Risk Assessment and Prevention of Logistics Center Construction Project—Take Xi’an Xinzhu Logistics Center as an Example

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Abstract: The construction of a logistics center involves many factors, including the investment of a large amount of funds, a long development cycle and a large amount of manpower, so the logistics center construction project has greater risks. According to the characteristics of logistics center construction, this paper analyzes the risks existing in each stage of the construction process of logistics center and the factors affecting the risk. On this basis, the risk evaluation index system is established, and the fuzzy comprehensive evaluation method is applied to the new integrated logistics center. The risk level was assessed and some corresponding risk prevention strategies were proposed.

Keywords: Logistics center; risk identification; risk assessment; risk prevention.

1. Risk Identification in the Process of Logistics Center Construction

The construction of the logistics center is related to factors such as regional economic development level, industrial structure, traffic conditions, urban planning and land application. It involves many departments and units and is a comprehensive cross-collector of multi-disciplinary and multi-industry. The logistics center can be divided into three phases from concept to operation: the preliminary planning phase, the medium-term construction phase and the later operational phase. Because the focus of each stage of the work task is different, the performance of the risk at each stage is different [1]. The application work breakdown structure (WBS) identifies the risks and possible risks in the construction of the logistics center by analyzing the main tasks of each stage.
1.1 Risk Identification in the Planning Process of Logistics Center
The main work in the planning process of the logistics center has the following four aspects: layout planning, facility planning, investment development, and model planning [2]. The risk factors include: improper site selection, excessive quantity, excessive scale, inaccurate functional positioning, too advanced facilities, improper selection of investment development methods, and improper selection of investment and development entities. The risks that may arise are: operational risks, cost risk, financing risk, technology and cost risk, social risk, credit risk, construction risk, etc.

1.2 Risk Identification in the Process of Logistics Center Construction
The main work in the construction of the logistics center has the following two aspects: the acquisition of land occupied by the logistics center, the construction of logistics infrastructure and service facilities. The risk factors include: in terms of land occupation, geological and hydrological uncertainty of the land, location conditions of the land and uncertain facilities, demolition and resettlement, compensation and time-consuming uncertainty; in the construction of logistics facilities, the design is not The determination, the method of bidding and the mode of contracting are uncertain, the coordination and coordination between various departments is not good, and the supply of funds is not timely. The main risks may be: natural risks, design risks, construction period risks, quality risks, capital risks, and technical risks.

1.3 Risk Identification in the Operation Process of Logistics Center
The main job in the operation of the logistics center is to actively strive for customers and provide logistics services. The main risk factors are: the uncertainty of the logistics market environment, the uncertainty of economic policy, the uncertainty of the logistics service level, the uncertainty of the management decision level, the uncertainty of the marketing means and the logistics concept [3]. Certainty, etc. The main risks are market environmental risk, logistics demand risk, market competition risk, management organization risk, decision risk, marketing risk, environmental protection risk and so on.

2. Determination of Risk Assessment Indicator System
The indicator system refers to an organism composed of several interconnected statistical indicators. The establishment of the indicator system is the premise and basis for conducting prediction or evaluation research. In order to fully and objectively reflect the inherent reasons and composition of the risk of logistics center construction, the following principles should be followed when designing the risk assessment indicator system.
(1) Systematic. The design of the indicator system should be comprehensive and avoid excessive cross-repetition of indicators.
(2) Scientific. The design of the indicator system must be scientific and reasonable, and objective and pragmatic.
(3) Operability. The design of the indicator system should not only be based on the theory, but also be simple and easy in the process of actual operation.

Although the risk factors in the construction of the logistics center include many aspects, the systematic analysis and summary of the risks therein shows that the most prominent risks in the construction of the logistics center come from the logistics market and organization management [4]. On this basis, combined with the principle of index system construction, namely, systemic, scientific and operability principles, the risk indicators for logistics center construction are mainly determined as: market risk, organizational management risk, technical risk, economic risk and environmental risk.

