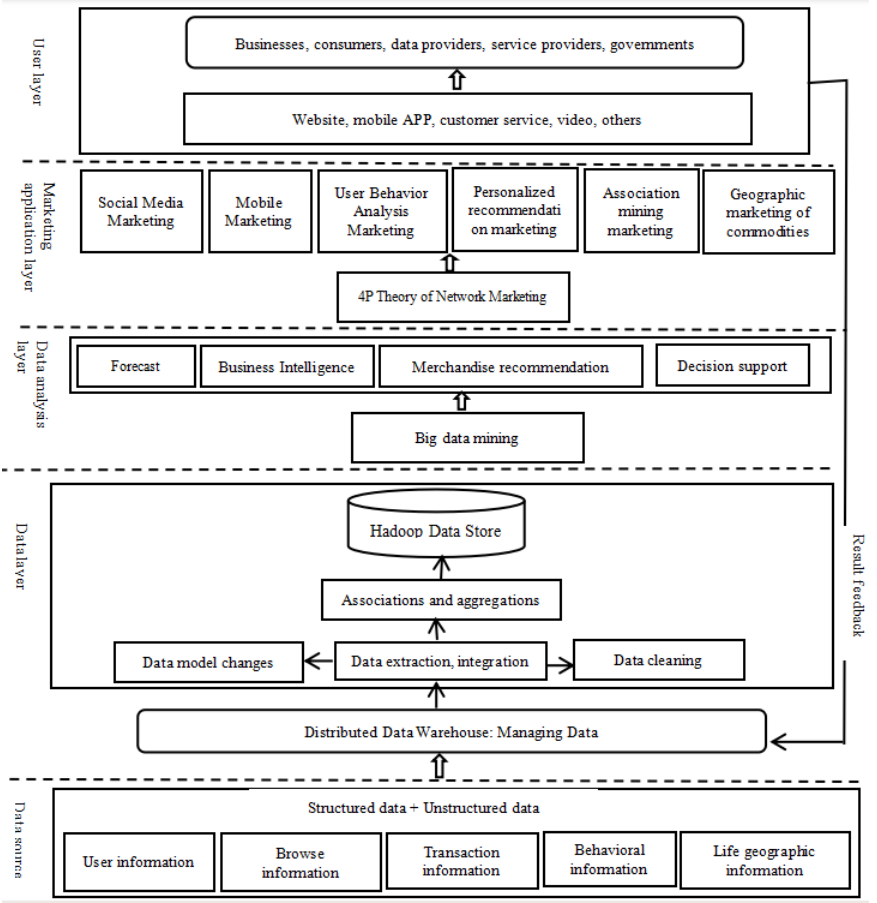

Figure 1 Network Marketing Model in Big Data Environment

III. Marketing Value of Big Data Network Marketing Model

A. Predict Consumer Behavior

The behavior of consumers is affected by specific behavioral factors, showing complex and diverse characteristics. Different consumers have their own emphasis on needs, preferences, and ways of choosing products. In terms of product selection, its behavior is also very different. Through the analysis of consumer data, we can predict the next step of consumer behavior, formulate corresponding stimulus strategies, and encourage consumers to buy.

B. Guide Products and Marketing Activities

Big data drives online marketing, using big data mining technology to analyze consumer behavior and optimize corporate marketing strategies. By analyzing the "big data" generated by various social media, we can recommend products they are interested in to users, detect the effectiveness of marketing strategies based on user feedback data, optimize marketing strategies, and improve consumer satisfaction.

C. Describe the Consumer More Complete

Analyze and process the data, mine the characteristics, preferences and purchasing habits of users, and describe consumers more and more carefully according to the data left by users on the Internet. Consumer data includes: browsing website data, social media data, geographic location data, etc. The mining of these data can better describe the complete characteristics of users. For example, by using big data technology to describe consumers' clicks, access process, purchase decision-making and evaluation on an e-commerce shopping website, consumers can be described in an all-round way, and consumers' age, occupation, gender and hobbies can be analyzed.

D. Personalized Marketing

Big data is an accurate and diverse analysis tool that enables corporate decision makers to segment consumers from a variety of angles. It is no longer a simple group division, but personalized marketing for each subdivided group. For example, accurately classify consumers according to their income, education, age, personality and other characteristics, push different marketing content for different consumers, and formulate "one-to-one" personalized marketing for consumers.

IV. Conclusion

With the rapid development of the Internet, data has penetrated into every industry and business functional field and has become an important production factor. For enterprises, the advent of big data drives changes in marketing concepts, management, and methods. Big data network marketing has become an important marketing method in the new era, and it is an inevitable trend in the development of network marketing. The big data network marketing model that this paper tries to build actively responds to this development trend, and fits big data and network marketing well through the establishment of the model. Through the application of big data in online marketing, it is possible to fully deconstruct the correlation of users' social networks, tap the potential needs of customers, effectively segment the market, accurately understand customers, and use the right channels at the right time. Push the correct information to customers, realize the "precision marketing" of enterprises, and let online marketing set sail on the wave of big data.

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References

1. CNNIC. The 53rd Statistical Report on Internet Development in China [R]. China Internet Network Information Center, 2024.
2. Ying Hu, Guanfeng Zhang. Network Marketing [M]. Zhenjiang: Jiangsu University Press, 2021.
3. Liu Jiaguo, Zhou Jinxia. Research on Big Data Network marketing model based on BI theory [J]. Journal of University of Electronic Science and Technology of China (Social Science Edition), 2018 (06).
4. Bo Wang, Chun Han. Research on Big Data Application Technology in Network Marketing: Current Situation and Development [J]. Guangxi Economy, 2022 (2).