

The Research on the Renewal Method of Industrial Areas in Historical Corridor

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Abstract: Under the background of the post-industrial era, the industrial areas in the historical corridor environment has always been the key research direction of urban renewal, and it is also the key practice area for the renewal of the existing construction land in territorial space planning. This article discusses the transformation and renewal methods of industrial areas from the perspective of historical corridors, and combines urban positioning and industrial transformation needs to solve the decline of industrial areas, improve spatial quality, and stimulate subsequent development of the areas. On the basis of the theoretical framework of heritage corridors, based on reality, the research idea of "resource investigation and corridor determination-characteristic analysis-corridor construction and industrial area renewal" is formed, which makes the renewal more systematic and hierarchical, and fully reflects the historical corridor spatial pattern characteristics. First, determine the historical corridors through background overview recognition, overall value evaluation, and information landing. Next, a comprehensive survey of the elements of the overall system of historical corridors is carried out from the perspective of the corridor system, industrial areas, and buildings. Among them, the industrial areas can be divided into six types, and evaluate the reuse potential from both own values and external influences. On this basis, suggestions for the transformation and renewal of industrial areas are put forward, which mainly include the four leading directions of economic benefits, social services, cultural promotion, and ecological restoration.

Keywords: Historical Corridor, Industrial Area, Renewal, Potential Evaluation

1. Research Background and Technical Approach

1.1. Background and Significance of the Study

With the continuous optimization and upgrading of the spatial and functional structure of the city, some industrial areas that were the focus of the previous round of industrial development appear incongruous with the surrounding construction due to inefficient land use, poor ecological environment, and other problems. In the context of the current national land use planning, the redevelopment of industrial areas has become a priority in the renewal of existing construction land [1]. The rejuvenation of industrial areas through transformation and renewal is an important research topic aiming toward achieving sustainable

development of the surrounding areas and meeting the functional needs of urban construction.

These industrial areas, many of which are located along major urban roads or waterways, have been at the forefront of the process of industrialization and urbanization. These historical corridors formed by major roads and waterways connect the scattered cultural fragments in the areas and have outstanding potential as cultural landscapes, while performing important transportation and information transmission functions within the areas [2].

At present, industrial enterprises have developed along the canals and roads in urban areas. Such areas are faced with both opportunities and challenges regarding their renewal. On the one hand, the industrial areas in old cities contain important cultural values. On the other hand, due to the degeneration of their functions, these areas are most vulnerable to the destruction of the preceding development of "knocking down

and rebuilding,” which included some unclassified cultural relics and industrial buildings with relatively good quality of preservation in terms of appearance but were not adequately valued. In the face of the impact of economic development, to reuse these existent industrial resources and effectively integrate them into the overall development of the city, it is necessary to adopt a more comprehensive and flexible approach to deal with the excavation and reuse of the values of industrial areas, and to supplement and improve strategies and mechanisms for their renewal.

To prevent elements of cultural resources in the historical corridor environment from being gradually compressed into isolated fragments during industrial area renewal, which endangers the continuation of the historical corridor, it is necessary to study how to perform the analysis and evaluation from the perspective of the overall corridor system [3], combine the needs of urban branding and industrial upgrading, solve the problem of the decay of industrial areas, improve the spatial quality, and stimulate the subsequent economic development of the areas.

1.2. A research Scheme for the Renewal of Industrial Areas in the Historical Corridor

The proposed scheme for the renewal of industrial areas in historical corridors focuses on three key aspects: resources surveying and determination of historical corridors, analysis of the features of constituent elements, and the design of the overall layout and the lot renewal plan.

First, it is necessary to conduct a background study of the corridor using resources such as local gazetteers, historical maps, and related literature, as well as fieldtrips, to understand the historical lineage and the pattern of spatial evolution and determine the historical status of the corridor and the development achievements during each historical stage. Based on this, the overall value of the corridor is to be assessed to confirm whether the research objective meets the

