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Research on Innovation of Automobile Marketing Mode Based on Big Data Marketing

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***Abstract*—With the rapid development of the Internet, the application of big data is more and more extensive. Compared with traditional marketing, big data marketing has significant advantages in market information acquisition, data processing and analysis, and data application. For the automotive industry, the traditional marketing mode is facing severe challenges due to the development of big data technology. In view of this form, a new marketing mode based on big data marketing, which is called precision marketing, came into being. The new automobile precision marketing mode based on big data can be implemented from the following aspects: precise positioning based on big data analysis, accurate push based on big data mining, and fine management based on big data application.**

Keywords-innovation; automobile marketing; big data marketing

I. INTRODUCTION

Since McCarthy, a world-famous consulting company, first summarized the concept of big data systematically in its 2011 Research Report big data: the next new field of innovation, competition and productivity, there have been a lot of big data related research in the field of big data [1]. Like material assets and human capital, data has become one of the important production factors. McCarthy consulting company calls big data technology another disruptive technological revolution in IT industry after cloud computing and Internet of things. At present, the research and application of big data has become a hot spot in the field of information technology. As a pioneer in the field of big data, Victor michaelenberg's big data era is a milestone of big data. Michael Schoenberg thinks: the essence of the world is data, and big data will open a major era transformation[2]. He expounded the social and commercial changes in the era of big data from the perspectives of thinking, business and management, which involved all aspects of our life.

For automobile marketing, accurately grasp the market situation and seize the development opportunities can create greater development space for automobile enterprises and bring greater economic benefits. The accurate data provided by big data technology can truly reflect the consumption trend of consumers, so as to take more targeted marketing scheme in the process of automobile sales and effectively improve sales performance.

II. DIFFERENCE BETWEEN BIG DATA MARKETING AND TRADITIONAL MARKETING

Applying big data to enterprise marketing activities and improving the effectiveness and efficiency of marketing activities for enterprises through big data analysis is called big data marketing. Mikalai Tsytsarau, Themis palpanas pointed out that through big data technology, a large number of structured, semi-structured and unstructured data existing in the Internet can be collected, and the potential value hidden in a large amount of data can be obtained through data mining, so that enterprises can more accurately analyze customer needs, further update product content, and achieve better marketing effect[3]. Yuan Qing pointed out that in the era of big data, the traditional marketing competition is developing in a red sea, and the huge marketing cost has become a heavy burden for enterprises[4]. Xu Tao believes that big data marketing is mainly through recording and collecting consumer behavior and habits to label consumers, so as to provide targeted consumer services[5].

In the era of big data, great changes have taken place in the marketing mode of enterprises. Big data marketing is not only based on the continuous collection of large samples of data, but also actively explores the relevant relations. It can analyze the relationship from the miscellaneous data and apply it to the following marketing scheme, which not only improves the rapid response ability to the market, but also improves the response to the personalized needs of customers. The differences between big data marketing and traditional marketing are mainly reflected in the following aspects:

A. Market information acquisition

Because big data has the characteristics of large amount of data, complex data structure and diversified data modes, enterprises are facing greater challenges in obtaining market information. Firstly, the market information of the external macro and micro environment faced by enterprises may exist in various types, such as text and video; secondly, the amount of information is rapidly increasing with the popularity of the Internet and the development of e-commerce; thirdly, the traditional market research methods may be outdated, and new research methods based on the Internet should be adopted with the help of new technologies; fourthly, consumer consumption concepts and preferences are in the form of Website browsing, micro blog and so on are displayed in different ways.

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B. Data processing and analysis

Timely and accurate extraction of information and knowledge from massive data to provide support for marketing decision-making of enterprises is the requirement of each department of enterprises for marketing information system, which requires the processing and analysis of massive data. Data warehouse, data mining technology and so on become the current hot technology. At present, the processing of massive data mostly uses machine cluster and parallel technology, and there are high-performance computing, grid computing, cloud computing and other methods, which pose a serious challenge to the security of enterprise information and data.

