

Big Data Analysis Implementation in Consumer Behavior

Tiantian Shan^{1,*†}, Keyu Shen^{2,†}

¹ School of Public, Administration South China Agricultural University, Guangzhou, China

² Business school, East China University of Science and Technology, Shanghai, China

* Corresponding Author Email: zsb@scau.edu.cn

† These authors contributed equally.

Abstract. In the era of mobile Internet, short video has become a leader among them in just a few years. With the increasing number of users, a new e-commerce model has also emerged. This article will use big data to analyze two well-known Internet companies in the e-commerce industry, i.e., Xiaohongshu and Douyin. To be specific, we will focus on the impact of their marketing models on consumer behavior, analyzing the pros and cons, and seeking effective improvement measures. According to the analysis, further understanding of the emerging e-commerce model will be presented. In addition, a better understanding of consumer psychology will also be demonstrated. Meanwhile, we realize the limitations of this e-commerce model, and put forward corresponding effective suggestions. It is conducive to creating a good online shopping environment and regulating bad behaviors as well as to better safeguarding the rights and interests of consumers. These results shed light on guiding further exploration of consumer behaviors in the e-commerce industry.

Keywords: Big Data, e-commerce model, consumer behavior.

1. Introduction

With the continuous development of Internet and mobile technology, the country's electronic industry has achieved rapid development. According to China Commerce industry Research institute, it is predicted that market size of China will reach 6.79 trillion yuan in 2022. China's online retail sales have continued to grow since 2019. Influenced by the epidemic, online retail sales in 2021 exceeded 12 trillion yuan. In the first half of 2022, China's online retail sales totaled 6.3 trillion yuan, up 3.1% year. An increase of 2.2% compared with the same period last year [1].

With the development of internet enterprises and e-commerce enterprises, big data is playing an increasingly prominent role. Big data application is a new generation of information system engineering technology with data as its essence. Through the collection and processing of information on mobile Internet, Internet of things, social networks and other network platforms, more accurate content delivery can be achieved for consumers. As the structure of consumer goods tends to be diversified, users' perception of product value will be constantly affected by external information. Social media has become a mainstream information exchange platform. Mobile video and mobile shopping have high activity and penetration rate. It plays an important role in the factors that affect users' willingness to consume. Consumers will have more information to choose products and more channels to receive product information, they can promote information also.

Big data analysis can create tremendous economic benefits and social value for the society. It helps enterprises to accurately put goods on the market, improve the success rate, and obtain greater profits. As the much-discussed Internet companies in recent years, Douyin and Xiaohongshu not only pioneered live streaming of goods. New delivery channels (e.g., embedding advertisements in videos and articles) have changed the traditional consumption behaviors of consumers to a certain extent through big data analysis and the new shopping mode created by them. The traditional consumer behavior will change due to the emergence of big data, social + online shopping new consumers behavior is gradually forming in the context of the era of big data. Jin et al. established a model based on S-O-R theory and analyzed factors influencing consumer decision-making behaviors in the big data environment [2]. Liu et al. investigated the influence of big data on consumers' online and offline purchasing behaviors [3].

This study would take Douyin and Xiaohongshu as research objects and mainly focuses on the influence of big data analysis on the realization of consumer behaviors in the two Internet enterprises. Specifically, we will investigate the live streaming with goods mode based on big data analysis and the influence of the Douyin and Xiaohongshu article advertising on the realization of consumer behaviors. It will also make suggestion on how enterprises and the Internet industry can adapt to the changes in consumer behaviors brought about by big data. The study will illustrate the principle of big data analysis, data analysis in the application of the Douyin and Xiaohongshu, and the influence on consumer behavior. In addition, it will analyze the shortcoming, put forward suggestions for Internet companies to use big data analysis.

2. Basic descriptions of big data

With the development of information and network technology, the digital economy has become a key point of China's economic development. In the context of big data, the styles of online platforms and consumers' purchasing habits are diversified. It is necessary to gradually expand the collection of consumer data and analysis of behavior to more data sources, combining shopping websites, other web browsing information, social media platform information, search engines and other platforms are used to reach consumers and mine data for comprehensive evaluation and analysis. The AIDA model proposed by E. ST. Elmo Lewis in 1898 was one of the mature theories to study consumption behavior.

