The Impact of Big Data Analysis on Consumer Behavior

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Abstract. Based on the new environment of big data, this paper expounds the connotation and characteristics of big data, and analyzes the characteristics of consumer behavior under the application background of big data analysis technology. With the help of AISAS model, which is used to analyze consumer behavior in the network economy, and in combination with the influence mechanism of big data analysis on consumer behavior decision-making process, we have constructed a consumer behavior model under the background of big data and tested it by means of questionnaire survey. The results show that the factors that affect consumer decision-making include external factors and internal perception, while big data affects consumer internal perception through the impact of external factors, thus affecting consumer decision-making. At the same time, consumer information sharing is also conducive to improving the accuracy of big data analysis.

1. Introduction
In the era of big data, data informatization has penetrated into all levels of society. Especially for the participants in the network economy, big data is playing an increasingly important role. Taking consumer demand as the center has become one of the operating rules of modern market economy. Therefore, it is of great significance to discuss consumer behavior under the background of big data. Over the years, many scholars at home and abroad have studied consumer behavior in the network economy with fruitful results. The focus of the research is mostly on how to construct the online consumer behavior model and explore the consumer behavior model.

2. Consumer Behavior Analysis in Big Data Era

2.1 Connotation and Characteristics of Big Data Analysis
The Big data refers to the large amount of data involved in the data collection, and conventional analysis tools cannot complete the acquisition, processing and collation of data in a short period of time. Different from sample analysis, big data analysis is to process all data comprehensively, comprehensively and professionally and obtain effective information from it. It is generally believed that big data analysis has five characteristics: Huge amount of data, ultra-fast calculation speed, diversified data types, low value density and high information authenticity. At present, big data analysis has been widely used in all walks of life and has gradually become an indispensable productive force, promoting the efficient allocation and utilization of means of production and rapidly promoting the improvement of social production efficiency.
2.2 For Consumer Behavior Characteristics in Big Data Era

2.2.1 Consumers' Behavior Choice Is More Rational. The advent of the big data era has changed the way consumers obtain product information, and the information they know is more sufficient and accurate. In the traditional market model, consumers mostly know a certain product or brand through advertisements and lack other information support, which will restrict consumers' rational decision-making. In the era of big data, consumers can fully grasp the product information through massive analysis data, deeply understand the product attributes, and continuously upgrade from the situational involvement of products to long-term involvement. Therefore, consumers will continuously generate positive internal perception and promote the occurrence of consumer purchasing behavior. Nowadays, there are many consumers with high product involvement in the market. Such buyers will use network information search and comparison, as well as other user evaluations, to comprehensively evaluate factors such as product cost performance, brand advantages and their own needs, and finally make more rational purchase decisions[1].

2.2.2 Consumers' Demand Continues to Escalate. The popularity of big data is slowly changing the behavior of online and offline traders. Consumers have higher and higher requirements for choosing online shopping. They not only need the function and quality of products, but also satisfy their pleasure and experience of online shopping, that is, they pay more and more attention to personalized services provided by merchants. The value of trading activities includes the use value of the product itself and the purchase experience value. Furthermore, sometimes the utility brought by the experience to consumers plays a decisive role in the purchase decision. Big data promotes personalized marketing of e-commerce, while consumers are demanding more and more innovative and personalized services.

2.2.3 Consumers' Trust in the Commercial Functions of Social Media has Increased. Nowadays, the commercial functions of social media are continuously explored and utilized, and the commercial value is increasingly prominent. And innovative business models appear in social media and are gradually accepted and recognized by consumers. Through social media, enterprises can master more and more comprehensive personal information of consumers, so as to be able to accurately analyze their personal preferences, habits and other information, so as to better meet the deep needs of consumers or tap the potential needs of consumers. Enterprises can analyze people's habits, beliefs and preferences through social media, and can be accurate to a certain extent, thus forming an almost invasive intimate relationship with consumers and better meeting the deep needs of consumers. And consumers also expect their needs to be paid more and more attention, discovered and satisfied, so they also trust and support the commercial promotion of social media more and more.

3. Construction of Consumer Behavior Model under Big Data Environment

3.1 AISAS Model Analysis Framework Based on Big Data Analysis

In the theory of consumer behavior research, AISAS model proposed by Dentsu Company is more suitable for analyzing consumer behavior choices in the era of network economy. According to the theory, consumers go through five stages from coming into contact with product or service information to finally completing the purchase behavior: A (Action), I (Interest), S (Search), A (Action), S (Share). It is developed according to the traditional AIDMA mode. On the one hand, both of them describe a series of behavioral changes in the process of consumer selection. On the other hand, the difference is that in AISAS mode, two "s" with network characteristics-search and share-have been added, which reflects the importance of search and share in the Internet era, instead of unilaterally transmitting information and inputting ideas to consumers, which highlights the influence of the Internet on people's lifestyle and consumption behavior[2].
Factors that affect consumer behavior are usually divided into two aspects: Stimulation of external factors and internal perception. External factors mainly include product promotion, marketing methods, product price, sales volume, brand, user evaluation, etc., which will stimulate consumers’ internal perception and value judgment, thus affecting consumers’ purchase decisions to a certain extent. The value of big data analysis lies in transforming complex and huge low-density information data into reference data with high commercial value through analysis and processing. On the one hand, big data analysis can help enterprises to better understand consumer demand, determine clear and targeted market strategies, and create more competitive advantages; On the other hand, the results of big data analysis are also used to improve and optimize external factors that affect consumer behavior, guide consumers to make optimal decisions and maximize utility[3].

