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Evaluation of High-quality Development of the Construction Industry in the Beijing-Tianjin-Hebei Region

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Abstract: The construction industry is an important production sector of the national economy. The high-quality development level of the construction industry in the Beijing-Tianjin-Hebei region is explored, taking into account the role of the fast-growing areas in pulling the same industry to the surrounding areas. The high-quality development index system of Beijing-Tianjin-Hebei construction industry is constructed from three aspects of economic orientation, economic benefit and good life construction. A case study based on data from 13 cities in Beijing, Tianjin and Hebei proved that there is a big gap in the development of the construction industry in the region, Hebei region is an important breakthrough point.

Keywords: Beijing-Tianjin-Hebei region; Construction industry; High-quality development

1. Introduction

The 20th Party Congress still proposes to respond to the new requirements of national construction in the new period with high-quality development and promote the national economy to continuously realize the leap[1]. As a pillar industry of the national economy, the construction industry plays a great role in enhancing people's living standards, improving the quality of cities and promoting employment. The Beijing-Tianjin-Hebei region is the center of North China, with a large population and high potential for domestic demand, which is an important engine for promoting high-quality economic development. However, there are some differences in the high-quality development of the construction industry in Beijing-Tianjin-Hebei region. Beijing, as a political, economic and cultural center, absorbs a large number of high-quality construction resources; Tianjin, based on the logistical advantages of the Tianjin port, gathers abundant resources for the construction industry; and Hebei, despite its wide geographic area, is lagging behind in the development of the construction industry. Based on this, it is of great significance to scientifically evaluate the development situation of the construction industry in the Beijing-Tianjin-Hebei region, to promote the high-quality development of the construction industry in Beijing-Tianjin-Hebei.

At present, scholars have evaluated the level of high-quality development of the construction industry based on different levels and regions, and Ma S has combined the high-quality development of the construction industry with low-carbon constraints to explore the level of development of the construction industry at the regional level[2, 3]. All of the above studies provide a reference to the evaluation of high-quality development of the construction industry from different perspectives, however, Yan W et al. has pointed out that the existing research lacks the synergistic and decentralized effect between regions, and it is easy to ignore the pulling effect of the faster-developing regions on the same industry in the surrounding regions[4]. Therefore, a global analysis of the region, following by the development characteristics of each region, differentiating high-quality development proposals. This paper takes the construction industry of 13 cities in the Beijing-Tianjin-Hebei region as the research object, constructs the evaluation system for the high-quality development of the construction industry in the Beijing-Tianjin-Hebei region, and explores the problems of the development of the construction industry in the Beijing-Tianjin-Hebei region.

2. Beijing-Tianjin-Hebei construction industry high-quality development evaluation system construction

2.1 Connotation of high-quality development of the construction industry

Some scholars believe that high-quality development is a major strategic choice in the economic sense or the transformation of the way, structure[1, 5], and some scholars believe that it is the green sustainable and coordinated development on the five development concepts[6]. For the high-quality development of the construction industry, some scholars believe that it is the ability and degree of the construction industry to meet the needs of people's lives, ecological environment, scientific and technological innovation and industry development[7, 8]. At present, there is no uniform regulation for high-quality development, but its ultimate goal is oriented to improve the quality of people's good life.

The construction industry is an important branch of the economic system, defining high-quality development's connotation for the construction industry across the Beijing-Tianjin-Hebei region is a new development path that conforms to the needs of the times, is based on its own development orientation, relies on the foundation of economic development, and ultimately achieves the construction of a better life. Based on the definition of the connotation of high-quality development of the construction industry, this paper reflects the level of high-quality development of the construction industry from the three levels of economic positioning of the construction industry, economic efficiency of the construction industry and good life construction.

2.2 Evaluation system construction

Since the development conditions and economic situation of the construction industry in each region are not the same, not all indicators can be selected, so this paper selects representative indicators to constitute the evaluation system.

The economic positioning of the construction industry reflects the direction of the construction industry sector and the extent to which it contributes to regional development. The economic efficiency of the construction industry reflects the efficiency of production and innovation in the construction industry, which directly or indirectly affects economic efficiency. The construction of a good life reflects the employment of people's livelihoods, while emphasizing the protection and beautification of the human environment. According to the principles of accessibility and truthfulness in data acquisition, three dimensions and 12 evaluation indicators are selected, as shown in Table 1.

