Research on Cainiao in Service rating

Group members: Jingyang Feng, kehan Li

1. Motivation (Research background and purpose)

In the context of the booming e-commerce, consumer demand for express delivery services has increased significantly, especially with rising expectations for delivery speed. The quality of logistics service directly affects consumers' shopping experience, while the relationship between payment amount, logistics commitment time, product weight and logistics service score can reveal whether customers' expectations of logistics service are different when they pay different amounts, commit time and weight. Understanding the impact of these three factors on logistics service score is helpful for logistics enterprises to optimize service quality and improve customer satisfaction.

1.1 Variable selection reason

1.1.1 Significance of logistics service score:

Logistics service score is the direct feedback of customers to the quality of logistics service, and is an important index to measure the quality of logistics service. A high score indicates customer satisfaction with the logistics service, while a low score may reflect problems with the service. By analyzing the logistics service score, it can help logistics enterprises find and improve the shortcomings in the service.

1.1.2 The impact of payment amount on customer expectations:

The amount paid is one of the important indicators of orders, reflecting the level of spending by customers when purchasing goods. Orders with high payment amounts may lead customers to have higher expectations for logistics services. Therefore, analyzing the relationship between payment amount and logistics service score is helpful to understand the difference in customer service expectation under different payment amount.

1.1.3 Impact of logistics commitment time on customer expectations:

Logistics commitment time is directly related to customer expectations for delivery speed. Customer satisfaction is usually higher for orders with shorter commitment times if they are delivered on time. Therefore, analyzing the relationship between logistics commitment time and logistics service score is helpful to understand the service expectation difference of customers under different commitment time.

1.1.4 The impact of commodity quantity on logistics services:

The quantity of goods is one of the important indicators of orders, reflecting the complexity and cost of logistics services. Larger orders usually require more shipping resources and can affect delivery speed and service quality. Therefore, the analysis of the relationship between the quantity of goods and the score of logistics services is helpful to understand the difference of customers' service expectations under different quantity of goods.

By analyzing the impact of payment amount, logistics commitment time and commodity weight on logistics service scores, we can better understand customers' expectations of logistics services and make corresponding improvement suggestions to improve logistics service quality and customer satisfaction.

2. Main Idea

2.1 Synthesis

2.1.1 Relationship between payment amount and score
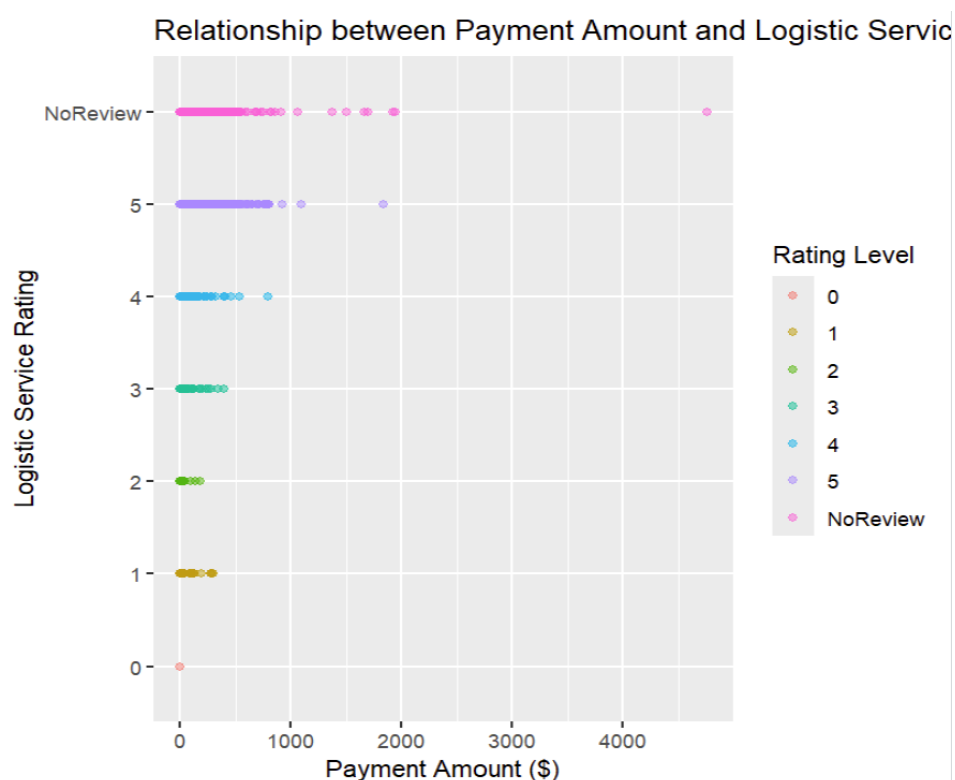
By analyzing the relationship between payment amount and logistics service score, we can see that the score of most orders is concentrated in the high score range (4 and 5 points), while the order with high payment amount is mainly concentrated in the unrated and high score area. Further statistical analysis will quantify this relationship and

