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Abstract: With the rapid development of e-commerce and increasingly fierce market competition, customer satisfaction has become the key to enterprise competition. However, the current quality of e-commerce services is uneven, and there is room for improvement in customer satisfaction. This paper's method is not only targeted, but also reflects the real feelings and needs of customers more accurately. This paper not only calculates the mean, standard deviation and variance of related variables, but also further discusses the specific impact of various service quality indicators on customers' shopping experience. It is found that the six service quality indicators, practicality, safety, enthusiasm, reliability, feedback mechanism and compensation mechanism, have different degrees of influence on customer satisfaction and loyalty. This paper shows innovations in research methods, data analysis and interpretation of results, which provides strong theoretical support and practical guidance for e-commerce enterprises to improve service quality and enhance market competitiveness.

Keywords: online shopping; E-commerce; service quality; customer satisfaction; big data.

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1 Introduction

Under the internet expansion and global economic boom, e-commerce (Electronic Commerce) is attracting ever-more worldwide attention with its diversified forms (Zhu, 2021). E-commerce, as an extension of the internet and a new business model of national strategic importance, involves various business activities, and it has become the medium to accelerate the integration of traditional industries using new technologies,

centred around commodity exchange, and based on new media and the internet platforms (Sitar-Tăut and Mican, 2020). Thus, e-commerce will form a new development model and will be transformed into an ecosystem. By December 2020, China will have nearly 1 billion internet users (Guo et al., 2021). At present, China's e-commerce has a good prospect.

In recent years, with the popularity of smartphones and other mobile terminals, China's consumer market has been occupied mostly by mobile online shopping platforms. Online shopping has many advantages, such as convenience, efficiency, and timeliness, which have completely submersed people's traditional life and shopping style. But then, all kinds of contradictions and industry problems become more and more significant (Fagerstrøm et al., 2021; Meng et al., 2023). For example, the service quality of some enterprises is questioned, while other enterprises want to improve consumer satisfaction and gain more market share. Consumers expect a better user experience through a convenient mobile network. Therefore, it is necessary to improve the service quality of the e-commerce industry and establish a sustainable and healthy e-commerce consumption system for a benign network business environment and stable consumer market, so that the online shopping market will become more and more prosperous (González et al., 2021; Wang et al., 2023). Today, the network platform competition has been ever-more intense. To gain a long-term benefit, mere price competition is not enough for network platforms or network stores (Revindran et al., 2020). Noticeably, Taobao, as the largest online retail platform, has huge consumer traffic.

In the field of e-commerce, this paper focuses on the evaluation of customer service quality of platform-based online shopping, and conducts in-depth research from three dimensions: service quality, customer satisfaction, and customer loyalty. This paper not only provides innovative research ideas, but also provides a direction for the development of new fields of e-commerce. Firstly, this paper breaks through the traditional service quality evaluation framework, combines with the characteristics of e-commerce, and builds a comprehensive and in-depth evaluation system to accurately capture service problems and their impact on customer experience. Secondly, this paper emphasises the importance of service quality in e-commerce and reveals its far-reaching influence on customer perception and decision-making process, especially its key role in cultivating customer loyalty. This discovery provides valuable enlightenment for enterprises to improve service quality and build long-term customer relationship. Finally, the research results of this paper provide practical guidance for e-commerce enterprises, which is helpful for enterprises to accurately improve service quality, improve customer experience, and enhance customer loyalty and stickiness, thus maintaining a leading position in the fierce market competition (Zhang, 2024). To sum up, this paper shows innovation and practical value in the evaluation of e-commerce service quality, which provides new ideas for the development of e-commerce enterprises.