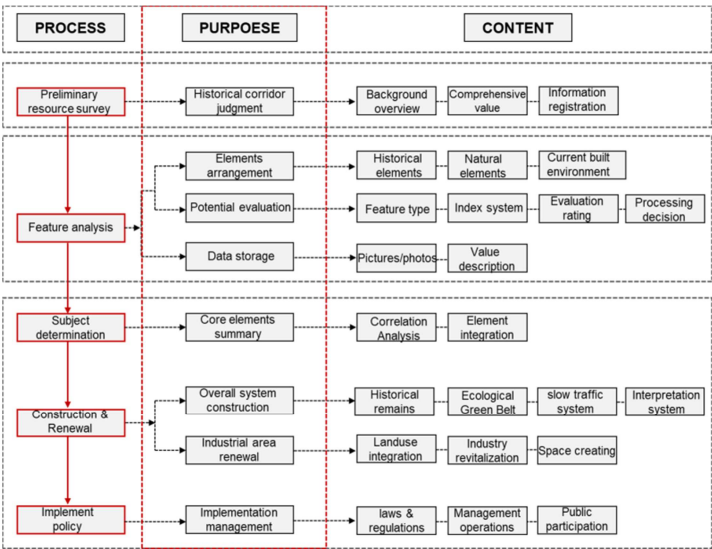
criteria of a historical corridor, which lays the groundwork for the transformation and renewal of industrial areas.

Second, the characteristics of each resource element and industrial enterprise should be analyzed at the overall corridor system and individual lot levels. These elements should be digitalized into databases, in which data collected through accurate surveying and mapping of the current resources and recorded in the form of texts, blueprints, photos or video are required. This usually entails descriptions of the historical background, nature of use, preservation status, and landscape features of the areas along the corridor for subsequent planning and implementation.

Finally, the integration of the spatial structure is performed from the overall level [4]. The themes that are closely related to the corridor system are refined by analyzing the interconnection between the elements to fully reflect the core features of the resource elements, the cultural symbols, and comprehensive values of the corridor region [5][6]. The viability and public acceptability of the leisure and entertainment projects, educational projects, industrial enterprises, and other projects should also be considered. On this basis, the spatial structure of the industrial areas of the historical corridor is designed to protect the historical relics and ecological resources within the scope of the corridor region, to avoid their encroachment during urban space expansion, to enhance the opportunities of the corridor to serve as the sites of cultural display and leisure and recreational activities, and to integrate it into the urban development system. Specifically, the construction of the system mainly includes four aspects: historical relics, ecological green belt, slow walking system, and interpretation system. Based on this, specific designs of the transformation and renewal of industrial areas are implemented.

In addition, specific implementation policies should be established for the renewal of industrial areas in the corridor, such as relevant legal regulations and proposals for funding and operation [7].

A diagram for the renewal scheme is shown in Figure 1 below.



(Image credit: drawn by the author. Unless otherwise specified, the figures and tables in this article are all made by the author)

Figure 1. New scheme for the renewal of industrial areas in the historical corridor.

2. Methodology for Identifying Historical Corridors

Xi & Zhang [8] discussed how to identify a historic cultural landscape. The task of identifying a historical corridor is similar, which is to judge whether its value meets the criteria for a historical corridor based on a comprehensive understanding of its constituent elements. The historical corridor identification method can be divided into three main stages: comprehension, assessment, and logging.

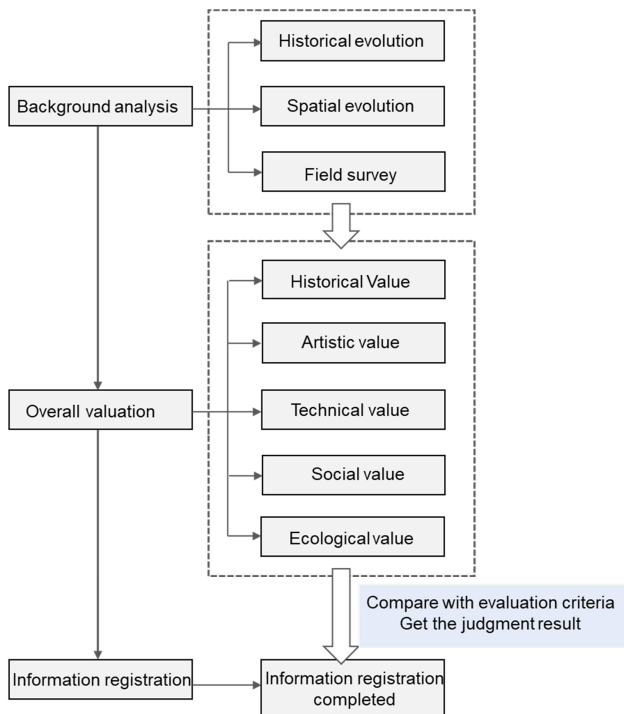


Figure 2. Process flow of identifying a historical corridor.

2.1. Comprehending the Background of the Historical Corridor

Comprehending the background of a corridor is the first step in the identification process. This step aims to clearly understand development achievements and spatial evolution during each historical period and to interpret the remaining resource elements and the characteristics of the scenes formed. This is a prerequisite for the subsequent systematic analysis and the integration of corridor elements and the basis for assessing the historical value.

