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WORLD MARITIME UNIVERSITY

Shanghai, China

**RESEARCH ON LOGISTICS OPERATION MODE
OF SHANGHAI 2010 WORLD EXPO**

By

CHEN JIAYING

China

A research paper submitted to the World Maritime University in partial fulfillment of
the requirements for the award of the degree of

MASTER OF SCIENCE

(INTERNATIONAL TRANSPORT AND LOGISTICS)

2007

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DECLARATION

I certify that all the material in this research paper that is not my own work has been identified, and that no material is included for which a degree has previously been conferred on me.

The contents of this research paper reflect my own personal views, and are not necessarily endorsed by the University.

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ACKNOWLEDGEMENT

First of all, I would like to owe my deepest appreciation to my supervisor, Professor Wang Xuefeng. His guidance, support and encouragement throughout my dissertation writing are inevitable and critical. Without his insightful suggestions and continuous assistance, this dissertation would not have been completed. Also, his intelligence, wisdom, kindness and patience I have enjoyed during my study will benefit me for my life.

I am grateful to Ms. Zhou Yinchun, Ms. Qu Shanshan, and Mr. Zhu Mingjian, who are in charge of this joint postgraduate program on behalf of Shanghai Maritime University, as well as many dear friends. It is their help and assistance that make my life in Shanghai Maritime University an enjoyable experience.

Finally, but certainly not least, I would like to send my indebtedness to my beloved parents, Chen Guorong and Tao Limin, who offer both financial and emotional support to me. I am fortunate to have their eternal love and encouragement as I go forward.

ABSTRACT

Title of Dissertation: **Research on Logistics Operation Mode of Shanghai 2010
World Expo**

Degree: **Master of Science in International Transport and Logistics**

The World Expo begins in the middle of 19th century, having a history of more than 100 years. Along with the progress of society and the development of economy, the scale of World Expo is expanding constantly, the function of the World Expo logistics is more and more outstanding, which is paid more and more attention by the host nations. Because this is the first time for China to host the World Expo, there is no experience of logistics operation and the logistics market of the third party in China is still undeveloped and the infrastructure is not perfect. So how to set up a scientific and high-efficient logistics operation mode is the focus for the World Expo logistics.

The dissertation concludes that the operation mode for World Expo logistics with the analysis of logistics providers' current situation and Shanghai logistics infrastructure, thus formed the system frame of the logistics operation mode for the World Expo.

The dissertation carries on research to the operation mode of the World Expo logistics from two levels. The first level is to carry on the mode of operating of serving the subject of the World Expo logistics at the management level. The method of theory combined with reality is used to draw the management level logistics operation mode that is market oriented outsourcing. With the current situation of the

environment of Chinese logistics and the related enterprises' operation level, detailed operation mode for World Expo outsourcing logistics mode—contract and subcontract modes—are further analyzed and their advantages and disadvantages are compared and risks are analyzed. The second level—technique level is used for the analysis of World Expo logistics centre operation mode. On the basis of logistics operation mode analysis and the current situation in Shanghai, making good use of existed equipment for the requirement of 2010 World Expo logistics demand is drawn. With the further analysis of demand and supply situation for logistics centre, by quantitative and qualitative method the comparison for 2 modes' advantages and disadvantages are made.

The combination of theory and practice of the dissertation and the analysis from real situation and theory help to get the operation mode for World Expo logistics. The subject for research not merely is a good reference for the practice of World Expo, but offers theoretical support for logistics operation in other fields in China.

KEYWORDS: The World Expo logistics, operation mode, location decision for World Expo logistics centre.

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LIST OF ABBREVIATIONS

DC	Distribution Centre
TNCs	Transnational Corporations
3PL	Third Party Logistics

1. Introduction

1.1 Background

The first World Expo was held in the middle of 19th century. The global event now has a history of more than a hundred years. As a large-scale exhibition activity to comprehensively show the development of politics, economy, culture, science and technology and achievements of different countries, the World Expo is called as the Olympic Games in the field of economy, science and technology, and culture. The World Expo not only shows the development of economy, science and technology, and culture and the achievements of different countries, but offers a platform for people to exchange, and popularize their technique achievements.

In 2002, Shanghai successful won the right to host the 2010 World Exposition (2010 World Expo for short). And the number of visitors of 2010 World Expo, as forecasted, will be over 70million, which will break the record. Up to May 23rd 2007, there has been 139 nations and international organizations confirmed to attend 2010 World Expo. Thus, various organizational management of 2010 World Expo, including logistics management, will be such a complicated systems engineering.

