

Ecological function planning research of expo area in Jinjiang City's rural reconstruction

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ABSTRACT: In view of the demand on industrial renovation and urban strategic transformation in rural retransformation, the authors researched the development condition and analyzed the functional demand through using the advanced experience at home and abroad for reference in terms of regions and zones. The plan is to build the comprehensively functional expo area with exhibition and transportation under the rural retransformation in Jinjiang City, and a site inspection was conducted through issuing questionnaires. At last, multiple suggestions were put forward to offer the advanced instruction to regional planning, investment attraction, financing election and project construction and operation. These suggestions are about adapting the designed function of local development, spatial structure and the development and design of key projects to build the central construction area which is combined with exhibition, transportation and business.

Keywords: ecological civilization; rural transformation; expo planning; exhibition transportation; industrial transformation of city

1 INTRODUCTION

Jinjiang Expo Area Exhibition Transport Complex (the "Expo Area") is the main exhibition project conducted by government of Jinjiang City and the key project of strategic layout in the exhibition industry. Moreover, it is also an important carrier of the International Exhibition Trade Centre construction and of great significance to promote the comprehensive and matching reform pilot program of rural construction and rural services in Jinjiang City. Expo area in Jinjiang City is an important shift from a center of industrial city to a function node of post-industrial city, and it is a hub of the industry-driven and post-industrial city which is harmoniously developed.

2 RESEARCH BACKGROUND

According to the demand of the development and transformation of Jinjiang City and the purpose of making efficient use of rural land resources, the expo area covers 326-hectare land in total and this area of research which involves 8 villages will expand from 4,000 to 5,000 hectares. The progress of this project is divided into five courses and four thematic achieve-

ments. The five research courses are used to explain the data (literature consulting and information retrieving), conduct field research (investigate item by item and collect data in the regional base and surrounding areas), analyze the existing circumstance (transfer the data into chart and check information), do monographic study (topics about TOD and exhibition), develop conception (making an initiate planning about the function plan and further explain and prove it, then decide the plan); the four thematic achievements are respectively the special topic of research results, TOD development research, the exhibition research and the assumption and conception of function.

3 THE ANALYSIS OF DEVELOPMENT CONDITION

3.1 *Plentiful land for construction*

At present, the idle land takes up the most of part in this area, including the land for some town buildings, road, logistics & warehouse, forest, water and mountain and so on. The idle land accounts for 47% of the whole land of the expo area where the development condition is relatively good. The other proportion in

total areas, for example, that for town building site is 33%, for transportation is 6%, for logistics & warehouse is 4%, for the forest and mountain is 8%, and for the water is 2%.

3.2 *Convenient transportation*

There is 308 Provincial Road, the exit and entrance of the highway and inter-city railway station are in the southeast of the area. This area has many advantages to develop faster and better, for instance, convenient transportation and the superior location.

3.3 *The limitation of the planning area development and the suggestion for exploiting and design*

There are two water supply pipes across the whole area so a new plan should be made to avoid them when the construction is started. The one running from east to west is the open channel water pipe which can be coexisted and cooperated in the future road plan or designed as resort. The other one running from northeast to southwest is an underground pipe that will cause certain limitation to the future development and, some adjustments are better to be made.

Landfill disposal locates on the northeast of the area, which is 4.6 hectares and has 20-year history. It will have an impact on both area development and the environment. Some measurements toward the landfill disposal are suggested to be made. It can be designed as a landscape park or replanned according to the decomposed degree of the rubbish in the landfill disposal.

4 THE ANALYSIS OF FUNCTIONAL DEMAND IN CONSTRUCTING THE EXPO AREA

4.1 *Data collection from enterprises and analysis of the result*

Research and analysis were conducted based on the demand of enterprises. There are 700 questionnaires distributed to enterprises, 564 of which were returned as the valid ones. And there are 400 questionnaires on demand of facility and 170 questionnaires on demand for the exhibition and collaborative commerce. The type of enterprises being researched including shoe-making, the textile and clothing, the ceramics and building materials industry, food, printing and packing, papermaking, photo-electricity information, mechanical equipment, umbrella-making, new chemical material and so on. Among the total enterprises being researched, the large enterprises account for 45%, the small businesses account for 46%, and the medium-sized enterprises account for 9%.

The facilities of the city were studied and analyzed. A general investigation was made of the major functional facilities around the expo area about 5,000 hec-

tares, including commerce, residence, hotels, cultural facilities and parks. Therefore, efficient urban functional structure around the expo area was figured out.

