Identification of Key Influencing Factors and Strategic Research on the Renewal of Old Industrial Cities from a Multidimensional Perspective

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Abstract: Urban renewal and transformation constitute a pivotal task in the transformation of old industrial cities in China in recent years. Scientific identification of their key influencing factors is of great significance for advancing sustainable development. This article takes Zibo City in Shandong Province as an example to construct an urban renewal evaluation system that includes 5 dimensions and 14 indicators. The DEMATEL-ISM method is comprehensively used to analyze the hierarchical relationship between indicators, identify the core deep factors of strategy effectiveness, economic motivation, social response, technological support, and spatial optimization, and propose differentiated renewal strategies. The research can provide theoretical reference and empirical support for the renewal and transformation of industrial cities of the same type.

Keywords: Old Industrial City; Urban Renewal and Renovation; DEMATEL-ISM Method; Promotion Strategy

1. Introduction

In May 2025, in the "Opinions on Continuously Promoting Urban Renewal Action", it is explicitly proposed to support local exploration and innovation based on local conditions, establish and improve sustainable urban renewal mechanisms, and provide guidance for building livable, resilient, and smart cities. Urban renewal and renovation not only improve residents' housing conditions, but also optimize urban functions, enhance the comprehensive carrying capacity of cities, and enable more people to have a place to live and live comfortably. From 2019 to 2023, a total of 220,000 old urban communities in China have been renovated, benefiting more than 38 million households. Renovation of shantytowns, urban-village and dilapidated-housing programmes is steadily underway, and urban renewal is progressing in an orderly manner.

Research on urban renewal and renovation started earlier in foreign countries. In 1958, at the "International Symposium on Urban Renewal" in The Hague, the Netherlands, urban renewal was first proposed, defined as the construction activities to improve cities, including repairing and renovating urban houses, improving park and street environments[1], replanning land, and creating comfortable living environments. Yildiz et al. [2] took Turkey as an example, through expert review and quantitative research, they carried out weight analysis on architectural design elements in urban renewal, and established a sustainable urban renewal framework. They concluded that there is a high proportion and interaction between economic, environmental and social sustainability, and some easily ignored factors in urban renewal have received higher attention. Lee and Edwin [3] began the concept of sustainable urban design and used the Analytic Hierarchy Process to evaluate urban renewal projects. Hemphill [4] establishes an evaluation index system from the perspectives of material, economic, and social aspects to assess the transformation actions of urban renewal and sustainable development. Jacobs [5] argues that cities lacking vitality are seeds of self-destruction, while cities full of vitality and diversity are seeds of urban rebirth. In order to create lively and interesting communities and streets, we need to pay attention to safety, humanity, and culture.

China's urbanization process started relatively late, and research on urban renewal has been lagging behind for a long time. After the reform and opening up, with the large-scale urbanization, a series of urban problems

gradually emerged. Domestic scholars began to introduce the concept of urban renewal and attempted to conduct localized research. Wu and Yang[6] proposed the theory of system renewal, which believes that urban renewal should stand at a higher level, with the overall development of the city as the goal, and involve multiple parties. These achievements have strong localization characteristics and practicality. Since then, more and more domestic scholars have begun to explore urban renewal in various ways. Chen[7] emphasized the role of government macro-control in the process of urban renewal. From the perspective of the government, An and Sun[8] use game theory as a basis to compare the cost-benefit of the renovation of new and old cities, and clarify the purpose and destination of government control over the construction of new areas. Urban renewal is a livelihood project, which is not only the improvement of the old city area, but also the key to creating a livable environment, reflecting the voices of the masses, and ensuring social harmony. However, it involves many issues such as laws and policies, land ownership, demolition compensation and resettlement, cultural inheritance, etc[9]. Therefore, in the implementation process, we must adhere to the concept of people-oriented, comprehensively consider the layout of district demolition and renovation, rely on investment platforms, synchronously plan the three major links of "demolition, construction, and management", and build a new urban landscape with profound heritage, livable and business friendly.

Overall, research on urban renewal in foreign countries started early and has a relatively complete theoretical system. It emphasizes in-depth exploration of urban renewal from a multidisciplinary perspective, providing rich theoretical references for urban renewal research in China. After introducing the concept of urban renewal, domestic scholars have conducted localized research based on the actual situation in China and achieved certain results, but there are still some shortcomings. In the future, research on urban renewal in China needs to further deepen theoretical research, strengthen interdisciplinary integration, focus on practical application, and explore a path of urban renewal that is suitable for China's national conditions, in order to promote sustainable development of Chinese cities.

