Understanding the Consumer Satisfaction of the "Last-Mile" Delivery of E-Business Services

Shujun Liu[1], Yan Li[1(✉)], Jingqi Huang[1], and Xin Zhao[2]

[1] International College, China Agricultural University, Beijing 100083, People's Republic of China
liushujun_cherie@163.com, icbliyan@cau.edu.cn, 376138979@qq.com

[2] College of Humanities and Development Studies, China Agricultural University, Beijing 100083, People's Republic of China
Zhaoxin_phd@cau.edu.cn

Abstract. With the rapid development of e-business and modern logistics, people put more and more attention on the service of the express delivery industry. The "last mile" delivery is regarded as the most important link between logistics companies and customers, which deeply affects consumers' satisfaction on the companies' services. Concerning the non-linear relationship between production supply and consumer meet, Kano model is widely adopted to evaluate the satisfaction from consumers in the e-business services. This research aims to figure out the factors that influence the consumer satisfaction on the service of the "last mile" by using Kano model. According to the result analysis, some suggestions are raised up to meet customers' needs to enhance the quality of service of the "last mile" delivery of e-business service.

Keywords: Consumers satisfaction · Kano model · The "last mile" delivery

1 Introduction

1.1 Development of E-Business and Express Delivery Industry in China

Because of the low-cost, efficient, speedy alternative offers, Chinese market is going rapidly. E-business makes the handling of channel speedier and logistics functions more convenient, for instance inventory handling and delivery, order processing. Online shopping are becoming crucial in people's daily life. As the China Electronic Commerce Research center reported, at the first half of 2016, China e-business' transactions amount, which is up to 10 trillion and 500 billion RMB. It is an year-on-year growth increase of 7.2% [1]. Furthermore, B2B market transaction grows to 7 trillion and 900 billion RMB, and online retail market transaction is 2 trillion and 300 billion RMB.

New online tools construct a closer, personalized, interactive customer relationship. However, the rapid development and the severe competition bring some problems and challenges. One of the most serious challenges is express delivery. In 2016, the

Published by Springer Nature Switzerland AG 2019
D. Li and C. Zhao (Eds.): CCTA 2017, IFIP AICT 546, pp. 411–418, 2019.
https://doi.org/10.1007/978-3-030-06179-1_41

amount of Chinese express delivery company has been 13.25 Billion Pieces, up 56.7% year on year [2]. The high speed of development of the express delivery industry requires scientific management and efficient distribution, which could undertake the pressure from e-business.

1.2 Development of the "Last Mile"

Express delivery can be divided into four stages. They are solicitation, sorting, transfer, and delivering. Delivering, which is the last part of distribution, is the most important part in this industry. It is because delivering is the only access for express delivery companies to contact the customers. In order to improve the service quality in the last part, express delivery industry develops the "last mile" strategy, which is particularly used to illustrate the interaction between people and goods from transportation centre to homes [3].

Express delivery companies have came up with two models for the "last mile". The first one is joint distribution, which means one company will collect the products from different express logistic companies, then distribute them uniformly. The second one is that customers pick up the goods autonomously. The second model also can be divided into two categories. First, express delivery company could cooperate with convenience store. They put goods in the convenience store, customers are able to pick up them with certain message. The another one is that company build specialized pick-up points in communities or universities.

1.3 Jinlinbao Express

Jinlinbao is a typical and famous company that build the pick-up locations. It acts as a platform to provide service in the last mile. It offers intelligent express mail box for customers. Express delivery companies would put the packages in the mail box, then customers are able to pick up package according to certain cell phone massage. Jinlinbao has been introduced in Beijing, Shanghai, Tianjin and other 20 cities. In addition, more than 1,000 communities and 100 colleges have Jinlinbao pick-up locations [4]. Because of the leading market share, Jinlinbao is the representative of this model. This model saves time, improves efficiency of distribution, and protects customers' privacy. What's more, it provides mobile app and official account of Wechat, which enlarge its coverage and allows mobile phone remote operation.