The World Expo, as the largest scale global exposition, needs a comparatively perfect logistics system for the success of the exposition. However, in China, logistics is facing quite a lot of problems: logistics is still on the starting stage and logistics personnel are scarce and high-quality lacking; logistics equipments are in a backward state and the degree of mechanization is quite low; the logistics network operation is unreasonable for unorganized scattered logistics points; among 3PL, logistics

companies and customers, there lacks cooperation; logistics equipments are not enough; the traditional warehousing and transport are facing the situation of overstock capability and unreasonably used capability; the information technology is out of date and technologies like Internet, bar code and EDI are not widely applied; logistics companies and their customers can not reasonably share information resources; the scale of logistics companies is small and companies' credibility is not high at large; the situation of redundant logistics construction and waste of logistics resources are so serious; logistics resources should be integrated and the logistics cost is very high; the advantage of intensive operation is not obvious. Therefore the World Expo logistics which is characterized by large-amount, accuracy and complication is certainly a big challenge for Chinese under-developed 3PL.

1.2 The Significance of Research

From the experience of large scale games and expositions in the world, it is quite necessary to get the logistics planning ahead of schedule so as to cope with the logistics demand on the occasion. For example, the Organizing Committee for the Games of the Atlanta Olympic set up the logistics committee which is specialized in Olympic logistics management. The Organizing Committee for the Games of the Sydney Olympic planned the Olympic logistics systematically. Now, Beijing has started the systematic management planning of logistics system for 2008 Beijing Olympic Games.

This is the first time that a long-period, large-scale and extensive-areas involved international exposition will be hold in a developing country, so taking the logistics operation mode and World Expo as the objective of study will not only be used as a good reference for the specific practice for World Expo logistics but will offer some theoretical support for the logistics operation of other large-scale international

expositions.

1.3 Literature Review

1.3.1 Literature Review on World Expo

1. Research in China

The research for World Expo is mainly from Tongji University.

There are three schools in Tongji University that study for the World Expo, which are construction and city layout school, economy management school and transport and traffic school.

Professor Keping Li estimated the visitor flow for 2010 World Expo in his article with a model (Keping Li, 2005). In the article, the visitor flow data and that of 1970 Osaka World Expo are the main resources for estimation and he drew the distribution curve for 2010 World Expo visitor flow. He also got the regulation and basic characteristics for visitor flow from Hanover Expo and Seville Expo and with some specific factors in China he estimated the visitor flow for 2010 World Expo.

Professor Dongyuan Yang, in the article *The Logistics Layout for World Expo Traffic System*, stated that the logistics system for Shanghai World Expo is supported by exhibition logistics system, materials support system in Expo Park, visitors' luggage track system and traffic system for World Expo (Dongyuan Yang, 2005).

2. International research development

The research of logistics support for some certain large-scale international activity is scarce in international literatures even comparing with national ones.

1.3.2 Literature Review for outsourcing research

1. International Research for outsourcing

The magnum opus for outsourcing research develops with the research of the whole supply-chain. For example, Clifford F. Lynch published *Logistics Outsourcing-A Management Guide* in 2000; Ram Reddy & Sabine Reddy published *Supply Chains to Virtual Integration* in 2001; Michael Milgate published *Alliances, Outsourcing, and the Lean Organization* in 2001; Angappa Gunasekaran & Yahaya Y. Yusuf published *Internetbased Enterprise Integration and Management* in 2001; in 2002 Donald J. Bowersox, David J. Closs, & M. Bixby Cooper published *Supply Chain Logistics Management*.

2. National Research for outsourcing

The research for outsourcing in China is not ample comparing to the international resources.

The research literatures for outsourcing are mainly for the concepts explanation, the reasons for outsourcing, the advantages and disadvantages for outsourcing, the risks for outsourcing, strategies and tacit. Moreover, the research for advantages and disadvantages and tacit are on the basis of long-period development strategy and long-term cooperation relationship is established. For such a temporary large-scale logistics activity, there is no special research for that.

1.4 Organization & Structure of the Dissertation

The organization of this dissertation is as follows:

Chapter 1 is the introduction of the dissertation where the background and significance of research are covered. Related literatures are arranged and analyzed and the objective for research is concluded.