2. Construction of Evaluation Index System

Based on the theories of urban renewal and industrial heritage regeneration, and in accordance with the Guiding Opinions on Promoting Urban Renewal Action and the Implementation Plan for Promoting the Protection and Utilization of Industrial Heritage in Old Industrial Cities and other special policies, relevant literature on urban renewal and transformation [10-14] is summarized and integrated.

At the same time, we established a diversified expert team, consisting of 30 experts covering three dimensions: academic, practical, and grassroots. The academic experts (12 people) include renowned university professors and researchers in urban planning, urban management, regional economy, sociology, civil engineering, information technology, and other fields, all of whom are responsible for national level related projects; Practical experts (8 people) come from senior officials of government departments (Housing and Urban Rural Development Bureau, Natural Resources and Planning Bureau, National Development and Reform Commission) who have long been engaged in urban renewal project management, planning and policy-making, as well as leaders of planning and design institutes, engineering consulting companies, and development enterprises. They have more than ten years of experience in policy formulation and project management; The senior practitioners (10 people) are composed of frontline professionals such as community workers and historical and cultural protection experts who have participated in three or more projects. The expert team structure balances theoretical depth with practical insights, ensuring a comprehensive research perspective. Through two rounds of Delphi method to screen indicators (questionnaire response rate of 92% and consensus threshold above 80%), expert opinions were integrated to form a "PEST-S" (Policy, Economy, Society, Technology, Space) five dimensional analysis framework. Principal component analysis was used to reduce dimensions, and finally 5 primary indicators and 14 secondary indicators were determined to construct an indicator system that affects the urban renewal and transformation of Zibo City.

The reliability and validity of the evaluation

index system were tested using composite reliability (CR) and average variance extraction (AVE) tests. The results showed that *CR*>0.8 and *AVE*>0.5 met the Fornell Larcker criterion; Content validity index (S-CVI/AVE)=0.92; In the convergence validity test, the square root of AVE for each dimension is greater than the correlation coefficient between dimensions (based on SPSS 27.0). Based on this, the indicator system for evaluating the urban renewal and renovation of Zibo City has been determined as shown in Table 1.

Table 1. Evaluation Index System for Urban Renewal and Renovation in Zibo City

Dimension	Index	Explanation of indicators
Policy effectiveness (A)	Policy and Regulation S_1	This indicator examines whether relevant policies and regulations have been formulated and improved, providing institutional guarantees for the smooth implementation of renovation and reconstruction work. The more standardized and refined the rules and regulations are, the higher the score of this indicator
	Government organization leadership S_2	This indicator examines whether a unified leadership group has been established at the government level, whether a unified management process has been developed, and whether key and difficult issues have been coordinated. The more complete the work plan and workflow, the higher the score of this indicator
Economic Synergy (B)	Input cost S_3	This indicator is scored based on the investment data of urban renewal and renovation area funds. The higher the unit renovation area investment cost, the higher the score of this indicator
	Fund synergy S_4	This indicator examines whether the local government has raised funds according to the plan and fully stimulated social capital participation. The more actively social funds participate, the higher the score of this indicator
	Extra income S_5	This indicator assesses the extent of tax exemptions and government subsidies, and the higher the additional income, the higher the score of this indicator
Social responsiveness (C)	Community grassroots governance S_6	This indicator assesses the completion of the renovation work by grassroots managers in the renovated community, and evaluates the work of community grassroots managers by residents. The higher the evaluation, the higher the score of this indicator
	Resident participation rate S_7	This indicator examines the enthusiasm and cooperation of residents in participating in urban renewal and renovation work. The higher the cooperation of residents, the higher the score of this indicator
	Public satisfaction S_8	This indicator measures the public's satisfaction with urban renewal and renovation work. The higher the public satisfaction, the higher the score of this indicator
Technical Support (D)	Technology maturity S_9	This indicator assesses the technological maturity during the process of updating and renovation. The more mature the technology, the higher the score of this indicator
	Informationization level S_{10}	This indicator assesses the level of informatization in the process of updating and renovating. The higher the level of informatization, the higher the score of this indicator
	Renovation period S_{11}	This indicator assesses the project duration of updates and renovations. The shorter the duration, the higher the score of this indicator
Space optimization (E)	Space reconstruction S_{12}	This indicator examines the mixed use rate of land and the activation rate of idle land. The higher these two values, the higher the score of this indicator
	Function Enhancement S_{13}	This indicator measures the coverage rate of public service facilities and the jobs-housing balance index. The higher these two values, the higher the score of this indicator
	Traffic Improvement S_{14}	This indicator examines the degree of improvement in road network density and the rate of change in traffic congestion index. The higher these two values, the higher the score of this indicator

