

2014

# BioTechnology

*An Indian Journal*

FULL PAPER

BTAIJ, 10(9), 2014 [3371 - 3376]

## Study on regional logistics system and logistics park planning system

Li Zhang

Baotou Teachers College, (CHINA)

E-mail : btsy\_zhangli@163.com

### ABSTRACT

The trend of Modern logistics' development displays features such as globalization and socialization. In order to keep up with this trend, countries worldwide have established their own logistic system platforms as an important way to strength their overall national power. A good logistic system planning is one of the most effective means of improving regional logistic system. For the purpose of improving the regional logistic system and logistic park planning, this paper, focusing on the design of logistic system planning and freight transportation, propose an ideal set of planning system and utilize the prediction model and network model to analyze and expound on the land layout and its functions, with the instruction of micro-simulation theory for logistic park planning and the advanced experienced of other countries.

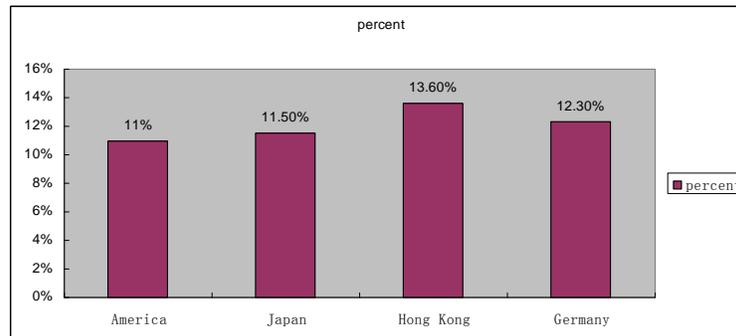
### KEYWORDS

Logistics system; Logistics Park; Planning; Land layout; Freightage; Network model.



## INTRODUCTION

Modern logistics, widely regarded as a source of gaining profit by reducing wastes in production and financial input and of increase the productivity, is an advanced technical means of organization and management. Right from its birth, it has been heated pursued and become the cornerstone industry in many developed countries. In 2001, the worth of America's logistics has reached 970 billion dollars, taking up an 11% in America's total GDP. Figure 1 are percentages of the worth of some countries' logistics in their respective amount of GDP.



**Figure 1 : Percentages of the worth of some countries' logistics in their respective amount of GDP**

The development of modern logistics becomes more and more connected with information sharing, networking and socialization. With the development of economic globalization, logistics has broken out from the geographical fetters among countries and become a global logistic chain. Studies of logistic planning is very popular on the worldwide scale, but it remains a weak link in the regarding study in china, without a consistent and operational methods system. It is, in china, still lacking in the according logistic planning theory bases about the location and planning of logistic junctions such as logistic networks, logistic parks and the docks, about the number and scale of the amenity within the logistic district, and about the settings of functions insides logistic park. This paper offers an in-depth study of regional logistic system and logistic park planning system from the theoretical and practical perspective.

## LOGISTIC SYSTEMS AND LOGISTIC PLANNING SYSTEM

### General framework of planning

Regional logistic system and logistic park general framework planning include the design of the network planning and logistic park planning and the micro-simulation evaluation, these 3 aspects.

Network planning is mainly about the design of the network system of the regional logistics, for example, the design of the transportation network and the number and distribution of the network's junctions, which aims at the making of the scientific quantitative planning design, at the integration and promotion of the regional logistic network, providing detailed and precise statistical analysis for the logistic system planning; Logistic park planning is the analysis of the functions and distribution of the amenity in the logistic park and of the planning of the scale, the number, the transportation and etc.; micro-simulation evaluation is the micro-simulation and evaluation of functions of the logistic park. The analyses of this three aspects are independent and yet connected and mutually checking and constraining each other, functioning together on the regional logistic system and logistic park planning to overcome the shortcomings resulted from the ignorance of the mutual restraint among the different logistic planning designs.

## THE NETWORK PLANNING

In china, our domestic transportation planning mainly refers to passenger transport planning, while the traditional freight transport planning is logging behind the demand of the development of modern logistics. Network planning is based on the traditional transport planning and adjusted according to the modern transport's characteristics, and thus improves the transport plan. The aims of network planning have been explain above. Network planning's specific models can be divided as macro-economy model, regional logistics model, price-quality model, time distribution model, mode distribution model, goods-vehicle model and etc.

### Macro-economy model

Macro-economy model is utilized when predicting the economic indicators and the trade volume. The most common means are I/O model analysis method, linear analysis method, make/use analysis method. In this model, the trade volume of the output district refers to the import and export volume of every district; freight volume in trade is the import and export of freight in every district; the unit is currency.

### Regional logistic model

Regional logistic model aims at the quantitative prediction of the production, the import and export volume and the distribution of different type of commodities. In this model, the most commonly used means are trend method, system dynamic analysis method, neural network modal analysis method, gravity analysis method productivity growth analysis method and etc.