2 Service quality theories and research methods

2.1 The composition of service quality measurement index and customer satisfaction

- 1 *Service quality index system* (Pawełszek and Bajdor, 2020). E-commerce, as a new business model, service quality is different from traditional service quality, which

has been studied and perfected since its birth (Kusdibyo and Februadi, 2019; Moyer et al., 2025). Here, six standards are chosen according to the results of perceived quality evaluation researchers and actual Taobao online shopping experience to measure the service quality of online Taobao stores: security standards, enthusiasm, reliability, feedback mechanism, and compensation mechanism. Based on these six standards, some related problems are put forward to describe the service quality of Taobao online shops. Service quality is a magic weapon that can help online stores excel among homogeneous competitions. Service quality affects the customers' online purchase feeling, determines customer satisfaction and customer loyalty.

- 2 *Customer satisfaction.* Today, under an overwhelming network environment, e-commerce has become an important marketing channel, and online customer satisfaction has become the centre of attention. In the past marketing model, transactions between sales staff and customers are completed face-to-face in response to the customer's purchase experience. By comparison, the mode of e-commerce is completely different, which is based on the internet and networks to complete most transactions, so the customer satisfaction factors have changed fundamentally (Khan et al., 2019; Wang et al., 2023; Akan et al., 2025). Firstly, the concept of customer satisfaction can be reflected by its definition, of which researchers' views differ greatly from country to country. Here, customer satisfaction is defined as a degree that compares the purchase experience perceived by customers during online purchases with their expectations. Accordingly, there is a close relationship between customer satisfaction and the service quality of online stores, which is a group of interactive variables (Brusch et al., 2019; Zhang et al., 2025). The relationship between customer satisfaction and the service quality of online stores is a subject of debate among researchers. While some scholars argue that customer satisfaction is a variable contingent on the service quality provided by online stores, others propose an alternative perspective, suggesting that the service quality of online stores is an outcome influenced by customer satisfaction and contributes to the overall development of the enterprise. This dichotomy in viewpoints underscores the complexity of the interplay between customer satisfaction and service quality in the online retail landscape. Future research could delve into reconciling these perspectives, exploring the bidirectional nature of the relationship and its implications for the strategic development of online enterprises (Zhang et al., 2024). A nuanced understanding of these dynamics would provide valuable insights for shaping customer-centric strategies and fostering sustainable growth in the e-commerce sector (Shu and Wang, 2024).
- 3 *Customer loyalty index.* Many researchers believe that the main manifestations of customer loyalty are the increase in purchase volume, the decrease in sensitivity to time and price changes, and recommendations for others to purchase and repurchase (Zhou et al., 2021). Many domestic and foreign researchers have analysed the direct relationship between customer satisfaction and customer loyalty, and most believe that customer satisfaction can have a positive impact on customer loyalty (Renolafitri, 2020). High customer satisfaction will have a positive impact on the purchase recovery. Moreover, certain researchers have identified that providing satisfactory customer services not only attracts customers but also cultivates consumer loyalty, creating a dedicated fan base. Additionally, it contributes to building a positive public reputation for the online store. This finding underscores

the multifaceted impact of customer satisfaction on various aspects of an online business. By establishing strong connections with customers through exemplary service quality, online stores can not only retain their existing customer base but also enhance their brand image and attract new customers. Future research could delve into the specific mechanisms through which customer satisfaction influences consumer loyalty and public perception, offering actionable insights for businesses seeking to thrive in the competitive e-commerce landscape (Fang and Wang, 2024).

2.2 *Design of QS (Questionnaire survey) on service quality standard*

Here, a group with Taobao shopping experience is recruited for research, a total of 300 QSSs are issued, and 250 valid QSSs are obtained.

- 1 The service forms of online shopping and offline shopping are very different, so the QS is designed based on practical experience and relevant content of the service quality measurement index. Thus, the QS of Taobao shop service quality is obtained, as shown in Table 1.