Comprehending the background consists of three tasks.

- (1) Comprehensive research on historical lineage and in-depth analysis of the characteristics of each period, including important people and events. Based on this, the role of the historical corridor within its region can be summarized and the status of the historical corridor can be established. In addition, researching the historical evolution is an important guide for the integration of historical and cultural heritage and provides a reference for guiding the collection of

research data and the focus of on-site surveys.

- (2) Analysis of the spatial evolution process using historical maps, aerial photos, and other historical records. This includes analysis of mechanisms of change and potential interconnectedness in land use, the natural environment, road traffic, and the spatial organization of villages and towns, as well as combing through successive plans to clarify spatial development priorities, directions, and the overall spatial pattern characteristics at each stage.
- (3) Analysis of the preservation status of resource elements to provide a basis for the subsequent assessment of overall value. This includes taking photographs, mapping, and recording existing historical resources, ecological landscapes, road traffic, and structures, and conducting in-depth interviews with residents to understand actual conditions.

2.2. Assessing the Value of the Historical Corridor

Research on assessing the overall value of historical corridors remains in the exploratory stage, showing an absence of unified standards. To promote the standardization and codification of the protection and reuse of historical corridors, the selection of assessment indicators and the establishment of their systems are mainly based on existing laws and regulations, such as the Convention Concerning the Protection of the World Cultural and Natural Heritage and the Law of the People's Republic of China on the Protection of Cultural Relics¹.

Analysis of the relevant assessment criteria mentioned above shows that the value of historical corridors primarily consists of historical, artistic, technical, social, and ecological values.

Historical value: A historical corridor is a historical entity in an urban area. Together with various elements along its route, it records and preserves historical figures, events, and spaces, embodying the social, cultural, economic, political, and technological characteristics of a specific historical period. Its protection reveals historical facts and conveys historical information. Historical value is reflected in four aspects as follows: how long ago the corridor was formed; whether the corridor truly reflects the historical environment in which important historical events or people were active; how closely the corridor is related to the regional historical

¹ Notes: The Convention Concerning the Protection of the World Cultural and Natural Heritage explicitly specifies that cultural heritage sites are "works of man or the combined works of nature and man, and areas including archaeological sites that are of outstanding universal value from the historical, aesthetic, ethnological, or anthropological perspective." In the subsequent Operational Guidelines, "outstanding universal value" is defined as "cultural and/or natural significance that is notably exceptional and thus transcends national boundaries, while holding common importance for both present and future generations of all humanity." The Law of the People's Republic of China regarding the Protection of Cultural Relics determines that unmovable cultural relics, such as important historical sites and typical buildings of modern and contemporary times, should be graded and protected as historical and cultural sites based on their historical, artistic, and scientific value.

structure; and whether the existing historical heritage of the corridor is unique or has outstanding value due to its representation of a certain type of heritage.

Artistic value: The artistic value of a historical corridor refers to engineering and aesthetic characteristics of a certain historical stage. Artistic value is reflected in two aspects, as follows: whether the corridor and buildings and structures along it display the style, characteristics, or genre of engineering or art of a certain period, including the spatial form, volume, and scale, and materials and colors; whether the corridor has a unique landscape style and has become an iconic area.

Technical value: The technical value of the historical corridor refers to the level of productivity development and scientific and technological innovation contained in the corridor, such as the site selection, design, construction, and operation technologies applied to the corridor to perform its shipping, defense, water conservancy, or other functions. Technical value is mainly reflected in the following two aspects: whether the corridor has value in the areas of urban construction, planning, and design, including the layout and site selection, ecological protection, or comprehensive disaster prevention; whether the corridor represents the technical level of the time in the engineering field in terms of structure, materials, technology, and so on.

Social value: The social value of the historical corridor refers to its impact on the development of contemporary society, including the promotion of cultural heritage and the revival and advancement of education and scientific research. Social value is reflected in three aspects, as follows: the significance of the corridor to social groups and the sense of belonging and identity of the residents, which is a concentrated expression of emotional value; whether the corridor reflects the unique cultural traditions, social customs, and production and lifestyle of the area along the corridor; whether the corridor has mementos of important historical events or figures with considerable educational significance.

Ecological value: The ecological value of the historical corridor enhances its potential for improving regional habitats. Ecological value is reflected in the ecological benefits of ecological elements along the corridor in terms of geography and hydrology.

The assessment of overall value is mainly qualitative to establish a macro and abstract view of the overall value profile. It should not be bound to the high or low value of a specific aspect, thus affecting the judgement of its value as an organic whole. The assessment should determine its historical patterns and realistic development positions within the entire city and adhere to the following criteria.