2 The Problems of the "Last Mile" Delivery

Compared with developed countries, it is no doubt that China still has a supply and demand problem on developing express delivery. The fast developing online business in China requires the higher quality of express delivery's service. They highly focus on the "last mile" because it directly affect customer's satisfaction for the shopping experience. "Considered the goods have to be transported to each consumer's home eventually, they cannot be stand still in any freight station or port. However, in reality, the last leg of the supply chain is sometimes inefficient, literally up to 28% of the total

cost for moving goods, which is known the "last mile problem [5, 6]." According to it, we can know that "last mile" still exists some serious problems that drag on the development of e-business. Hence, the following part explains the most remarkable problems of the "last mile" delivery.

2.1 Low Quality of Distribution Services

Low quality of distribution services in the "last mile" can be reflected in three aspects. First, delivery man cannot distribute the packages to the customer in time, so the efficiency of distribution is pretty low. Second, customer may get the packages that are damaged during transportation. Third, the bad attitude of delivery man also lowers the quality of distribution services [7].

2.2 Low Traceability of Distribution Information

Nowadays, most express delivery companies still use labors to delivery and distribute packages. Therefore, the level of informatization is low. The information about when the packages are delivered to customers, or whether customers sign for the packages can be imprecise. It prevents companies and customers from following the track of their packages. Sometimes, express delivery companies even cannot discover the loss of products until customers complain about it.

3 Kano Model

We use Kano model to analyze customers satisfaction in our experience. This model consists of three attributes which are necessary attribute, attractive attribute, and value-added attribute. Necessary attribute is the basic requirement, and customers will be dissatisfied if company doesn't provide it. Attractive attribute has Linear relationship with customers satisfaction, and more attractive attributes are provided, more satisfied customers would be. For value-added attribute, customers will be surprised and very satisfied if companies provide it, and not be dissatisfied without it.

Kano model requires a two side research questions which will be mentioned in next part. According to customers' answers to question 1 and 2, Table 1 may record each consumer's attitude about the classification of those factors. For each factor, most of consumer's answers suggest it to be which attribute, we then classify it to be that attribute. After that, Kano model requires to calculate SI (satisfied influence) and DSI (dissatisfied influence) value according to the percentage of consumers' A, O, M, I answers. The following two are the SI and DSI equations.

$$\mathrm{SI} = (\mathrm{A} + \mathrm{O}) / (\mathrm{A} + \mathrm{O} + \mathrm{M} + \mathrm{I})$$
$$\mathrm{DSI} = -1 \times (\mathrm{O} + \mathrm{M}) / (\mathrm{A} + \mathrm{O} + \mathrm{M} + \mathrm{I})$$

A unit square is drawn, and its one side represents SI value while the adjacent side represents DSI value. We also draw a circle with center of the intersection vertex of those two sides and its radius is half the length of the square's diagonal. After that, we

label the attributes on the square according to their SI and DSI value. If the points are in the circle, it means they are less sensitive, can be put away temporarily. And the further the points from the center of the circle, the larger affects they have on customers satisfaction.

Table 1. Quality attributes categories of Kona model

With/without the attributes of service	Like	Must-be	Neutral	Live with	Dislike
Like	Q	R	R	R	R
Must-be	A	I	I	I	R
Neutral	A	I	I	I	R
Live with	A	I	I	I	R
Dislike	O	M	M	M	Q

4 Design of Duestionnaire and the Investigation of Consumers

4.1 Design of Questionnaire

In order to collect the data accurately, the questionnaire can be divided into two parts. The first part mainly investigates the demographic information of relevant customers, which contains gender, age, the use Jinlinbao, and the frequency for using Jinlinbao. Another part of is the express service-related attributes, a total of 10 pairs of entries, each of which is designed as the Table 2. The following chart illustrates each entry stand for what attribution about express delivery service. This part integrates the Kona model and traditional 5 scale survey method [8]. Therefore, participants will be asked to select answer from "like", "muse be", "neutral", "live with", and "dislike". According their answers for each pair of questions, we can divide the attributions of express delivery service into five quality factors that the Table 1 already shows.

