

Study on the Relationship between Income Perception, Satisfaction and Retention Intention of Social Deliverers in Crowdsourcing Logistics

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Abstract: The crowdsourcing logistics service mode outsources the logistics distribution work completed by enterprise employees to the public. The social distribution personnel and the platform of crowdsourcing logistics belong to the relationship of cooperation rather than labor employment. The social distribution personnel have the right to choose the platform and choose whether to participate in the logistics distribution service. The social distribution service ability of crowdsourcing logistics has great uncertainty, and the sustainable guarantee of the social distribution service ability of crowdsourcing logistics is a huge challenge for platform operation. The shared retention intention of socialized deliverers has become an important guarantee for the delivery service ability of crowdsourcing logistics service platform. Considering the service process of high contact between customers and social deliverers of crowdsourcing logistics service, this paper takes a new research perspective of the relationship between customer satisfaction of crowdsourcing logistics service, satisfaction and retention intention of social deliverers, based on paired data analysis method, and through the design of paired questionnaire between customers and social deliverers. The empirical research method is used to study the interactive relationship among customer satisfaction, social deliverer satisfaction, social deliverer retention intention and crowdsourcing logistics distribution cost. In this survey, 285 pairs of formal questionnaires were issued, 264 questionnaires from customers and 271 questionnaires from couriers were collected, and 261 pairs of valid questionnaires were obtained, including 194 in Shanghai and 67 in Xi'an. SPSS and AMOS22.0 software were used to analyze the questionnaire data, and the structural equation model was constructed. The reliability and validity test showed that the model had a good fit. The results show that customer satisfaction of crowdsourcing logistics services has a significant positive impact on the satisfaction of social deliverers, the satisfaction of crowdsourcing logistics social deliverers has a significant positive impact on the retention intention of social deliverers, and the perception of delivery cost plays a partial intermediary role between customer satisfaction and satisfaction of social deliverers. The research results of this paper enrich the management theory of crowdsourcing logistics services, and also provide useful management enlightenment for the practice of crowdsourcing logistics services.

1. Research Background

Social deliverers are the main distribution human resources of crowdsourcing logistics service platform, and the retention intention of social deliverers becomes a very important guarantee of the distribution service ability of crowdsourcing logistics service platform. Although domestic and foreign experts and scholars have made many very important research results in the aspects of satisfaction, retention intention, willingness and behavior of crowdsourcing logistics participants. However, in view of the characteristics of social operation of crowdsourcing logistics distribution service, there are few research literatures on the satisfaction and retention intention of social deliverers in crowdsourcing logistics. Therefore, through the design and distribution of a pair of questionnaires of crowdsourcing logistics customers and deliverers, this study empirically studied the influence of customer satisfaction of crowdsourcing logistics services on the satisfaction of social deliverers, as well as the influence of social deliverers' satisfaction on their retention intention. The influence of the perception of distribution cost dynamically adjusted by the crowdsourcing logistics service platform on the satisfaction of social deliverers is further analyzed, and the mediating role of the perception of distribution cost of social deliverers in the relationship between customer satisfaction and satisfaction of social deliverers is further analyzed.

2. Study Models and Assumptions

In the process of crowd-sourcing logistics customers and social distribution personnel highly contact the customer satisfaction of crowd-sourcing logistics services has a great impact on the behavior of social distribution personnel. Combining the practice of crowdsourcing logistics service operation and management, based on the balance theory of F. Hedder [1], the fair theory of J. S. Dams [2] and the two-factor incentive theory of F. Hedzberg [3], etc. This study established a structural equation model of the relationship between customer satisfaction of crowdsourcing logistics services and social deliverers' satisfaction and retention intention based on paired data analysis, as shown in Figure 1.