Historical importance: The construction and development of the corridor should have historical time and space markers, with important local or national historical events or people's activities, and be closely related to the regional history and structure.

Engineering and technical importance: The corridor and the structures within it should exhibit uniqueness in terms of form and structure, or use special technical methods, which strongly represent the science and technology of the time.

Artistic and aesthetic importance: The buildings and structures within the corridor should prominently display the artistic characteristics of a certain period and form a unique landscape that become a symbol of the area.

Socio-cultural importance: The corridor's local culture should stimulate a strong social identity among local people, and it should have historical events or people of great commemorative significance.

Ecological importance: Places along the corridor should have a prominent geographical or hydro-ecological impact on the natural landscape.

A historical corridor would be considered significant if an assessment reveals the existence of the previously listed five areas of value.

2.3. Logging Information of the Historical Corridor

According to the Notice of the Ministry of Housing and Urban-Rural Development and the National Administration of Cultural Heritage on the Identification of Historical and Cultural Districts (Building Regulation [2014] No. 28), the following information must be logged during the identification of historical corridors: the name and location of the corridor, the name of the government agency, type and level, function and use, description of importance (historical and current condition), relevant geographic data (area, spatial coordinates, boundary representation, reasons for boundary delineation), and supporting information (relevant maps and photographs).

3. Analysis of Characteristics and Elements of Industrial Areas in Historical Corridors

3.1. Research Level

Each resource element is further characterized after determining the historical corridor. As the industrial area in the historical corridor environment is a multi-level resource system, it is necessary to clarify the interrelationship between the various levels to coordinate and connect them in the subsequent planning processes. This is to achieve effective management and implementation of renewing and reusing the industrial areas. Specifically, the industrial areas of the historical corridor can be divided into three levels: the corridor system (regional level), industrial areas (neighborhood level), and industrial buildings (architectural level).

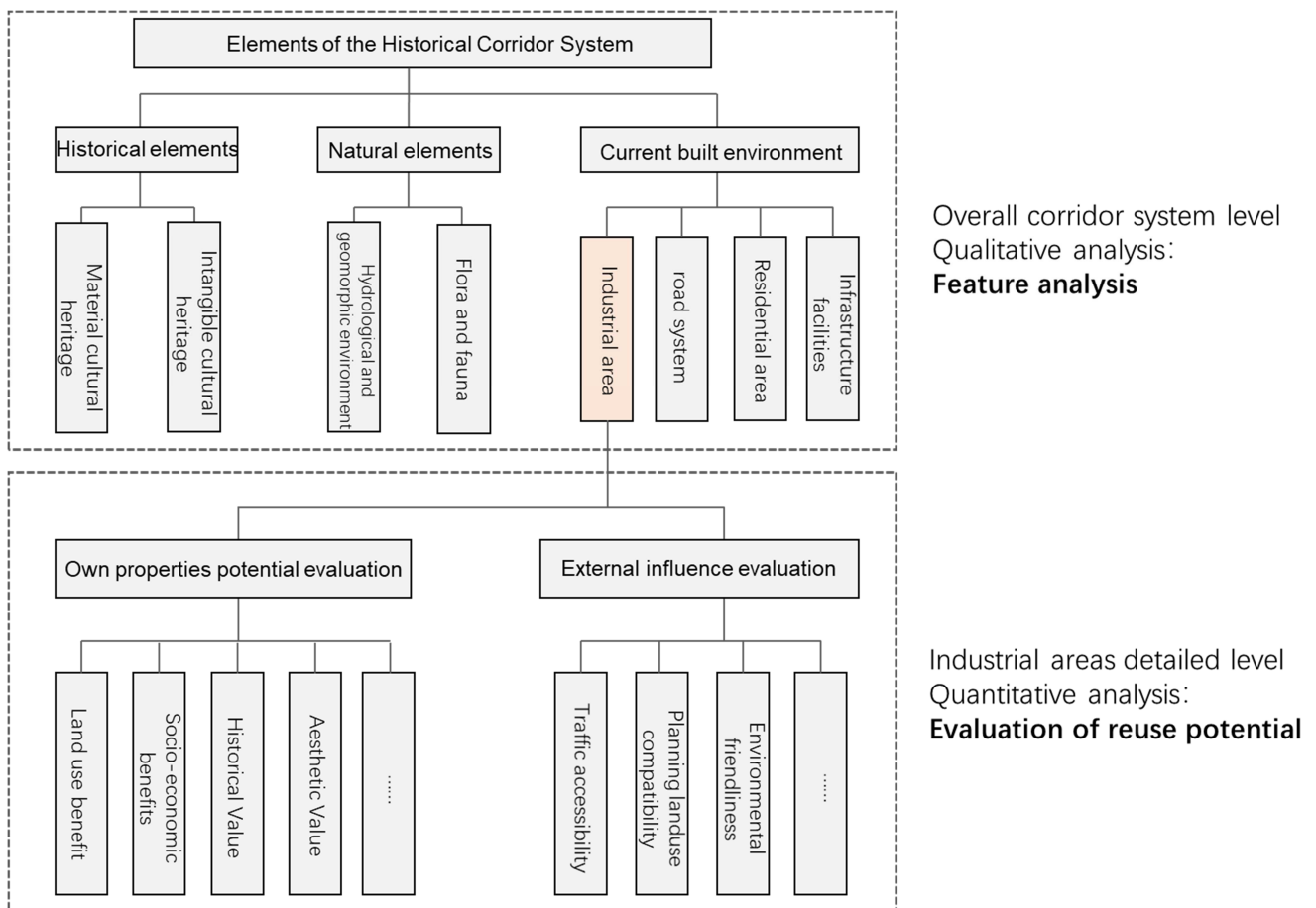
Table 1. Levels of study for the renewal of industrial areas in the historical corridor.