C. Data application

Through the above several links, enterprises can use the data obtained from the analysis in the process of marketing management, so as to grasp the market opportunities, determine the target market, carry out new product development, draw up the marketing strategy and marketing mix strategy of the enterprise, and ensure the effective planning, organization, implementation and control of the entire marketing activities.

III. CHALLENGE OF BIG DATA TO TRADITIONAL AUTOMOBILE MARKETING MODE

A. Challenge to the connectivity of data

The traditional automobile marketing model is based on sampling data survey. Due to the limitation of manpower, material and financial resources, it is difficult to guarantee the representativeness, randomness and accuracy of sampling data. If the accuracy of sampling data has problems, it will be difficult to accurately grasp the basic situation and needs of customers in the process of automobile marketing. In addition, automobile enterprises also invest a lot of money in advertising design and advertising publicity every year. If there is no complete customer information database, then they can not understand the requirements of most customers, which will greatly reduce the effect of advertising, thus greatly reduce the revenue of enterprises, and even lose money. At the same time, due to the fact that automobile enterprises and 4S stores are independent legal persons, they have different management methods and business objectives, so the data are isolated from each other. If the data is isolated, not only can not guarantee the comprehensive understanding and tracking of customers, but also there will be duplication between the data, which will lead to many problems in the process of automobile marketing.

B. Challenge to the application field of data

With the rapid development of information technology and automobile industry, big data technology has been applied to all parts of the automobile industry. The production, sales and after-sales service of automobile industry need to sort out and collect the information and data of consumers, and then grasp the psychology of consumers in different processes, and finally achieve the needs of production. In the process of automobile manufacturing and production, EPR information processing method is mainly used for enterprise management and production quality control. In the process of car sales, DMS system is mainly used to sort out and process all kinds of customer information, so as to help sales personnel have a more accurate understanding of the requirements of consumers. In the process of after-sales service in the automobile industry, the CRM system is mainly used to sort out the data of each car and the requirements of consumers, so as to realize the superiority of service.

C. Challenge to data integrity

Rich data resources are the premise of marketing mode reform in the era of big data, because only through rich data resources can we accurately understand the needs of customers. According to the current situation of automobile marketing mode, how to master the needs of consumers and meet the expectations of consumers is the first problem to be solved. Big data technology can make automobile enterprises survive in the fierce competition, and can also enhance the value of their own brands and enhance their own industry competitiveness. However, in the process of automobile marketing, the collected data are relatively trivial and scattered, so it is necessary to strengthen the management of the collected data. Big data technology is based on Internet technology, so it requires data managers to extract data reasonably, and then establish an accurate and complete database, so as to enhance the competitiveness of enterprises. Typical representatives of big data application scenarios are typical search engine companies (Baidu), social networking companies (Tencent) and e-commerce companies (Taobao) at home and abroad. These application scenarios are representative in China at present. On the whole, customers' evaluation of them is relatively high. Baidu, a search engine company, can solve the doubts of various users, and the whole operation process is also more convenient. Therefore, automobile marketing enterprises' massive information can be obtained from the application scenarios of big data

IV. BIG DATA APPLICATION IN AUTOMOBILE MARKETING

A. Research introduction

This study focuses on the impact of customer interaction on customer satisfaction in 4S stores. Through big data analysis, it can provide suggestions for automobile sales personnel to improve their interactivity, make automobile 4S stores attract more customers in actual marketing, make customers obtain satisfaction and trust, improve customer satisfaction, and then improve automobile sales rate. In this study, customer interaction is measured from three dimensions: controllability, responsiveness and bidirectional. Customer interaction is an independent variable and customer satisfaction is a dependent variable. The data was from the customer database of an automobile 4S store. 400 samples were selected from people who have bought cars in automobile 4S stores. Among them, 63% were male and 74.09% were 30-49 years old. They became the main force of car purchasing. SPSS software and Amos software were used for data analysis.