determine its significance.

For orders with a score between 0 and 3, further analysis of the characteristics of these orders is required to find out the reason for the low score. First, from the perspective of logistics companies, whether the low score orders are concentrated in specific logistics companies, these companies may have service quality problems. Second, from a distribution area perspective, is the low score order concentrated in some specific distribution areas, where there may be delivery delays or other logistics issues. In addition, order processing times need to be analyzed, whether low-rated orders take longer to process, and failure to meet customer expectations for delivery times can lead to low ratings. Through these analyses, the issues that lead to low ratings can be better identified and resolved, thereby improving overall customer satisfaction.

2.1.2 Relationship between commitment time and rating
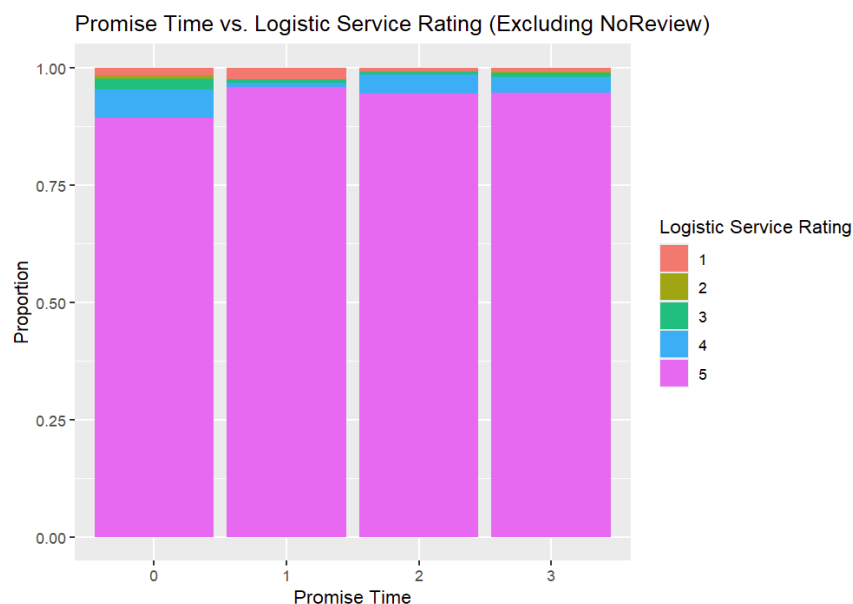
By analyzing the relationship between commitment time and logistics service score, we found that regardless of commitment time, the score of most orders is concentrated in the high score range. Further statistical analysis will quantify this relationship and determine its significance.

In each commitment cycle, customers' ratings on logistics services remained basically consistent, indicating that commitment time was not the main factor affecting customer ratings. Customers may be more concerned about the overall experience of logistics services, including delivery speed, item integrity, and service attitude of delivery personnel. By understanding this, logistics companies can improve their service quality in other ways to further improve customer satisfaction.