3. DEMATEL-ISM Model Construction

3.1 Theoretical Basis

DEMATEL (Decision Laboratory Method) is a method that combines graph theory and matrix theory for research. Its central idea is to determine the system of influencing factors, study the mutual influence relationship between factors, quantify and calculate, so as to determine the causal relationship between factors and the importance of each factor. However, this method can only determine the size order and causal relationship of various parameters between individual influencing factors, and cannot determine the hierarchical structure between factors.

ISM (Interpretive Structural Model) is a method used to analyze the internal relationships of modern systems. Its central idea is to analyze the hierarchical relationships between influencing factors through a series of core mathematical topological operations, and obtain a multi-level hierarchical directed topology diagram. The logical relationships between various influencing factors are expressed in a clear trapezoidal structure diagram, but this method cannot determine the degree of influence of factors on the entire system.

By coupling DEMATEL with ISM to analyze the influencing factors of urban renewal and renovation, key influencing factors and their degree of influence in the system can be screened, and each influencing factor can be hierarchically divided to construct a multi-level structural topology diagram. Thus, this paper adopts DEMATEL-ISM to analyze the influencing factors of urban renewal and renovation in Zibo City.

3.2 Model Construction Steps

1) Build a system of influencing factors. The evaluation index system for urban renewal and renovation in Zibo City includes 14 indicators, denoted as S_1, S_2, S_3,..., S_{14}.

2) Construct a direct impact matrix A. Using a scoring method, score based on the direct impact between two factors, define 5 levels, and assign values of 0-4. a_{ij} represents the degree of influence of factor *ai* on *aj*. If $i=j$, its own influence degree $a_{ij}=0$. Construct a direct impact matrix A based on the arithmetic mean calculated from collecting multiple scoring data.

3) Calculate the normalized influence matrix B. Calculate the direct influence matrix A according to the following formula to obtain matrix B.

$$B=\left(b_{ij}\right)_{n\times n}=\frac{A}{\max\limits_{1\le i\le n}\sum_{j=1}^{n}a_{ij}} \quad (1)$$

4) Calculate the comprehensive impact matrix C.

$$C=B(E-B)^{-1} \quad (2)$$

In the formula, c_{ij} represents the indirect relationship between the influencing factors i and j; E represents the identity matrix.

5) Based on matrix C, calculate the degree of influence X_i, the degree of influence Y_i, the centrality M_i, and the degree of cause N_i in sequence. At this point, the DEMATEL model can be analyzed to obtain the causal relationship and importance between factors.

$$X_i=\sum_{j=1}^{n}c_{ij},1\le i\le n \quad (3)$$

$$Y_i=\sum_{j=1}^{n}c_{ij},1\le i\le n \quad (4)$$

$$M_i=X_i+Y_i \quad (5)$$

$$N_i=X_i-Y_i \quad (6)$$

6) Calculate the reachable matrix E. Add the comprehensive influence matrix C to the identity matrix E to obtain the $D=(d_{ij})_{n\times n}$ overall influence matrix. Based on the overall influence matrix, set the threshold λ. If $d_{ij}\ge\lambda$, then $e_{ij}=1$; If $d_{ij}<\lambda$, then $e_{ij}=0$.

7) Divide each factor into levels. On the basis of the reachable matrix E, obtain the reachable set $R(Si)$ and the antecedent set $A(Si)$ of the factor Si. If the elements satisfy $R(Si)=(Si)\cap A(Si)$, these factors can be used as the first level, and the factors in the first level can be deleted. Continue the above steps until all influencing factors are hierarchical.

8 Based on the hierarchical division, a multi-layer hierarchical structure model is obtained and analyzed to obtain the hierarchical structure and influence path between factors.

