Data Analysis in Mobile E-Commerce

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Abstract: We know that in the mobile e-commerce operation, a very important link to improve efficiency and decision-making effectiveness is data score. Therefore, this paper analyzes the application of data analysis in mobile e-commerce. Through consulting the literature, this paper understands the data analysis technology in mobile e-commerce, and summarizes the specific application of data analysis technology in mobile e-commerce, which lays the foundation for the research on the application effect of data analysis technology in mobile e-commerce. In order to further study the application effect of data analysis in mobile e-commerce, this paper set up a control experiment to study. In this study, two e-commerce enterprises (A B) are selected as the research objects. Among them, enterprise A is an e-commerce enterprise that uses data analysis to manage e-commerce platform, and enterprise B is an e-commerce enterprise that uses traditional methods to manage e-commerce platform. We take the conversion rate of intended customers, transaction rate, repurchase rate and satisfaction degree as the research indicators. The results show that the conversion rate of intention customers of enterprise A is 45%, the transaction rate is 31%, the repurchase rate is 45%, the satisfaction rate is 85%, the conversion rate of intention customers of enterprise B is 21%, the transaction rate is 15%, the repurchase rate is 27%, and the satisfaction is 62%. From the data results of the mobile electronic platforms of the two enterprises, it can be seen that the adoption of data analysis technology in mobile e-commerce can achieve better results for enterprises revenue.

1. Introduction

In the development of e-commerce, a new product has been derived, that is, e-commerce. Nowadays, with the development of information technology and the popularity of the Internet, the development trend of mobile e-commerce is getting better and better, which has been gradually popularized in the global scope [1-2]. Specifically, mobile e-commerce is essentially an innovation of e-commerce technology. It is based on mobile wireless network, relying on mobile phones and other personal mobile devices, and is a commercial activity that can break the restrictions of time and space. This is not only a new form of e-commerce, but also changes the traditional pattern of e-commerce [3-4].

Data analysis is an important part of mobile e-commerce and an important reference for product decision-making [5-6]. For mobile products, data analysis is to use data mining methods and technical means to summarize the rules and characteristics between product transaction and conversion rate, and to analyze users' consumption habits and hobbies [7-8]. The application of data analysis in e-commerce, specifically, is to extract the data of customers, markets and products through network and transaction information, and establish relevant models on these basis, so as to effectively optimize products and business models in a more dynamic business environment [9-10]. Therefore, it is of great significance to study the application of data analysis in mobile e-commerce.

This paper first describes the concept of mobile e-commerce, analyzes the common methods in data analysis, and summarizes and analyzes the application of data analysis in mobile e-commerce. In addition, in order to study the application effect of data analysis in mobile e-commerce, this paper sets up a comparative experiment, selects two e-commerce enterprises as the research object, and takes the intention customer conversion rate, transaction rate, repurchase rate and satisfaction

degree of the two enterprises as research indicators. The experimental results show that the application of data analysis technology in mobile e-commerce can make enterprises and users achieve a win-win situation.

2. Mobile E-Commerce and Data Analysis

2.1 Mobile E-Commerce

With the development of modern Internet technology, e-commerce has also been further developed, extended to the field of mobile e-commerce. Mobile e-commerce is developed on the basis of traditional e-commerce. After years of development and research by many scholars, the definition of mobile e-commerce has been defined. Some foreign scholars believe that mobile e-commerce is an activity that combines wireless network and mobile terminal to conduct online transaction. Some scholars also believe that the use of wireless network technology to trade activities, so as to achieve the value of goods. Some scholars emphasize that mobile e-commerce is to connect businesses and users through wireless devices, so as to conduct online e-commerce activities. Some define mobile e-commerce as the transaction of goods and services through mobile traffic and wireless network through mobile terminals such as smart phones and tablet computers. Chinese scholars have also defined mobile e-commerce, some think that it is the use of modern network technology and mobile devices to store, transmit and exchange information, so that products and services can be traded. Some point out that m-commerce is a new form of transaction activity which integrates e-commerce technology and wireless network technology through mobile terminals such as smart phones.