2.1 Market Risk U1
Market risk refers to the market risk arising from the competition of the logistics center, the competition due to the logistics market, the application of new technologies, the adjustment of the industrial structure, the service level and marketing means, and the uncertainty of the management mechanism. Its main performance is that the actual income is lower than the expected income, and the cash flow is insufficient, thus affecting the development of the logistics center [5]. The revenue of the logistics center is mainly related to the logistics service price and logistics service volume, mainly related to logistics demand U11, market competition U12, logistics service level U13, and marketing capability U14.

2.2 Organizational Management Risk U2
Organizational management risk refers to the risk caused by the uncoordinated relationship between various departments and the uncertainty of management in the process of construction of the logistics center, such as management decision-making mistakes, strategic adjustment, work system adjustment and other factors. On the one hand, the construction of logistics centers requires the participation of many departments, and communication and coordination in all aspects is very important. On the other hand, the normal operation of the logistics center itself requires a high-quality leadership and a well-structured organization. Therefore, the main risk factors affecting organizational management are: the rationality of the organization U21, the scientific U22 of decision-making, the coordination of the relationship between departments U23, and the rationality of the management mechanism U24.
2.3 Technical Risk U3
Technical risk mainly refers to the demand distraction, layout planning, functional design caused by the uncertainty of the technology adopted in the planning, construction and operation of the logistics center due to the advanced nature, applicability and economy. And the risk of investment planning, technical risks are mainly reflected in: the rationality of the location of the logistics center U31, the suitability of the scale U32, the rationality of the layout U33, the suitability of the functional design U34, the rationality of the technology U35.

2.4 Economic Risk U4
Economic risk refers to the risk brought about by the construction of economic projects related to the construction of logistics centers. The main factors are: cost risk U41, tax policy U42, fund raising U43, interest rate change U44.

2.5 Environmental Risk U5
Environmental risks mainly include natural environmental risks and operating environmental risks. The natural environment risks are mainly natural climate change, bad land projects, etc. The business environment risks are mainly the country's macroeconomic environment and macro policy changes, including changes in industrial policies and local economic conditions of logistics centers. The main environmental risks are: natural environment U51, industrial economic policy U52, macroeconomic environment U53, local economic status U54, logistics concept U55.

In summary, the risk indicator system in the process of logistics center construction is shown in Figure 1 below:

Figure 1. Logistics Center Construction Risk Assessment Indicator System
3. Risk Assessment and Its Application

The level of project risk is a vague concept, and the fuzzy comprehensive evaluation method can be used to evaluate and quantify the risk. The fuzzy comprehensive evaluation method is a kind of ability to transform qualitative evaluation into quantitative evaluation, that is, using fuzzy mathematics to make an overall evaluation of things or objects subject to various factors. It has the characteristics of clear results and strong system, which can solve fuzzy and difficult to quantify problems, and is suitable for solving various non-deterministic problems. The following is a case study of how to apply the fuzzy comprehensive method to project risk assessment of logistics center construction.