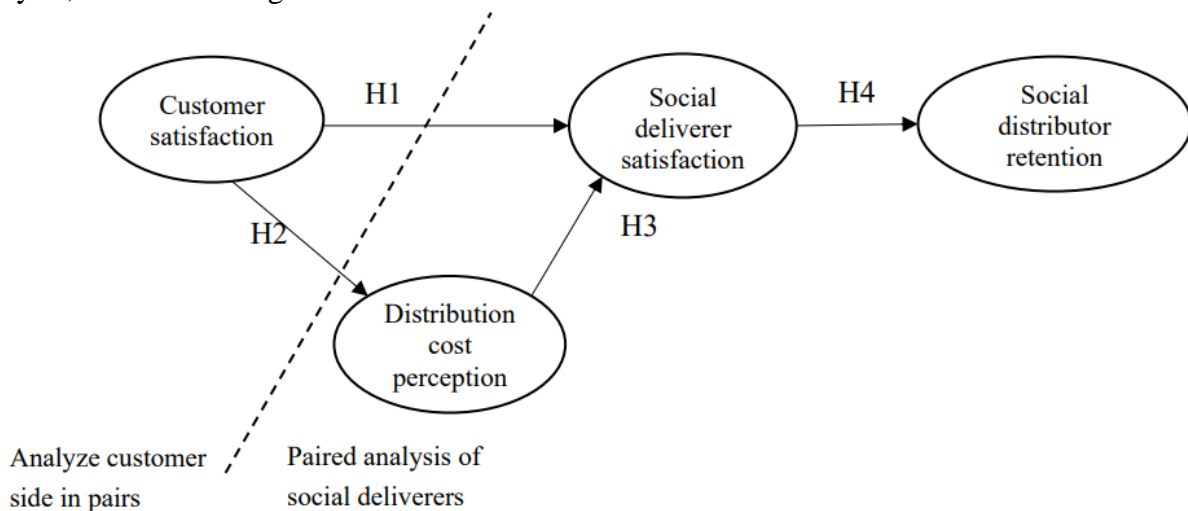


Figure 1: Structural equation model of customer satisfaction of crowdsourcing logistics service and social deliverer satisfaction and retention intention

2.1. Customer Satisfaction of Crowdsourcing Logistics Service and Social Deliverer Satisfaction

Based on Hyde's balance theory [1], we propose the hypothesis that customer satisfaction has a direct impact on the satisfaction of social deliverers. According to Hyde's theory of altered attitude balance, people usually agree on an object, even if their opinions do not agree at first. Considering the high contact between customers and social deliverers in the process of crowdsourcing logistics services, based on the concept of "customer first" in service science research, customers have more influence to change the attitude of social deliverers. Therefore, we propose the following research hypothesis H1:

Research hypothesis H1: Customer satisfaction of crowdsourcing logistics services has a significant positive impact on the satisfaction of social deliverers.

2.2. Crowdsourcing Logistics Distribution Cost Perception and Satisfaction

In crowdsourcing logistics and distribution services, satisfied customers may be willing to pay higher delivery costs, thus improving the satisfaction of social deliverers. Therefore, this paper first studies the direct impact of crowd-sourced logistics customer satisfaction on the perceived distribution cost, and the direct impact of crowd-sourced logistics distribution cost perception on the satisfaction of social distribution workers. Then, the mediating effect of crowdsourcing logistics distribution cost perception on customer satisfaction and social distribution worker satisfaction was studied. Therefore, based on hypothesis H1 in this study, the mediating effect of perceived delivery cost on the relationship between customer satisfaction and social deliverer satisfaction is proposed as follows:

Research hypothesis H2: Customer satisfaction of crowdsourcing logistics services has a significant positive impact on the perception of crowdsourcing logistics distribution costs.

Research hypothesis H3: The distribution cost perception of social distribution personnel in crowdsourcing logistics has a significant positive impact on the satisfaction of social distribution personnel.

