

Research on Location and Evaluation of Self-built Logistics Distribution Center of B2C E-commerce Enterprises

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Abstract: With the rapid development of B2C e-commerce, people's requirements for B2C e-commerce enterprise service quality are getting higher and higher. In order to improve service capabilities and competitiveness, B2C e-commerce companies set up their own logistics systems in the field of logistics. The location of the B2C e-commerce enterprise self-built logistics distribution center is a complex system engineering. The location of the site is directly related to the profitability of the logistics distribution center and the utilization of the input resources. Therefore, a correct location is very important for the future development of the self-built logistics distribution center. This paper constructs the site selection index system and uses AHP to determine the weight. In view of the location problem of Jingdong's self-built logistics distribution center in Tongzhou District of Nantong, the fuzzy comprehensive evaluation method was used for the final site selection.

1. Introduction

Through investigation and research, it is found that B2C e-commerce has been integrated into the lives of consumers and has become an indispensable part of life. In order to enhance their own competitiveness, some B2C e-commerce companies began to participate in the logistics field, and began to build their own logistics system and seek new development directions. However, the construction of the logistics system is not a one-step process, and it needs to be explored continuously in the field of logistics. In the B2C e-commerce era, people are pursuing simple shopping methods and fast-moving shopping experiences. Mature information technology allows users to complete shopping activities in a simple way, and a reasonable location logistics distribution center can provide users with a fast-selling shopping experience. Therefore, researching the location of logistics distribution centers is very important for enterprises.

2. B2C e-commerce Enterprise Self-Built Logistics Distribution Center Location Index System

2.1 Construction Site Selection Index System

The decision to locate a self-built logistics distribution center needs to be considered in many aspects. It is not only necessary to understand the natural conditions of the current location, but also to take into account the economic, transportation and humanities of the current region.

In order to make the established index system more scientific, we comprehensively consult the relevant professional literature at home and abroad in combination with the actual needs of site selection, and conduct detailed analysis of the data. On this basis, we listen to the suggestions of practitioners and experts in the field of logistics to establish an indicator system. The indicator system has three levels, three first-level indicators and 11 representative second-level indicators. The first-level indicators include the social economy, the business environment and the construction environment.

(1) Social economy

The social and economic indicators mainly include three detailed indicators of regional development potential, land price and distribution costs. The study found that the correlation between social economy and self-built logistics distribution centers is very high. In particular, the early construction of the self-built logistics distribution center is inseparable from a healthy social and economic environment.

(2) Business environment

The business environment indicators mainly include four detailed indicators of customer satisfaction, traffic conditions, market demand and human resources. A good business environment can build the work tasks of employees, and at the same time bring a better service experience to customers.

(3) Construction environment

The construction environment indicators include four detailed indicators of terrain conditions, surrounding public facilities, fire safety and environmental protection. As a public facility, self-built logistics distribution center should consider whether the terrain of the construction site is reasonable, whether it is safe after completion, and fire protection and environmental protection must be considered.

2.2 Establishment of Indicator Weights

The location of the self-built logistics distribution center of the enterprise focuses on the facilities that can be built to promote the future development of the enterprise, and to effectively meet the core interests of the enterprise. The location of the site is preferably in line with the low construction cost, high service quality and can be brought to the enterprise. The profit margin is high. On the one hand, we must consider the construction environment of the construction site and the local social economy, on the other hand, we must also consider the operating environment after the completion of the facility.

In order to carry out the next site selection analysis, it is necessary to calculate the weight of each factor in the indicator system. In this paper, experts are invited to score the comparison between the first-level indicators and the second-level indicators in the site selection factors. The score results are analyzed to construct a judgment matrix. After the judgment matrix is obtained, the maximum eigenvalue and feature vector are calculated by the software Matlab, and the consistency check of the judgment matrix is performed in the process of applying the software.

2.2.1 Construction Judgment Matrix

A total of 20 experts were invited to fill out the questionnaire, including 10 logistics experts and scholars, and 10 leaders of Jingdong Logistics. The questionnaires were collected and analyzed using the method of collecting the number to obtain the judgment matrix.

Table 1. judgment matrix

Primary indicator	Social economy	Operating environment	Construction environment
Social economy	1	1/5	3
Operating environment	5	1	7
Construction environment	1/3	1/7	1

Through the final results obtained by the software operation, we can know that the weight coefficients of social economy, business environment and construction environment are 0.188, 0.731, 0.081, the maximum eigenvalue is 3.065, $ci = 0.032$, $cr = 0.062$, $cr = 0.062 < 0.1$, which means This judgment matrix passes the consistency test and meets the requirements of judgment. From the

weight coefficient we can see that the business environment and social economy are more important factors.