### Price-quality model

Price-quality model mainly analyze the changing relations between quality of different types of commodities and their price. When using this model, we first have to devised the law of the relationship of the price and quality and pay special attention to the unit of trade volume, currency. Price-quality model is often used upon the freight network planning of a county and the import and export of the goods.

### Time distribution model

Time distribution model is based on the production of different types of commodities and the relationship among the production, the attraction volume and time of production. Its function is to predict the weekly transport volume of one-month goods and one-day goods. Countries with a developed logistic industry have all constructed a time distribution model and a price-quality model that correspond their own logistic characteristics in their logistic planning system and freight volume planning system; whereas, our country has hand in a blank sheet in terms of the construction of the time distribution and price quality model.

### Mode distribution model

The construction of the mode distribution model is usually utilized on the transport mode. It is a social-economical concept that refers to the special form of transport that combines different means of transport (including road transport, rail transport, air transport, marine transport and pipeline transport). The construction of this model first need to conduct a survey of every means of transport and then use the regarding data to analyze based on the disaggregate model before getting the volume of the freight of the distribution of goods transmitted by different means of transport.

### Goods-vehicle model

Goods-vehicle model transfers the volume of different types of goods to the volume of different types of the goods wagons, which needs a specific investigation into the loading capacity of different vehicles and the number of the vehicles.

## LOGISTIC PARK PLANNING

In our country, Logistic parks have been built in many cities but the planning and design of them usually lacks integration. Logistic parks having little integral design, the rights of land use have been handed over to the logistic industry, which cause the misuse and underuse of the land, the uncoordinated situation among enterprises and further largely hamper the scale benefits and bring trouble to the management. Through the construction of the modals discussed above and the analysis of output data, we can then make a rational analysis of every factors affecting logistic park and make a better planning.

### The design of logistic park's functions

Through the analysis of the functions of the first-rated logistic parks across the world, the basic functions of logistics can then be divided into the basic function, supplementary service function, commercial function and industrial function. The basic functions of the logistics include cargo distribution and assembling, goods transport function, large-scale storage and delivery, circulating, processing and packaging and logistics information service centre; Supplementary service functions include supplementary service in everyday life and in business management; commercial functions include business display, transaction function and supplementary e-commerce function; industrial functions includes product processing industry and logistic equipment manufacturing industry.

Decisive factors of the design of logistic park functions are the needs of the logistics. After the analysis and prediction of the needs can we proceed to the design of logistic parks' functions. The instruction for the design of logistic park's functions is logistic park's development strategy, including the theory, goal, demand of the strategy, which should all be considered in the design. Funds, technology and environment affect the designing process. The development of the technology restrains the effects of the functions. For example, the functions of e-commerce are restrained and supported by electronic network technology; with the support of the limited financial support, the profit return should be considered in the function design while for services with a large capital input and little return, the necessity of the design of them should be taken into the consideration; as environment is a factor that should be noted in the design, it should be noticed that an industrial exploitation on a large scale cannot be conducted if logistic parks are built inside the nature reserves or residential building complexes. The design must follow the principle of the park's functions being intensive, specialized and further expanded, instead of pursuing the all-roundness single-mindedly and ignoring the efficiency of the land use. Besides, the design must also aim for the advancement and higher profit return.

### The planning of logistic land use

The selection of the logistic park's sites can be divided into two types: linking type and scattering type. Linking type refers to the type of the selection of the site which is on one piece or more adjacent pieces of land (for instance, two pieces of lands beside one road); scattering type refers to the type of the selection of the site which is on many pieces of lands that are not adjacent but with a certain distance between every two pieces. The site of a logistic park usually belongs to the linking type in order to get the maximum profit return. However, as a comprehensive logistic park need a lager site with many types of land use and the constraint of the local amenity, it cannot always successfully bid for the sites of the linking type and therefore have to divide its different functions to different non-adjacent pieces of lands.

The scale of the logistic park is affected by many factors, such the market factor, technology factor, cost factor and government's policy regarding to the land use. From analysis and study, we have learnt that the scale of the logistic park has to take the followings into consideration:

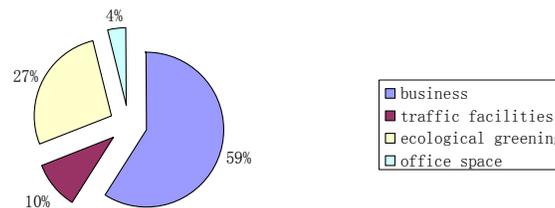
- 1) The quantity of the material resources in the service district;
- 2) The important service types and their need for the effectiveness;
- 3) The traffic condition around the logistic park;
- 4) Logistic facility and technology;
- 5) The attraction to the foreign capital.