Chapter 2 highlights the definition of World Expo logistics which gives the analysis and introduction to the definition, components and characteristics of World Expo logistics, thus concludes the core of the research---World Expo exposition logistics. The definition is got from management level and technique level which is the basis for further study.

Chapter 3 elaborates the operational mode for the principal part of World Expo logistics mainly from the management level. In this chapter, the types and characteristics of the principal part of logistics operational mode are introduced. Then combined with the characteristics of Shanghai World Expo, the operational mode for the principal part of World Expo logistics is decided, which is market oriented outsourcing; further analysis for general contract and subcontract and risk analysis for operational process are made with the preventive measures brought forward.

Chapter 4 proposes the operation of World Expo logistics center mainly from the technical level analysis of World Expo logistics operational mode. Firstly the definition and function of World Expo logistics center is introduced. With the analyzed result of operational mode from Chapter 3, the analysis for the location of World Expo logistics center is based on the market-oriented operational mode for World Expo logistics center; then, with the logistics infrastructure situation in Shanghai and the layout of pavilions for 2010 World Expo, the model for location decision is built. Finally, comparison from cost, advantages and disadvantages between two results are made.

Chapter 5 is the conclusion.

The structure of the dissertation is displayed in figure 1-1.

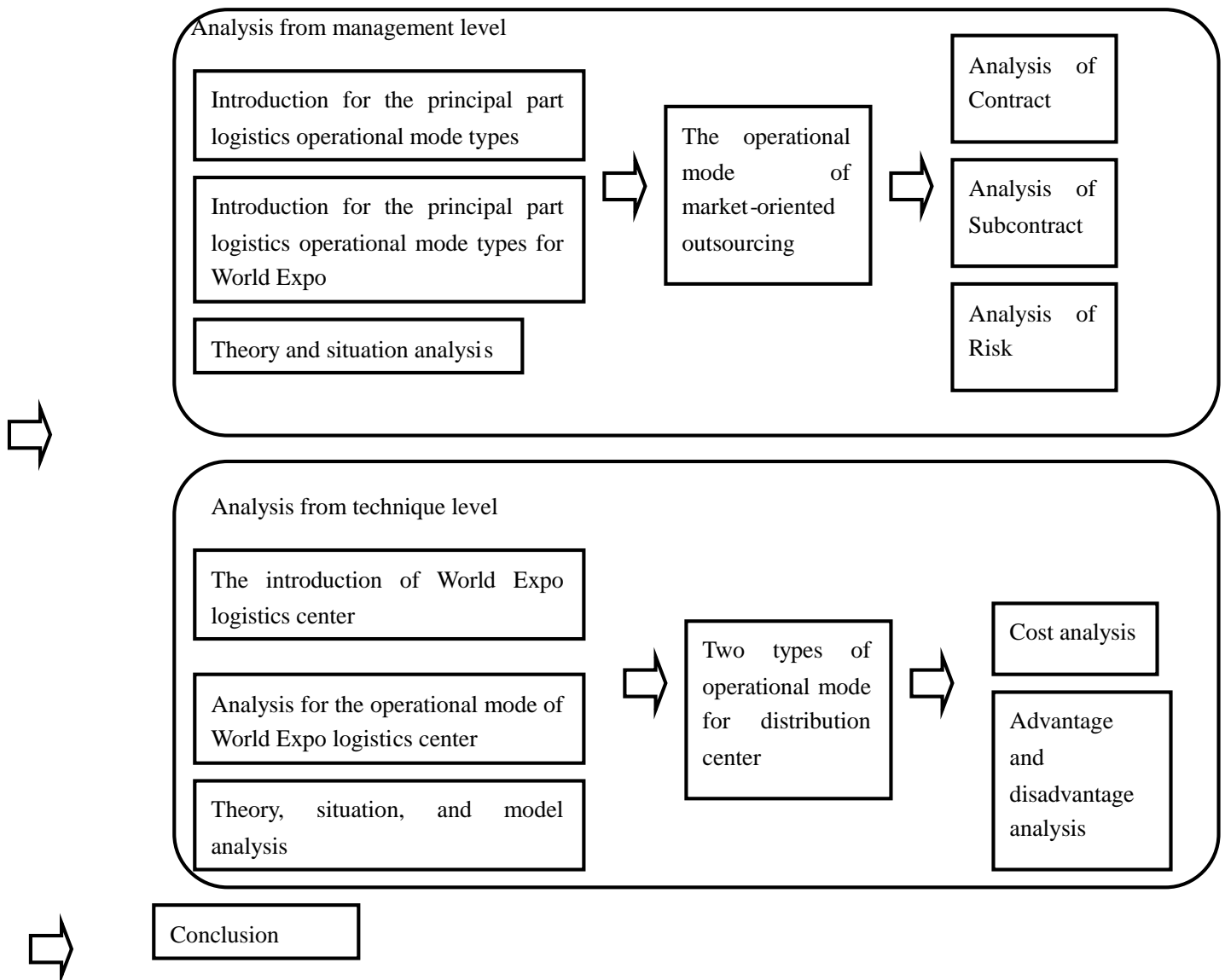
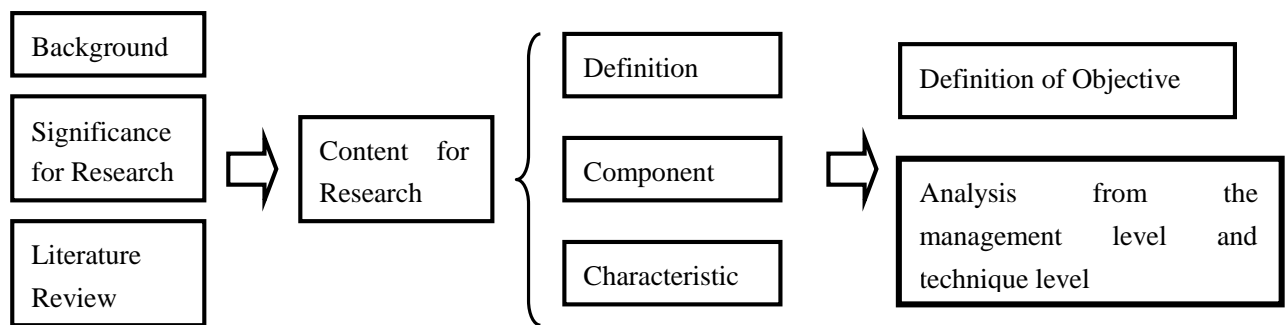