Table 1 Key questions setting

<i>Item distribution</i>	<i>Content</i>	<i>Options</i>
Practicability	Q1. Are you satisfied with the ease of finding goods on Taobao's home page?	A Very satisfied
	Q2. Is the operation mechanism of the Taobao shop satisfactory?	B Satisfied C Not sure D Not satisfied
Safety	Q3. Can you trust Taobao shops to provide your personal information and complete transactions?	E Very dissatisfied
	Q4. Are you satisfied with the trading platform of the store and standard?	
Reliability	Q5. Are you satisfied with the credibility of Taobao shop product pictures and the commitments made by the merchants?	
	Q6. Are you satisfied with the delivery speed and delivery date of the Taobao store?	
Enthusiasm	Q7. Do the staff often offer coupons?	
	Q8. Do you think Taobao shop's customer service staff are very enthusiastic to provide advice and help?	
Feedback mechanism	Q9. Are you satisfied with the response time of customer service staff?	
	Q10. Do you think customer service staff can answer your questions effectively?	
Complementary mechanism	Q11. Do you think the compensation measures taken by the shop is satisfactory, when the goods received are defective or damaged?	
	Q12. Do you think the return and exchange mechanism of the Taobao store is complete, and your property safety has been guaranteed all the way?	

2 According to the consumer's feelings in the purchase process, the key questions of customer satisfaction and customer loyalty are set up based on the previous research and practical experience, as shown in Table 2.

Table 2 Key questions setting

<i>Item distribution</i>	<i>Content</i>	<i>Options</i>
Customer satisfactory	Q13. Are you satisfied with the whole shopping process in the Taobao store?	A Very satisfied B Satisfied
	Q14. What is your overall evaluation of products and services?	C Not sure D Dissatisfied
Customer loyalty	Q15. Do you think you will repurchase when you need the product?	E Very dissatisfied
	Q16. Do you think you will recommend good things to your friends?	

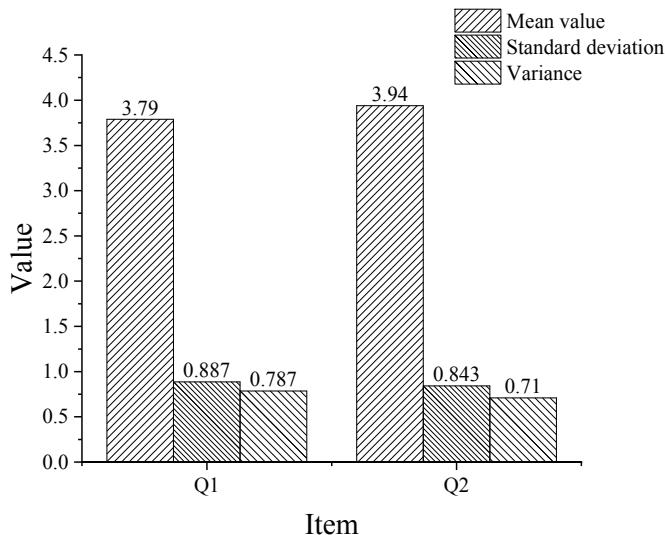
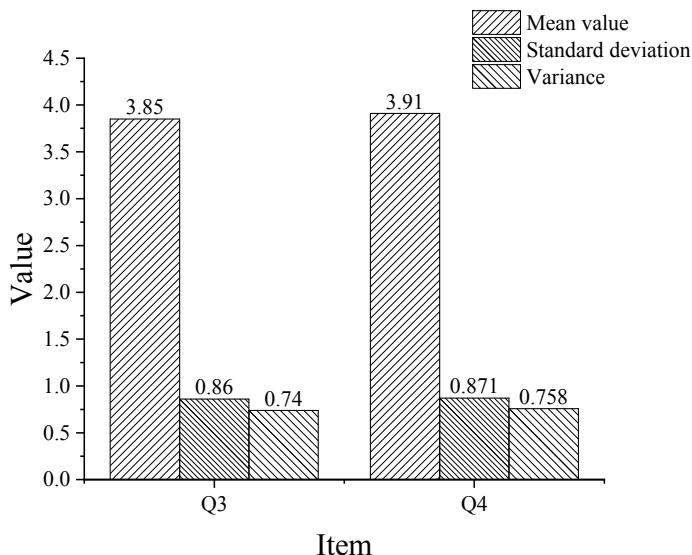
3 Customer service quality evaluation analysis