Through researching enterprises, 90% of enterprises stated that they would like to do business in the expo area and hold various exhibitions here. In the general view of the analysis on the demand of commercial office area in the expo area, the large area office demand which requires over 200 square meters is accounted for 78%, of which the demand on square meters which are about 200 to 500 accounted for 31%, square meters which are about 500 to 1,000 accounted for 18%, and square meters which are over 1,000 accounted for 29%. There are about 200 various kinds of promotional meetings that are held in Jinjiang and other cities per year. There were 33 promotional meetings which had over 200 guests, attracting 17 enterprises on average, and the area of exhibition is usual among 200 to 500 square meters. Enterprises that require the comprehensive and package facilities in the expo area should be given the catering, hotels and business packages in the first place; the business service should be diversified, mainly about the product popularization plan, the latest information of industry and market and the demand of marketing expand and exacerbation; commercial collaborative facilities should regard meeting facilities, network, service and database for product, industry and market as the major facilities.

4.2 *The analysis and assumption of functional structure in the expo area*

By using the GIS systems software to make a systematic analysis about the distribution and effective service radius of surrounding facilities of expo area, general investigation was made into the categories of urban function among which may be set up in expo area, including commerce, business, greenbelt, hotels, residences, specialized markets, parks, cultural and sports facilities and so on. After that, assumptions about the function in the expo area were made according to the analyzed results, as shown in Table 1.

5 THE GOAL AND FUNCTIONAL ORIENTATION OF THE EXPO AREA

The general goal and functional orientation of the expo area is decided by the "134" pilot project. "1" refers to the general orientation which will be the hub of the post-industrial city, cooperating at home and expanding in the foreign market ecologically and harmoniously. "3" refers to three major functions, namely, the exhibition function, the transportation function and the business function. "4" refers to the four associated functions, namely, the commercial function, the resident function, the public activity space function and the recreational function. Due to

Table 1. The function analysis of the situation and idea of Expo area

Type of function	Status Analysis	Assumptions
Commercial function	City center gives priority to commerce. The correlation of business facilities is rather weak within 8 kilometers.	To construct district of supporting commercial facilities, specialty industries.
Business function	Old city center gives priority to business offices. The correlation is rather weak out of 5 kilometers.	To construct independent business office building to meet the requirement of development.
Specialized markets	Mainly locates in the peripheral urban area. The correlation is high between the area and status market.	To impel the development of special products markets with a character of combing exhibition and trade. Develop comprehensive marketing business supporting the communities in a moderate way.
Parks and squares	Though the green space layout is balanced, it lacks holistic parks.	To build parks which use industry and sea cultural as the theme.
Residence	Rural settlements and village and town constructive using land take the most part of the surrounding area. Few commercial housing.	To exploit high-quality living quarters meeting the needs of resettlement and business people.
Cultural facilities	It is hard to reach within 3 to 5 kilometers	To build the leisure culture places to show the leisure culture, industry for the citizen, such as commercial stripes and squares. The cultural thematic parks can be built as well.
Sports facilities	There are some sports facilities in the mount and greenbelt within 3 to 5 kilometers.	Outdoor activities: expand green leisure way combing the mountain. Indoor activities: build gym, community center.

detailed organizational relations, the exhibition module contains the cohesive function such as relaxations, retails, hotels and parks. And the transportation module will be combined with logistics, business and shopping. And the business module will be combined with market development, marketing, enterprise information upgrading, residences, parks, hotels, entertainment and so on.

5.1 Group orientation of the exhibition function

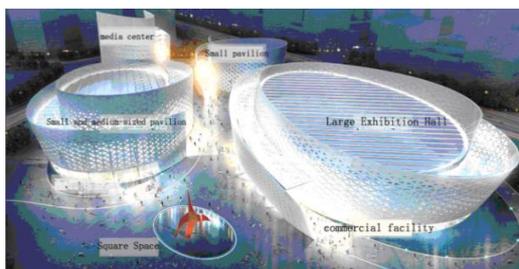


Figure 1. An architectural complex with "1 plus N" combination of separate structure

This function is defined that it is used as the public center to hold large-scale activities such as meeting and exhibition, and it is used to be the exhibition area core with the supporting facilities. The main types of the held activities include: a series of exhibition such as shoe fair, auto show, hardware show, food exhibition and so on; a series of product exhibitions and fairs such as brand sale, real estate expo and so on; large enterprise/business meetings like enterprise forum and activities such as cultural, physical activities, art per-

formance, wedding celebration and so on. For the form of the exhibition, it could consist of a large comprehensive exhibition hall and some small attached halls to form an architectural complex with "1 plus N" combination of separate structure (Figure 1). It is suggested that the scale area of the main building should be 50 to 60,000 square meters and the attaching building should be 20 to 40 thousand square meters. In addition, the scale area of conceptual experience pavilion and exhibition room could be 500 to 3,000 square meters, and the banquet hall and various media centers could be around 1,000 square meters.