As in the previous example, we can get the remaining judgment matrix, and then calculate the corresponding weights and eigenvalues through the MATLAB software, and perform consistency check.

2.2.2 Weight Result

After sorting out the above calculated data, specific weight results can be obtained. The specific results are shown in Table 2.

Table 2. Weight Results Table

Primary indicator	Secondary indicators
Social economy (0.188)	Regional Development Potential (0.0872)
	Land price (0.7510)
Operating environment (0.731)	Shipping fee (0.1618)
	Customer Satisfaction (0.1074)
	Traffic environment (0.4286)
	Market demand (0.3941)
	Human Resources (0.0699)
Construction environment (0.081)	Terrain conditions (0.1026)
	Nearby public facilities (0.1344)
	Fire safety (0.4621)
	Environmental protection requirements (0.3008)

3. Case Study--Location and Evaluation of Nantong Jingdong Self-built Logistics Distribution Center

Jingdong self-built logistics began in 2007, relying on the huge orders of Jingdong, and quickly grew into a famous logistics brand in China. After years of efforts by Jingdong people, a business system centered on large, medium, small, cold chain, cross-border and b2b logistics has been formed. Because of its excellent market performance, Jingdong Logistics has been assessed as a 5a-level logistics enterprise by the state.

In the Jingdong logistics system, the self-built logistics distribution center has the role of linking up and down, supporting the Jingdong logistics distribution network upwards, and down is related to the shopping experience of Jingdong users. Through investigation, it was found that Jingdong self-built logistics distribution center mainly serves three distribution modes. The three modes are full-managed distribution (FBP), no-stock delivery (LBP) and SOPL mode.

3.1 Alternative Address Determination

This paper mainly studies the location decision of the logistics distribution center carried out by Jingdong Logistics Distribution Center in Nantong. Nantong City is located in the southeast of Jiangsu Province, adjacent to Shanghai and Suzhou. The traffic is developed and the climate is pleasant. the city has an area of about 8001 square kilometers, mainly composed of Gangzha District, Chongchuan District, Economic Development Zone, Tongzhou District, Haimen City, Rugao City, Qidong City, Hai'an County and Rudong County. By inquiring about the leadership of Jingdong and consulting the Tongzhou District Planning, Jingdong will launch a new strategic layout in Tongzhou to provide customers with a faster service experience. This paper intends to build a logistics

distribution center in Tongzhou District. Site selection theory and data research, combined with the recommendations of Jingdong leaders, draw three alternative locations: Tongzhou Bus Station called a point, Jinyi Industrial Park called b point and Jinxia Dongyuan nearby called c point.

3.2 Fuzzy Comprehensive Site Selection Evaluation

The fuzzy comprehensive evaluation method converts the qualitative evaluation into quantitative evaluation based on the membership degree theory in fuzzy mathematics. The method itself has a high penetration rate in the field of logistics site selection. First of all, it is necessary to determine the set of influencing factors of the logistics distribution center and the comment collection of the plan area according to the actual situation. Then calculate the weight set of the relevant indicators, and the results will be constructed to determine the judgment matrix. Then, the actual scoring system will be established, the program will be scored, and the optimal plan will be selected to complete the comprehensive evaluation.

Judging by constructing the domain x for evaluating various factors in the location of the Jingdong self-built logistics distribution center, x= (good, better, fair, poor, poorest). Then, according to the actual situation of the location plan, the questionnaires will be filled out. The main participants in the questionnaire include school logistics professional teachers, classmates, logistics experts and Jingdong logistics staff.

3.2.1 Initial Evaluation

Site selection is a multi-factor decision-making activity, and the entire decision-making process is complex. Firstly, the fuzzy matrix constructed by the fuzzy comprehensive evaluation method is used, and then the membership degree of the alternative address is calculated. The specific calculation method adopted in this paper is to multiply the weight of the second-level index of the AHP method and the corresponding fuzzy matrix to obtain the preliminary evaluation matrix.

Through the above calculation method, a matrix relating to A ground, B ground, and C ground can be obtained.

$$U_A = \begin{bmatrix} 0.2913 & 0.3 & 0.2411 & 0.1589 & 0.0087 \\ 0.2498 & 0.3 & 0.3073 & 0.1 & 0.0429 \\ 0.2565 & 0.2933 & 0.3897 & 0.0435 & 0.017 \end{bmatrix}$$

$$U_B = \begin{bmatrix} 0.3 & 0.2913 & 0.2712 & 0.1 & 0.0376 \\ 0.214 & 0.3823 & 0.3037 & 0.1 & 0 \\ 0.2301 & 0.3102 & 0.3564 & 0.0897 & 0.0134 \end{bmatrix}$$

$$U_C = \begin{bmatrix} 0.2 & 0.3751 & 0.3913 & 0.0249 & 0.0087 \\ 0.2571 & 0.3753 & 0.2249 & 0.107 & 0.0464 \\ 0.2763 & 0.3763 & 0.2339 & 0.1 & 0.0134 \end{bmatrix}$$

3.2.2 Accurate Score Calculation

A secondary evaluation of the three locations is obtained by multiplying the calculation results of the above-mentioned locations and the weights of the first-level indicators.