2.1.3 The relationship between quantity and rating

Item Quantity vs. Logistic Service Rating

By analyzing the relationship between the quantity of goods and the score of logistics service, we find that the score of most orders is concentrated in the high score range. Further statistical analysis will quantify this relationship and determine its significance. As can be seen from the figure, the logistics service scores of most orders are concentrated in 4 and 5 points, which indicates that, in general, customers are highly satisfied with logistics services. Orders with high scores (4 and 5) are widely distributed across the number of items, indicating that orders receive a high score regardless of the number of items. Orders with a low score (0 to 3) have a smaller number of items, which may indicate that orders with a smaller number of items are more likely to receive a lower score.

2.2 Compare

2.2.1 The relationship between payment amount and rating
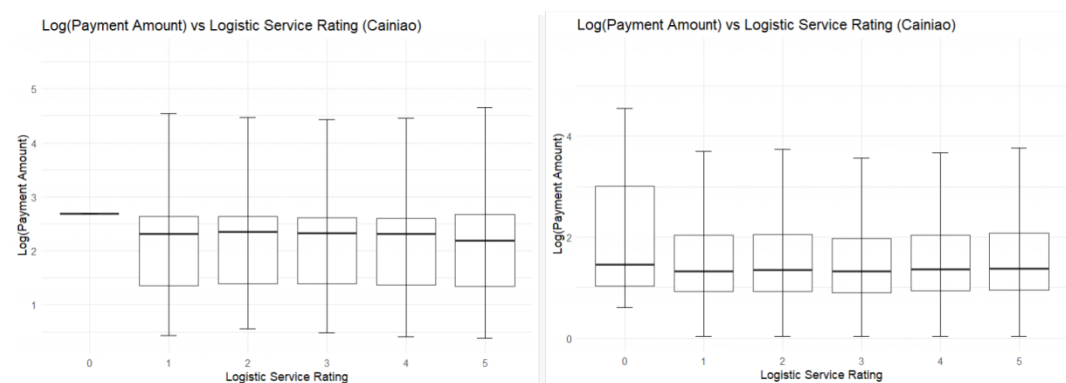
The first chart shows the logarithmic distribution of payment amounts for orders using Cainiao Logistics under different logistics service scores. The X-axis represents the

logistics service score (0 to 5) and the Y-axis represents the logarithm of the payment amount.

The analysis shows that orders with a score of 0 pay relatively concentrated amounts, with the logarithm of most pay amounts between 2.5 and 3, and the number of orders is small and the range of payment amounts is small. For orders with a score of 1 to 5, the logarithmic distribution of the payment amount is relatively uniform, concentrated between 2 and 4, with a certain degree of dispersion. The distribution of payment amounts for orders with high scores (4 and 5) was more consistent and the difference was not significant.

The second chart shows the logarithmic distribution of payment amounts for non-Cainiao logistics orders under different logistics service scores. The X-axis represents the logistics service score (0 to 5) and the Y-axis represents the logarithm of the payment amount.

The analysis shows that orders with a score of 0 have a wide range of payment amounts, high dispersion, and a wide distribution of payment amounts with a logarithmic range from 0 to 4. For orders with a score of 1 to 5, the logarithmic distribution of the payment amount is relatively uniform, concentrated between 2 and 4, and has a certain dispersion. The distribution of payment amounts for orders with high scores (4 and 5) was more consistent and the difference was not significant.

In summary, the order payment amount of Cainiao logistics with a score of 0 is relatively concentrated and the range is small; Payment amounts for orders rated 1 to 5 were evenly distributed and concentrated between 2 and 4, with no significant difference in payment amounts for high-rated orders. Non-cainiao logistics' orders with a score of 0 have a wide range of payment amounts and high dispersion; Payment amounts for orders rated 1 to 5 were evenly distributed and concentrated between 2 and 4, with no significant difference in payment amounts for high-rated orders.