4. Model Analysis

4.1 DEMATEL Model Analysis

Invite 18 scholars and relevant practitioners in the field of urban renewal to rate the degree of mutual influence among various evaluation indicators of urban renewal and transformation in Zibo City. The scoring will be based on a

0-4 point scale, and reliability and validity analysis will be conducted. The reliability and validity test will be qualified, and the data will be used to construct a direct impact matrix A (Table **2**).

Table 2. Direct-Impact Matrix

factor	S_1	S_2	S_3	S_4	S_5	S_6	S_7	S_8	S_9	S_{10}	S_{11}	S_{12}	S_{13}	S_{14}
S_1	0	0	3	3	3	1	1	1	0	0	0	1	1	1
S_2	0	0	1	2	2	3	2	4	0	0	2	1	1	1
S_3	0	0	0	2	1	1	2	2	0	0	0	0	0	0
S_4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
S_5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
S_6	0	0	0	2	1	0	0	0	0	0	0	0	0	0
S_7	0	0	0	3	0	0	0	0	0	0	0	0	0	0
S_8	0	0	0	2	0	0	0	0	0	0	0	0	0	0
S_9	0	0	2	1	1	1	1	1	0	0	3	0	0	0
S_{10}	0	0	1	2	1	1	1	1	0	0	2	0	0	0
S_{11}	0	0	4	1	1	1	1	1	0	0	0	0	0	0
S_{12}	0	0	1	1	1	1	1	2	0	0	0	0	3	4
S_{13}	0	0	0	1	0	0	0	2	0	0	0	0	0	0
S_{14}	0	0	0	1	0	0	0	2	0	0	0	0	0	0

Table 3. Comprehensive Impact Matrix

Factorr	S_1	S_2	S_3	S_4	S_5	S_6	S_7	S_8	S_9	S_{10}	S_{11}	S_{12}	S_{13}	S_{14}
S_1	0	0	0.161	0.212	0.173	0.064	0.073	0.089	0	0	0	0.053	0.061	0.064
S_2	0	0	0.078	0.191	0.127	0.171	0.122	0.243	0	0	0.105	0.053	0.061	0.064
S_3	0	0	0	0.138	0.056	0.053	0.105	0.105	0	0	0	0	0	0
S_4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
S_5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
S_6	0	0	0	0.105	0.053	0	0	0	0	0	0	0	0	0
S_7	0	0	0	0.158	0	0	0	0	0	0	0	0	0	0
S_8	0	0	0	0.105	0	0	0	0	0	0	0	0	0	0
S_9	0	0	0.138	0.103	0.072	0.069	0.076	0.076	0	0	0.158	0	0	0
S_{10}	0	0	0.075	0.143	0.066	0.063	0.066	0.066	0	0	0.105	0	0	0
S_{11}	0	0	0.211	0.102	0.068	0.064	0.075	0.075	0	0	0	0	0	0
S_{12}	0	0	0.053	0.109	0.059	0.056	0.059	0.149	0	0	0	0	0.158	0.211
S_{13}	0	0	0	0.064	0	0	0	0.105	0	0	0	0	0	0
s14	0	0	0	0.064	0	0	0	0.105	0	0	0	0	0	0

Based on the obtained direct influence matrix A, the comprehensive impact matrix C is calculated using Matlab software according to equations (1) and (2) (Table **3**), and then the influence degree X_i, affected degree Y_i, centrality M_i, and causal degree N_i are calculated according to equations (3) to (6) (Table **4**).

Table 4. Influence, Affected, Centrality, and Cause Degree

factor	Influence Degree	Affected Degree	Centrality	Reason Degree	Weight	Sort	Factor Attribute
S_1	0.94634	0	0.94634	0.94634	0.07769	7	reason
S_2	1.21262	0	1.21262	1.21262	0.09956	2	reason
S_3	0.45705	0.71467	1.17172	-0.25762	0.0962	3	result
S_4	0	1.49155	1.49155	-1.49155	0.12246	1	result
S_5	0	0.66969	0.66969	-0.66969	0.05498	11	result
S_6	0.15789	0.53622	0.69411	-0.37833	0.05699	9	result
S_7	0.15789	0.57382	0.73171	-0.41593	0.06007	8	result
S_8	0.10526	1.0128	1.11806	-0.90754	0.09179	4	result
S_9	0.69005	0	0.69005	0.69005	0.05665	10	reason
S_{10}	0.5822	0	0.5822	0.5822	0.0478	12	reason
S_{11}	0.59206	0.36841	0.96047	0.22365	0.07885	5	reason
S_{12}	0.85084	0.10526	0.9561	0.74558	0.0785	6	reason

S_{13}	0.16897	0.27977	0.44874	-0.1108	0.03684	14	result
S_{14}	0.16897	0.33795	0.50692	-0.16898	0.04162	13	result

According to Table 4, the analysis results of the DEMATEL model are as follows:

Influence degree. The top three influencing factors are government organizational leadership S_2, policy and regulation S_1, and spatial restructuring S_{12}, with impact degrees of 1.21262, 0.94634, and 0.85084, respectively, indicating that these three factors have a greater impact on other factors.