1 Survey statistics of practicability are shown in Figure 1

Figure 1 show that the overall mean value of the practicability standard is 3.865, the total variance of variables is 0.75, and the total standard deviation of variables is 0.865. This shows that most respondents agree that practicality is the standard to measure Taobao's service quality. Standard deviation tells that the choice of respondents is scattered. The surveyed score of Q1 "Are you satisfied with the ease of finding goods on Taobao's Home page?" is relatively low, which indicates that most online buyers are uncertain whether the goods are easy to find. The surveyed score of Q2 "Is the operation mechanism of the Taobao shop satisfactory?" is relatively higher, which indicates that most customers are satisfied with the operation mechanism of the Taobao store backstage (Dam and Dam, 2021). For example, customers can buy their favourites even during shopping carnival.

2 The survey statistics of safety standards are shown in Figure 2

Figure 2 illustrates that the overall mean value of the safety standard is 3.88, and the overall standard deviation is 0.866, which shows that most of the respondents are uncertain about the safety index of Taobao online shopping. The survey results also suggest that most online shoppers are not very satisfied with the security function of Taobao shop. Meanwhile, the survey results of Q3 "Can you trust Taobao shops to provide your personal information and complete transactions?" and Q4 "Are you satisfied with the trading platform of the store and standard?" are not satisfactory, which shows that under the complex online shopping environment, the safety standard should be further strengthened.

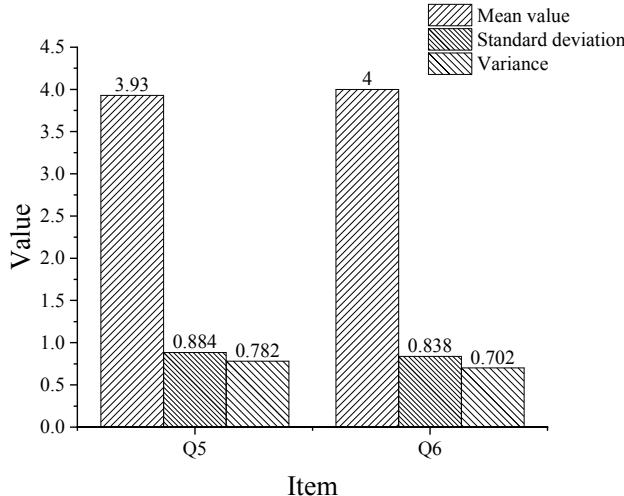
Figure 1 Statistics of practicability standard**Figure 2** Statistics of safety standard

3 The reliability survey statistics are shown in Figure 3

Figure 3 displays that the overall mean value of the reliability variable is 3.965, and the standard deviation of the whole variable is 0.861. Thus, the reliability is satisfactory as an index to measure the service quality of Taobao. Noticeably, the standard deviation is relatively large, which indicates that the data are scattered. Meanwhile, the survey results of Q5 “Are you satisfied with the credibility of Taobao shop product pictures and the commitments made by the merchants?” Q6 “Are you satisfied with the delivery speed and delivery date of the Taobao store?” indicates that reliability needs further

improvement. For example, some online stores capture customers' attention through much-refined product images, which are not always in compliance with the real ones. This inevitably leads to the reduction of customers' favour.