2.3. Satisfaction and Retention Intention of Social Deliverers in Crowdsourcing Logistics

According to the theory of rational behavior proposed by American scholars Fishbein and Ajzen [4], an individual's attitude determines an individual's behavior, and the intention to stay is generally regarded as an effective indicator to predict the behavior of staying. Satisfied employees perceive the benefits they can gain from staying in the organization and are willing to stay rather than leave. Therefore, this paper puts forward the research hypothesis H4 that social deliverers' satisfaction has a positive and direct impact on their willingness to continue to participate in the distribution work of the crowdsourcing logistics service platform.

Research hypothesis 4 H4: The satisfaction of social deliverers in crowdsourcing logistics has a significant positive impact on their retention intention.

3. Study Models and Assumptions

3.1. Research Object and Research Process

Considering that college students accept new things quickly and are the most active online shopping groups, existing studies have shown that taking students as samples of e-commerce research can obtain corresponding research results [5]. To this end, the research work of this study

selects college students and postgraduates as customers of crowdsourcing logistics services, and trains them as investigators to fill in the questionnaire of social deliverers. A total of 285 pairs of formal questionnaires were issued, 264 questionnaires from customers and 271 questionnaires from couriers were collected. A total of 261 pairs of valid questionnaires were obtained, including 194 in Shanghai and 67 in Xi 'an.

3.2. Questionnaire Design and Variable Measurement

This study designed two pairs of customer survey questionnaires and social distribution staff survey questionnaires, and conducted a survey on the delivery service of the same online shopping transaction. There are 13 measurement items in this study, as shown in Table 1. Questionnaire items in this study were collected using 5-level Likert scale, with "5" representing "strongly agree" and "1" representing "strongly disagree".

Table 1: Research variables and their measurement indicators

Research variable	index	index content	literature source
Crowdsourcing logistics Customer satisfaction	US1	Delivery clerk service attitude	Brady etc. [6] Stank etc. [7]
	US2	Delivery goods accurately delivered	
	US3	deliverer professionalism	
	US4	Customer care awareness for deliverers	
Social distributor Satisfaction	RS1	I am very happy with my current job as a rider	Moqbel etc. [8] Dong Xiangshu etc. [9]
	RS2	Crowdsourcing riders work flexible hours	
	RS3	I feel satisfied with the comments of customers	
	RS4	crowdsourcing riders' income can improve quality of life	
Social distribution staff retention intention	RR1	Will you continue to work as a rider on crowdsourcing platforms in the future?	Rust etc. [10]
	RR2	will you continue to ride on Jingdong Home in the future?	
	RR3	Would you recommend your family and friends to be riders?	
Delivery fee perception	DP1	What is the total delivery fee you received for this delivery?	Cho [11]
	DP2	Are you satisfied with the tip for this delivery?	

4. Data Analysis and Research Results

SPSS24. 0 and AMOS22. 0 were used for statistical analysis. Cronbach's α coefficient and factor analysis were used to test the reliability and validity of the scale. Then, on the basis of model fitting degree analysis, the structural equation model method is used to test the hypothesis of the relationship between customer satisfaction of crowdsourcing logistics service, social deliverers' satisfaction, their willingness to stay, and the perception of distribution cost.

4.1. Research Object and Research Process

The reliability test results of the scale in this study showed that the Cronbach's α coefficients were all greater than 0.7, the overall Cronbach's α coefficient of the scale was 0.909, and the Cronbach's α coefficient of social deliverer satisfaction was 0.897. The Cronbach's α coefficient of

social deliverers' retention intention was 0.839, and the Cronbach's α coefficient of social deliverers' perception of delivery cost was 0.738, indicating that the scale in this study had high reliability. Therefore, the reliability of the scale in this study has been effectively verified, indicating that the measurement results of the scale have a good overall consistency, and the reliability of the data obtained from the questionnaire survey is high.