Based on the above concepts, this paper believes that mobile e-commerce is an online transaction activity on mobile terminal equipment by using wireless network technology and mobile communication technology.

2.2 Data Analysis

Clustering analysis and data mining are common means in data analysis, among which K-means algorithm is a common clustering algorithm, because the algorithm is simple and fast, it is commonly used in mobile e-commerce data analysis.

In K-means clustering algorithm, its central idea is: let $X=\{x_1,x_2,...x_n\}\in R^P$, $x_j=(x_{j1},x_{j2},...x_{jp})^T$, which contains n sample data to be clustered, where is p-dimensional vector. K-means algorithm is to find the set $C=\{c_1,c_2,...c_k\}$ of k lustering centers to minimize the objective function:

$$C=\{c_1,c_2,...c_k\} \tag{1}$$

Here, S_i is the set of samples in the ith category, C_i is the cluster center of all samples x_j in, and is the euclidean distance between the sample data x_j and the cluster center, which is defined as follows:

$$d(x_j,c_i)=\|x_j-c_i\|_2=\left(\sum_{l=1}^{P}|x_{jl}-c_{il}|^2\right)^{\frac{1}{2}} \tag{2}$$

And

$$c_i=\frac{1}{n}\sum_{x_j\in s_i}x_j \tag{3}$$

Represents the center of the $i(i=1,2,...,k)$ class, n_i is the number of sample data in the class, and x_j represents the sample data belonging to the class.

3. Research Design

(1) Literature analysis

This paper uses the method of literature analysis, through consulting relevant materials and websites, in-depth analysis of data analysis technology in mobile e-commerce, which lays the theoretical foundation for further research of this paper. In addition, we also summarize and analyze the application of data analysis technology in mobile e-commerce.

(2) Control experiment

In order to analyze the application effect of data analysis technology in mobile e-commerce, this paper set up a control experiment to study. In the study, we selected two e-commerce enterprises A B as the research objects, among which enterprise A is an e-commerce enterprise that uses data analysis to manage e-commerce platform, and enterprise B is an e-commerce enterprise that uses traditional methods to manage e-commerce platform. The experimental period of this experiment is one month. After the experiment, we analyze the data of the two enterprises in the e-commerce platform, including the conversion rate of intended customers, transaction rate, repurchase rate and customer satisfaction

Intention customer conversion rate = Intention customer / Incoming customer * 100%

Turnover rate = Number of customers / Number of intention customers * 100%

Repurchase rate = Number of Repeated customers / Total number of customers * 100%

Satisfaction = Customer satisfaction / Total customer evaluation * 100%

4. Application of Data Analysis in Mobile E-Commerce

4.1 Application Analysis of Data Analysis Technology in Mobile E-Commerce

This paper uses literature analysis method to sort out and summarize the application of data analysis technology in mobile e-commerce by consulting relevant materials and websites. The results are shown in Table 1 and Figure 1.

Table 1. Application of data analysis technology in mobile e-commerce

Application	Objective
Mining potential customers	Personalized marketing for customers
Maintain effective customers	Increase purchase rate
Manage customer data	Improve service quality
Market prediction	Helping enterprises to make decisions
Inventory management	Reasonable planning of enterprise funds
Improve service quality	Increase the turnover rate
Ensure information security	Ensure capital security