This paper combines big data analysis with AISAS model to build a consumer behavior analysis framework to explain how big data affects consumer behavior, as shown in Figure 2. The impact of big data on external factors produces external stimulation to consumers through product promotion, marketing methods, information screening, data search and other links, and acts on attention, interest, search and other behaviors, affecting consumers' internal perception and finally making purchase decisions[4]. When the purchase behavior is over, the sharing of purchase experience has also become an important source of information for further big data analysis, which goes back and forth and continuously affects consumers' behavior choices.
3.2. Research Assumptions

Based on this, the consumer behavior model in the big data environment can be expressed by the following formula:

\[ Y = AX_1(X_2) + BX_2 + CX_3 + \varepsilon \]  

In Equation (1), \( X_1, X_2 \) and \( X_3 \) respectively represent the external stimulus factors, internal perception and consumption experience sharing of consumer behavior; \( Y \) represents the purchasing behavior of consumers; \( \varepsilon \) represents the error matrix; \( A, B \) and \( C \) respectively represent the influence coefficients of influencing factors on consumer behavior[5]. So, how does big data affect consumer behavior through the penetration of these influencing factors? How much is the correlation between consumer behavior and influencing factors? In view of these problems, this paper puts forward the following assumptions[6]:

H1: Big data analysis is conducive to improving product promotion paths and marketing methods, and can increase consumers' attention.

H2: Diversification of types of big data analysis is conducive to consumers' comparative analysis and screening out products of interest.

H3: Big data mining helps consumers to conduct all-round information search on target products, generate more rational internal perception and make final consumption decisions.

H4: After the consumer's purchasing behavior is completed, the sharing of product consumption experience will form a new big data supplement, further affecting the consumer's purchasing behavior and forming a virtuous circle.

H5: Good internal perception will positively affect consumers' purchase intention.

3.3 Questionnaire Design and Result Analysis

Based on the above analysis, this paper conducts a questionnaire survey on consumers by means of questionnaires. The survey objects include employees of enterprises, housewives, college students and other groups with strong consumption ability. A total of 380 questionnaires were distributed and 352 valid questionnaires were recovered[7].

First of all, we analyzed the reliability and validity. Validity analysis refers to the effectiveness of measurement, which refers to the degree to which the means and tools in the questionnaire survey can accurately measure the object to be measured. In KMO test, the higher its value, the more it shows that
the survey object is the object to be studied, that is, the more the results of the survey scale can show the real characteristic validity to be measured. The following results are obtained by using SPSS software:

| Indicators | Action | Attention | Interest | Search | share |
|------------|--------|-----------|----------|--------|-------|
| α          | 0.907  | 0.911     | 0.878    | 0.892  | 0.921 |
| KMO        | 0.812  | 0.774     | 0.769    | 0.795  | 0.804 |

As can be seen from the above table, the $\alpha$ coefficient values of each variable in the model are greater than 0.8, indicating that the internal consistency is high and the reliability meets the conditions. KOM values are above 0.7, and the availability level is also high.

After we carry out regression analysis on the hypothesis model, the verification results are as follows:

| Assumption | Coefficient | T value | Conclusion |
|------------|-------------|---------|------------|
| H1         | 0.635       | 9.728   | Support    |
| H2         | 0.783       | 14.304  | Support    |
| H3         | 0.867       | 12.626  | Support    |
| H4         | 0.846       | 14.572  | Support    |
| H5         | 0.857       | 12.435  | Support    |

As can be seen from the above table, the five assumptions in the model are all valid. Big data will act on the whole process of consumers' purchase decision-making and affect consumers' internal perception through external stimulation. At the same time, consumers' subsequent consumption experience sharing will continuously optimize and update the basic database of big data analysis. In addition, we can also see that the screening of relevant information and data search have a significant impact on consumer behavior.

4. Conclusion
With the development of big data analysis technology in the modern network economy, many network platforms or enterprises participating in e-commerce will collect personalized behavior information of consumers, and use big data analysis and processing technology to integrate and extract effective information, and make targeted recommendations to consumers accurately. Under the attraction of this "tailor-made" promotion mode and marketing methods, it is easier to stimulate consumers' interest and even change consumers' demand preferences, thus significantly improving the substitution effect of related commodities[8]. At the same time, as the era of big data makes product information quantitative, transparent and accessible, consumers can also independently collect relevant information of intended products, read relevant big data analysis conclusions, realize rational consumption, and achieve the expected utility value to the greatest extent[9].
The Internet provides a platform for every consumer to share the experience of purchasing and using products. After processing these low-density information through big data analysis technology, an objective product evaluation system can be constructed to help consumers make wiser shopping decisions.

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