The scale of the logistic park is closely linked to the amount of the logistic flow and the function layout. German logistic park takes up a relatively larger scale because it enable the park to perform functions such as relay and combined transport and yet they functions perfectly. TABLE 1 is about the scale of some countries' logistic parks and their separate indicators:

**TABLE 1: About the scale of some countries' logistic parks and their separate indicators**

| Logistics park     | Area (hectare) | Daily average weight (ton) |
|--------------------|----------------|----------------------------|
| Japan (Adachi)     | 32.4           | 8335                       |
| Japan (Keihin)     | 61.8           | 10152                      |
| Germany (Augsbury) | 12.1           | 3899                       |
| Werder Bremen      | 200            | 633                        |
| Stuttgart          | 253            | 5288                       |

The design of the scale of every functional zone within a logistic park must coordinate the complete function of the park and its surroundings. Germany's Bremen logistic park takes up a 2000 thousand square meters. Figure 2 is the function layout of the Bremen logistic park:



**Figure 2 : Function layout of the Bremen logistic park**

The land use planning in a logistic park usually use location distribution method, analysis and evaluation method, and mutual relation method.

**The design of the logistic park planning**

A first-rate logistic park should be one that performs its functions and services effectively, function smoothly and achieve a great efficiency, thanks to its rational transportation design that meet the scientific standard. The types of transport inside a logistic park are rather varied, including by truck, by passenger car, by bike, by foot and the likes. Because of the different location and design of the functional zones inside a logistic park, the planning of the transport in different zones corresponding varies. The design of the transport in a logistic party usually involves 4 aspects: 1. Transport planning for different logistic facility; 2. Transport planning for the auxiliary logistic facility; 3. Transport planning for the roads of a logistic park; 4. the planning of the means of transport. Transport planning is of vital importance for the whole logistic park. On one hand, as a newly exploitation, a logistic park that has a new transport planning will inevitable have a new demands for its surroundings. This will reduce the service quality of the original transport infrastructure and network. On the other hand, one of the reasons to build logistic park is to change the traffic condition of a particular locality, so it is necessary to analyze the effects of the logistic park's transport planning.

**THE MICRO-SIMULATION EVALUATION**

The micro-simulation evaluation to a logistic park is of great necessity in the whole planning system. From the research and analysis of the different business procedures of a logistic park enterprise, we can gain the regarding statistic of the actual carryout of the logistics. Added the calculation and analysis of the relating parameter and combined with the transport theory above and the micro-simulation technique, an analysis of the simulation of the logistic behaviours and transport behaviours

within a logistic park can be gained. Evaluating the outcomes of the simulation, we can then ascertain the services quality inside a logistic park. The utilization of the micro-simulation model usually involves the following aspect: 1). the evaluation of the ability of unloading; 2). the freight volume during transport; 3). the evaluation of the parking areas; 4). transport evaluation.

## CONCLUSIONS

This paper offers a comprehensive study for the planning of the logistic park from the development of the logistics, from several logistic planning models: macro-economy model, regional logistics model, price-quality model, time distribution model, mode distribution model, goods-vehicle model, and from function, site and transport of the logical park. Logistic planning and regarding studies are still rather weak in China at the moment. That's why we need to conduct more specific and more in-depth studies into the logistic planning theory, the selection of the logistic park's sites and its function layout, based on which we can construct a comprehensive logistic planning methods system that conformed to China's national conditions.

## REFERENCE

- [1] Cheng Ru-Zhang; Multimode application in University English vocabulary teaching [J]. Journal of Mudanjiang University, **11**, 140-142 (2011).
- [2] He Shan-Yan; Chinese multimode discourse analysis research summary [J]. Journal of Chongqing College of liberal arts (social science Edition), **5**, 153-157 (2011).
- [3] Ma Yu-Jie, Zheng Xi-Lai, Li Yong-Xia, Song Shuai; Underground water quality's fuzzy comprehensive evaluation method's improvement and application. Journal of China University of mining, **38(5)**, 745-75 (2009).
- [4] Ying Jian-Fen; Multimode discourse analysis and University English vocabulary teaching [J]. Journal of Mudanjiang University, **6**, 136-138 (2011).
- [5] Yuan Chuan-You; Multimode information cognitive teaching - learning mode initial exploration - complex course legal English" teaching reform trial [J]. Journal of Shandong foreign language teaching, **04**, 10-19 (2010).
- [6] Zhang De-Lu; Multimode discourse theory and the application of media technology in foreign language teaching [J]. Foreign language teaching, **04**, 15-21 (2009).
- [7] J.Bateman; Multimodal and Genre: A Foundation for the Systematic Analysis of Multimodal Documents [M]. Gordonsille: Palgrave Macmillan, (2008).
- [8] Li Xi-Lin, Wang Lai-Gui, Zhao Kui, Liu Ling; Mining water's water quality assessment fuzzy comprehensive evaluation method improvement and application. Journal of water resources and water engineering, **20(5)**, 5-8 (2009).