Research on Quality Evaluation of Campus Crowdsourcing Logistics Service

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Abstract. Crowdsourcing logistics is an effective means to solve the difficulty of distribution at the end of campus. Based on literature research and practical investigation, this paper puts forward the factors that can be used to analyze the quality evaluation of campus crowdsourcing logistics services from the perspective of campus crowdsourcing logistics. We determined the distribution of three indicators of campus crowdsourcing logistics service quality as a convenience, security, and responsiveness. We choose hierarchical analysis as the research method and conduct the empirical investigation in the form of a face-to-face interviews. Based on the results of empirical analysis, the influence weights of convenience, safety, and responsiveness were determined to be 45.7% %, 18.9%, and 35.4%, respectively. Our study provides a reference for improving the quality of campus crowdsourcing logistics services.

Keywords: Crowdsourcing logistics · Campus crowdsourcing · Quality of service

1 Introduction

Thanks to the rapid growth of e-commerce, college students are shopping online more and more often. According to iMedia, more than 60 percent of Chinese college students will shop online in 2021. In the mid-term, 9. 2 percent of college students only shopped online. Inevitably, the demand for logistics is getting higher and higher. However, we have to admit the fact that the end problem of campus express distribution (the last kilometer) is still outstanding. In the face of excessive express delivery, logistics outlets in colleges and universities are difficult to provide one-to-one door-to-door delivery services for students. In particular, amid the epidemic, some universities have banned express delivery outlets from entering their campuses.

Crowdsourcing logistics is a new business logistics model, which has developed rapidly in China in recent years. It integrates the logistics capacity of the public using internet-based network technology and business big data operation and other new generation of information technology. In the past, this capacity was so fragmented that it was often ignored, resulting in wasted logistics capacity. In the crowdsourcing logistics mode, the integration of fragmented logistics capacity can improve the speed of terminal logistics distribution, and achieve multi-party cooperation and a win-win situation. At

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present, the platforms engaged in logistics crowdsourcing in China include person-to-person express, Dada, flash delivery, express 100, 51, and so on. These crowdsourcing logistics companies are mainly concentrated in express delivery, catering, retail and O2O industries.

College students, who are easy to accept new things, can quickly understand the operation of crowdsourcing logistics and become participants in campus crowdsourcing. At present, there are many crowdsourcing platforms in universities. In the form of express delivery and take-out generation. However, due to a large number of students and high a degree of aggregation, in the absence of effective management, the service quality will inevitably be difficult to guarantee. For example, to gain more revenue, a recipient will sometimes deliver multiple packages at the same time. Obviously, in this case, it is often easy to lead to the phenomenon of delivery not in time, delivery of goods error. Therefore, the study on the quality of campus crowdsourcing logistics service is a problem worth exploring.

However, most of the research focuses on the social groups of crowdsourcing logistics, aiming to improve participation in crowdsourcing logistics. For example, contractor, contractor, crowdsourcing platforms, and so on. However, college students, they have a large demand for delivery in express delivery, take-out delivery and other aspects, with a high degree of group aggregation, and a large number of people participating in delivery. Therefore, we believe that in the research of crowdsourcing logistics, it is important to distinguish between college students and social groups. Based on this, this paper mainly does the following work. Firstly, we choose campus crowdsourcing logistics as the research object and propose the influencing factors that can be used to analyze the service quality evaluation of campus crowdsourcing logistics. Secondly, we analyze the influence degree of each factor through the analytic hierarchy process. Our research has enriched the literature on crowdsourcing logistics. And, in practice, we put forward corresponding countermeasures according to the weight of influencing factors, to achieve the purpose of optimizing the university campus crowdsourcing logistics service.

Other chapters of the paper are arranged as follows: In the second part, the work related to the study of campus crowdsourcing logistics service quality is described. In the third part, we use the analytic hierarchy process to conduct empirical research, and get the final weight data. In the fourth part, we discuss the results based on the weight data of influencing factors. In the fifth and last part, we put forward the research conclusions, limitations, and possible future research directions.