In 1925, Edward. K. Strong Jr added a "Memory" stage to the contact of the four-stage model, and proposed a five-stage AIDMA model. The AIDMA model was divided into five stages: Attention-Interest-Desire-Memory-Action, which was intended to describe the audience's dynamic guidance from receiving information to generating action. With the popularization of the Internet and mobile applications, profound changes in the communication environment, and changes in the relationship between audiences and media, audiences played dual roles as receivers and publishers of information. In this context, in 2005, Japan Dentsu proposed the AISAS evaluation model in the context of the web2.0 era. The AISAS model was divided into five stages: Attention-Interest-Search-Action-Share, the emergence of two "s" with Internet background characteristics—search and share pointed out the importance of consumers' active behavior in the Internet age.

The transformation process from AIDMA to AISAS model was based on the change of media and audience behavior in the context of the web2.0 era, creating a new paradigm of evaluation based on the web2.0 Internet era. In 2011, after AISAS, Dentsu released the "SIPS Model" analysis tool. The model was divided into four stages: Sympathize-Identify-Participate-Share& Spread. Under the background of human beings entering the era of "dialogue", the relationship between social individuals and information has changed, social individuals actively retrieved and shared personal information, and individuals with the same opinion gathered in groups. The three behavioral links of "participating in action" and "sharing and spreading" were clearly expressed. This model indicated that consumer behavior research has entered the digital age, and the stage of in-depth analysis of platform audience behavior. Based on the transformation of the Internet and mobile communication technology in the digital age, the channels, and ways for consumers to receive information have changed. Therefore, research needed to switch to more point, non-linear scenes. The development of the three stages of the consumer research framework model reveals the process from the early research on consumer behavior to the deep analysis of consumer intentions, thus providing an important reference for the transformation of consumer behavior research paths and methods [4].

3. Consumer behavior analysis of e-commerce

Wan takes the Xiaohongshu as an example [5]. They studied the psychological motivation of users to use social media and analyzed the relationship between their purchase intention and platform factors. Through the SPSS reliability and validity test, the research shows that users will judge,

evaluate, and agree with the quality of the browsing notes viewed. It shows that users will judge information according to their own value when choosing information, while the Xiaohongshu forms precise and personalized content recommendation through users' preference data to meet the personalized needs of users, and thus screen out the information really needed by the audience to contact the Xiaohongshu. Linear regression test, with the willingness to buy (consume) as the dependent variable, the user's motivation in personal image improvement, information selection judgment and social interaction were taken as the independent variables, which proved a significant linear correlation between the users' motivation and consumption willingness and had a positive impact.

Xie and Jiang took Xiaohongshu and Douyin as examples [6]. They mainly discussed how the information in social media affects the willingness to consume, and what psychological mechanism of rational thinking and impulse ideas combine or act on the final consumption willingness respectively. Based on the reflection-impulse model, it analyzed the willingness of RIM system to consume online users in the process. The data shows that the number of positive and negative information and the feedback ratio obtained from the UGC and its comments will affect the users' perception of product value, and make decisions through the comparative analysis of value judgments and expected values. The dynamic presentation mode of video is more in line with people's experience and cognitive mode. The dual impact of visual and hearing will further stimulate the diffusion and activation of IS association network, and the formation process of willingness will be smoother. The more professional the information provider, the higher the influence and reputation, the more the users can trust, and the cognitive efforts of systematic processing can be relatively reduced. The stimulation of positive information can directly affect the willingness to consume the formation of. Some users subjectively prefer the detailed description and experience of other users in the form of text and text. The whole browsing mode is conducive to quickly grasp the target information, to improve the efficiency of RS to obtain effective information.

