



Design of Customer Satisfaction Evaluation System Based on Big Data

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Abstract. The traditional customer satisfaction evaluation adopts the method of questionnaire survey, small data samples are subjective, which can not truly reflect the level of customer satisfaction. Using big data analysis technology, combined with questionnaire statistical analysis, is a useful attempt. On the basis of previous research results, this paper innovates and integrates, designs a set of customer satisfaction evaluation and management system based on big data, gives the technical architecture and function map of the system, and describes the big data mining analysis method. In the follow-up research, the system will be more in-depth research and application development.

Keywords: Customer satisfaction · CSE · Big data

1 Introduction

Customers are the most scarce resources of enterprises. How to improve customer satisfaction and loyalty has become the focus of enterprises. The premise of improving customer satisfaction is to measure customer satisfaction, so as to take targeted measures to improve customer satisfaction [1].

At present, many researches on customer satisfaction are carried out by using customer satisfaction measurement model, questionnaire and other methods. When measuring customer satisfaction, the respondents may have subjective feelings, which leads to the distortion of the questionnaire and can not correctly reflect the customer satisfaction. Moreover, the number of questionnaire samples collected by the questionnaire method is relatively small, and there will be a certain lack of persuasion and credibility. In addition, with more and more factors affecting customer satisfaction, the customer satisfaction measurement model cannot fully adapt to the needs of the current enterprises. So as to meet the requirements of rapid and efficient measurement of customer satisfaction, customer satisfaction evaluation and management system based on big data came into being.

This study aims to build a customer satisfaction evaluation and management system based on big data. This system can be used in online retail platform, telecommunications industry, power industry, mobile communication field, employee satisfaction, government public opinion supervision and other scenarios. The system tests and evaluates the real satisfaction level of customers by analyzing the business data of customer center,

external product comment crawler data and data collected by some hardware devices. In this way, the enterprise can provide better products and services according to the current situation of customer satisfaction. Meanwhile, it is also conducive to the enterprise to strengthen the continuous innovation of its own products, so as to better improve customer satisfaction and loyalty.

2 Literature Review

2.1 Review of Foreign Literature

The word customer satisfaction is translated into English as customer satisfaction, which was introduced into the field of customer satisfaction marketing by American scholar cordozo in 1965. His research found that high customer satisfaction will increase the probability of customers buying again [2]. Westbrook Robert A (1980) and Oliver (1980) believed that after consumption, customers would compare their pre-purchase psychological expectations of products or services with their actual feelings after purchase. If the products or services did not meet their pre-purchase psychological expectations, customers would be dissatisfied; otherwise, they would be satisfied [3, 4]. According to Churchill and Supreme (1982), customer satisfaction is a cognitive state produced by buyers comparing the return of expected results with input costs [5]. Bolton and drew (1991) believe that customer satisfaction is obtained by comparing the measured expectation of the product or service with the actual perception after purchase, and it will further affect the service quality [6]. Most of the above researches on customer satisfaction are from a qualitative perspective to study the relationship between various variables.

On the basis of qualitative research, some foreign scholars began quantitative research. In the research of customer satisfaction model, Sweden conducted the first customer satisfaction test in the world. In 1989, Sweden adopted a national satisfaction survey tool (SCSB) [1]. After that, the theoretical results of this study were summarized by Professor Fornell of the University of Michigan, and the earliest customer satisfaction index model was proposed, as shown in Fig. 1.

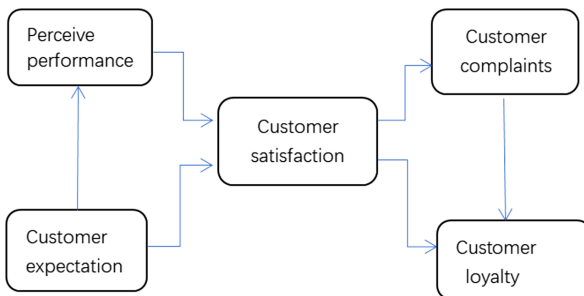


Fig. 1. Sweden Customer Satisfaction Barometer(SCSB)[7]

Professor Fornell (1996) established the American ACSI model based on the SCSB model, as shown in Fig. 2. Different from SCSB model, this model adds the variable

of perceived quality to analyze whether customers' purchasing behavior is driven by price or quality. On the basis of inheriting the basic structure of ACSI model, European quality organization and European Commission have made two modifications. On the one hand, the variable of corporate image is added to expand the application range of the satisfaction index model, so that the satisfaction index can be applied to different enterprises, industries and even countries for comparison [8].