Research scales	Corresponding level content	Main research content
Regional level	Corridor system	History of the development of the corridor, its relationship to the evolution of urban cities, and its historical significance. Spatial and temporal distribution characteristics, valuation, and interrelated impacts of the various elements in the corridor.
Neighborhood level	Industrial areas	History of the development of industrial areas, and composition of the different categories. Analysis and evaluation of the time period, quality, appearance, and other relevant attributes of industrial enterprises, and the development of appropriate disposal policies.
Architectural level	Industrial buildings and structures	Maintenance, restoration, management, and reuse of buildings and structures.

(table credit: drawn by the author. Unless otherwise specified, the figures and tables in this article are all made by the author).

Industrial areas in multi-level historical corridors have relatively complex system elements and value systems. Therefore, effectively coordinating the redevelopment of the entire corridor system region focuses on the spatial scale analysis of the industrial area itself, as well as

analyzes at a hierarchical level. For the characterization and evaluation of its elements, the main focus is to analyze the elements at the overall corridor system level, and evaluate the reuse potential at the level of individual land parcels.

**Figure 3.** Elements of the historical corridor system components and levels of evaluation.

3.2. Current Characteristics and Typology of Industrial Areas

Industrial areas along historical corridors generally have specific themes, common values, and characteristic attributes, and are diverse in number and types. This paper draws on the classification method of Zhu Qiang [9] on the industrial heritage in the Jiangnan section of the Beijing-Hangzhou

Grand Canal. Using the time period and spatial location characteristics as a starting point, and from the angle of the dominant factors generated by the industrial areas of the historical corridor, the industrial areas are divided into six forms: traditional workshop continuation, large state-owned enterprises, modern industrial new districts, port site facilities, traffic trunk line traction, and scattered. These are summarized in the following table.

Table 2. Classification of industrial area types in the historical corridor.

Classification type	Related notes	Key example
Traditional workshop continuation	A continuation from the recent industrial concentrations within the town	Changzhou City Southeast Cotton Textile Industrial Cluster
Large state-owned enterprise	After the founding of modern China, large state-owned enterprises formed by large-scale construction and expansion of existing corridors in line with the deployment of the national planned economy	Hangzhou Gongshu State Shipyard
New modern industrial district	After the reformation and opening up of China, a large number of industrial-based economic and technological development zones were developed along the corridor in belt-like clusters	Wuxi Binhu Economic and Technological Development Zone
Port site facility	Industrial zones established at major corridor ports and stations for co-development with logistics	Zhenjiang East Lotus Pond Power Plant
Traffic artery traction	Industrial enterprises developed by the construction of canals, roads, and railways	Suzhou Qimen North Area
Scattered	Scattered and patchy distributions along the corridor, organic and flexible in form, usually small in size	Zhenfeng Silk Weaving Factory, Zhenze Town, Wujiang City

3.3. Indicator System for Evaluating the Reuse Potential of Industrial Areas

The current situation, advantageous qualities, and key issues of industrial areas were studied. This was to clarify the purpose of evaluation and establish an evaluation and decision framework in alignment with the principles of comprehensiveness, practicality, systematization, and feasibility. Indicators were selected and combined with the

strategy by Huang Qi [10] on the protection and reuse of modern industrial buildings in Shanghai, the evaluation approach used by Liu Boying [11] on industrial heritage in Beijing, the evaluation index system by Niu Xinyi, Li Shijin et al. [12] on the spatial decision support of industrial land adjustment, and other expert opinions. Inputs from these sources supplemented, shortlisted, and improved the indexes, and a potential evaluation index system: hierarchical, systematized, and comprehensive was established.