2.2.2 Relationship between commitment time and rating
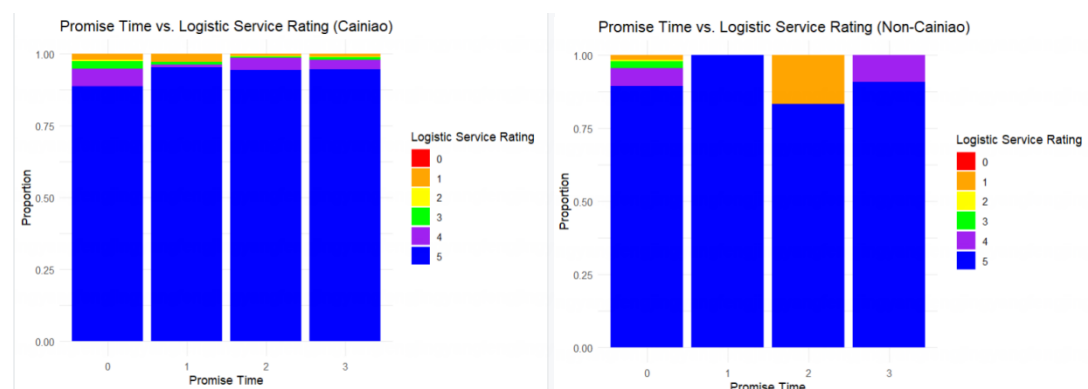
The first figure shows the distribution ratio of logistics service score for orders using Cainiao logistics under different commitment times. Two things can be learned from this. First of all, the majority of orders with a commitment time of 0 have a score of 5, indicating that the customer is very satisfied, while the proportion of orders with a score of 4 is small, and the proportion of orders with a score of 0 to 3 is almost negligible. Secondly, among the orders with a commitment time of 1 to 3, the orders with a score

of 5 dominate, indicating that customers' satisfaction with Cainiao logistics is high, the proportion of orders with a score of 4 is small but slightly higher than that of orders with a commitment time of 0, and the proportion of orders with a score of 0 to 3 is still negligible.

Next, let's look at the second chart, which shows the distribution ratio of logistics service scores of non-Cainiao logistics orders under different commitment times. We can see from this that the majority of orders with a commitment time of 0 have a score of 5, indicating very satisfactory, a small proportion of orders with a score of 4, and an almost negligible proportion of orders with a score of 0 to 3. Among the orders with a commitment time of 1, those with a score of 5 still dominate, but the proportion is relatively small, those with a score of 4 are smaller, and those with a score of 0 to 3 are smaller but slightly higher than Cainiao Logistics. Of the orders with a commitment time of 2, a smaller proportion had a score of 5, a higher proportion had a score of 1, indicating low customer satisfaction, and a relatively smaller proportion had a score of 0 to 3. Among orders with a commitment time of 3, orders with a score of 5 are dominant, orders with a score of 4 are smaller, and orders with a score of 0 to 3 are almost negligible.

In summary, we believe that Cainiao Logistics can maintain high customer satisfaction under all the promised time, most of the orders scored 5, and the proportion of orders scored 4 and below is very small. On the contrary, when the commitment time of non-Cainiao logistics is 2, the customer satisfaction is low, and the proportion of orders scored 1 is high, which needs attention and improvement. In general, Cainiao Logistics' customer satisfaction showed higher consistency under different commitment times, while non-Cainiao Logistics' customer satisfaction fluctuated significantly, especially poor performance under certain commitment times.

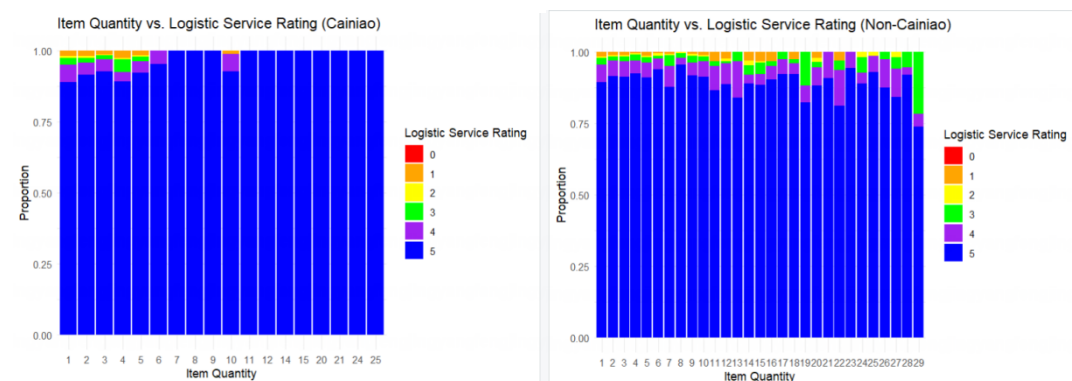### 2.2.3 The relationship between quantity and rating