5.2 Group orientation of the transportation junction

This function is defined to be a comprehensive transportation junction combining with the inter-city rail, long-distance passenger transportation in Jinjiang City, bus station and cab station. According to the actual situation in Jinjiang City and the status field in the expo area, the TOD pattern (Transit-Oriented-Development) is suggested to be used as the design of development model (Figure 2). Public transportation includes public transportation stop which uses the large traffic rail lines as the center, such as light rail line, bus and subways and so on. City subdivision, which combines with commerce, culture, residence, education and work as a whole, is developed within the transportation stop as the core of 400-800 meters, that is, a radius about 5 to 10 minutes' walk. The advantages are the overall and orderly network structure that can be formed on the bus node in the area, and it can effectively combine the natural environmental elements within expo area, set up urban growth boundaries to avoid the unrestrained spread so as to

balance the need of the development in old city and suburbs. In terms of the transportation junction structure in the expo area, the traffic distribution function area should be set within 100-meter radius of the traffic fortress. Passenger-service-oriented business is set within radius of 400 meters. Conference-and- exhibition-service-oriented business, business office and metropolitan business are set within 400 meters to 800 meters in radius. The supporting facilities in the transportation junction center are better and mainly use the following things: commercial service facilities such as mall and public entertainment places, business service facilities, dining and entertainment facilities, hotels which give priority to the type of typical, convenient and apartment, connection-type propylaea and grassy area.

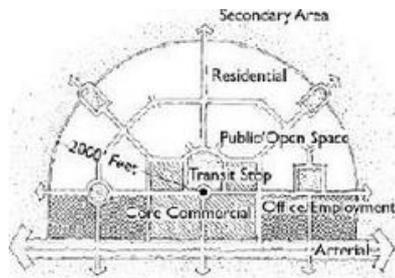


Figure 2. The model of TOD

5.3 Orientation of business collaboration function

This function is defined that it is the non- governmental industry collaboration platform center for private enterprise, offering the industry services between the second industry and the tertiary industry. It is an advanced form of the producer services and the

third-party service providers for the collaboration between enterprises and enterprises. The major function of it is to improve the collaboration among enterprises. It offers services such as providing legal advice on merging and reorganization among enterprises, providing the agencies that can train the needed talent person and build the well-equipped and comprehensive business office. The business collaboration center is the industrial center which is mainly set by constructing industry supporting facilities or business office. It is the agency settings that offer third-party service to manufacturers, having public places including industry collaboration center, information center, commerce and entertainment and so on. It can effectively lead the innovation of management, brand marketing, innovation of system, industrial resource and industrial image to change to be better. Proposal for the center of the collaborative layout consists of three aspects of “partition–block–building” to build a hybrid business district with highly modernized and low density function.

6 THE EXPO AREA LAYOUT PLANNING STRUCTURE AND FUNCTION LAYOUT

The structure and function of floorplan in expo area is planned according to three main functions that are exhibition, transportation and business collaboration (Figure 3). The planning layout of the business sub-region includes the space area of commercial office, the central business district of city community, pedestrian–street-typed community, unique cultural square and service-oriented leisure places such as book malls and restaurants. The planning structure of the collaborative sub-region includes the collaborative cooperation zone, the collaborative center with service