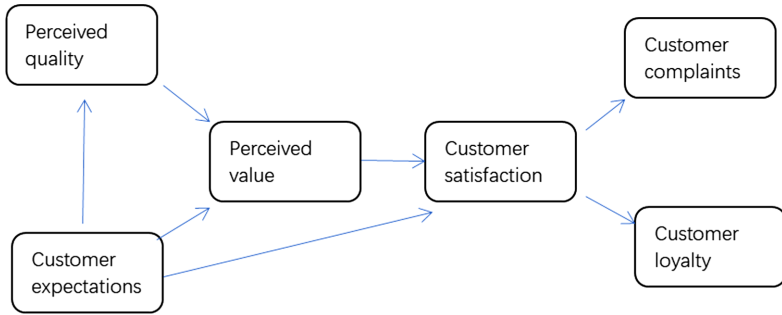


Fig. 2. American Customer Satisfaction Index (ACSI) [7]

2.2 Domestic Literature Review

The study of customer satisfaction in China started relatively late, which may be greatly related to the level of economic development in China. In the past decade, many scholars have studied the theory of customer satisfaction, and these studies are also fruitful. Since 1998, Chinese experts have introduced the theory of customer satisfaction evaluation, and also carried out the construction of service quality evaluation index system model in practice. The main research status is as follows

Yongqing Wang and Haoren Yan (2000) draw lessons from the theoretical research of customer satisfaction abroad and build the customer satisfaction evaluation system, which has a strong practical value [9]. Yu Liu (2001) proposed the comprehensive application of customer satisfaction evaluation system for general industries on the basis of SCSB model. His research mainly focuses on the evaluation method of customer satisfaction [10]. Meihua Zhou (2004) constructed the index system of customer loyalty and established the customer loyalty evaluation model [11]. Xiangyang Liu (2005) analyzed the relationship between quality investment and marketing decisions from the perspective of customer profitability and customer satisfaction [12]. Xiangcui Wang (2006) constructed the evaluation index tree model of customer satisfaction of port logistics system [13].

Although these studies in China have made some achievements, they are not perfect, and need the continuous efforts of a large number of scholars and experts. Only when the theoretical knowledge is applied to some enterprises, can the two complement each other. In this way, our country's customer satisfaction research can get vigorous development. At present, in terms of customer satisfaction, because the method has a

certain representativeness in the world, it is relatively perfect, so this method has also been widely used in China.

2.3 Summary of Research at Home and Abroad

Comprehensive domestic and foreign research review can be found that foreign research on customer satisfaction started earlier, the research scope is wide, the research problems are more in-depth, and the earliest summary of the theoretical model of customer satisfaction, the theory of foreign research, for us to do customer satisfaction research has a good reference significance, can be used as the basis of our research. Domestic research on customer satisfaction started relatively late, the research content is relatively small, but because these researches on customer satisfaction are based on China's national conditions, so the results are very meaningful and valuable, and also very worthy of our reference and study. Therefore, when we research and analyze the customer satisfaction of domestic enterprises, we must refer to the relevant foreign theories and index models, and refer to the results and cases of domestic customer satisfaction research. Only in this way can we combine theory with practice to study and analyze the customer satisfaction of the enterprise, and truly study the customer satisfaction of our enterprises in place, so as to find out the true customer satisfaction According to the characteristics of Chinese customers and domestic companies, it puts forward targeted measures to maximize the company's customer satisfaction and make the research content and results convincing and credible.

In addition to the above findings, we also found that whether domestic or foreign literature, most of the literature is about the measurement of customer satisfaction and satisfaction model research, there is no research based on big data customer satisfaction evaluation management system. This article starts the first study of customer satisfaction evaluation and management system based on big data.

3 System Design

3.1 Technical Framework

The system is based on cloud computing +Hadoop big data platform, which is grouped into six levels, namely platform management, data analysis layer, programming model layer, data storage layer, file storage layer and data integration layer. The back end of application layer adopts Linux (Windows) + Apache (Nginx) + MySQL + J2EE + PHP; the clients support app, miniprogram, H5 (Fig. 3).

3.2 Function Map

This system has four main functions, which are data collection, satisfaction evaluation, satisfaction promotion and system management (Fig. 4).

The data collection function mainly completes the data collection of traditional online questionnaire survey system, customer service business data collection from call center, external data collection based on crawler technology and related data collection based