The first figure shows the distribution ratio of logistics service score for orders using Cainiao logistics under different quantity of goods. Two things can be learned from this. First of all, for orders of 1 to 5 items, most of the orders scored 5, indicating very satisfactory. A small number of orders have ratings of 3 and 4, while orders with ratings of 0, 1 and 2 are almost negligible. Secondly, for orders with a quantity of 6 to 25 items, the dominance of orders with a score of 5 indicates that customer satisfaction with

Cainiao logistics is high, and the proportion of orders with a score of 4 and below is negligible.

Next, let's look at the second chart, which shows the distribution ratio of logistics service scores of non-Cainiao logistics orders under different commodity quantities. We can see from this that for orders with a quantity of 1 to 5 items, although most orders have a score of 5, the proportion is slightly lower than that of Cainiao Logistics. The proportion of orders rated 4 and 3 is relatively high, and the proportion of orders rated 0, 1 and 2 has also increased. For orders of 6 to 29 items, orders with a score of 5 still dominate, but the proportion is gradually declining, and the proportion of orders with a score of 4 and below is relatively high, especially the proportion of orders with a score of 3 has increased significantly.

In summary, we believe that Cainiao Logistics has scored 5 for most orders within the range of all commodity quantities, indicating that customers have high satisfaction with Cainiao Logistics, and the proportion of orders scored 4 or below is very small. On the contrary, non-Cainiao logistics in the number of goods of 1 to 5 orders, the score distribution is more dispersed, the score of 4 and below the order proportion is higher; Among orders of 6 to 29 items, the proportion of orders with a score of 5 gradually decreases, while the proportion of orders with a score of 4 and below is higher. In general, Cainiao Logistics shows higher consistency and customer satisfaction under different commodity quantities, while non-Cainiao Logistics shows a significant decline in customer satisfaction under larger commodity quantities, which needs to be improved.

3. Analysis result

3.1 The relationship between payment amount and logistics service rating

Overall, there is no significant direct relationship between payment amount and logistics service rating. However, on Cainiao Logistics platform, there is a relatively significant positive correlation between the payment amount and the logistics service score, that is, the higher the order amount, the longer the delivery time. That relationship doesn't exist on non-newbie platforms.

Further analysis found that the presence or absence of delivery commitments also affected the relationship. In the absence of commitment, there is a positive correlation between delivery time and order amount; In the case of commitment, the relationship initially showed an inverse correlation, that is, the higher the order amount, the shorter the delivery time, until the order amount reached $8 to $10, the relationship became positive again. This indicates that delivery commitment has a moderating effect on the relationship between delivery time and order amount in different price ranges.

3.2 Logistics service score distribution under different commitment time

On the Cainiao logistics platform, regardless of whether the commitment time is 0, 1, 2 or 3 days, most orders have a score of 5, indicating high customer satisfaction with Cainiao logistics. The proportion of orders with a score of 4 or below is very small. On the non-Cainiao logistics platform, most orders with a commitment time of 0 and 3 days have a score of 5, while orders with a commitment time of 1 and 2 days have a more dispersed score distribution, showing a certain difference in satisfaction.