2 Related Work

2.1 Advantage of Crowdsourcing Logistics

Crowdsourcing logistics has certain advantages in solving the problem of optimal one-kilometer distribution, and strengthening the understanding of social groups on crowdsourcing logistics has potential benefits to expand the influence of crowdsourcing logistics [7]. [2] pointed out that more participants can be obtained by developing customers' social networks. Compared with traditional third-party logistics, crowdsourcing logistics can bring strategic advantages to enterprises [1]. Moreover, it can bring obvious economic benefits to enterprises [6].

2.2 Crowdsourcing Logistics Costs and Benefits

Crowdsourcing logistics mode can reduce logistics costs by using idle social resources. Therefore, the cost is the focus of many scholars. Effective algorithms can combine the delivery of goods with the demand of the time window, and reduce logistics costs while improving customer service levels [3]. In particular, under the social link of intensified competition, the establishment of a distribution pricing model to regulate supply and demand can help crowdsourcing platforms obtain expected benefits [8]. Of course, for the receivers of crowdsourcing logistics, appropriate monetary compensation is an effective means to intensify their role as deliverers [5]. In addition, in the face of complaints caused by the service attitude of the receiver, the appropriate penalty policy can achieve higher service quality. [4].

From the above literature analysis, we can guide that the application and value of crowdsourcing logistics have attracted the attention of many scholars. However, there are few types of research on the quality of crowdsourcing logistics services. The research on campus crowdsourcing logistics is even less. For campus logistics, how to solve the terminal distribution problem, to provide better service for students is very important. Based on the perspective of campus crowdsourcing logistics, this paper studies the service quality of campus crowdsourcing logistics. We believe that improving the quality of campus crowdsourcing logistics services can promote the benign development of campus logistics distribution.

3 Methods and Results

3.1 Research Model

TO better solve the problem of campus end distribution and promote the benign development of campus crowdsourcing, we chose the service quality of campus crowdsourcing logistics as our research direction and invited some students involved in campus crowdsourcing logistics to have a face-to-face conversation. Based on the above literature research and actual interview survey, we divide the evaluation index of campus crowdsourcing logistics service quality into three parts. They are; convenience, security, and responsiveness. The specific contents are shown in Table 1:

We believe that from the perspective of campus crowdsourcing logistics, convenience, security and response performance can adequately reflect the service quality of crowdsourcing logistics. Furthermore, according to the service quality evaluation results,

Table 1. Indicator system

Indicators	Instructions
Convenience	The convenience of pick-up method, the flexibility of distribution, the convenience of system operation
Security	Accurate distribution, goods integrity, personal information security
Responsiveness	Delivery speed, waiting time, complaint handling rate

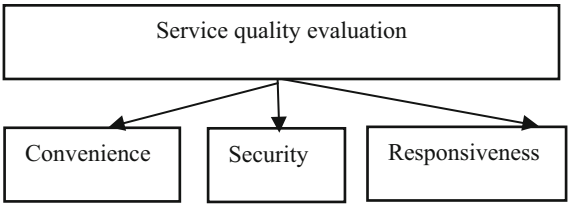

Fig. 1. Research model

adopting appropriate strategies to further improve the service level is an effective way to promote the development of the campus crowdsourcing platforms, in our opinion.

According to the evaluation index of campus crowdsourcing logistics service quality determined above, we constructed a research model of campus crowdsourcing logistics service quality evaluation. as shown in the Fig. 1.

3.2 Research Methods

In the evaluation of campus crowdsourcing logistics service quality, it is an essential step to determine the influence weight of different indicators on service quality. We believe that only by determining the influence degree of different indicators can crowdsourcing platforms carry out reasonable, targeted, and effective development strategy design. Therefore, the selection of reasonable research methods to determine the impact of service quality evaluation indicators plays an important role in the research.