Figure 1.1 - Structure of the Dissertation

2. The Definition and Types of World Expo Logistics

2.1 The Basic Concept of World Expo Logistics

2.1.1 The Definition of World Expo Logistics

World Expo logistics is the process of the physical flow of the large amount of goods for the purpose of holding World Exposition (including exhibits, commodities, luggage and castoff) from the suppliers to the demanders. Meanwhile, the physical flow of the exhibits for the World Expo and the exchange of information also exist. According to the demand of World Expo, basic functions such as transportation, warehousing, discharging and transition, packing, processing, distribution, and information transition are organically combined for serving the World Expo.

2.1.2 The Composing of World Expo Logistics

1. To classify from the perspective of exposition

World Expo logistics can be classified into World Expo logistics and non-World Expo logistics from the perspective of exposition.

(1) World Expo logistics

World Expo logistics is the logistics activities that are occurred because of the holding of World Expo and have direct relationship with the World Expo, which includes the following matters:

- a) Exhibits logistics. The exhibits will be moved into different pavilions before the opening of World Expo; when the World Expo is over, the exhibits will be transported out of the host nation and part of the exhibits that will be sold in the host nation should conducted import procedures.

- b) Pavilion establishment logistics. Pavilion establishment will be moved into the pavilion for installation and commissioning before the opening of the World Expo; when the World Expo is over, establishment like this will be removed, reclaimed or abandoned.
- c) Park logistics. The logistics activities in the World Expo park are for the purpose of ensuring the providing logistics of expo park materials to meet the demand from exhibitors, staff, and visitors. Meanwhile, the activities also include those for the purpose of ensuring the distribution logistics of materials for pavilion sets, for the building of pavilion, and for maintenance.
- d) Vein logistics. The green logistics for expo construction waste, garbage from the visitors, and waste in the park; the waste will be reclaimed or abandoned.
- e) Luggage logistics. It is the distribution and transition of visitors' unaccompanied baggage between the external transport hub (airport, bus station) and various hotels.
- f) Other World Expo logistics. This includes the logistics activities that occurred because of the expo but not mentioned in the above activities, and other unexpected activities.

(2) Non-World Expo logistics

Non-World Expo logistics is the logistics activities that don't have direct relationship with the World Expo, which includes the following matters:

- a) The logistics activities for the goods that is necessary for the journalists, government representatives, volunteers and expo staff. This kind of logistics

activities should be organized according to the real situation, for example, this kind of goods should be moved into the pavilion at the real time and should be reclaimed, abandoned, or returned back after the consumption.