Figure 3 Statistics of reliability

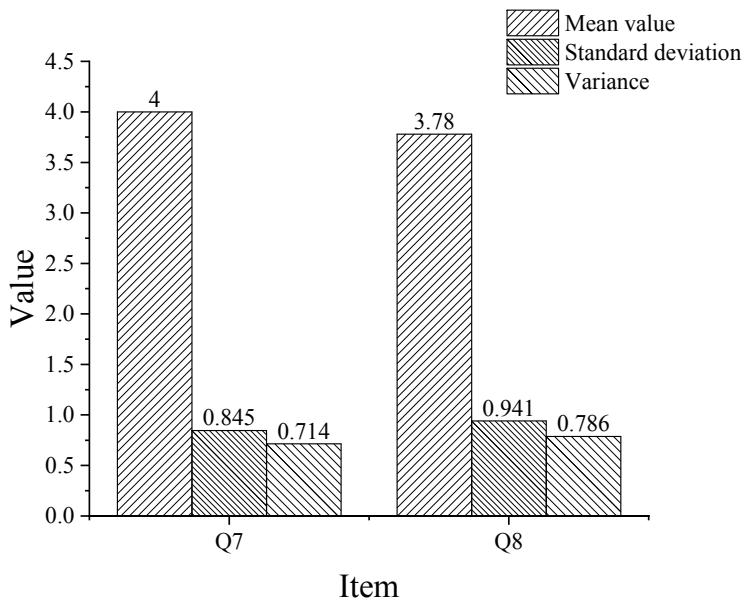
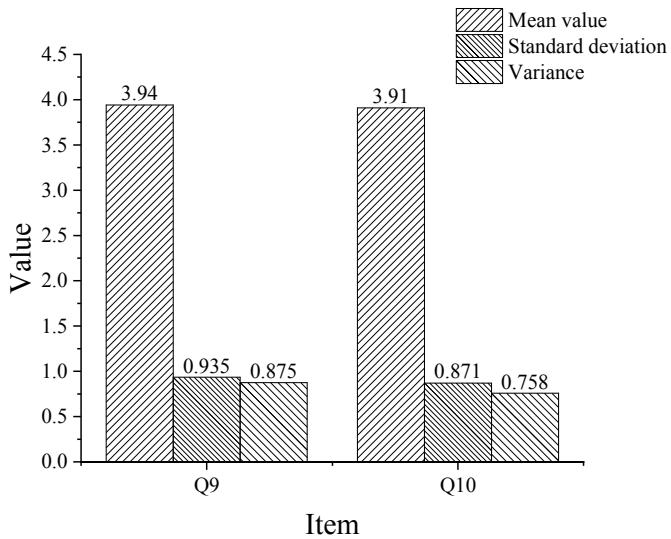


4 The survey statistics of enthusiasm are shown in Figure 4

Figure 4 demonstrates that the overall mean value of the enthusiasm variable is 3.89, and the overall standard deviation is 0.893, which indicates that customers shopping in Taobao stores feel uncertain, and the data are scattered (Shen et al., 2021). Thus, the respondents' opinions are diverse about the enthusiasm standard. Meanwhile, the survey results of Q7 "Do the staff often offer coupons?" and Q8 "Do you think Taobao shop customer service staff are very enthusiastic to provide advice and help?" are not satisfactory. For example, there is no discount at all in ordinary times. When it comes to holidays, the store will raise the price and release some coupons, which means there is no discount either. Sometimes, the product may get more expensive. In terms of the help provided by after-sales service, most respondents are unsatisfactory. To sum up, the online shopper in Taobao should strengthen their enthusiasm standard.

5 The survey statistics of the feedback mechanism are shown in Figure 5

Figure 5 suggests that the overall mean value of the feedback mechanism variable is 3.925, and the overall standard deviation is 0.903, which shows that customers of Taobao shops are relatively satisfied with the feedback mechanism service set by Taobao. Meanwhile, the survey results of Q9 "Are you satisfied with the response time of customer service staff?" and Q10 "Do you think customer service staff can answer your questions effectively?" do not meet the satisfaction standard. For example, customer service only answers questions according to particular rules and requirements, and the reply is slow and rigid sometimes and cannot meet the customer's requirements (Masri et al., 2020). This shows that the customer service of Taobao stores should strengthen their response, such as reaction and problem-solving methods, to satisfy customers as much as possible (Parasuraman et al., 2005).