Factor analysis method was used to test the validity of the measurement. Firstly, KMO and Bartlett sphericity tests were conducted on the whole measurement items. KMO value of the data was 0.867 greater than 0.8, and the significance p value of Bartlett sphericity test was 0.000 less than 0.001, indicating that the test results were significant, indicating that the correlation between variables was strong. The data can be factor analyzed. Then, the maximum variance method was used to carry out rotating principal component factor analysis on the 13 measurement items of all questionnaires. The results showed that the 13 measurement items extracted four factors, including customer satisfaction (US), social deliverer satisfaction (RS), social deliverer retention intention (RR) and delivery cost perception (DP). The explanation rate of the accumulated variance of the four factors reached 80.71%. The factor rotation load matrix is shown in Table 2. The load of each measurement item on its corresponding factor is greater than 0.7, and the cross load on other factors is less than 0.4. In particular, according to the reality of dynamic pricing of crowdsourcing logistics distribution cost, the factor load of the measurement item of satisfaction of delivery gratuity designed in the perception dimension of distribution cost reaches 0.912. It indicates that the factors designed in this study have high validity.

Table 2: Factor load matrix after rotation by maximum variance method

	component			
	US	RS	RR	DP
Delivery clerk service attitudeUS1	0.889	0.115	0.131	0.040
Shipping goods accuratelyUS2	0.801	0.171	0.033	-0.046
Deliveryman professionalismUS3	0.903	0.055	0.083	0.183
Deliveryman caring awarenessUS4	0.845	0.130	0.040	0.127
Satisfied with rider jobRS1	0.248	0.743	0.275	0.232
Crowdsourcing riders work flexibleRS2	0.078	0.824	0.206	0.069
The customer's evaluation makes the evaluation meetRS3	0.185	0.831	0.199	0.111
Improve the quality of lifeRS4	0.092	0.811	0.268	0.197
Will continue to work as rider on JingdongRR1	0.037	0.518	0.734	0.071
Will continue to rideRR2	0.105	0.575	0.667	0.060
Will recommend othersRR3	0.137	0.199	0.841	0.190
The total delivery fee receivedDP1	0.121	0.562	0.086	0.670
Delivery tip satisfactionDP2	0.123	0.136	0.174	0.912
Note: Extraction method: principal component analysis. Rotation method: Caesar's normal maximum variance method. aa. Rotation has converged after 6 iterations.				

4.2. Hypothesis Testing

In this study, the structural model software Amos 22.0 was used to conduct data fitting analysis on the research model, and the specific model fitting index results were as follows: $\chi^2 / df = 2.169 <$

3, CFI = 0.967, GFI = 0.928, NFI = 0.958, IFI = 0.968, CFI, GFI, NFI and IFI were all greater than 0.9, AGFI = 0.893 > 0.8, RMSEA = 0.067 < 0.08, the fitting indexes were all within the critical standard, indicating that the model in this study has a good fitting degree.

Table 3: Path analysis and hypothesis testing results of the research model

Hypothetical	path	Path coefficient	t-value	P-value	test result
AssumeH1	customer satisfaction → social deliverer satisfaction	0.162	2.806	0.005	pass
AssumeH2	customer satisfaction → delivery cost perception	0.288	4.515	***	pass
AssumeH3	distribution cost perception → social distribution worker satisfaction	0.625	7.127	***	pass
AssumeH4	social deliverer satisfaction → social deliverer retention intention	0.797	9.771	***	pass

Note: *** means $p < 0.001$, ** means $p < 0.05$, * means $p < 0.1$.

The standardized coefficients and hypothesis testing results of each path of the structural equation model are shown in Table 3 and Figure 2. The path testing results of the model show that the four direct impact study hypotheses proposed in this study are supported. Among them, the path coefficient between customer satisfaction of crowdsourcing logistics service and satisfaction of social deliverers is 0.16, T-value is 2.806 is greater than 1.960, and p value is 0.005 is less than 0.05. The test results are significant, and the research hypothesis H1 test results are valid. The path coefficient of crowd-sourcing logistics service customer satisfaction on the perception of crowd-sourcing logistics distribution cost is 0.29, the T-value is 4.515 (greater than 1.960), and the p value (0.000) is significantly less than 0.001. The test results are significant, and the research hypothesis H2 is valid. The path coefficient of the crowdsourcing logistics distribution cost perception on the satisfaction of social deliverers is 0.63, the T-value is 7.127 (greater than 1.960), and the P-value (0.000) is significantly less than 0.001. The test results are significant, and hypothesis H3 is proved to be valid. The path coefficient of social deliverers' satisfaction on their retention intention was 0.80, T-value was 9.771 (greater than 1.960), and P-value (0.000) was significantly less than 0.001. The test result was significant, and the research hypothesis H4 was proved to be valid.