When determining the weight of campus crowdsourcing logistics service quality index, it is not easy to be accepted by others if it is only a qualitative analysis. The analytic hierarchy process (AHP) is a systematic and hierarchical analysis method that combines qualitative and quantitative analysis. It can decompose the problem into different component factors and determine the weight of different factors to form a multi-level analysis structure model. On this basis, less quantitative information is used to make the decision-making process mathematical. The analytic hierarchy process is chosen as the main research method. We believe that in determining the weight of different service quality indicators, the analytic hierarchy process can enhance the persuasion of the results through the combination of qualitative and quantitative methods. In terms of data analysis, THE ANALYTIC hierarchy Process needs to invite different experts to compare these factors and determine the final score. Further, we need to carry out arithmetic average calculation according to the scoring results to determine the influence weight of different factors.

3.3 Questionnaire Design

It is worth noting that YAANP software is our data analysis tool. Based on the characteristics of data collection, collection and analysis steps, and methods of the analytic hierarchy process, YAANP software can assist us to achieve questionnaire design, data collection, and data analysis more quickly. After inputting the research model of campus crowdsourcing logistics service quality evaluation and related instructions into YAANP software, we can quickly get a formed survey form.

Table 2. Scoring table

Factor	5	4	3	2	1	2	3	4	5	Factor
Convenience										Security
Convenience										Responsiveness
Security										Responsiveness

It should be noted that, combined with the characteristics of the analytic hierarchy process and the content of the campus crowdsourcing logistics service quality evaluation index, we choose YAAHP software as the research tool. After importing the paper model, we use the questionnaire generation module of the software to design the corresponding questionnaire. Details are shown in the following table. Our purpose in designing the questionnaire was to make sure that it was not to be overlooked that we divided the measures in the questionnaire into five levels. The values of 5, 4, 3, 2, and 1 correspond to absolute importance, very important, relatively important, slightly important, and equally important respectively. as shown in the following Table 2.

3.4 Data Collection and Consistency Test

College students are participants in campus crowdsourcing logistics, so we take college students as the subjects of the questionnaire. The questionnaire was collected in offline and online ways. To ensure the reliability of the data, we chose the offline one-to-one interview to collect the questionnaire. In our opinion, offline one-on-one interviews can more effectively help us identify students' identities and fill in questionnaires. This is an effective way to avoid students filling in on behalf of others or filling in perfunctory aspects. Finally, respondents were selected and data collection was completed after 7 working days. We got 14 questionnaires.

To test the consistency of the data, we imported the survey data into YAANP software and carried out the necessary operations. According to the software feedback results, we found that CR < 0.1. Therefore, we can conclude that all 14 points of survey data are valid.

3.5 Data Analysis

Based on data passing the consistency test, we determine the final weight score judgment matrix. In addition, the group decision function of YAANP software is selected to judge the weight. See Table 3.

Table 3. Indicator system

	Convenience	Security	Responsive
Convenience	1	2. 414718	1. 288091
Security	0. 414127	1	0. 533433
Responsive	0. 776343	1. 874649	1

Table 4. Weight

Project	Wi
Convenience	0. 456523
Security	0. 189059
Responsive	0. 354418

The weight table is shown in Table 4.

From Table 3, and Table 4, we can know the weight of the research model of campus crowdsourcing logistics service quality evaluation. Among them, Convenience accounts for 45. 7% %, Security for 18. 9%, Responsiveness for 35. 4%. Based on this, we conclude that convenience is a key factor to be paid attention to in the development of campus crowdsourcing logistics. Of course, rapid response to the needs of users is also indispensable, his weight accounted for the second.

4 Discussion

4.1 Theoretical Enlightenment

From the perspective of literature, research content, and methods, our research has two theoretical implications. Firstly, this paper enriches the literature on campus crowdsourcing logistics research. In the context of sharing economy, crowdsourcing is an effective way to reduce resource utilization. Crowdsourcing logistics is the solution to the end of-campus delivery. Therefore, guiding campus crowdsourcing logistics to develop in a good direction is conducive to the overall planning and management of campus packages. By studying the quality evaluation of campus crowdsourcing logistics services, this paper helps campus crowdsourcing platforms to design different strategies for better development. Therefore, this paper enriches the literature on the research methods of campus crowdsourcing logistics.