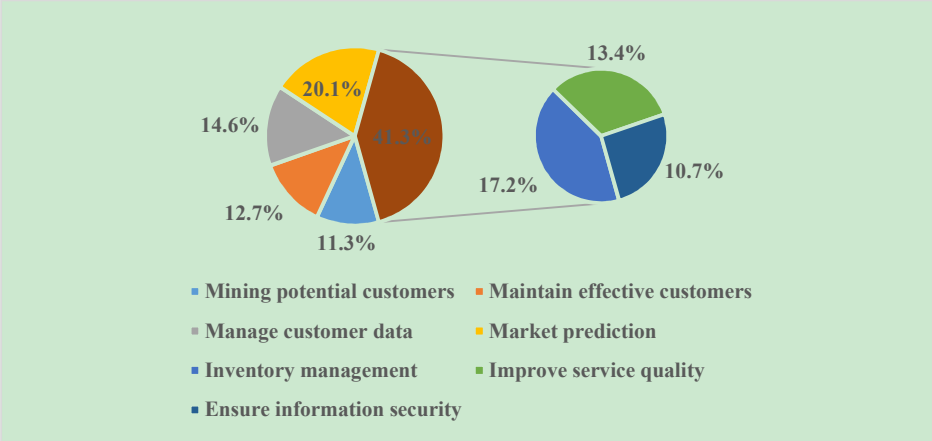

Figure 1. Application of data analysis technology in mobile e-commerce

In this paper, the application of data analysis technology in mobile e-commerce is summarized. From Table 1 and Figure 1, data analysis technology can mine potential customers and carry out personalized marketing for these potential customers. Secondly, it can maintain effective customers and improve the purchasing rate of such customers. Using data analysis technology to manage customer data can effectively judge customers Purchase preferences to improve customer service quality. Analyze the market through big data analysis, and provide suggestions for enterprise decision-making. The application of data analysis technology to inventory management can reasonably arrange production and purchase, and make enterprise funds reasonably arranged. Service quality is an important standard to evaluate mobile e-commerce. Data analysis technology can analyze customer satisfaction and improve customer repurchase rate. Finally, the data analysis technology can effectively ensure the security of account and the security of funds by detecting the commonly used IP of customers and businesses.

(1) Tap potential customers (11.3%)

Whether the mining of potential customers is thorough or not will greatly affect the market share of enterprises. Marketing staff often take the way of posting advertisements, refining target customer groups and targeted marketing to attract customers. In terms of potential customer mining, data analysis technology is a very desirable measure, it can more accurately select the qualified potential customers. In the process of mining customer information, we can record the behavior of visitors with the help of computer platform, and do a good job in customer and behavior classification, and summarize the characteristics of each type. For example, when a new visitor appears in the system, the staff can quickly use the classification function to analyze it, judge whether there are similarities between the customer and the customer groups that have been classified and studied, and divide them into specific types. Grasp the characteristics of potential customers, we need to do dynamic and personalized marketing for customers.

(2) Maintain effective customers (12.7%)

In the process of scientific utilization of data analysis technology, it is often able to play an important role in maintaining customers. Enterprises can adopt reasonable forecasting methods to find out the types of customers that may have the tendency of losing in the enterprise information files, and make scientific analysis on the information, find out the specific reasons for the loss phenomenon, and deal with them pertinently, and design a perfect program to implement customer retention work. Enterprises should strengthen the rational use of data analysis technology, adhere to the "customer-oriented" business principle, comprehensively investigate customers' browsing habits, personal hobbies and actual needs, and track their information changes, so as to create long-term and humanized high-quality services for old customers, such as providing customers with promotion information that they may need through high-quality product page recommendation, Make the old customers can maintain a relatively continuous attention to the enterprise itself, and improve the frequency of browsing and purchasing.

(3) Manage customer data (14.6%)

In the long-term development and operation process of an enterprise, a large number of customer information has been accumulated. Scientific management of such data is an important means to make it play the maximum value. The adoption of data analysis technology and detailed analysis of customers' habits and characteristics will help enterprises more accurately grasp the actual needs of customers, discover more potential consumer groups, adhere to the working principle of "customer-oriented", ensure that customers get good consumption experience in consumption, and form a good impression on enterprises. For example, when consumers browse transaction information, enterprises can judge their basic information from their browsing records, including age, gender, education background, hobbies, etc., and accurately record and efficiently manage these information. In the subsequent operation, according to the information files of customers, improve the layout design of the website, and create different characteristic websites according to different people, And to target customers to send effective advertising and promotion information, improve the quality of service.