4. Xiaohongshu

Xiaohongshu is a famous e-commerce platform, including the Xiaohongshu community and consumption window. The uniqueness lies in word-of-mouth marketing and authentic self-operation, which not only attracts users but also attracts a large number of businesses to contact bloggers for promotion. Social media platforms are dominated by young audiences, who have stronger cognitive ability and receptivity to media. However, Xiaohongshu has strong sociability and weak relationship link, which attracts young people to explore the use of social networking and sharing functions through the platform. According to the research, the gender distribution of Xiaohongshu users is far more female than male. The majority of users are female. Although the users group structure of Xiaohongshu is diversified, most of them are employees and students from enterprises and public institutions, accounting for about 80%. This kind of group has relatively stable monthly income, the overall consumption shows a continuous and stable situation. To sum up, the user's profile of Xiaohongshu is clear. Its main audience is young women with stable income and sustainable consumption power. Audiences tend to use platforms that can provide communication, sharing, leisure and entertainment function based on their own consumption needs. Xiaohongshu, as a typical social media of shopping and sharing, it is meeting the needs of this user's group. Xiaohongshu mainly delivers goods based on articles published by its bloggers and the shopping section of the platform. Comparing Xiaohongshu with Douyin, the threshold to cash out is lower, and Xiaohongshu gives the opportunity to thousands of fans to cooperate with the brand for promotion. Big data analysis will judge the preferences of users according to their geographical location, frequency of clicking, liking, and forwarding content, and search content, and adjust the content pushed to improve the duration of user stay and increase user stickiness. The big data analysis adopted by Xiaohongshu also has a certain influence on consumer behavior.

The results show that price is one of the important factors influence consumers' purchase decision, and an important basis for consumers' channel choice. In terms of channel selection, online discount has a significant impact on consumers' channel selection, while offline discount has a weak impact. Because online merchants do not need to pay rent such as store space, they reduce the cost of goods and thus lower the price of goods. Therefore, the difference between online merchants and offline commodity prices is conducive to attracting more consumer with low prices or discount. In addition, the platform often offers discounts or offers in the form of Xiaohongshu envelopes and welfare to stimulate consumers' consumption.

In Xiaohongshu, business will invite bloggers for promotion, which is equivalent to use the flow and word-of-mouth effect of bloggers for promotion. The goods can be certified by them, which can greatly improve the word-of-mouth and flow of goods. Some business will contact multiple bloggers that have a large fan base, so the amount of reading and clicking on the article will have a good effect, which can play a good publicity effect. Commodities have a greater chance of exposure, which is more conducive to the exposure of commodity information resources. When a product appears in front of the users for many times, it can deepen the impression of the user on the product and improve the consumer's consumption desire imperceptibly. When consumers see recommendations from bloggers they like or trust, their purchasing power will increase to a greater extent.

Purchase intention refers to the likelihood that a consumer will buy a certain product. It is not only affected by its preferences and value judgement, but also influenced by external information, such as public praise. On the network, everyone can express their views and comments, so as to provide more information to more consumers and establish the reputation of goods. Generally, the greater the amount of product-related information acquired by users, the stronger they perceived usefulness of the information [7], which will promote the formation of consumption intention. The interview results show that when users browse the relevant information content, RS tends to identify the information with a large number of followers, a large number of comments and likes and rich content of the blogger. The more consumers participate in the discussion of the product, the greater the possibility of users to know the product information [8], which is also conducive to reducing the risk of consumption decision (as shown in Fig.1). In addition, different from other social media platforms, Xiaohongshu sets a shopping mall model on its home page to realize the combination of social networking and e-commerce functions. By participating in the comments pushed by notes and videos, users can communicate and exchange information with users with common consumption needs. The link from the note page can be directed to the product page, thus enhancing the purchase intention.

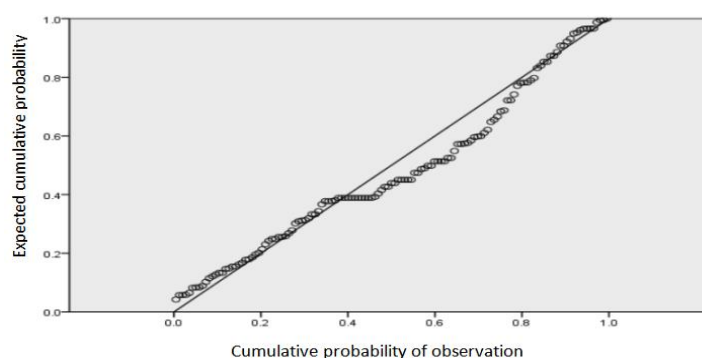


Figure 1. Willingness to buy the item

5. Douyin

With the growing development of the e-commerce industry, a new business model "live streaming" has emerged. The article takes Douyin as an example to analyze consumer behaviors from the perspective of live streaming. Douyin is a short video sharing platform designed to help users express themselves and record a better life. In such a platform, users can create their own short music video works and share them with others, so as to get likes and attention from others. According to the "2018

Douyin Big Data Report", the daily active users of Douyin in 2018 were 250 million; the "2019 Douyin Data Report" indicated that the number of daily active users of Douyin in January 2020 exceeded 400 million.

