

Land Intensive Utilization Evaluation of Linhai Industrial Zone in Xingcheng City

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Abstract

igorously promoting the intensive use of land of industrial zone is of great significance to relieve the contradiction of land supply and demand, and even to guarantee the comprehensive coordinated and sustainable development of local economy and society. This article takes the Linhai Industrial Zone in Xingcheng, Liaoning province as the research object. Combined with the local reality, this essay selects 6 level two indexes and 14 level three indexes from three aspects including the situation of land utilization, land use efficiency and management performance to make an evaluation system and uses the Delphi method to determine the index weight and the evaluation factor score, and to evaluate the intensive use level of lands in the development zone. The results show that the industrial park land intensive utilization degree is the medium level; the land development and utilization intensity is relatively high; land use structure is not reasonable; the land use efficiency still remains to rise.

Keywords: industrial zone, Xingcheng, intensive land use, evaluation index

1. Introduction

Industrial zone is the carrier of industrial agglomeration, which consists of clusters of enterprises connected with each other, forming a three-dimensional multiple interwoven chain ring, and has practical significance to improve the innovative capacity and economic benefits. Most cities in the realization of industrialization regard the development of industrial zone as one of important strategic initiatives for promoting economic transformation. (Xu Xiaolan, 2010) Along with rapideconomic development land the increasing conflict between supply and demand of the land, the scientific and rational use of land resources has become a strategic issue in development of area. The industrial zone, an important part of the urban -scale expansion and socio-economic development, has to pay much attention on its utilization of land resources.

In 2008 July, the Ministry of land and resources issued "the Ministry of land and resources on land intensive use evaluation in development zones work notice" (land endowment [2008] No.145) and started the country's first national and provincial Development Zone land intensive utilization evaluation work, meanwhile, setting out the tide of developing intensive land use in industrial zone. The work of evaluation work and the implementation of industrial zone land intensive utilization is not only conducive to the promotion of efficient land use, to achieve expansion upgrade, but also for promoting industrial zone land use management information construction, improving the level of management, building perfect land saving and intensive use assessment system and mechanism, enhancing the land macro-control ability, building up resource conservation-minded society, (Shi Da, 2010) and is of great significant influence on regional sustainable development. In addition, how to realize the industrial zone land intensive use of resources is related to the expansion degree, manner and regional market development of industrial zone land use, which has large effect on the direction and pattern of city.

2. General Situation of Study Area

Xingcheng city, located in the southwest side the "Liaoning coastal economic belt", is the opening-up and the frontier zone. As an important part of Bohai economic circle, it is in the West Liaoning Corridor throat and plays the role of communication of northeast and North China. Xingcheng Linhai Industrial zone is located in 10 km from downtown to the south of Xingcheng city. It is close to the Bohai Bay. The planning area of the zone is 52.49 square kilometers. The starting area and long-term planning area are relatively 11 square kilometers and 100 square kilometers. It is located in the "node" of two big economic circles of northeast and north China and it is in the key areas of Liaoning coastal economic belt. Study on the Linhai industrial zone land resources intensive utilization evaluation is very important for the understanding of regional intensive land use status and for determining the future development direction of city planning as well.

3. Evaluation Process and Results of Xingcheng Industrial Zone Land Intensive Use

3.1 Ideas and Methods of Evaluation

The data of Industrial Zone evaluation comes from statistical departments and field survey. After data acquisition, in accordance with the relevant requirements for statistical analysis, the characteristics of land use will be uncovered. With reference to "Trial Regulations" requirements of land intensive use evaluation in development zones, industrial zone index system should include the status of land use, land use efficiency and management performance. Combined with specific circumstances of Xingcheng Linhai Industrial zone, this paper takes the following evaluation indexes (see Table 1). Evaluation is done by a kind of multi factors comprehensive evaluation method. Based on the ideal values, the selected indicators should be treated by standardized. According to the index weight of evaluation results, we should calculate the comprehensive score of industrial zone land intensive utilization. If the score is high, the level of land intensive use is high, and potential of the land intensive use is small. (Long Hualou, Cai Yunlong & Wan Jun, 2000) Concrete evaluation of technical line is shown in Figure 1.