(4) Market forecast (20.1%)

Through the data analysis technology, we can analyze the offline and online information comprehensively. The data not only reflects the customers' shopping information and shopping habits, but also the overall trend of the market. In the mobile e-commerce platform, data analysis technology is not only to collect information of one or some customers for analysis, to provide high-quality services for individual customers, but also an effective means for businesses to accurately predict the market. Through the data analysis of customers' purchase information, we can obtain the change of market demand, including the change of customers' shopping tendency over time, the subsequent shopping tendency and potential tendency of customers, and the profit situation of sold goods, etc., which can be obtained through data analysis technology. In order to obtain more profits, enterprises must ensure the accuracy of decision-making, analyze market demand through accurate market research, make correct decisions, and do not blindly sell and increase service quality. The data analysis technology is a favorable assistant to help enterprises analyze the market. It can make advanced and high-quality recommendations according to the information of previous years and customers' shopping information, help enterprises analyze and predict the market, help enterprises implement the decision-making efficiently, and ensure the stable operation and development of mobile e-commerce platform to a certain extent.

(5) Inventory management (17.2%)

In mobile e-commerce, data analysis can more accurately judge the market demand, improve the real-time and scientific nature of product inventory management, improve the ability to judge the direction of market development, so as to arrange production more reasonably, avoid product backlog to the greatest extent, and realize the ability of enterprises to make reasonable capital planning.

(6)Improve service quality

Service quality is an important standard to evaluate me in mobile electronics. Only with good reputation will more loyal customers be able to achieve a win-win situation of good user experience and enterprise income. On the one hand, we can improve the user's shopping experience on the website to improve the user's praise rate for the business; on the other hand, we can use high-quality after-sales service to retain customers. In terms of improving the user experience, we can use data mining to find the products that users like, push the products accurately and improve the transaction rate. In terms of providing high-quality after-sales service, we can use data mining to summarize the problems that customers often encounter. When customers encounter problems again, they can respond quickly and deal with them quickly.

(7) Ensure information security (10.7%)

In the process of interaction with users, mobile electronic platform involves a lot of personal information of users and capital information of businesses, so the importance of network security is self-evident. A complete e-commerce platform should be based on network security to ensure the safety of users' personal information and the security of business funds. There are also many examples of improving network security through data analysis technology. For example, when a

lawbreaker logs in a user's account with a user's login password, the defense mechanism based on data analysis technology will discover the user's abnormal behavior through IP detection and other technologies. If you want to continue to operate the account, you need to verify it again, Through SMS verification, e-mail verification and other information verification methods closely related to users, otherwise it can not be operated to ensure the user's information security and fund security.

4.2 Application Effect Analysis of Data Analysis Technology in Mobile E-Commerce

In order to analyze the application effect of data analysis technology in mobile e-commerce, this paper sets up a control experiment, and the experimental results are shown in Table 2 and Figure 2.

Table 2. Application effect of data analysis technology in mobile e-commerce

E-commerce platform data	Conversion rate of intention customers	Turnover rate	Repurchase rate	Satisfaction
Enterprise A	45%	31%	45%	85%
Enterprise B	21%	15%	27%	62%