According to the "2020 DouYin Big Data Report", as of August 2020, the daily active users of Douyin have exceeded 600 million. This means that at a time when the growth rate of the Internet is slowing down and the dividends are declining, the traffic of the Douyin platform is still growing against the trend. Faced with such a huge user traffic, Douyin has gradually explored a suitable and innovative business realization path in the process of development. The Douyin delivery models are mainly video implantation and advertising marketing, direct entry of merchants, and live delivery of goods [9]. At the same time, it has derived a variety of e-commerce functions (product window, Douyin store, video shopping cart, Douyin applet, DOU+ promotion, Luban e-commerce, etc.), which also provides technical support for the continuous innovation of its delivery model. In the whole process of live broadcast and delivery, there is more internal logic: when the user opens the software, the Douyin background will use big data to track the content of the customer's vertical field, the interactive content in the account in related fields, and the works uploaded by the user. The significance of this is that users can get recommendations for their favorite live broadcasts in the early stage of using the APP, which greatly improves customer satisfaction, and brings more traffic support to the live broadcast room while increasing customer stickiness. Meanwhile, Douyin's live delivery model has also had a significant impact on consumer behavior.

Economist Dusen Bailey once proposed that consumer consumption would be affected by the consumption level of surrounding consumers and determine consumption. It is the existence of the relative income hypothesis that stimulates the consumption of the Douyin platform [10]. On the platform of live broadcast with goods, there are often thousands of consumers in a general live broadcast room. First, the anchor with goods will set the price of the goods very low, which is very attractive to consumers. On the one hand, it has attracted many offline consumers. On the other hand, consumers who originally did not need the product will rush to buy it because the price is extremely low. The anchor will use the countdown method to stimulate consumers to place orders, and at the same time, they will continue to explain on the platform how many orders are left for the product, or the original price will be restored in a few minutes. When consumers see that so many people in the live broadcast room are buying the product, they are influenced by the surrounding consumers and hurry up to buy. So, the relative income hypothesis is completely consistent. Secondly, the consumption mode of each commodity in the live broadcast platform is basically to give a platform price first, and then start the seckill during the live broadcast, and give a seckill price. The time is very short and the number of commodity supply is limited, which stimulates consumers' desire to buy.

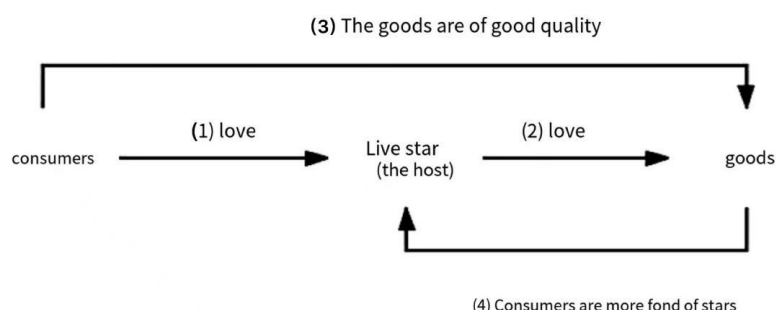


Figure 2. Star Bringing Goods Effect

It is not uncommon for celebrities to bring goods in the Douyin live broadcast room. The celebrities here are mainly divided into two categories, one is the live broadcast influencers, and the other is the popular stars. As depicted in Fig. 2, the advantage of celebrities bringing goods is that they have a lot of fans, high attention, and great attraction. In the monthly rankings, the top two live broadcast rooms both help broadcast stars, and the higher the popularity of the stars, the higher the volume of goods they bring [11]. The quality factor of the products it brings will be weakened to some extent due to

the love for stars. As long as the products are recommended and used by stars, they will be purchased unconditionally.