Table 1 High-quality evaluation system for the construction industry in the Beijing-Tianjin-Hebei region

Evaluation dimension	Evaluation indicators		Nature of the indicator
Economic positioning of the construction industry	X_1	Growth rate of civil engineering construction industry (%)	+
	X_2	Value Added of Construction Industry/Gross Regional Product (%)	+
	X_3	Gross output value of construction industry (billion yuan)	+
	X_4	Profit tax rate of output value (%)	+
Economic Efficiency of the construction industry	X_5	Labor productivity (yuan/person)	+
	X_6	Power equipment rate (kW/person)	+
	X_7	Total Assets of Construction Industry Enterprises (billion yuan)	+
	X_8	Total profit (billion yuan)	+
	X_9	Profit rate of output value (%)	+
Good Life Construction	X_{10}	Number of employees in construction enterprises (person)	+
	X_{11}	Construction area of housing floor space (hm)	+
	X_{12}	Greening coverage rate of built-up area (%)	+

3. Analysis of the results of the evaluation of the high-quality development of the construction industry

The data in this paper come from China Statistical Yearbook 2022, Hebei Provincial Statistical Yearbook 2022, and China Construction Industry Statistical Yearbook 2022.

Gray correlation analysis is a multi-indicator evaluation method, applying Matlab2021, calculating the indicators and comprehensive scores and rankings of the 13 cities, as shown in Table 2.

Table 2 Evaluation Score of High-Quality Development of Construction Industry in Beijing-Tianjin-Hebei Region

Evaluation dimension	Evaluation indicators	Beijing	Tianjin	Hebei
Economic positioning of the construction industry	X_1	0.0297	0.0501	0.0955
	X_2	0.0642	0.0773	0.0880
	X_3	0.5816	0.1935	0.0245
	X_4	0.1543	0.0671	0.0799
Economic Efficiency of the construction industry	X_5	0.0873	0.0718	0.0866
	X_6	0.1008	0.0905	0.0830
	X_7	0.7004	0.1728	0.0149
	X_8	0.8723	0.0807	0.0082
	X_9	0.2605	0.0728	0.0685
Good Life Construction	X_{10}	0.2842	0.2909	0.0461
	X_{11}	0.6557	0.1296	0.0232
	X_{12}	0.097	0.0753	0.0850
score		3.888	1.3724	0.7035
ranking		1	2	3

Firstly, the construction industry economic positioning level in the three regions of civil engineering construction industry growth rate in Hebei scored (0.0955) is significantly higher than the Beijing and Tianjin region, Hebei region's infrastructure construction relative to Beijing, Tianjin construction industry to be improved. The value added of the construction industry as a percentage of GDP in Hebei is 0.0880 ahead of Beijing and Tianjin, indicating that the development of the construction industry in Hebei contributes significantly. The gross output value of the construction industry in Beijing (0.5816) is significantly higher than that in other regions, and Tianjin (0.1935) ranks second, which is closely related to the large scale of the construction industry in Beijing and Tianjin. Only Beijing exceeded the average profit and tax rate of output value of the highest level of 0.1543.

Secondly, the economic efficiency of the construction industry in the level of regional labor productivity power equipment rate overall gap is not large. Total profit score ups and downs significantly, Beijing (0.8723), Tianjin (0.0807) exceeded the Beijing-Tianjin-Hebei average (0.0803), Hebei region (0.0082) in the overall disadvantage; output value profit margin score, Beijing's highest at 0.2605, Tianjin and Hebei are lagging behind Beijing by a wide margin.

Finally, the good life construction level, Beijing, Tianjin, employees score are above the overall level of 0.0833, while the average level of Hebei region is 0.0461, reflecting Beijing, Tianjin, the role of talent absorption is large, Hebei region construction industry is small. Beijing's construction area score (0.6557) has a significant advantage, followed by Tianjin (0.1296), Hebei is far behind Beijing and Tianjin, and there is still room for growth. The green coverage score of built-up areas is balanced overall, with Beijing's highest at 0.097 and Tianjin's lowest at 0.0753, reflecting a green and sustainable habitat.

4. Conclusion

Through the above evaluation and analysis of the high-quality development of the construction industry in Beijing-Tianjin-Hebei, it can be seen that there are obvious differences in the high-quality development of the construction industry in each region of Beijing-Tianjin-Hebei, with Beijing leading the way in high-quality development of the construction industry, the development of Tianjin is relatively balanced, but the overall development of Hebei is relatively lagging behind. Under the coordinated development of Beijing-Tianjin-Hebei, Hebei region is an important breakthrough point for the future of Beijing-Tianjin-Hebei region.

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