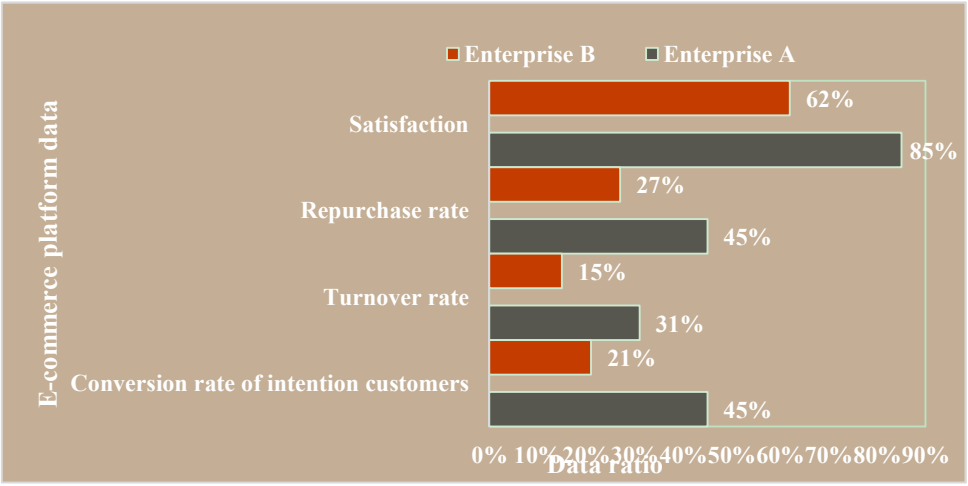

Figure 2. Application effect of data analysis technology in mobile e-commerce

As can be seen from Table 2 and Figure 2, the conversion rate of intention customers of enterprise A is 45%, the transaction rate is 31%, the repurchase rate is 45%, and the satisfaction rate is 85%. The intended customer conversion rate of enterprise B is 21%, the transaction rate is 15%, the repurchase rate is 27%, and the satisfaction rate is 62%. From the comparison of the e-commerce platform data of the two plus enterprises, it can be seen that the enterprises that use data analysis to manage the e-commerce platform have the same data This shows that the use of data analysis for e-commerce platform management can effectively improve the sales performance and service quality of enterprises.

5. Conclusions

With the development of science and technology, the development momentum of mobile e-commerce is more and more fierce. This paper studies the application of data analysis in mobile e-commerce. This paper holds that the business and management ideas based on data analysis may become the basis of consumer behavior and market analysis in the mobile e-commerce market, In this case, data will become the theme of decision-making. In this way, the data obtained by enterprises will be intuitive, dynamic and timely. Compared with the lag analysis of consulting companies or research companies, data analysis has the advantages of big data and full samples. In

this way, if we use the data to analyze the user's behavior habits, we can speculate the user's psychology, and then we can deeply mine the user's needs. In this way, we can accurately get the product positioning and activities, and make decisions.

References

[1] Edition S. An Introduction to Categorical Data Analysis [J]. Journal of the Royal Statal Society, 2017, 170(170):1178-1178.

[2] Huaiyu M, Xiaosong H, Anushya M, et al. PANTHER version 11: expanded annotation data from Gene Ontology and Reactome pathways, and data analysis tool enhancements [J]. Nuclc Acids Research, 2017(D1):D183-D189.

[3] Melgar, Estrada, Liliana, et al. Audiovisual Media Annotation Using Qualitative Data Analysis Software: A Comparative Analysis [J]. The Qualitative Report, 2018, 23(13):4-4.

[4] Mishra B K, Barik R K, Priyadarshini R, et al. An Investigation Into the Efficacy of Deep Learning Tools for Big Data Analysis in Health Care [J]. International Journal of Grid and High Performance Computing, 2018, 10(3):1-13.

[5] Mishra B K, Barik R K, Priyadarshini R, et al. An Investigation Into the Efficacy of Deep Learning Tools for Big Data Analysis in Health Care [J]. International Journal of Grid and High Performance Computing, 2018, 10(3):1-13.

[6] Hansi Z, Yi G, Qian L, et al. An ontology-guided semantic data integration framework to support integrative data analysis of cancer survival [J]. Bmc Medical Informatics & Decision Making, 2018, 18(S2):41.

[7] Kern S, Meyer K, Guhl S, et al. Online low-field NMR spectroscopy for process control of an industrial lithiation reaction—automated data analysis [J]. Analytical and Bioanalytical Chemistry, 2018, 410(14):3349-3360.

[8] Xu X. PLATFORM LICENSING FOR ELECTRONIC COMMERCE ECOSYSTEMS [J]. Journal of Electronic Commerce Research, 2017, 18(2):177-188.

[9] Zhang T, Lu C, Kizildag M. Engaging Generation Y to Co-Create Through Mobile Technology [J]. International Journal of Electronic Commerce, 2017, 21(4):489-516.

[10] Waithaka S T, Mnkandla E. Challenges Facing the Use of Mobile Applications for E‐Commerce in Kenya's Manufacturing Industry [J]. Electronic Journal of Information Systems in Developing Countries, 2017, 83(1):1-25.