3.3 The relationship between the quantity of goods and the score of logistics service

On the Cainiao logistics platform, within the range of all commodity quantities, most orders scored 5, indicating high customer satisfaction with Cainiao logistics, and the proportion of orders scored 4 and below was very small. On the non-Cainiao logistics platform, the score distribution of orders with the quantity of goods ranging from 1 to 5 is more dispersed, and the proportion of orders with the score of 4 and below is higher; For orders of 6 to 29 items, the proportion with a score of 5 gradually decreases, while the proportion with a score of 4 and below is higher.

3.4 The relationship between logistics service and order price

In the express delivery industry as a whole, there is no significant correlation between delivery time and order price. However, when it comes to Cainiao, this relationship shows a significant positive correlation, that is, the higher the order price, the longer the delivery time. On non-newbie platforms, that relationship doesn't exist. Further analysis found that the presence or absence of delivery commitments also had an impact on the relationship. In the absence of commitment, there is a positive correlation between delivery time and order price. In the case of commitment, the relationship is inversely correlated until prices reach $8 to $10, and the relationship becomes positive again. This shows that delivery commitment has a moderating effect on the relationship between delivery time and order price in different price ranges.

4. Potential Reasons

After analyzing the effects of payment amount, logistics commitment time, and quantity of goods on logistics service ratings, we have summarized the following potential reasons.

4.1 The Impact of Infrastructure Differences on Logistics Services

Research indicates that the level of urban infrastructure development directly affects the efficiency and quality of logistics services. Larger cities, with their well-developed infrastructure, have shorter and more efficient delivery routes. Bergmann et al. (2020) pointed out that differences in urban infrastructure not only impact the efficiency of last-mile delivery but also affect the overall layout and operation of the logistics network. Additionally, Wang Chenxu (2020) mentioned in his study that compared to urban areas, rural logistics face more severe infrastructure deficiencies, particularly in remote areas where delivery routes are longer and conditions more challenging. This increases the complexity and cost of logistics delivery, leading to a poorer delivery experience for local residents (Wang Chenxu, 2020).

4.2 Logistics Network Layout

The layout of urban logistics networks is crucial for enhancing delivery efficiency and reducing costs. A well-organized logistics network can effectively shorten delivery routes, improving timeliness and customer satisfaction (Shi Zhao, 2014). Research shows that due to the dense logistics nodes in large cities, delivery routes are short and efficient, especially with self-built logistics systems playing a crucial role for e-commerce companies. For instance, JD.com has achieved efficient integration and resource sharing in logistics delivery through its self-built logistics centers, significantly enhancing delivery efficiency and reducing costs (Li Jiyue, 2011). JD.com's logistics network layout, particularly in economically developed regions, demonstrates that by optimizing logistics nodes and delivery routes, companies can significantly improve logistics service quality and customer satisfaction.

4.3 The Impact of Commitment Time

Commitment time, as a service guarantee, can improve customer satisfaction and order delivery efficiency to a certain extent. However, the effect of commitment time varies with the order price and customer expectations. Within a certain range, commitment time can shorten the transportation time of high-priced orders, but beyond a certain price range, its effect diminishes or even reverses (Bergmann et al., 2020). Wang Xuhui et al. (2016) pointed out that the application of Internet of Things (IoT) technology can optimize commitment time and delivery routes, thereby improving customer satisfaction. The integration of IoT technology enables logistics companies to predict and manage delivery times more accurately, enhancing their ability to fulfill customer commitment times. Moreover, Li Jiyue's research also shows that informatization in the logistics system allows for more effective

management of orders and delivery times, thereby improving the overall quality of logistics services (Li Jiyue, 2011).

4.4 Logistics Costs and Expenses

In logistics services, reasonable allocation of human, material, and financial resources can effectively reduce logistics costs in various stages, including processing, transportation, delivery, and warehousing (Zhou Yuxin, 2021). Haroum et al. (2015) pointed out that traditional logistics cost accounting methods are no longer applicable and that precise cost accounting methods are needed to predict enterprise costs (Haroum et al., 2015). Additionally, logistics costs have characteristics such as hidden costs, interest reversibility, and multiplicative effects. By establishing modern information management systems and reasonable talent management systems, logistics efficiency can be significantly improved, reducing return costs and expenses caused by order management chaos (Zhou Yuxin, 2021). When costs are reduced, order prices can also decrease, contributing to improved customer service satisfaction.