The geographical advantage of Xi'an has brought great convenience to the logistics center in Xi'an. An important hub connecting the northwest inland of Xi'an with the southwest, northeast and southeast regions. There are many national highways and many provincial highways in Xi'an. Especially in terms of railway transportation, the railway has Beijing-Kowloon Railway and Longhai Line, which can be connected with Chengdu, Lanzhou, Luoyang and other indirect hinterland of Taiyuan. The railways and expressways have formed a comprehensive and modernized comprehensive transportation network, which will enable Xi'an to form radial radiation to the surrounding areas as well as the entire northwestern region. Therefore, the logistics center in Xi'an will have unique advantages. The Xinzhu Railway Integrated Logistics Center project is located in the International Port Area. The project is connected to the spinning road in the east, the railway container center station in the south, the Kushiro road in the west and the grass shop village in the north. It covers an area of about 3,000 mu. The planning area involves the relocation and resettlement of six administrative villages in Yujia Village, Shuiliu Village, Luobaizhai Village, Dongyang Village, Xingnan Village and Caodian Village of Xinhe Street. Up to now, the project's environmental impact assessment, soil and water conservation plan, geological disaster assessment, crushing assessment, social stability risk assessment, site selection submissions have been completed, and land pre-trial procedures have also been approved. Xi'an Xinzhu Railway Integrated Logistics Center is one of the comprehensive logistics bases that the iron company has planned and deployed in the whole country. It will enter the implementation stage in October 2016. The project is connected to the existing Xi'an Railway Container Center Station. The scale of the battlefield is about 2,500 mu and the total investment is about 4.8 billion yuan. The overall planning functions include the packaged packaging operation area, the international cargo operation area, the warehouse distribution area, and the cold chain fresh operation. 6 functional areas such as district, long and bulky operation area and
comprehensive service area [6]. The main functional business segment will be operational in 2018.

In order to speed up the construction of the new railway comprehensive logistics center project, Xi’an International Port Area has set up a project leading group to comprehensively coordinate the various problems encountered during the progress of the project, clarify the main body of responsibility, and reverse the time schedule according to the time node to ensure that the project is on schedule.

Based on the above analysis, follow the steps below to assess the construction risks of Xi’an Xinzhu Railway Integrated Logistics Center.

The first step: establish indicator sets, reviews

(1) Define the main factor layer indicator set as $U=\{U_1, U_2, U_3, U_4, U_5\}$, The corresponding weight set is $W=\{W_1, W_2, W_3, W_4, W_5\}$, where $W_i$ represents the proportion of $U_i$ in $U$.

(2) The sub-factor layer index set is defined as $U_i=\{U_{i1}, U_{i2},...,U_{ij}\}$, and the corresponding weight is $W_i=\{W_{i1}, W_{i2},...,W_{ij}\}$, where $W_{ij}$ represents the proportion of the index $U_{ij}$ in $U_i$.

The expert investigation method is used to judge the importance of each risk factor, and the weights of the primary and secondary risk factors are as follows:

$W=\{0.2,0.2,0.1,0.3,0.2\}$
$W_1=\{0.3,0.3,0.2,0.2\}$
$W_2=\{0.3,0.3,0.2,0.2\}$
$W_3=\{0.2,0.3,0.3,0.2\}$
$W_4=\{0.3,0.3,0.2,0.2\}$
$W_5=\{0.2,0.2,0.25,0.2,0.15\}$

(3) The definition of the set of reviews is $V=\{V_1, V_2, ... V_5\}$ representing low risk, low risk, medium risk, high risk, high risk, etc.

The second step is to determine the fuzzy evaluation matrix.

$$
R_1 = \begin{bmatrix}
0.3 & 0.3 & 0.2 & 0.1 & 0.1 \\
0.3 & 0.4 & 0.2 & 0.1 & 0.0 \\
0.4 & 0.4 & 0.2 & 0.1 & 0.0 \\
0.4 & 0.3 & 0.2 & 0.1 & 0.0
\end{bmatrix}
$$

$$
R_2 = \begin{bmatrix}
0.3 & 0.2 & 0.2 & 0.2 & 0.1 \\
0.3 & 0.3 & 0.2 & 0.2 & 0.0 \\
0.3 & 0.3 & 0.2 & 0.2 & 0.0 \\
0.4 & 0.3 & 0.3 & 0.1 & 0.0
\end{bmatrix}
$$

$$
R_3 = \begin{bmatrix}
0.3 & 0.4 & 0.2 & 0.1 & 0.0 \\
0.3 & 0.3 & 0.2 & 0.1 & 0.1 \\
0.4 & 0.4 & 0.2 & 0.0 & 0.0 \\
0.3 & 0.3 & 0.2 & 0.1 & 0.1
\end{bmatrix}
$$
The third step, fuzzy comprehensive evaluation calculation

\[ B_i = W_i \times R_i = \{b_{i1}, b_{i2}, \ldots, b_{i5}\} \]

\[ B = \{W_1, W_2, W_3, W_4, W_5\} \times \{B_1, B_2, B_3, B_4, B_5\}' = \{0.321, 0.311, 0.214, 0.119, 0.031\}, \]

After the obtained data is normalized, it is obtained: \( B = \{0.322, 0.312, 0.215, 0.119, 0.031\} \).