(1) A area

$$A = (0.188 \quad 0.731 \quad 0.081) \begin{bmatrix} 0.2913 & 0.3 & 0.2411 & 0.1589 & 0.0087 \\ 0.2498 & 0.3 & 0.3073 & 0.1 & 0.0429 \\ 0.2565 & 0.2933 & 0.3897 & 0.0435 & 0.017 \end{bmatrix}$$

$$=(0.2581 \quad 0.2995 \quad 0.3015 \quad 0.1065 \quad 0.0344)$$

(2) B area

$$B=(0.188 \quad 0.731 \quad 0.081) \begin{bmatrix} 0.3 & 0.2913 & 0.2712 & 0.1 & 0.0376 \\ 0.214 & 0.3823 & 0.3037 & 0.1 & 0 \\ 0.2301 & 0.3102 & 0.3564 & 0.0897 & 0.0134 \end{bmatrix}$$

$$=(0.2315 \quad 0.3594 \quad 0.3019 \quad 0.0992 \quad 0.0082)$$

(3) C area

$$C=(0.188 \quad 0.731 \quad 0.081) \begin{bmatrix} 0.2 & 0.3751 & 0.3913 & 0.0249 & 0.0087 \\ 0.2571 & 0.3753 & 0.2249 & 0.107 & 0.0464 \\ 0.2763 & 0.3763 & 0.2339 & 0.1 & 0.0134 \end{bmatrix}$$

$$=(0.2479 \quad 0.3753 \quad 0.2569 \quad 0.0910 \quad 0.0366)$$

3.2.3 Location Determination

The evaluation field $x = (\text{good, better, fair, poor, poor})$ is given a corresponding value: preferably 40, preferably 50, generally 30, the difference is 20, and the difference is 10. Then comprehensive scoring is performed for each location.

a location rating:

$$A = 0.2581 \times 40 + 0.2995 \times 50 + 0.3015 \times 30 + 0.1065 \times 20 + 0.0344 \times 10 = 36.818$$

b location rating:

$$B = 0.2315 \times 40 + 0.3594 \times 50 + 0.3019 \times 30 + 0.0992 \times 20 + 0.0082 \times 10 = 38.353$$

c location rating:

$$C = 0.2479 \times 40 + 0.3753 \times 50 + 0.2569 \times 30 + 0.0910 \times 20 + 0.0366 \times 10 = 38.574$$

From the above, it can be seen that the gap between the alternative locations is not very large, and the c-site score is the highest. Jingdong self-built logistics distribution site selection should be at point c, serving the Tongzhou market.

3.3 Site Evaluation

The location of Jingdong Logistics Distribution Center should thoroughly implement the development strategy of Jingdong's "efficiency-based, experience-winning". On the one hand, it is necessary to serve Jingdong Mall, on the other hand, it needs to enhance the market competitiveness of Jingdong Logistics and other logistics companies.

In order to meet the above requirements, through the investigation and analysis and the calculation of the system, the address suitable for the Jingdong self-built logistics distribution center is selected from the alternative addresses a, b and c. c The location is close to the main road, far from the residential area, about 900 meters away from the provincial road s22, and the terrain is flat, the construction available land is about 400 acres. It has great advantages for building a logistics distribution center. After completion, it can provide high-quality distribution services for users in Tongzhou District.

4. Summary

The location of the B2C e-commerce enterprise self-built logistics distribution center is a complex system engineering. The location of the site is directly related to the profitability of the logistics

distribution center and the utilization of the input resources. Therefore, a correct location is very important for the future development of the self-built logistics distribution center. This paper first constructs the site selection index system and uses AHP to determine the weight. In view of the location problem of Jingdong's self-built logistics distribution center in Tongzhou District of Nantong, the fuzzy comprehensive evaluation method was used for the final site selection. In the process of site selection activities, it is necessary to continuously analyze the location factors to reduce the error of the site selection results. This paper mainly quantifies the problem of site selection of self-built logistics distribution center through ahp analytic hierarchy process and fuzzy comprehensive evaluation method, which makes the site selection problem more intuitive and enhances the rationality of site selection decision, which reduces it to a certain extent. Unnecessary work improves the efficiency of site selection decisions.

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