Table 2. Attributes and the benefits of express service

Service attributes	Description of logistic attributes	Benefit provided for customers
$f1$	Time difference between goods in distribution center and goods in pick up point is short	Fast
$f2$	Received goods are undamaged	Safe
$f3$	Customers can pick up goods in appointed place	Safe
$f4$	Arrive at next day	Fast
$f5$	Location for pick up point is reasonable, which saves time	Convenient
$f6$	Services for 24 h	Convenient
$f7$	Communicate with delivery staff easily	Cheerful
$f8$	Delivery staff dress clean and tidy uniform	Cheerful
$f9$	Have certain VIP activities	Value-added
$f10$	Have special activities for holidays	Value-added

4.2 The Distribution and Collection of Questionnaire

The questionnaire is distributed and collected from February 20, 2017 to April 15, 2017. Over the roughly 2 months, 400 questionnaires were collected in total, among which 365 are effective through the soft-ware testing. According to the statistical result, the characteristics of the personal information in the sample are as follows: 49.86% are males, 50.14% are females; 25.75% are freshman, 29.86% are sophomore, 21.92% are junior, 22.47% are senior; 30.68% seldom receive or send express, 35.07% receive and send 1–3 express one week, 34.25% receive and send more than 3 express one week.

In general, the male female ratio is fairly reasonable and the distribution of informants' grade and the frequency of receive and send express are considered as normal distribution, which means that each index conform to the discipline of normal statistics.

4.3 The Analysis of Reliability of Questionnaire

Reliability represents the consistency and stability of a scale. In social science area, Cronbach's Alpha is the most common standard to test a scale's reliability. A high value of Cronbach's Alpha suggests a high reliability of the scale and less error of the measurement. By using the PASW Statistics18.0, the result suggests that the Cronbach's Alpha of all 21 questions in the second part is 0.835. Under normal circumstances, when the Cronbach's Alpha is greater than 0.8, it suggests that the reliability of the scale is ideal. Therefore, it means that the collected data is consistent and stable which is very reliable, and it can satisfies the general requirement of the research.

5 Results and Discussion

5.1 Results

The mean satisfaction level of 365 customers is calculated, which is 2.9. Table 3 shows the independent variables classification results. It indicates that factor "fast" and "convenient" are classified into one-dimensional quality attribute, while "value-added" and "cheerful" factors belong to attractive quality attribute. Meantime, the factor "safe" is belonging to must-be quality attribute.

Table 3. Independent variables classification results

Independent variables	A	O	M	I	R	Q	Classification result (%)
Fast	19.2	32.5	22.5	24.5	0.2	1.1	O
Safe	14.2	11.5	26.4	45.2	0.8	1.9	M
Convenient	15.8	49.8	30.1	2.5	0.6	1.2	O
Valued-added	55.8	26.6	13.8	2.1	0.7	1	A
Cheerful	33.2	29.8	12.5	18.6	0.9	1	A

After classifying the attribute quality of these most important factors for express delivery industry, the SI (Satisfied influence) and DSI (Dissatisfied influence) are also analyzed, according to the formulas:

$$\mathrm{SI}\,(\text{satisfied influence}) = (\mathrm{A}+\mathrm{O})\,/\,(\mathrm{A}+\mathrm{O}+\mathrm{M}+\mathrm{I}) \tag{1}$$

$$\mathrm{DSI}\,(\text{dissatisfied influence}) = -1\,\times\,(\mathrm{O}+\mathrm{M})\,/\,(\mathrm{A}+\mathrm{O}+\mathrm{M}+\mathrm{I}) \tag{2}$$

Table 4. Result for SI and DSI

	SI	DSI
Fast	0.52	−0.56
Safe	0.26	−0.39
Convenient	0.67	−0.81
Value-added	0.29	−0.41
Cheerful	0.67	−0.45

Table 4 represents the SI and DSI for each factor. According to the results for SI and DSI, Fig. 1 is drawn and it shows the sensitiveness of each factor. Figure 1 pictures that if one factor is in the circle, this factor is less sensitive for customers, which can be put away temporarily. While the customers are very sensitive for the factor that is out of circle. Figure 1 shows that "convenient", "fast", and "cheerful" are the most sensitive and influential factors.