According to the principle of maximum risk membership, the comment \( V_1 \) represented by 0.322 – low risk, is the overall risk level of the railway integrated logistics center project. Since the overall risk is at a low level, the project can be implemented from a risk perspective.

### 4. Risk Prevention of Logistics Railway Center Construction

#### 4.1 Actively Seek Government Support

As a kind of enterprise with certain public welfare nature, the logistics center needs strong support from the government, such as preferential land, taxation policy, construction of supporting infrastructure, and support for some construction funds. The active support of the government can effectively reduce construction costs, reduce the difficulty of fundraising, and facilitate coordination among various departments. To a certain extent, it can reduce the risk of planning and implementation of logistics parks.

#### 4.2 Strengthen Logistics Center Layout Planning Research and Provide Reasonable Solutions

In order to reduce the risks caused by the unreasonable planning, the local macroeconomic trend, regional economic structure and logistics characteristics should be analyzed on the basis of in-depth and meticulous research, from the perspective of urban spatial development and transportation coordination. To study the number, scale and location of logistics centers, we should also consider how to make full use of some existing idle logistics facilities and how to coordinate the interests of all parties.
4.3 Establish a Reasonable Organization and Management Organization
A reasonable organization and management organization, a team of solidarity and cooperation, a responsible, strong, and scientific decision-making leadership is the fundamental guarantee for the success of the logistics center construction project. Therefore, the establishment of a reasonable and effective organization and management organization, careful selection of team members and leadership is one of the important measures to reduce the risk of logistics center projects.

4.4 Choose the Right Partner
Selecting companies with certain economic strength and logistics operation experience or with large logistics service needs as partners can effectively spread risks and reduce the risk of logistics center projects. Partners with successful logistics operation experience can make the logistics park occupy a certain logistics market in a short period of time and increase the influence of the logistics center. Enterprises with large logistics service demand can provide greater logistics demand for the logistics center[7]. Choosing these companies as partners is also an effective means to achieve a win-win situation and reduce the risk level of logistics center construction projects.

4.5 Improve the Level of Logistics Services
The level of service that the logistics center itself can provide and the degree of innovation of its services are related to its competitiveness in the market. Therefore, the logistics center can strengthen and manage internal management, formulate and implement strict rules and regulations, and adopt corresponding incentive mechanisms to fully mobilize the whole. Employees are motivated to work and strive to minimize the damage caused by the cause. By improving the standardization of logistics operations, reducing the cost of logistics services, and striving to improve the level of logistics services, we will improve the competitiveness of enterprises in the logistics market with high-quality services and reasonable service prices.

4.6 Adopt an Active Logistics Marketing Strategy
Market risk is the main risk faced by the logistics center. How to attract the logistics demand in the region to the logistics center or logistics park is the most important issue. The logistics center should establish brand awareness, expand the visibility of the logistics center through various propaganda methods, attract customers with high-quality service and good reputation, and pay attention to the production and sales status of units with large logistics demand, and understand their demand for logistics services. The situation, and by designing logistics solutions for them, quantitatively
analyze the benefits that third-party logistics services can bring to them, and gradually win the trust of these units to gain more market share.

5. Conclusion
This paper analyzes and identifies the problems and risks in the process of logistics center construction, and draws out the most prominent risks: market risk, organizational management risk, technical risk, economic risk and environmental risk. On the basis of the above, the overall risk degree is quantified through the fuzzy comprehensive evaluation method, and the risk prevention strategy is proposed.

References