The degree of influence. The top three influencing factors are fund synergy S_4, public satisfaction S_8, and investment cost S_3, with respective degrees of influence of 1.49155, 1.0128, and 0.71467, indicating that these factors are more susceptible to the influence of other factors.

Centrality. The top three influencing factors are fund synergy S_4, government organizational leadership S_2, and investment cost S_3, with centrality values of 1.49155, 1.21262, and 1.17172, respectively. The magnitude of centrality indicates the critical importance of this factor in the urban renewal and renovation process in Zibo City. That is, the greater the centrality, the greater the impact of this factor on the urban renewal and renovation process in Zibo City, and it is more worthy of attention.

Reason degree. Among the 14 influencing factors, there are a total of 6 causal factors, namely policy and regulation S_1, government organizational leadership S_2, technological maturity S_9, informatization level S_{10}, renovation period S_{11}, and spatial reconstruction S_{12}. This indicates that the above factors can have an impact on other factors, among which policy and regulation and government organizational leadership are the main factors affecting urban renewal and renovation in Zibo City. There are a total of 8 outcome factors, namely investment cost S_3, fund synergy S_4, additional benefits S_5, community grassroots governance S_6, resident participation S_7, public satisfaction S_8, functional improvement S_{13}, and traffic improvement S_{14}. These factors are easily influenced by other factors, among which fund synergy and public satisfaction are the more important ones.

4.2 ISM Model Analysis

In order to obtain the reachable matrix, a threshold λ needs to be introduced. The purpose of setting λ is to filter out the influence relationship between indicators with weak influence. The size of λ value will affect the complexity of the system. The larger the value of λ, the less hierarchical the system is, but the interrelationships between various influencing factors are difficult to describe clearly; The smaller the value of λ, the more hierarchical the system is, but it lacks integrity.

Using the mean of the comprehensive influence matrix 0.031072142857142857+standard deviation 0.05387935758692369 as λ, with a value of 0.08495150044406655, the reachable matrix E can be calculated as shown in Table **5**. Obtain the antecedent set $A(Si)$ of factor S_i, the reachable sets $R(S_i)$ and $R(S_i) \cap A(S_i)$, as shown in Table **6**. Divide each factor into levels and obtain a multi-level hierarchical structure diagram of the factors that affect the urban renewal and transformation of Zibo City, as shown in Figure **1**.

Table 5. Reachable Matrix E

	S_1	S_2	S_3	S_4	S_5	S_6	S_7	S_8	S_9	S_{10}	S_{11}	S_{12}	S_{13}	S_{14}
S_1	1	0	1	1	1	1	1	1	0	0	0	1	1	1
S_2	0	1	1	1	1	1	1	1	0	0	1	1	1	1
S_3	0	0	1	1	1	1	1	1	0	0	0	0	0	0
S_4	0	0	0	1	0	0	0	0	0	0	0	0	0	0
S_5	0	0	0	0	1	0	0	0	0	0	0	0	0	0
S_6	0	0	0	1	1	1	0	0	0	0	0	0	0	0
S_7	0	0	0	1	0	0	1	0	0	0	0	0	0	0
S_8	0	0	0	1	0	0	0	1	0	0	0	0	0	0
S_9	0	0	1	1	1	1	1	1	1	0	1	0	0	0
S_{10}	0	0	1	1	1	1	1	1	0	1	1	0	0	0
S_{11}	0	0	1	1	1	1	1	1	0	0	1	0	0	0
S_{12}	0	0	1	1	1	1	1	1	0	0	0	1	1	1