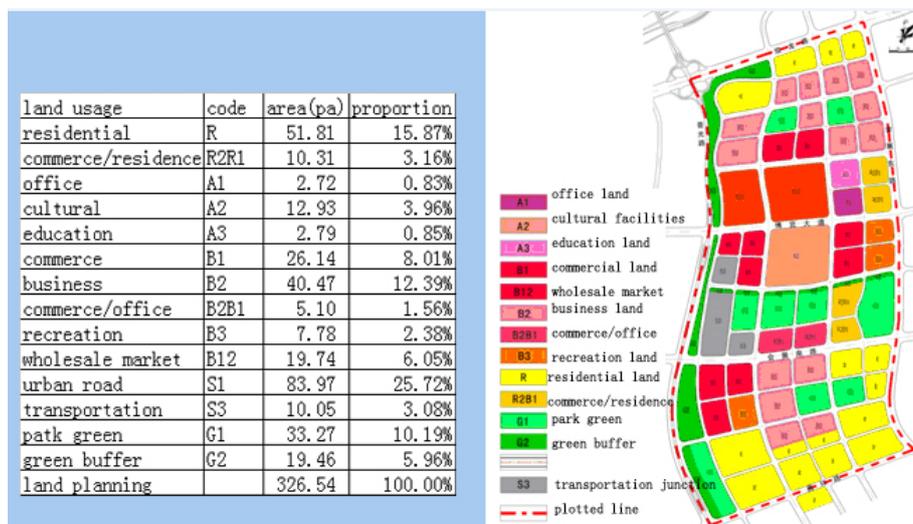


Figure 3. The structure and function of floorplan in expo area

center and cloud computing information platform, the cultural zone like education and training, the multi-functional commercial zone with apartments for top-level talents and experts and the supporting service facilities. The exhibition sub-region is planned to be the main functional region of the large exhibition and selling place, so the planning structure of it can combine the recommended exhibition zone with the personalized display space of small business, the exhibition business matching area of city-typed commerce, the special market zone of the west coast of the Taiwan Straits international purchasing and regional logistics center, parking facilities area, a complete set of commercial residential area and public activity space zone with local characteristic culture. The planning layout of the transportation sub-region is to be a comprehensive transportation zone with commerce, parks, business and transportation junction. There is also a proposal for the space correlation degree between the two leading function, namely, exhibition and transportation. They could be close to each other in the space and interact with each other in the function. On the basis of meeting the demand of the design rule, harmful factors that may influence the development should be avoided by dealing with the space properly.

7 PROPOSAL FOR THE DESIGN AND DEVELOPMENT OF THE EXPO AREA

7.1 *General proposal for the development mode of the expo area*

The general proposal for the development mode of the expo area is listed as follows. First, it should be a green and low carbon mode with more efficient and convenient eco-activities and walking space. Second, it should raise the utilization ratio of land and space by adopting the multiple development mode with various function lands which are mixed used and a balanced ratio, avoiding the comprehensive development mode with single-function exhibition center by adopting the mode of diversified space development which combines the business, culture, entertainment and public space with this expo area and the mode of mixed street development with small scale land. Third, it should effectively reduce the traffic jam which is caused by motor vehicle.

7.2 *The schedule of the development of the expo area*

Phase I: Start the development project of the expo area with the detailed construction of the two main function—exhibition and transportation. At the same time, the plan of investment promotion and capital introduction can be launched.

Phase II: On the basis of deciding the exhibition and transportation function, develop collaborative office

sub-region which is combined with the marketing sites of the business sub-region in the south of the expo area, and create the commercial center which is collaborated with large industrial enterprises.

Phase III: Develop the southern business sub-region which combines the public facilities project in the south expo area with the settlement programs to build an expo area with clearly development goal and complete function.

7.3 *Proposal for the design method of the expo area*

In general, in terms of the design method, emphasis should be given on the flexibility (the flexibility of the space and function), diversity (the diverse function of each using land collaborative with each other), ecological features (ecological features of transportation, architecture, life and production), and compatibility (compatibility among different functional land, architecture, transportation and the compatibility between the using land and the eco-environment).

In the exhibition sub-region, independent pavilion or experience pavilion can be built by cooperating with large enterprises. Use two or three stories flexible placement according to the green land parking lot in front of the exhibition hall or parking building. Develop the supporting facilities such as hotels, catering and business functional facilities in the east of the exhibition sub-region. Set up the public park and green land, combining the underground parking lot with the public opening area of the transportation junction in the south.

The transportation junction sub-region can be designed by adopting the TOD mode. However, the multifunction about commerce, business, hotels and residence should be taken into consideration. Therefore, the sub-region can be divided into the transport interface area (within 100 meters), the passenger-service-oriented business district (within 400 meters), the leading business district of exhibition (within 400 to 800 meters) and the business district and urban commercial district.

As for the collaborative sub-region of business, the development should be cooperated with large enterprises and give the first place to the office building with the unit of 200 to 500 square meters, mainly build the collaborative commercial center of the meeting and the infrastructure resources of information technology like Internet, and develop service facilities such as restaurants and hotels in the collaborative sub-region of business.

8 CONCLUSION

The site of the expo area and ecological civilization construction area in the rural construction should be carefully selected so as to meet the basic condition of convenient transportation which is not far from the

city. Transportation of exhibition has a significant impact on the development of the expo area because of its large-scale passenger flow volume, centralized freight location and the great relevance with the transportation in the rush hours. In order to make sure that the expo area can run efficiently, we should firmly follow the main direction based on ecological civilization construction and reasonably build various related functional facilities from different aspects. Therefore, we can orderly realize main parts such as exhibition, transportation and business collaboration.

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