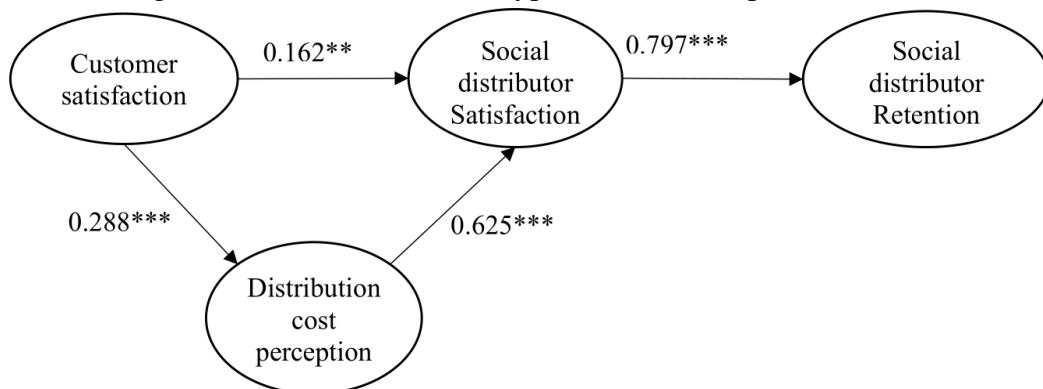


Figure 2: Estimation results of structural equation model

4.3. The Test of Mediation

Considering the strategy of the crowdsourcing logistics service platform to dynamically price delivery cost to regulate service ability, this study examines the mediating role of the intermediary variable perception of delivery cost in the relationship between customer satisfaction and social delivery agent satisfaction. The mediation effect test method of Bootstrapping, which is non-parametric test proposed by Taylor et al [12], is used to study the mediation effect of crowdsourcing logistics distribution cost perception on customer satisfaction and the satisfaction path of social deliverers.

Table 4: Test the mediating effect of distribution cost perception on customer satisfaction and social distribution worker satisfaction

	95% confidence interval			
	Uncorrected		deviation correction	
	Lower	Upper	Lower	Upper
Total effect	0.204	0.459	0.208	0.464
The direct effect of customer satisfaction on deliveryman satisfaction	0.009	0.298	0.014	0.303
The intermediary variable is the indirect effect of customer satisfaction perceived by distribution cost on distributor satisfaction	0.071	0.309	0.072	0.309

Note: The sample size was 5 000 and the confidence interval was 95%

In this study, the number of resampling of Bootstrap was set to 5 000, and the mediating effect was determined according to whether the 95% confidence interval of path coefficient contained 0. The test results of the mediating effect of Bootstrapping are shown in Table 4. At 95% confidence level, the confidence interval of the total effect of uncorrected and deviation corrected does not include zero, indicating that the research on the mediating effect of customer satisfaction on the perceived distribution cost and the satisfaction of social deliverers is significant. In the relationship between customer satisfaction and social distributor satisfaction with the perception of distribution cost as the intermediary variable, the indirect effect of customer satisfaction on the satisfaction of social distributor is not included in the 95% confidence uncorrected and deviation corrected confidence interval, which indicates that the intermediary effect of the perception of distribution cost of crowdsourcing logistics is significant in the relationship between customer satisfaction and social distributor satisfaction. However, under the 95% confidence degree, the deviation correction and uncorrected confidence interval of the direct effect of customer satisfaction on the satisfaction of social deliverers do not include zero, indicating that customer satisfaction also has a significant direct impact on the satisfaction of social deliverers. Therefore, distribution cost perception has a partial mediating effect in the relationship between customer satisfaction and social deliverer satisfaction. Therefore, the test results of the Bootstrap mediation effect in this study show that the perception of crowdsourced logistics social deliverers on distribution cost plays a partial mediating role in the relationship between customer satisfaction and social deliverers satisfaction.