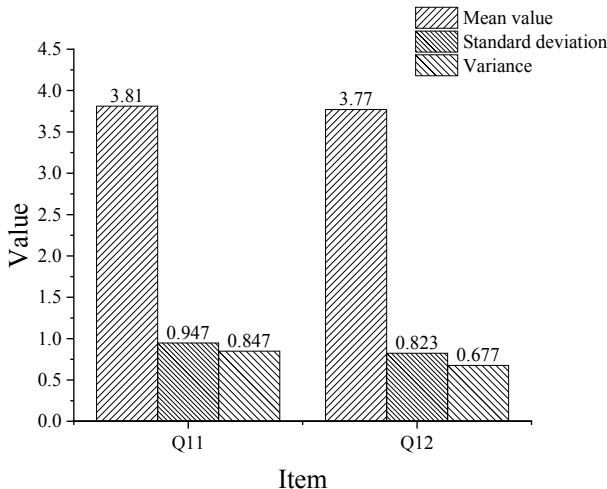
Figure 4 Statistics of enthusiasm**Figure 5** Statistics of feedback mechanism

6 The survey statistics of compensation mechanisms are shown in Figure 6

Figure 6 implies that the overall mean value of the compensation mechanism variable is 3.79, and the overall variance is 0.762. As a standard to measure the service quality of Taobao, the freight insurance services have not reached the standard, which cannot meet the needs of customers of online stores. Meanwhile, the survey results of Q11 “Do you think the compensation measures taken by the shop is satisfactory when the goods received are defective or damaged?” Q12 “Do you think the return and exchange

mechanism of the Taobao store is complete, and your property safety has been guaranteed all the way?" does not meet the satisfaction standard. For example, some older people cannot operate a refund mechanism and thus may lose money (Şimşek and Güvendiren, 2023). Besides, some Taobao shops do not have a freight insurance mechanism, so the financial loss during shipping will be solely liable to customers. In short, Taobao stores should try their best to reduce customer losses in compensation mechanisms.

Figure 6 Statistics of compensation mechanism



7 Customer satisfaction survey statistics are shown in Figure 7

Figure 7 displays that the overall mean value of customer satisfaction is 3.82, and the overall variance is 0.833. This shows that the majority of Taobao shop services are not satisfactory, its service quality cannot guarantee customer satisfaction (Blut, 2016). Additionally, the overall variance of attention variables and results of the customer satisfaction survey is also relatively scattered. Meanwhile, the survey results of Q13 "Are you satisfied with the whole shopping process in the Taobao store?" and Q14 "What is your overall evaluation of products and services?" do not meet the satisfaction standard, which indicates that consumers feel neutral when shopping on Taobao (Clemes et al., 2014). Thus, most Taobao online customers have an uncertainty towards product quality and evaluate product quality through a trial-purchase. However, the after-services of Taobao stores on substandard products are mostly unsatisfactory.

8 The statistics of customer loyalty are shown in Figure 8

Figure 8 illustrates that the overall mean value of customer loyalty variables is 3.90, and the overall variance is 0.78, which means that customer loyalty is formed during the shopping process in Taobao stores. The survey results of Q15 "Do you think you will repurchase when you need the product?" and Q16 "Do you think you will recommend good things to your friends?" indicates that some online stores in Taobao platform have accumulated consumer fans, these consumers will collect satisfactory stores and

recommend satisfactory things to their friends (Huang et al., 2019). By contrast, consumers will not repurchase if the overall store service is unsatisfactory and may even give a bad review to the store.