Secondly, this paper introduces the analytic hierarchy process into the study of campus crowdsourcing logistics, and provides a service quality evaluation model of campus crowdsourcing logistics. It is worth noting that we can quantitatively measure the impact of the three indicators of convenience, security, and service, and get the weight of the impact. Therefore, this paper expands the application of the analytic hierarchy process in campus crowdsourcing logistics service quality.

4.2 Practical Enlightenment

The practical implications of this paper are as follows: firstly, crowdsourcing logistics platforms should attach great importance to users' requirements for convenience of pick-up method, the flexibility of distribution, and convenience of system operation. As can be seen from our data analysis results, the weight of convenience is as high as 45. 7%. College students, they are quick to accept new things, but too complicated a process will reduce their study time. Therefore, both the contractor and the contractor have higher requirements for the convenience of campus crowdsourcing.

Secondly, in improving the quality of campus crowdsourcing logistics service. Responsiveness is also an important factor. At present, campus crowdsourcing logistics platforms in colleges and universities are mostly for students to start their businesses, while the self-organized crowdsourcing logistics platforms lack professional processes and efficiency. Therefore, more efforts should be put into optimizing the operation of the crowdsourcing platform so that it can respond to the demand more quickly.

5 Conclusion

It is worth noting that part of our research has not been fully considered, many aspects need to be further explored and analyzed. First, we consider the impact of convenience, security, and responsiveness on the quality of campus crowdsourcing logistics service. However, we must admit that we ignore the gender of the respondents. We took gender out of the equation when we conducted the survey. No doubt compared with men, female college students pay more attention to safety issues. Therefore, when determining the weight of indicators, how to distinguish according to gender is worth further study. Second, our overall sample size is small, so we can increase the sample survey in the future.

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Appendix

The evaluation form of the respondents is shown in the Table 5:

Table 5. Summary of survey data

	1	2	3	4	5	6	7
Convenience VS Security	3	3	1/2	2	2	3	4
Convenience VS Responsivenes	2	2	2	1	2	2	2
Security VS Responsiveness	1/3	1/3	3	1/4	1	1/3	1/2
	8	9	10	11	12	13	14
Convenience VS Security	3	4	3	3	3	1	2
Convenience VS Responsivenes	1	2	2	1	1	1	1
Security VS Responsiveness	1/4	1/4	1/3	1/4	1/4	1/2	1

References

1. Castillo, Vincent E. , Mollenkopf, Diane A. , Bell, John E. , Et Al. (2018). Supply Chain Integrity: A Key to Sustainable Supply Chain Management. J. Journal of business logistics, 39 (1) : 38-56.
2. Devari, Aash. winikumar, Nikolaev, Alexander G. , He, Qing (2017). Crowdsourcing the last-mile delivery of online orders by exploiting the social networks of retail store customers. J. Transportation Research, Part E. Logistics and transportation review, 105: 105-122.
3. Liu C , Wang J , Jizi L I , et al. (2019). Simulation and optimization model of cold chain logistics delivery under crowdsourcing mode. J. Computer Integrated Manufacturing Systems, 25(10):2666-1675.
4. Mladenow, Andreas & Bauer, Christine & Strauss, Christine (2012) Crowdsourcing in Logistics: Concepts and Applications, J. Using Social Crowd. 2012, 31 (2) : 231–239.
5. Neudoerfer F , Mladenow A , Strauss C . (2021). Urban Crowd-Logistics - Monetary compensation and willingness to work as an occasional driver. J. Procedia Computer Science, 184:508-515.
6. R. Vecera and O. Pribyl, (2017). Key denominators of success in crowdsourced logistics. J. Smart City Symposium Prague (SCSP), 1–5.
7. Sanna Ketonen-Oksi, Hannu Kaerkkaeinen, Jan Jussila. (2017). How Can Crowds Be Used In Developing Complex Industrial Products? An Analysis Of Factors Impacting the usefulness of crowdsourcing outcomes. J. International journal of business innovation and research, 14(4):460–478.
8. Wang W , Xie L . (2021). Optimal pricing of crowdsourcing logistics services with social delivery capacity. J. Journal of Combinatorial Optimization, 29 (3) : 11-20.