Table 1. Evaluation system of Xingcheng Linhai Industrial Zone land use

Goal	Subgoal	Index
Status of land use(A)	Degree of land development(A1)	Land development rate (A11)
		Land supply rate (A12)
		Land completion rate (A13)
	Status of land use structure(A2)	Rate of industrial land (A21)
		Comprehensive volume ratio (A31)
	Land use intensity(A3)	Building density (A32)
Land use Efficiency(B)	Land input and output efficiency of output(B1)	Comprehensive volume ratio of industrial land (A33)
		Industrial land building density (A34)
		Intensity of investment in fixed assets of industrial land (B11)
	Land use regulatory performance(C1)	Output intensity of industrial land (B12)
Management performance(C)		Disposal rate project maturity due (C11)
	Level of land supply market(C2)	Idle land disposal rate (C12)
		Land auction rate (C22)

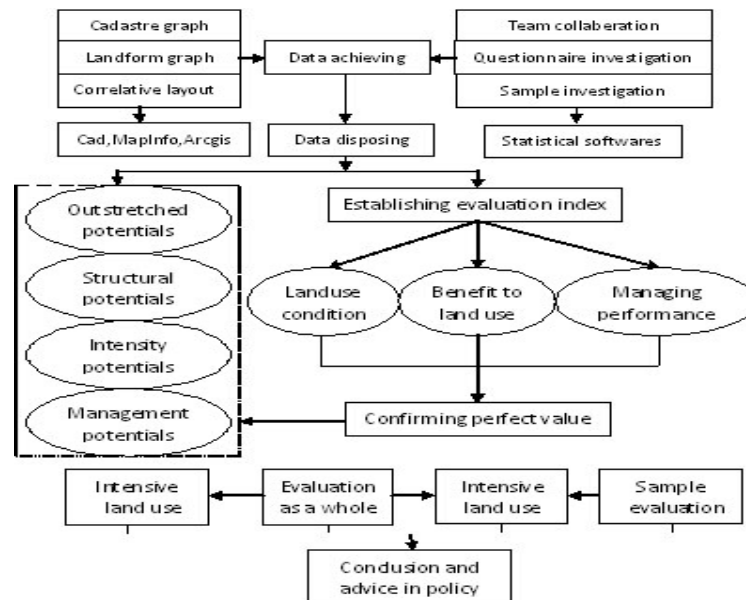


Figure 1. The technique courses of intensive land use evaluation of Linhai Industrial Zone in Xingcheng

3.2 Land Use Intensity Calculation through the Collection of Information

This paper selects evaluation data and calculates the status quo value. According to relative documents, the ideal evaluation value adopts the provincial unity of the ideal target value determined by provincial technology group study. Combined with the actual situation of Xingcheng Linhai Industrial zone, the ideal values of some indicators make some adjustments. If the status quo value is greater than the ideal value; ideal value is taken place by the value of the status quo. (Tong Liquan, Si Jingbo & Shi Yaping, 2010) Then we standardize indicators, using the ideal ratio of the projection method, in order to achieve and measure the degree of score indicators. The standardized formula is as follows:

$$S_{ijk} = \frac{X_{ijk}}{T_{ijk}} \times 100\% \quad (1)$$

As we can see in the formula:

S_{ijk} —— i: Goal; j: Subgoal; k: Goals in the degree of score;

X_{ijk} —— i: Goal; j: Subgoal; k: Status quo values of indicator;

T_{ijk} —— i: Goal; j: Subgoal; k: Ideal value of indicator;

Evaluation scores should lie between 0 and 100%. If it is above 100%, the targets in the degree of score is recorded as 100%. (Ruan Fuyun & Zhang Yong, 2010) After obtaining the weight of each index with The Delphi method, we calculate the evaluation scores of goals and sub-goals, and finally we can get the final score of industrial zone, that is intensity degree of the industrial zone (Table 2).

Calculation formula of sub-goals is:

$$F_{ij} = \sum_{k=1}^n (S_{ijk} \times W_{ijk})$$

As we can see in the formula:

F_{ij} —— i: Goals; j: Sub-goals of the Land Use Intensity score;

S_{ijk} —— i: Goals; j: Sub-goals; k: goals in the degree of score;

W_{ijk} —— i: Goals; j: Sub-goals; k: Weight of Indicators related to k sub- target value;

n ——Number of indicators.

Formula for calculating the goal score:

$$F_i = \sum_{j=1}^n (F_{ij} \times W_{ij})$$

As we can see in the formula:

F_i —— i: Land use Intensity goal score;

Fij—— i: Goal; j: Land use Intensity score of Sub-goals;

Wij—— i: Goals; j: Weight of Indicators related to i sub- target value;

n——Number of sub-goals.