B. Variable measurement

The fitting indexes of customer interaction confirmatory factor model are shown in Table 1. According to the data in the table, the absolute fitness index $X\ 2 / DF < 3$, $RMSEA \leq 0.08$, meet the adaptation standard. The value-added adaptation index (NFI), TLI and CFI were 0.915, 0.935 and 0.950 respectively, which were all greater than 0.9. Therefore, the interactive measurement model achieves good fitting degree.

TABLE 1 INTERACTIVE MODEL FITTING INDEX

X^2/df	RMSEA	NFI	TLI	CFI
2.278	0.08	0.915	0.935	0.950

According to the data in Table 2, the absolute fitness index (X 2 / DF, RMSEA) and value-added adaptation index (NFI, TLI, CFI) meet the adaptation standard. Therefore, the measurement model of customer satisfaction has good fitting degree.

TABLE II OVERALL FITTING INDEX OF CUSTOMER SATISFACTION

X^2/df	RMSEA	NFI	TLI	CFI
2.075	0.073	0.983	0.982	0.991

C. *Data analysis*

Table 3 and table 4 show that the R-square value of the relationship between shopping website interactivity and customer satisfaction is 0.614, and the adjusted R-square value is 0.608, indicating that the fitting degree of the regression equation is 60.8%, which is within the acceptable range. The standard estimation error is 0.450, which indicates that the gap between the regression model results and the target results is acceptable, and the F-test value is 105.002, and the significance probability is 0.000, which means that there is a significant correlation between the two.

The regression results show that bidirectional, controllability and responsiveness are added to the regression equation in turn, and the bidirectional first enters into the equation, indicating that the contribution to customer satisfaction is the largest, followed by controllability, and responsiveness finally enters the equation, and the regression coefficients among three dimensions are 0.391, 0.245 and 0.207, respectively. According to the results of regression analysis, we can get the standardized regression equation of each dimension of shopping website interaction and customer satisfaction: customer satisfaction = 0.391 * bidirectional + 0.245 * controllability + 0.207 * responsiveness + 0.190. From the above data analysis results can be verified: customer interaction has a positive impact on customer satisfaction, in which two-way, controllability and responsiveness have a positive impact on customer satisfaction.

TABLE III MODEL SUMMARY

model	R	R2	adjusted R	Standard estimate error	Debin Watson	F	Sig.
1	0.752[a]	0.566	0.564	0.474		261.050	.000[b]
2	0.777[b]	0.604	0.600	0.454		151.694	.000[c]
3	0.784[c]	0.614	0.608	0.450	2.018	105.002	.000[d]
a. Predictive variable: (constant), bidirectional							
b. Predictive variables: (constant), bidirectional, controllable							
c. Predictive variables: (constant), bidirectional, controllable, responsive							
d. Dependent variable: customer satisfaction							

TABLE IV COEFFICIENT

model		Non standardized coefficient		Standardization coefficient	t	Sig.	Collinear statistics	
		B	Standard error	Beta			Tolerance	VIF
1	(constant)	.753	.191		3.948	.000		
	Bidirectional	.797	.049	.752	16.157	.000	1.000	1.000
2	(constant)	.578	.187		3.088	.002		
	Bidirectional	.565	.071	.534	7.935	.000	.440	2.272
	Controllability	.271	.062	.293	4.351	.000	.440	2.272
3	(constant)	.481	.190		2.531	.012		
	Bidirectional	.414	.097	.391	4.272	.000	.233	4.287
	Controllability	.227	.065	.245	3.520	.001	.401	2.492
	Responsiveness	.224	.098	.207	2.282	.024	.236	4.232
a. Dependent variable: customer satisfaction								

D. *Research results*

Through the big data analysis of automobile 4S shop customers, it is concluded that customer interaction has a significant positive impact on customer satisfaction. Customers can obtain more product information through communication with automobile 4S stores, so as to improve their satisfaction. Therefore, during the process of automobile sales, customer service's timely response to customer's questions and targeted solution to consumers' doubts can satisfy consumers' understanding of commodities, make consumers feel the importance of automobile 4S stores to service quality and consumers' demand, and have trust in 4S stores and then improve satisfaction.