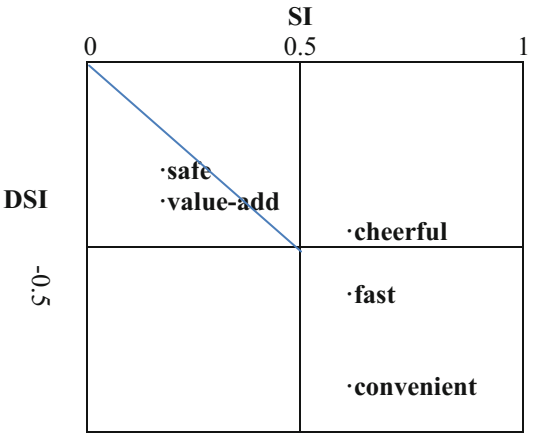

Fig. 1. Sensitiveness of factors

5.2 Discussion

Logistics enterprises may gain much more precious data on customer needs, providing kano model applies [9]. As the results state, the consumers' satisfaction for Jinlinbao are not so high. About 55% customers think that the Jinlinbao's service is generic or below. Therefore, some problems exists of Jinlinbao about its "last mile" delivery. Jinlinbao company needs to understand what customers think and adjust their service. The Kano model gives us a good way to know what service of express industry can satisfy their need. Therefore, express delivery companies are supposed to introduce appropriate policies to enhance the service quality according to the various service attributes.

From the statistical analysis in Fig. 1, we can conclude that most customers regard "safe" as must-have attribute, which means that safe is the most basic service that express delivery company should provide in the "last mile". The "fast" and "convenient" are the attractive attributes. It hints that if the "last mile" could quickly deliver goods to customers and customers can take goods from pick-up points conveniently, customers will be satisfied with its delivery service. The one-dimension attribute includes staffs with clean cloth and special promotions. These kind of services would not drive customers away if companies don't provide them. However, offering these services would have advantage than other companies, and attract more consumers. We find that "convenient" has the biggest influence on customers satisfaction and the following two are "fast' and "cheerful".

6 Conclusions

Based on the former research, it is conspicuously said that intensive interaction exists between consumers and companies, which constructs an ethical system, and the last mile, which I believe is a form of margin embedded in the system containing the both subjects. Therefore, since we concern the consumers' satisfaction, sellers' rights and obligations cannot be neglected.

First, rules must be established to constrain the acts of company workers. Now that safety is the most basic element in the "last mile", according to our research, proper article shall stipulate that workers have the obligation to take accurate measures to preserve the goods safety, and they shall fix the cabinet if it does not work ensuring the regular service.

Secondly, institution of sales back or escrow shall be properly established to make sure the efficiency use of every locker. However, to prevent the abuse of such rights, companies must have the obligation to announce the consumer fetching goods, and leave a reasonable time for them.

Eventually, considering the fast and convenient factors, more picking up places could be set in one relatively close but big area, like universities or communities. Consumers can conveniently choose where to fetch by using Apps; on the other hand, to release the crowed at the same time.

References

1. China's e-Commerce Research Center: China E-business Report 2016, February 2017
2. China's e-Commerce Research Center: China Express Delivery Industry Report 2016 (2016)
3. Prickett, K.: What is The Last Mile for E-Commerce? Prospress, July 2014. https://prospress.com/what-is-the-last-mile/. Accessed 29 Jun 2017
4. Sun, H., Wang, X., Li, H., He, Y.: The analysis of the new distribution model: last mile. J. Liaoning Univ. Technol. (Soc. Sci. Ed.) **04**(19), 1–5 (2013). https://doi.org/10.15916/j.issn1674-327x.2017.04
5. Rodrigue, J.-P., Comtois, C., Slack, B.: The "Last Mile" in Freight Distribution. The Geography of Transport Systems, 2nd edn, p. 212. Routledge, London (2009)
6. Scott, M., Anderka, S., O'Donnell, E.: Improving Freight Movement in Delaware Central Business Districts. Institute for Public Administration, University of Delaware (2009)
7. Yang, J., Yang, C., Yao, X.: Research on the "Last-Mile" issue in the E-commerce logistics system. J. Bus. Econ. **04**(207), 17–20 (2014)
8. Meng, Q., Zhou, N., Tian, J., Chen, Y., Zhou, F.: Analysis of logistics service attributes based on quantitative Kano model: a case study of express delivering industries in China. J. Serv. Sci. Manag. **04**(01), 42–51 (2011)
9. Tang, Y., Meng, Q., Wang, X., Zhang, X., Wang, J.: Detection analysis of logistics services based on Kano model. Value Eng. 19 (2011)