Table 2. Evaluation summary of Xingcheng Linhai industrial zone land intensive use

Goal	Sub-goal	Index	Status quo value of Industrial Zone	Ideal Values	Achievements degree scores
Land use status	Degree of land development	Rate of land development	88.05	95.00	92.68%
		Land supply rate	99.20	99.20	100.00%
		Completion rate of land	91.57	93.00	98.46%
	Structural condition of land	Rate of industrial land	54.98	60.00	91.63%
		Comprehensive volume ratio	1.42	1.42	100.00%
		Building density	41.00	43.00	95.35%
	Land use intensity	Comprehensive volume ratio of industrial land	0.88	1.00	88.00%
		Building density industrial land	41.53	42.00	98.88%
		Intensity of investment in fixed assets of industrial land	2067.55	2500.00	82.70%
	Industrial land Input and output efficiency	Output intensity of industrial land	2671.48	3000.00	89.05%
Management performance	Land use regulatory performance	Disposal rate of land for the project due	100.00	100.00	100.00%
		Idle land disposal rate	100.00	100.00	100.00%
	Level of land supply market	Utilization of land compensation	35.13	75.00	46.84%
		Utilization of land hanging signs	18.57	20.00	92.85%

Table 3. Xingcheng Linhai industrial zone land use Intensity score

Goal	Intensity score	Sub-goal	Intensity score
Status of land use	75.48	Degree of land development	95.51
		Structural condition of land	22.41
		Land use intensity	92.73
Land use efficiency	62.59	Input-output efficiency of industrial land	62.59
Management performance	81.21	Land use regulatory performance	100.00
		Level of land supply mercerization	57.33
Composite scores		71.42	

3.3 Evaluation Results

Through the evaluations above, the composite scores of intensity of Industrial park land use lies in the medium level with 71.42%. According to the angle of constitution of intensive land us, industrial zone management, land use conditions and rates of land are of high performance, but the land use efficiency is low which will be further improved access to business park standards.

4. Conclusions and Recommendations

Land use structure of Xingcheng Linhai industrial zone is reasonable: the major functions of the industrial zone are production, research and warehousing; the land is mainly used for industrial land use, storage space, land-based road traffic and municipal utilities for residential life and public uses. (Bai Tao, 2010) In the north of Xingcheng Linhai Industrial Zone, most of the lands are for industrial production and research sites. The productive land areas account for 51.54%, 18.33% for storage space, others are for the industry uses. Living area is located in Cao Town, including the residential, commercial finance, food service, administrative office, entertainment, health, municipal facilities, and any other living facilities, which totally account for about 13.76% of the north area. Research sites and processing lands occupies 58.43% of South Area. Appropriate arrangements for industrial development area are set aside to meet future development needs. However, industrial zone land use efficiency is relatively low. Besides the land supply marketization is low as well. Score of Efficiency Intensity is the lowest out of the three evaluation objectives (land utilization, land use efficiency and management performance), indicating Xingcheng linhai industrial zone land use efficiency needs to be improved in the future.

In future development, to fully tap the potential of the industrial park land use is particularly important. The potential estimates of Xingcheng Linhai industrial zone land intensive use point out the direction and magnitude of this zone's development future. Results of the investigation and analysis of the industrial zone land resources, the use of level and the number of potential land-use structure provide an important frame of reference for the zone's development and land readjustment in the future. To fully tap the Xingcheng Linhai industrial zone land's potential can be achieved not only by lands that are not accessed now, but also by the adjustment of land use structure layout and improving land use intensity. In addition, increasing capital attraction strength and building up perfect capital attraction policy system and enterprise access standards can also improve the land output efficiency. The industrial enterprise projects introduced should have high starting points and their types have to be reasonable. Based on land suitability evaluations, the development of the zone can avoid the discomfort zones, tourism scenic areas and the natural, ecological protection zones. Moreover, in the convenient transportation areas, we should make rearrangement of the scale of construction land as a replacement for regional, adjusting the scope of use of development zone.

Highlighting the importance of making full use of modern means of science and technology and strengthening land dynamic monitoring and scientific management are the effective means of the realization of industrial zone land intensive use as well. Land is not a renewable natural resource, but also the important means of national adjusting control. To make it play a better and timely regulation, it must have advanced technology support. "3S" and other modern means of science and technology is significant for the dynamic monitoring of Industrial zone land use. So as to strict the implementation of land use planning, we should timely, accurately grasp the dynamic changes of development zone land use, and use advanced technology to timely detect the weak point in land intensive use, which can provide technical supports for improving and adjusting the land use and advancing the land use efficiency.

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