- b) The logistics activities that happen for the national and international visitors who are attending the exhibition, living for the life, and traveling. According to the real situation, logistics services should be provided.
- c) Logistics that served for people's life and for the commerce. In the periods before and after the World Expo, this kind of logistics activities occur because of the citizen's life activities and the national and international visitors' tourism activities.
- d) Other non-World Expo logistics. During the World Expo, other non-World Expo logistics include those activities that are not mentioned in the above and other unexpected non-World Expo logistics.

2. To classify from the perspective of time period

World Expo logistics can be classified into pre-expo logistics, amid-expo logistics and post-expo logistics according to the time period.

- 1) Pre-expo logistics is the logistics activities for ensuring the World Expo to be successfully hosted within the scheduled time, which include the warehousing and transportation of pavilion construction materials, infrastructure, and other materials for the construction of Expo Park.
- 2) Amid-expo logistics is the logistics activities that occur because of the host of

World Expo for the purpose of providing the logistics guarantee for the World Expo. This part of logistics activities are with high-level of uncertainty and high-level of service.

- 3) Post-expo logistics are the activities for ensuring the further reutilization after the expo, which include waste logistics activity for exhibits. This is a reverse process for the pre-expo logistics. However, for its short-period and urgency, high-level logistics service is required.

3. To classify from the perspective of zone

The World Expo logistics can be classified into expo park logistics, host city logistics and host nation logistics and international logistics.

- 1) Expo park logistics refers to the logistics activities that happen in the pavilions and Expo Park.
- 2) Host city logistics refers to the logistics activities that happen in the host city in the periods of preparation, holding and after-holding. It is the logistics activities that include living, producing, trading and tourism logistics in the period of the holding of World Expo.
- 3) International logistics refers to the transnational logistics activities of import and exhibits reverse for the World Expo. As the World Expo is an international event, large number of government officials, visitors, journalists will attend the expo. Thus the international logistics activity is inevitable. The good coordination of each activity in the international logistics and the guarantee for the effective, convenient, safe and orderly international logistics operation are what the

organizer has to face up.

4. To classify from the perspective of services function

The World Expo logistics activities can be classified into production logistics, supply logistics, sales logistics and reutilization logistics according to different services functions.

- (1) Production logistics refers to the logistics activities for guaranteeing the production activities for the holding of World Expo, such as the logistics activities for pavilion establishment, and life articles.
- (2) Supply logistics refers to the logistics activities for guaranteeing the supply for the holding of World Expo, such as the logistics activities for Expo Park supply, and supply for living materials.
- (3) Sales logistics refers to the logistics activities for guaranteeing the sales activities in the Expo Park, in the city, and in the country and out of the country.
- (4) Reutilization logistics refers to the logistics activities for guaranteeing the reverse, and reutilization of the waste in the Expo Park and of the exhibits after the holding of the expo.

2.2 The Characteristics of World Expo Logistics

2.2.1 The Safety for the principal part of World Expo logistics

The principal part of the World Expo logistics demand--the exhibits, the equipments of the pavilions, and living materials, is the key part, which has high-level safety requirement. The amount of the exhibits should be perfectly exact and the exhibits

proper should not be slightly damaged. What's more, strict safety measures should be taken. Meanwhile, the safety measures for the equipments installation and debugging should also be paid great attention.

The exhibits for World Expo are mainly from abroad. For the particularity of the exhibits, it is quite difficult to get the substitutes for those damaged substitutes, which will certainly affect the holding of the expo.

Therefore, the service provider for World Expo logistics must guarantee the safety of the goods in the process of logistics.

2.2.2 The Diversity for the Objective Part of World Expo Logistics

As the World Expo is an international event, the amount of the attending nations and regions will be the largest in the world and the visitors will be from different countries, and nationalities, with different cultures and ages. The diversity for the objective part of the expo is a necessary part for the logistics service provider to take into consideration. The following table shows the number of nations and visitors for the past World Expos:

Table 2-1 The amount of nations and visitors for the past World Expos

Year	World Expo	Amount for nations and visitors
1970	Osaka World Expo	77 nations, 4 international organizations, and 10 Japanese administration offices 64.21 million visitors
1986	Vancouver World Expo	More than 100 nations and organizations 22.11 million visitors