Table 3. Indicator system for evaluating the reuse potential of industrial areas in the historical corridor.

Potential evaluation perspective	Evaluation content	Evaluation indicators
Attributes of industrial areas	Land use and continuity benefits	Includes floor area ratio, building density, plant size, building quality, adaptability for retrofitting, etc.
	Socio-economic benefits	Gross industrial output per land, labor force per land, etc.
	Industrial benefits	Degree of innovation in process change
	Historic value	Historical era, historical status, etc.
	Aesthetic value	Architectural style, geographical landscape pattern, period features
External environmental impact (Corridor industrial area site suitability evaluation)	Transport accessibility	Distance from important urban traffic arteries
	Level of industrial pollution	Pollution levels in different industrial sectors
	Corridor ecoregion	Distance from the ecological green belt around the corridor
	Land use compatibility	Degree of compatibility with the nature of the surrounding land parcels

4. Strategies for Transformation and Renewal of Industrial Areas in Historical Corridors

After the overall development position and pattern of the historical corridor were determined, the transformation and regeneration strategies of the industrial areas were explored [13, 14]. The following introduces the applicable objects, modes, and relevant practical cases of regeneration from four key perspectives: economic efficiency, social services, cultural promotion, and ecological restoration. In the practical implementation process, one of the modes may be taken as the leading mode, or several modes may be combined for regeneration and reuse.

4.1. Economic Efficiency-oriented

The economic efficiency-led mode is mainly from the perspective of industrial areas reuse through functional replacement, industrial revitalization, or integrated

tourism, as well as other means to develop creative and cultural industries, modern services, etc. to generate positive economic benefits. The current functional planning appears to be mostly for creative industries, urban industries, etc. Through the renovation and renewal of factory buildings and warehouses, creative companies and studios were introduced. Alternatively, industrial upgrading strengthens urban industries in the knowledge economy, thereby opening up tourism channels to stimulate urban vitality [15].

Applicable targets: industrial areas with high intrinsic value and good location conditions, as well as highly adaptable industrial enterprises within the areas for transformation.

Renewal methods: at the functional level, new urban production, and living functions including leisure and entertainment, business offices, etc. are added to enhance the land use efficiency of the original industrial areas. The original industries were transformed and upgraded, and the restructuring of industrial areas toward scientific and technological functions improved the technological

capacity of urban industries and value-added products. At the spatial level, various reuse transformation methods increased new public spaces. At the building level, the original façade's features were usually maintained, with reinforcement and repair of the structure, while the interior of the building was transformed according to the new functions.

Case study: the Derwent Valley Industrial Corridor, UK.

Project background: located in central Scotland, with the largest cotton textile mills of the eighteenth and nineteenth centuries, this was an industrial landscape of historical importance and technological influence.

Renewal strategy: full exploration of the "industrial achievements" of the corridor, including the preservation of various advanced technologies in the process of industrialization and the reproduction of historical scenes of industrial land, etc. Thus, the needs of tourists to experience recreational and experiential functions were largely met through using the factory to form a shadow screen to reproduce Richard Ackley's cotton spinning manufacturing process.



(Image source: www.hopevalleyridingclub.co.uk/bridleway)

Figure 4. The Cycle routes of Derwent Valley.



(Image source: www.hopevalleyridingclub.co.uk/bridleways.h)

Figure 5. High-tech shadow screen of the Derwent Valley corridor.

4.2. Public Services-oriented

Public services-oriented strategies entail transforming industrial areas into public service facilities with the aim to

enhance the region's service functions in accordance with the development needs of the local community.

Applicable to: Public services-oriented strategies are applicable to medium- or small-sized industrial areas with a high adaptability for internal transformation among the industrial enterprises.

Renewal method: Based on the actual development needs of the local community, relevant public service facilities, such as civic centers, cultural and sports centers, shopping malls and supermarkets, are built. Characteristic buildings and structures in the original industrial areas can be partly preserved and serve as special landscape design in the service centers with the aim to enhance the industrial cultural heritage and the quality of the community. Based on the renovation of the building facades and internal structures, specific modern facilities are added to ensure adaptability to the needs of modern life.

Renewal case: Taiyuan Mining Machinery, Workers' Dormitories, Historic District.