5. Practical Implications

5.1 Improving Infrastructure

To enhance the quality of logistics services, especially in remote and rural areas, significant improvements in infrastructure construction are necessary. Both the government and logistics enterprises should invest jointly to optimize road networks and build more logistics nodes and distribution centers to shorten delivery routes and improve delivery efficiency (Wang Chenxu, 2020). Additionally, adopting intelligent logistics technologies, such as automated warehousing systems and unmanned delivery vehicles, can provide more reliable logistics services in areas with poor infrastructure (Bergmann et al., 2020).

5.2 Optimizing Logistics Network Layout

Logistics enterprises should focus on optimizing the layout of logistics networks by reasonably setting up warehousing centers and distribution nodes to enhance the overall efficiency of the logistics network (Li Jiyue, 2011). Large cities should leverage their existing logistics infrastructure advantages to further integrate resources and increase the density and coverage of the logistics network. For small and medium-sized cities and rural areas, a "centralized distribution + end-point delivery" model can be adopted to reduce costs through centralized distribution while improving service quality through end-point delivery (Shi Zhao, 2014).

5.3 Enhancing Information and Intelligence Levels

Logistics enterprises should increase investment in information and intelligent technologies, building advanced logistics information management systems to achieve real-time monitoring and data analysis of the entire logistics process (Wang Xuhui, 2016). By utilizing IoT technology, artificial intelligence, and big data analysis, they can optimize delivery routes and commitment times, improving the punctuality of orders and customer satisfaction (Li Jiyue, 2011). Additionally, companies should establish sound information feedback mechanisms to promptly handle customer complaints and feedback, thereby enhancing service levels.

5.4 Improving Cost Control Mechanisms

Logistics enterprises should establish scientific cost control mechanisms to reduce logistics costs through optimizing resource allocation at each stage (Zhou Yuxin, 2021). Specific measures include enhancing employee training to improve their quality and work efficiency; perfecting the cost accounting system to accurately predict and control various costs (Haroum et al., 2015); and reasonably allocating human resources to avoid redundancy and waste (Zhou Yuxin, 2021). Moreover, companies should actively adopt advanced logistics technologies and equipment to increase automation levels, thereby reducing labor and operational costs.

5.5 Personalized Services and Customer Relationship Management

To improve customer satisfaction, logistics enterprises should provide personalized logistics services based on customer needs. Through customer relationship management (CRM) systems, they can gain deep insights into customer needs and preferences, enabling the development of personalized delivery plans (Bergmann et al., 2020). For instance, high-value order customers can be offered priority delivery and dedicated customer service; frequent shoppers can be provided with reward points and coupons as value-added services (Li Jiyue, 2011).

6. Reference

[1]Shi, Z. (2014). *Research on Logistics Distribution Location and Transportation Route Optimization* [D]. Central South University.
[2] Li, J. (2011). *An Analysis of Logistics Distribution Problems in China's BtoC E-commerce: A Case Study of JD.com* [J]. Logistics Technology, 34(10), 108-111.

[3] Wang, C. (2020). *Strategy Research on the "Last Mile" of Rural Logistics Distribution* [D]. Beijing University of Posts and Telecommunications. DOI: 10.26969/d.cnki.gbydu.2020.003097.

[4] Wang, X., & Zhang, Q. (2016). *Construction of Fresh Agricultural Products Cold Chain Logistics System Based on the Internet of Things: Framework, Mechanism, and Path* [J]. Journal of Nanjing Agricultural University (Social Sciences Edition), 16(01), 31-41+163.

[5]Bergmann, F.M., Wagner, S.M., & Winkenbach, M. (2020). *Integrating first-mile pickup and last-mile delivery on shared vehicle routes for efficient urban e-commerce distribution.* Transportation Research Part B: Methodological*, 131, 26-62.