1992	Seville Expo	World	112 nations and regions, 23 international organizations, 17 Spain's autonomous regions, and 7 TNCs 41.81 million visitors
1993	Daejeon Expo	World	14 million visitors
1998	Lisbon Expo	World	144 nations and 160 international organizations
2000	Hanover Expo	World	173 nations, regions and international organizations 18 million visitors
2005	Aichi World Expo		120 nations and international organizations 22 million visitors

As forecasted, the 2010 Shanghai World Expo will have more than 70 million visitors and up to May 23rd 2007 there has already been 139 nations and international organizations confirmed to attend the 2010 World Expo. The logistics service provider for World Expo must satisfy the logistics demand from exhibitors and visitors coming from different countries and having different cultures.

2.2.3 The stages of World Expo logistics

The World Expo logistics can be classified into 3 stages: preparation stage for pre-expo, supply stage for amid-expo, and reclaim stage for post-expo. The characteristic for different stage's demand is described as follows.

1. The preparation stage for pre-expo

(1) The stage for the planning of logistics net

The preparation for World Expo includes the perfection with the environmental

changes, the planning of logistics net, and infrastructures, the adjustment of logistics system, and the updating of logistics process. This stage is a big investment project. The planning for strategy and layout for the logistics and the construction for the infrastructure play a basic role for the success of the World Expo logistics activity.

(2) The stage for the transportation and assembly of pavilion equipment

In this stage, a great amount of materials, including pavilion equipment, and exhibits will be transported to the World Expo logistic center, pavilions and other related places. The logistics activity in this stage is of high strength. From the perspective of logistics, this stage not only is important to the preparation work of expo, but also requires very detailed planning and coordination. Logistics staff will have a relatively busy work then.

2. The supply stage for amid-expo

The supply stage is the period of amid-expo, which lasts for 6 months. During this period, the exhibits logistics almost doesn't occur but logistics activity is mainly for the high-frequency living materials. In this stage, logistics activity is of high-uncertainty. Thus adjustment with the change of environment is very important for meeting the needs of World Expo logistics.

3. The stage for reclaim of post-expo

In the reclaim stage, the pavilion equipment and most exhibits will be removed, or returned back to the participating nations. The workload for this stage is almost the same as that for the first stage. Actually, this stage is a reverse process for the establishment stage. The key for the operation in this stage is track, and control for the purpose of safety reclaim of the assets.

2.2.4 The concentricity for logistics space

For 2010 World Expo, the location of the Expo Park is selected in the central area alongside the banks of Huangpu River. This area is from Nanpu Bridge to Lupu Bridge, covering 5.28 km². During the World Expo, related logistics services for expo logistics may occur in this area.

2.2.5 The complication for logistics demand

From the above analysis for the composing of World Expo logistics, the World Expo logistics has a wide range and the main activity, key point and detailed requirement for the logistics demand with different types and in different stages are certainly not the same. Thus the demand for expo logistics is quite complicated. Therefore, the World Expo logistics service provider must provide the World Expo with different kinds of services to meet the requirements.

1. The demand for World Expo logistics is huge

The World Expo is an international event that attracts the world attention and the amount of participating nations and visitors is the biggest in the world. As forecasted, the visitors for 2010 World Expo will be over 70 million. And up to May 23rd 2007, there has been 139 nations and international organizations confirmed to attend the expo. The demand for logistics service then must be extremely huge.

2. The demand for expo logistics is unexpected suddenly

Apart from the construction logistics for World Expo infrastructure and the exhibits logistics, other logistics demand only exist during the expo and before the expo and after the expo, the period of which is limited. This also brings sudden pressure for the logistics system of the host city. At the same time, the logistics providers for the

World Expo are required to have the capability to cope with large amount of logistics activity in a short period.

3. The uncertainty for World Expo logistics demand

Because of the variety of services for the World Expo logistics and the complication of expo logistics, the demand for World Expo logistics is of high-uncertainty. During the World Expo, a lot of accidents related to the logistics will happen and these accidents need be solved as soon as possible. During the World Expo, it is very difficult for the logistics organizers to get the planning of the logistics activity because they have to have a good command of basic planning method and capability and have a comprehensive consideration about the different situation for the failure of plan.