Figure 7 Statistics of customer satisfaction

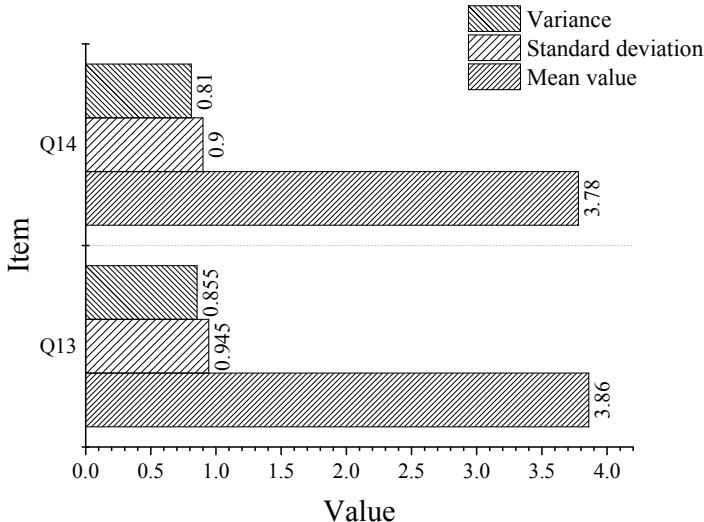
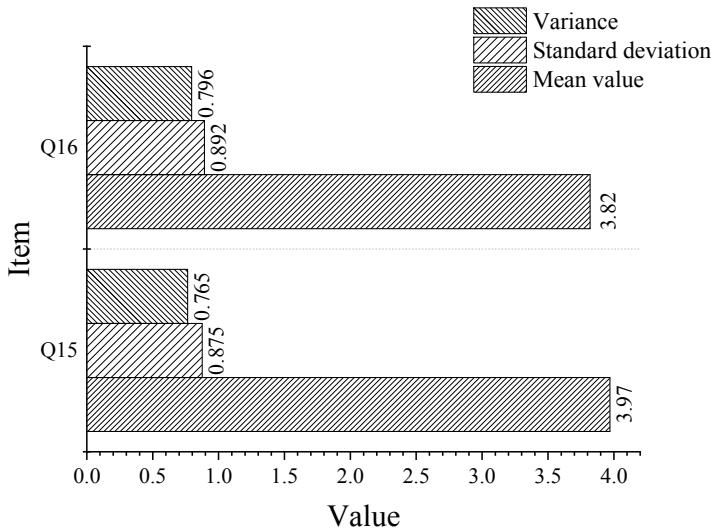


Figure 8 Customer loyalty statistics



4 Conclusion

Globally, the realm of e-commerce has garnered increasing attention from entrepreneurs and consumers, reshaping people's lifestyles and consumption habits through continuous innovation. E-commerce, functioning as both a commercial activity and a transformative

force, leverages information and network technologies to revolutionise commodity exchanges. It deeply integrates with traditional industries, giving rise to a new development model characterised by innovative technologies, methodologies, and internet platforms. In this context, a comprehensive analysis of customer satisfaction on Taobao is conducted using the QS method. Mean, standard deviation, and variance are computed for six key service quality standards – practicality, safety, enthusiasm, reliability, feedback mechanism, and compensation mechanism. These variables are then examined to understand their impact on customer service quality in Taobao stores. The findings highlight the paramount importance of the safety standard, followed by practicality and the compensation mechanism in influencing service quality. This insight serves as a valuable reference for online enterprises seeking to enhance service quality in the competitive e-commerce landscape.

While the obtained data meets the research requirements, the study acknowledges limitations related to sample size. Expanding the sample size would bolster the credibility of the results. Additionally, the employed model is relatively simple, yet it yields meaningful research conclusions. Future investigations should delve deeper into the intricate dynamics of service quality, customer satisfaction, and customer loyalty, unravelling their nuanced relationships for a more comprehensive understanding.

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Conflicts of interest

All authors declare that they have no conflicts of interest.

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