5. Research Conclusions and Management Implications

5.1. Research Conclusion

This paper discusses the influence of customer satisfaction of crowdsourcing logistics on satisfaction and retention intention of social deliverers, and constructs a structural equation model

of the relationship between customer satisfaction of crowdsourcing logistics service, perception of distribution cost of crowdsourcing logistics, satisfaction of social deliverers and their retention intention. Based on the empirical research and analysis of the questionnaire survey data between customers and social deliverers of the crowdsourcing logistics service platform Jingdong Home - Dada, the following five research conclusions are drawn: (1) The customer satisfaction of crowdsourcing logistics service has a significant positive impact on the satisfaction of social deliverers, that is, the higher the customer satisfaction of crowdsourcing logistics service, the higher the satisfaction of social deliverers. (2) Customer satisfaction of crowdsourcing logistics services has a significant positive and direct impact on the perception of distribution cost, indicating that the higher customer satisfaction of crowdsourcing logistics services, the more willing they are to pay higher distribution cost of crowdsourcing logistics services. (3) The perception of crowdsourcing logistics distribution cost has a significant positive and direct impact on the satisfaction of social distribution workers, that is, the higher the distribution cost social distribution workers receive, the higher the job satisfaction of social distribution workers. (4) The satisfaction of social deliverers in crowdsourcing logistics has a significant positive and direct impact on their retention intention. The higher the satisfaction of social deliverers, the higher the intensity of their retention intention. (5) As an intermediary variable, the perception of crowdsourcing logistics distribution cost has a partial mediating effect on the relationship between customer satisfaction and social deliverer satisfaction. Therefore, improving customer satisfaction of crowdsourcing logistics services will make them willing to pay higher delivery tips, improve social deliverers' perception of delivery costs, and thus improve social deliverers' job satisfaction, and thus increase their willingness to stay.

5.2. Management Enlightenment

From the empirical analysis results of this study, it can be seen that customer satisfaction of crowdsourcing logistics services and social deliverers' satisfaction will both affect social deliverers' retention intention, and satisfied customers will affect social deliverers' job satisfaction, and thus affect their retention intention. At the same time, the perception of crowdsourcing logistics social deliverers on delivery costs also has a positive effect on the satisfaction of social deliverers, and then through the satisfaction of social deliverers has a positive impact on their retention intention. Therefore, as an effective means to control service ability, the distribution service fee premium strategy of crowdsourcing logistics service platform will positively and significantly affect social deliverers' retention intention through their job satisfaction. Therefore, the crowdsourcing logistics service platform should attach importance to the customer satisfaction management of crowdsourcing logistics services. On the basis of improving customer satisfaction, the dynamic premium strategy of crowdsourcing logistics distribution service fee should be implemented to improve the satisfaction of social distribution personnel, improve the retention rate of crowdsourcing logistics distribution personnel, stabilize the crowdsourcing logistics distribution team, and optimize the operation and management of crowdsourcing logistics.

5.3. Research Prospect

Social shared mass deliverers are a unique feature of the emerging crowdsourcing logistics model, and socialized deliverers are the core distribution human resources of the crowdsourcing logistics service platform. It is very important to improve customer satisfaction and social deliverer satisfaction for the optimization of crowdsourcing logistics service operation. Therefore, the influencing factors of customer satisfaction and social deliverer satisfaction of crowdsourcing logistics need to be further studied. In addition, in the process of crowdsourcing logistics and distribution services, the service process of high contact between social deliverers and customers

also needs to be further explored. Future research can adopt the actual big data of crowdsourcing logistics platform or the data collection method of experimental research.

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