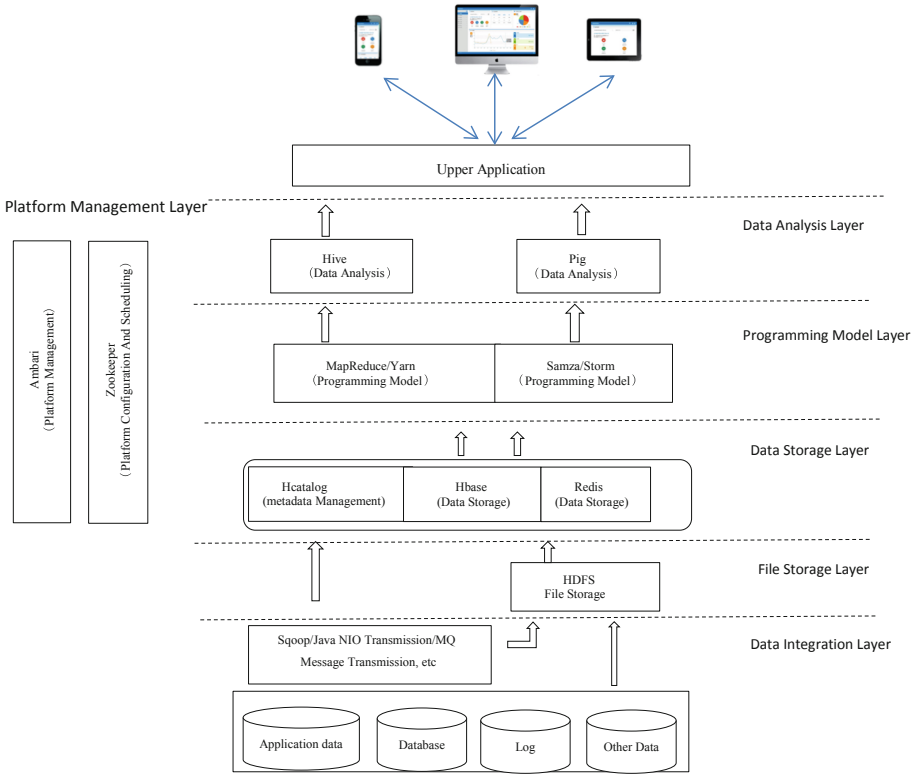


Fig. 3. Technical Architecture of B-CSE System [14]



Fig. 4. Function Map of B-CSE

on intelligent hardware devices. This function module is the data base of customer satisfaction evaluation.

Satisfaction evaluation function is the core of the system, in addition to using the traditional questionnaire statistical analysis to evaluate satisfaction, the most core function of this system is to use big data mining analysis to evaluate satisfaction. It includes the establishment of customer satisfaction evaluation score based on business type by analyzing business data and business type of call center; the establishment of customer satisfaction score mapping conversion matrix by text mining and web mining through

external crawler data; and the collection and analysis of customer satisfaction index based on intelligent hardware, such as wearable watch/Bracelet Points.

Satisfaction enhancement function module, mainly based on the results of satisfaction evaluation, targeted design improvement scheme, as well as the effect tracking and monitoring of the implementation scheme.

The system management function mainly includes the basic data management of system configuration and operation, as well as authority/user/role management.

3.3 Analysis Method of Big Data Mining

1. Call center data analysis. Based on the business data of the call center, the indicators reflecting customer satisfaction are extracted for analysis. For example, based on different business types, the index matrix of customer satisfaction score is designed, and then transformed into customer satisfaction score. Or directly according to the customer satisfaction score.

2. Analysis of external crawler data. Based on the external crawler data for text mining, web page mining, and then converted into a response to customer satisfaction index value (Fig. 5).

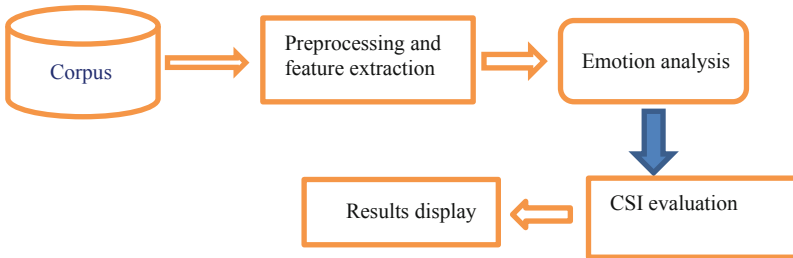


Fig. 5. Big Data Mining Flow Chart [15]

The figure shows a schedule of the text data mining based on external crawler data when the system implements customer satisfaction evaluation. The first step is to screen the existing corpus, through which the problems that need to be solved can be clearly defined. Then the data preprocessing and feature extraction, including checking the integrity and consistency of the data, filling the missing domain, deleting invalid data, after the above procedures, according to the system settings for intelligent feature extraction, the next step is to process the data for sentiment analysis, after sentiment analysis, the system will analyze the group characteristics according to the classified data, and finally the group characteristics will be extracted. The results are displayed, including the results of emotion analysis and theme analysis.

3. Hardware acquisition data analysis. Based on the active data collected by intelligent hardware devices or the log of device usage, the big data analysis is carried out, and the index factors that indirectly reflect or affect customer satisfaction are extracted for customer satisfaction evaluation and analysis.

4 Conclusions

Based on the research on customer satisfaction at home and abroad, this paper summarizes and considers the existing literature, puts forward the idea of customer satisfaction evaluation and management system based on big data, and describes the system's technical framework, functional mapping, and big data mining analysis methods. Both from the current economic development situation and market demand, customer satisfaction measurement system based on the big data application prospects are very broad, modern society needs a customer satisfaction measurement based on large data management system, the system's efficiency, convenience and other features to meet the needs of enterprises, reduce the cost of enterprise.

Build a customer satisfaction measurement management system based on big data can greatly reduce the cost of measuring customer satisfaction, and can measure customer satisfaction quickly and efficiently.

Through the construction of customer satisfaction evaluation system, customer satisfaction evaluation will be more systematic, systematic and complete. In addition, the system can be used in multiple scenarios and has strong scalability.

The research of customer satisfaction measurement management system based on big data makes up for the previous blank in this field, creates a new research field, and provides a research reference for future scholars.

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