Project background: The industrial community of the Taiyuan Mining Machinery was built during the First Five-Year Plan period (1953–1957) and was one of the 158 major projects supported by the State. The community was equipped with several public service facilities, such as Soviet-style workers' dormitories, a workers' club, and a hospital. Due to the continuous development of the city, these early public service facilities can no longer fulfill the current needs.



(Photo credit: Shanxi Taiyuan Mining Machinery Renovation Project)

Figure 6. Master plan for the renovation of the Taiyuan Mining Machinery Industrial Community.

Renewal strategy: The renewal strategy includes upgrading basic service facilities and improving the living environment. Based on the preservation status of existing public service facilities, there are two types of renewal: on the one hand, public buildings that are now vacant can be transformed into public service facilities, in line with the development needs of the local community. For example, the original community hall of the Mining Machinery has been transformed into a supermarket in an effort to build a community commercial center. On the other hand, public buildings that remain in use can be preserved and upgraded to maximize their service-providing function after considering the opinions of community members. For example, the former Mining

Machinery Hospital is maintained with partial renovation and expansion to increase the bed capacity and quality of the hospital facilities. The existing kindergartens and primary schools also continue functioning through upgrades in the facilities and the level of school operation.



(Photo credit: Xinhua News Agency 2012.12)

Figure 7. Soviet-style workers' dormitories of Taiyuan Mining Machinery.

4.3. Culture-oriented

Culture-oriented strategies are typically led by the government using a top-down approach for regeneration, thereby rejuvenating the region by discovering and shaping local characteristics, with local folk culture playing the leading role.

Applicable to: Culture-oriented strategies are applicable for industrial areas with key historical and cultural resources in the region, particularly in cases where it is crucial to maintain local historical characteristics and cultural relevance in the renewal process.

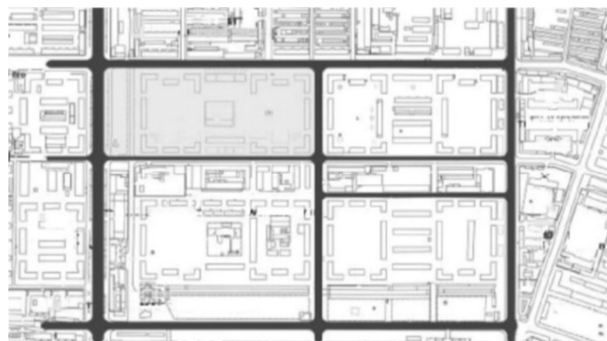
Renewal methods: Well-preserved traditional buildings and other resources with historical and cultural characteristics can be developed into cultural sites that attract residents and tourists by adding new cultural service facilities and transforming historically significant buildings into folklore experience halls or exhibition halls to serve as key figures of renewal.

Renewal case: Shenyang Tiexi Workers' Village.

Project background: Shenyang Tiexi Workers' Village was built during the First Five-Year Plan period (1953–1957), and was the largest settlement for workers during this period. After the reform and opening up in 1978, the old industries of Shenyang fell into a stagnant state. Many state-owned industrial enterprises faced bankruptcy, thus the Workers' Village, which only provided a supportive function, also declined because it did not fulfill the requirements of the times. In the new round of general planning, Tiexi Workers' Village was designed as one of the five historical and cultural districts, with prospects of improving the quality of space and promoting the development of tourism of the traditional industrial zone in Tiexi District through protective transformation.

Renewal strategy: Numerous traditional Soviet-style residential buildings remain in Tiexi District, and the uniform layout, simple forms, and compact and inexpensive interior spaces reflect the unique industrial style of the period, thereby embodying high cultural value. By introducing new

functions, such as cultural activities, business with distinctive characteristics, art creation, and local life experience, Tiexi District is built into a center for workers' cultural activities and a showcase of workers' life in Shenyang, encompassing several major functional blocks, such as local life experiencing area, historical retrospective area, multimedia display area, and interactive entertainment area.



(Photo credit: Shenyang Tiexi District Workers' Village Renewal Project)

Figure 8. General plan of Workers' Village in Tiexi District, Shenyang.



(Photo credit: Shenyang Tiexi District Workers' Village Renewal Project)

Figure 9. View of architectures in the Workers' Village in Tiexi District.

4.4. Ecological Restoration-oriented

Ecological restoration-oriented strategies entail the transformation of industrial areas with high risk of pollution into open public spaces, such as urban greening and landscape parks, through ecological restoration [16].