S_{13}	0	0	0	1	0	0	0	1	0	0	0	0	1	0
S_{14}	0	0	0	1	0	0	0	1	0	0	0	0	0	1

Table 6. Reachable Set, Antecedent Set, and Intersection

factor	reachable set	Antecedent set	intersection
1	1,3,4,5,6,7,8,12,13,14	1	1
2	2,3,4,5,6,7,8,11,12,13,14	2	2
3	3,4,5,6,7,8	1,2,3,9,10,11,12	3
4	4	1,2,3,4,6,7,8,9,10,11,12,13,14	4
5	5	1,2,3,5,6,9,10,11,12	5
6	4,5,6	1,2,3,6,9,10,11,12	6
7	4,7	1,2,3,7,9,10,11,12	7
8	4,8	1,2,3,8,9,10,11,12,13,14	8
9	3,4,5,6,7,8,9,11	9	9
10	3,4,5,6,7,8,10,11	10	10
11	3,4,5,6,7,8,11	2,9,10,11	11
12	3,4,5,6,7,8,12,13,14	1,2,12	12
13	4,8,13	1,2,12,13	13
14	4,8,14	1,2,12,14	14

The multi-layered hierarchical structure model diagram obtained from the analysis shows that there are complex relationships between factors. The influencing factors can be divided into five levels, and as the levels increase, the importance of the influencing factors to the urban renewal and transformation of Zibo City also gradually increases. The leftmost factors are the surface influencing factors, and the rightmost factors are the root influencing factors. The degree of influence in the middle gradually increases from left to right.

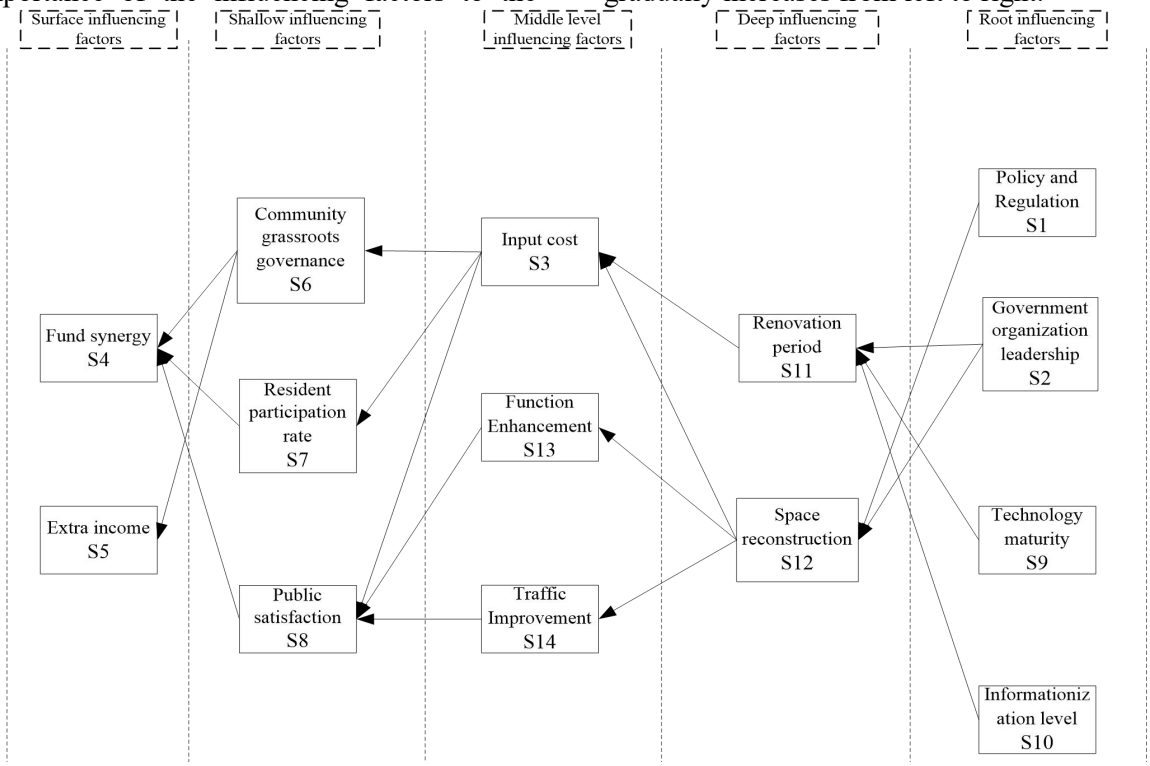

Figure 1. Multi Level Hierarchical Structure Model Diagram

The surface influencing factors include financial synergy and additional benefits, which are directly focused on in the process of urban renewal and transformation in Zibo City, and are the most direct factors affecting Zibo City's urban renewal and transformation; Community grassroots governance, resident participation, and public satisfaction are shallow influencing factors; The input cost, functional improvement, and transportation improvement are the middle-level influencing factors, which have a relatively large number