V. INNOVATION OF AUTOMOBILE MARKETING MODE BASED ON BIG DATA MARKETING

As a new marketing model, the key to big data marketing is to quickly reflect all kinds of data and information, and transfer the effective product information or advertising information to the potential customer groups through effective carriers at the right time and in a reasonable way. With the advent of big data era, enterprises need to change the traditional marketing mode and implement a precision marketing mode. The concept of precision marketing was first formally proposed by Philip Kotler, an American marketing expert, in 2005. He believed that enterprises need precision marketing mix with measurable and high return on investment, and also need to develop marketing plans that focus on results and actions. With the help of big data analysis and application, 4S stores can accurately push advertising information of different models for target customers, and improve the click through rate and conversion rate of information[6]. The automobile precision marketing mode based on big data mainly includes three aspects:

A. *Precise positioning based on big data analysis*

The application of big data technology promotes the deep mining of high-value data in massive big data information. In order to enhance the competitiveness of automobile enterprises and occupy the market competitive advantage, it is very important to mine and obtain the data information of consumers and competitors. Based on the development of

automotive electronic technology in China, sensors and chips are widely used in the production and manufacturing of automobiles. Enterprises can use sensors and chips to collect and sort out the relevant data, and analyze the performance of automobiles based on these data, and comprehensively grasp the behavior and habits of consumers, and then in the follow-up process of automobile research and development, the basis for Consumers like to improve and innovate automobile R & D, so as to achieve the precise positioning of the developed products, and effectively enhance the competitive advantage of enterprises while meeting the needs of customers.

B. Accurate push based on big data mining

If automobile enterprises want to realize the accurate dissemination of information, the key premise is to find the audience target. Based on this, in the specific precision marketing process, automobile enterprises can analyze and sort out the information such as consumers' interests and hobbies, brand concerns, search content, regional attributes, consumption ability, social habits, etc., so as to realize the mining of consumer consumption rules, and then implement precise push to explore the corresponding consumer groups. Precision push includes relevance recommendation and personalized recommendation. Relevance recommendation is based on the horizontal latitude and vertical dimension of the automobile website. Each user sees the same push content and ranking order. It is pushed according to the number of hits, industry hot spots, comments and collections. The personalized recommendation method, each netizen sees the content, the sorting way is not the same, the recommendation principle is according to the user's portrait tag matching recommendation.

C. Fine management based on big data application

Based on the application of big data technology, automobile enterprises can improve the efficiency of data collection and processing customer information, vehicle information, procurement information, transaction information, production information, etc. Based on this, automobile enterprises can use big data technology to construct big data platform, so as to provide basis and suggestions for relevant decision-making of automobile enterprises. Therefore, in the specific process of precision marketing, the top management of enterprises should focus on the integration of data and the construction of big data platform. In addition, it is necessary to build professional data analysis team and mining team according to the actual situation, so as to provide support for big data analysis and ensure the smooth development of its precision marketing.

VI. CONCLUSION

For the automobile industry, the whole marketing process can be divided into three parts: early publicity, mid-term sales and after-sales service. The early publicity mainly includes brand promotion and customer development, and the mid-term sales covers a series of service processes after customers arrive at the sales place, including reception, consultation demand, product introduction, test drive, etc. after sales service is the tracking service after delivery. The traditional automobile marketing often attaches importance to the mid-term sales itself, focusing on how to complete the sales and achieve the performance after the customers enter the store, neglecting the early publicity and developing the target customers, which results in extensive advertising, low accuracy, increased cost and unable to improve sales. With the continuous development of big data technology, it supports automobile enterprises to implement the big data marketing mode, which refers to building user database, effectively completing accurate product information push, having insight into consumer demand and grasping consumption hot spots, and timely providing services to improve user experience, so as to improve its performance.

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