2.3 Problem formulation

The core of the World Expo is exhibition, thus the core problem for World Expo logistics is World Expo exhibition logistics. The World Expo exhibition logistics has a great impact on the success and safety for the host of the World Expo. For those non-World Expo exhibition logistics, like tourists' business logistics, citizen's living logistics is offered by the logistics companies that scattered in the World Expo Park. There are many logistics companies like this in Shanghai and their service form has been developed. From the perspective of World Expo pavilions areas, the main activities of World Expo are in the Expo Park and the logistics demand in other areas is comparative small and simple, so this will not be discussed here. In summary, the research object in this dissertation is the exposition logistics in the Expo Park for the host city Shanghai.

The research for the logistics operation mode in this dissertation is conducted from

two levels: the management level and technique level, i.e. the research of logistics operation mode for the principal part of World Expo on the basis of management level and the research of logistics operation mode for the World Expo logistics centre on the basis of technique level. Figure 2-1 shows the research content.

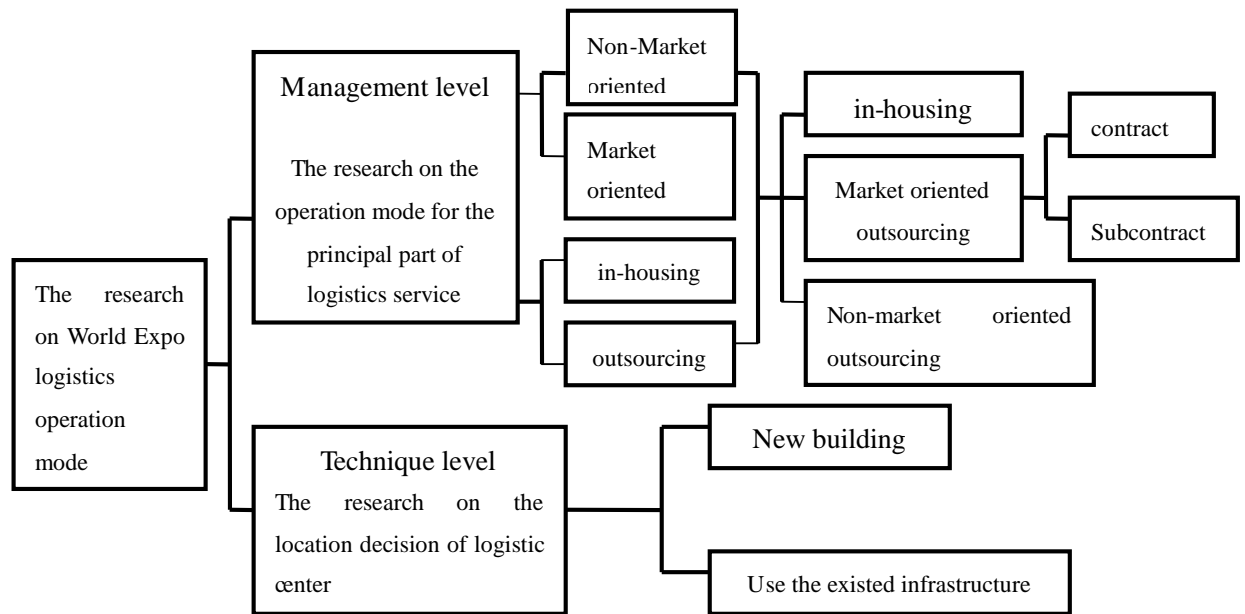


Figure 2-1 Research Content Structure

3. The Analysis of the Operation Mode for the Principal Part of World Expo Logistics Service

The World Expo is the largest scale event in the world and the participating nations and visitors are much more than other expositions. Thus, for China which never hosted the World Expo, the organization and management for the World Expo logistics is a extremely complicated system engineering. Though the World Expo logistics is characterized by time-convergence and space-unexpectation, the essence of the World Expo logistics is logistics activity, which is large-scale high quality logistics activity characterized by temporary, and having stages. Therefore, in order to do the research of World Expo logistics operation mode, several modern logistics operation modes will be introduced.

3.1 The types and characteristics of the operation mode for the principal part of logistics services

The logistics operation mode is the systematic method applied in the logistics operation process of company. It exchanges the resources like personnel, capitals, materials and information into products and services that the market and corporation need with high quality, low cost and rapid speed. According to different classifications, the logistics operation mode can have different composing.

3.1.1 To classify the operation mode into in-housing and outsourcing from the perspective of principal part of operation

1. In-housing

In-housing refers to the process for the manufactures using their own logistics resources and advanced logistics management system and technology to continuously optimize the logistics operation, i.e. “self-sufficiency” way of self-providing.