of nodes in the model diagram, connecting shallow and deep influencing factors, and linking the entire influencing factor system. Therefore, these three factors also need to be given special attention; The renovation period and spatial reconstruction are deep-seated influencing factors that play an important role in the urban renewal and renovation of Zibo City; Policies and regulations, government organizational leadership, technological maturity, and information technology level are the root influencing factors of urban renewal and transformation in Zibo City. They are important factors that need to be paid attention to in the process of urban renewal and transformation, and are essential influencing factors that need to be taken seriously.

5. Promotion Strategy

To accelerate the pace of urban renewal and transformation in Zibo City, this article proposes the following promotion strategies:

In response to DEMATEL's revelation that "policy and regulation S_1, government organization and leadership S_2 have the highest impact" and the "root influencing factors" of ISM positioning, the municipal government should take the lead in issuing the "Zibo City Urban Renewal Special Regulations" to solidify provisions such as land mixed use, plot ratio rewards, and fiscal refunds into legal tools. Simultaneously establish an "update command center" led by the mayor, integrating approval processes such as natural resources, housing construction, and finance into a "one-stop office", and transforming policy momentum into departmental collaborative execution through organizational restructuring.

The corresponding ISM "renovation period S_{11}, spatial reconstruction S_{12}" are deep key factors and DEMATEL shows their high-altitude factors. Therefore, an "Urban Renewal Technology Laboratory" should be established to jointly research and develop short-term technologies such as modular assembly and existing building reinforcement with Shandong University of Technology and Zibo Urban Exploration Institute. Synchronize the launch of the "Zibo Update Cloud" platform, integrating BIM, GIS, and IoT sensors to monitor the progress of demolition, pipeline relocation, and traffic diversion in real time. Use information technology to compress deep uncertainty into mid-level dispatchable parameters.

Seize the transmission characteristics of the ISM nodes with the highest input cost S_3, functional improvement S_{13}, and traffic improvement S_{14}, and establish a "cost function traffic" linkage model: On the cost side, the municipal finance will set up a 300 million yuan turnover fund to provide a 5% direct subsidy to projects that adopt green building materials and prefabricated technology, reducing the vulnerability of DEMATEL's high impact "input cost S_3". On the functional side, high-frequency facilities such as community canteens and pocket parks are implanted according to the 15 minute living circle standard. On the transportation side, synchronous implementation of "small blocks+one-way circulation" micro updates will be carried out to ensure that functional improvement and traffic improvement are mutually supportive.

In response to DEMATEL's "high impact on fund synergy S_4 and high centrality of public satisfaction S8" and ISM's "fund synergy and additional benefits" as surface level direct factors, a three yuan fund pool of "resident investment financial allocation development agency construction" is established: residents can voluntarily invest 10% of the property evaluation price in the renewal project, and the government will allocate funds at a ratio of 1:1. The shortfall will be balanced by the development enterprise through a plot ratio reward; Simultaneously linking revenue dividends with property service quality, transforming the passive outcome relationship of "funds satisfaction" into quantifiable positive incentives, ultimately achieving a sustainable closed-loop of surface performance.

6. Conclusion

This article analyzes the influencing factors of urban renewal and renovation in Zibo City by using the DEMATEL coupled ISM model. Through the DEMATEL model analysis, it is found that fund synergy emerges as the most critical factor on urban renewal and renovation in Zibo City. The top three influencing factors for centrality are fund synergy, government organizational leadership, and investment costs, indicating that in addition to fund synergy, government organizational leadership and investment costs also have a significant impact

on the urban renewal and renovation of Zibo City. According to the ISM model analysis, the influencing factors of urban renewal and renovation in Zibo City are divided into five levels. Among them, the synergy of funds and additional benefits are the surface influencing factors, while policies and regulations, government organizational leadership, technological maturity, and information technology level are the root influencing factors of urban renewal and renovation in Zibo City. The renovation period and spatial reconstruction are the deep influencing factors, which also play a crucial role in the urban renewal and renovation of Zibo City.

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