Applicable to: Ecological restoration-oriented strategies are applicable for industrial areas developed by highly polluting industries, wherein the ecological and environmental quality of the area requires improvement. The industrial enterprises in the lot must be of a certain scale, with relatively open spatial layout. The buildings and structures have certain regional characteristics, or the lot is surrounded by good environmental conditions, such as mountains and water bodies, which can provide a good space for public activities.

Renewal method: Landscape design techniques can be used for industrial structures with historical, artistic, and scientific values that can be retained as landscape elements. Moreover, the geomorphic environment and facilities are artistically recreated, whereas modern ecological management techniques and educational activity facilities are incorporated to create an open urban space integrating ecology, education, and leisure.

Renewal case: Nordsternpark, Germany.



(Image source: en.wikipedia.org/wiki/Landschaftspark_Duisburg-Nord)

Figure 10. General plan of Nordsternpark, Germany.



(Image source: en.wikipedia.org/wiki/Landschaftspark_Duisburg-Nord)

Figure 11. Scenes from Nordsternpark, Germany.

Project background: Nordsternpark, located in Gelsenkirchen, Germany, is a key part of the International Architecture Exhibition Emscher Park project in the Ruhr industrial region, and covers 160 hectares of land. The area was previously a coal mine dump that was forced to cease

production in the late 1980s due to industrial restructuring. In 1997, the area became the site of the German Garden Show (Bundesgartenschau), thus the government transformed the area into a landscape park and residential area.

Renewal strategy: The first step is to perform an environmental assessment of the site, and divide the polluted areas into different zones, and to eliminate remaining industrial pollution decontaminate such as water bodies, soil, waste, etc. The original topography and industrial structures are preserved, and based on this, geodesic landscape art is used to shape scenes of industrial civilization with regional characteristics, thereby transforming the preserved structures as iconic landmarks. Through this method, vegetation and greening are also increased. Moreover, the park preserves the value of industrial culture, enhances the quality of the local environment, and fulfills the needs of local inhabitants at the lowest possible cost.

5. Conclusion: Selecting a Renewal Model for Industrial Areas in Historical Corridors

The selection of a renewal model for industrial areas involves the influence of various economic, social, cultural, and other factors, and primarily depends on two aspects. First, in conjunction with the need for the overall redevelopment of historical corridors, requirements for the transformation and renewal of industrial areas, in terms of urban spatial adjustment, industrial revitalization, and ecological restoration, must be considered. Second, as a result of the value characteristics of the attributes of industrial areas, various types of classification and evaluation for determining the reuse potential can serve to highlight different directions for their transformation and renewal, and thus provide references and restrictions for the selection of the renewal model. A diagram for the selection of a renewal model is presented in Figure 12.

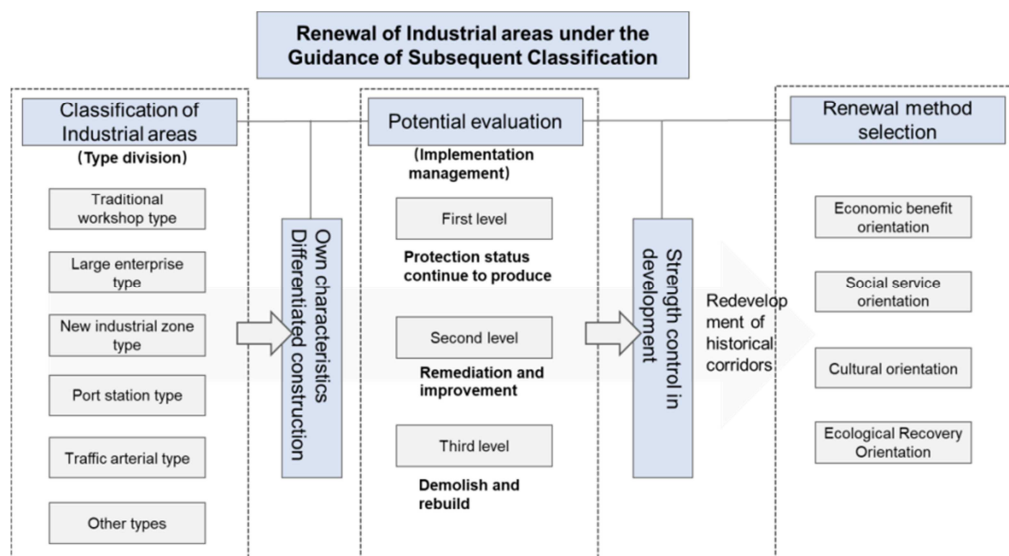


Figure 12. Selecting a renewal model for industrial areas in historical corridors.

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