The consumer psychology of greed for cheap is common in most consumers when they buy goods. The higher the utility level, the greater the propensity of consumers to buy. The utility level mentioned here does not only refer to the utility level when consuming commodities, but also includes the pleasure of consumers when they buy low-priced commodities, that is, purchasing utility. One of the marketing methods often used in live broadcasts is to set the price of a commodity at a very low price, but not everyone can buy it. It is necessary to wait for the popularity of the live broadcast room to reach a certain amount. They often delay time and attract more of consumers enter the live broadcast room, and then conduct ultra-low price spikes. In order to obtain the cheap commodity, consumers will stay in the live broadcast room and wait, and if the price reaches a low price in seconds, the utility level of consumers in the purchase process is great. The lower price of consumption caters to consumers' purchasing psychology. Consumers often do not pay too much attention to the reasons for the low price of goods. When the platform anchors say that their products are the lowest price on the entire Douyin platform, they do not care about the platform's price. The bigger the coverage, the better the price of this product on other network platforms, just blindly trust the anchor to trade [12].

Big data analysis also has many shortcomings in the realization of consumer behavior. The content of big data screening and push is mixed. Due to the low threshold and low requirements for bringing goods, many products do not match the video content. Big data analysis lacks big data analysis and still lacks a complete sales system and standard requirements. Exaggerated propaganda, false propaganda, shoddy, and no after-sales problems emerge in an endless stream. Users who buy products of poor quality without knowing whether the products are good or bad will also have a bad impact on the reputation of the entire delivery industry. It is not conducive to safeguarding the consumer rights and interests of users, nor is it conducive to the analysis and subsequent push of products by big data. At the same time, the big data supervision system still needs to be improved. The level of the anchors who bring goods is also uneven. As long as they have a short video client, they can participate in the delivery of goods, which brings dazzling products to users. At the same time, because of the low threshold for bringing goods, many unscrupulous merchants and unscrupulous videos flood in. Usually, false and exaggerated propaganda is pushed to the majority of users without even knowing the product at all. Not only can it not allow consumers to buy high-quality and cheap products, but it will also cause a lot of trouble to consumers. The analysis of big data still needs to be studied and improved in these aspects.

6. Suggestion

According to the analysis, it is necessary to strengthen supervision, standardize platform sales standards and specify requirements. Platforms should timely update and promote the delivery standards of the short video platforms, establish, and improve the relevant supervision system, and indicate the sales bottom line. Platforms need to strictly check the quality of product sources and attach importance to the qualification examination, quality testing and after-sales guarantee of merchants. Platforms should also implement the delivery rules and fine management of the platform as soon as possible to protect the rights and interests of the platform users. It is significant for platforms to have timely supervision and control of bad merchants and Internet celebrities. Platforms have the responsibility to effectively protect the legitimate rights and interest of consumers. It should timely close the account of the merchants for fake and shoddy, false publicity.

In addition, Platforms ought to attach importance to users' experience and feedback. Platforms needs to analyze the frequency of bad reviewers and good reviews through the big data collection. In this way, it can timely adjust the push flow of merchants and products. It is necessary for the platform to review the products with too many bad reviews and deal with them in time if there is any problem and ensure consumers' shopping experience.

7. Conclusion

In summary, this paper investigates consumer behaviors based on big data of Douyin and Xiaohongshu. Specifically, it obviously shows consumers' purchasing motivation and psychology and the pros and cons of this e-commerce model. The rapid development of emerging e-commerce platforms satisfies people's entertainment and leisure in their spare time, and brings a new business model, which has become a new direction of e-commerce development. The success of Douyin's "Live Streaming with Goods" model and the success of many personal short video bloggers on Xiaohongshu also confirm this. In the meantime, through the research on consumer behaviors in this paper, the limitations of this model are also discovered. Platforms need high-quality contents, merchants need merchandising, short-video bloggers need to monetize, and short-video users can buy high-quality and cheap products. The construction of a good platform business environment requires the joint efforts of all parties. Based on the analysis, it is conducive to realizing a good e-commerce environment, using consumer behavior analysis to adjust marketing strategies, allowing consumers to consume rationally. Nevertheless, the content of the e-commerce platform is mixed, and the supervision system is not perfect, which will jeopardize consumer rights. In the future, these problems need to be effectively addressed, and the rights and interests of consumers should be protected well. Overall, these results offer a guideline for e-commerce platforms better adjust marketing strategies, improve the marketing environment, and continue to develop.

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