The biggest advantage of in-housing is the reutilization of the existed resources of the corporation. Manufactures can conduct the operation (like the planning of transport time, the selection of transport mode) with their own willingness, and they can have an effective inspect for the whole process of the logistics operation, which saves the time for the selection and inspection of logistics provider. While, the biggest disadvantage of in-housing is that large amount of capitals should be put into the construction of fixed assets, the purchasing and maintenance of equipment. What's more, professional logistics technicians are necessary. Thus, it can be concluded that the premise for corporations to choose in-housing mode is that the relevance between the corporation's logistics business and the core business is relatively close and the corporation should have the necessary resources for logistics operation, including hardware, location and equipment, software, professional logistics technician and information technology.

2. Outsourcing

Outsourcing refers to the way of “external commission”, that is the corporation commits part of its logistics service or its whole logistics service to the professional 3PL. The manufactures choose to commits their own logistics activity to the professional logistics service provider through the contract so as to focus on their main business, and they keep close contact with the logistics provider with information system for the purpose of managing and controlling the whole process of logistics.

The main reasons for corporations to outsource their logistics business are as follows;

- (1) To make good use of the resources that the corporation doesn't possess

If the corporation doesn't have the necessary resources (including cashes, logistics technology, logistics equipment) for the effective logistics business which is the indispensable business for the operation, the corporation will outsource the logistics part. This is also the reason for the corporation to outsource temporary and periodical logistics business.

(2) Spread the risks

As the resources owned by the corporation is limited and the lack of experience, the corporation can spread their risks from economy, market and finance through outsourcing. Thus the corporation will become more flexible and adaptable for the changing external environment.

(3) Reduce and control the operation cost

A lot of external resources providers have more effective, more inexpensive technology and knowledge to conduct the business than the corporation owned, and such providers are willing to make profits through this way. Therefore, the corporation can save the huge capitals to be put on the logistics technology, equipment, and information system research.

(4) This helps the corporation to release the resources being used for the non-main business so as to focus on the development of core business.

In the process of operation, every corporation will face the problem of limited resources. If the corporation outsource some operational work to the professional personnel in the service provider, it can readjust the distribution of its resources (in most occasion is human resource). The corporation will transfer their business from non-main business to core business or more value-added business, which helps the corporation to focus on their advantageous business to meet the requirements from

customers.

(5) Balance the requirement of capitals

Outsourcing can directly reduce the capitals in the non-main business. The operation fees occur step by step according to the practical use of the services, thus the big amount of capital input is replaced and the burden of the corporation finance is eased.

3.1.2 To classify the operation mode into market oriented and non-market oriented from the perspective of the way of resources allocation

Generally speaking, in a certain period and range, the resources in the society can be used is limited. People have to make the arrangement of how to use the resources to meet their various necessary. The process is called resources allocation.

(1) Market oriented mode

Market oriented mode refers to allocate the social resources through the market. The main characteristics are: equality, competitiveness, legality, and open.

(2) Non-market oriented mode

Non-market oriented mode refers to the operation mode of resources allocation not through the market instrument, such as planning, administrative orders and law. With this mode, the principal participants don't operate according to the market law, which doesn't meet the law of the market and is not good for the optimization of resources allocation in the whole market. The situation of high cost and low efficiency will occur.

3.2 The analysis for operation mode of the principal part of World Expo logistics services

From the above analysis of the logistics operation mode, there are 3 main operation modes in the World Expo logistics: in-housing, non-market oriented outsourcing and market oriented outsourcing.

Firstly, in-housing mode refers to the operation mode that the World Expo organization committee will recruit large number of logistics staff, purchase large amount of logistics equipments, construct large amount of logistics establishment to meet the World Expo logistics needs. In this operation mode, the World Expo organization committee will cost quite a lot for the operation of logistics, which is of high cost and low efficiency.

Secondly, non-market oriented outsourcing mode refers to the operation mode that the World Expo organization committee will appoint the exact logistics service provider to conduct the logistics activity. In this mode, though the World Expo organization committee takes advantages of professional logistics provider to conduct the logistics activity, the service provider is not selected in the market but is appointed by the government according to the logistics demand. Randomicity exists here, thus the situation of low efficiency and high cost also occurs.

Thirdly, market oriented outsourcing mode refers to the operation mode that the World Expo organization committee will appoint the logistics service provider through the market. In this mode, the logistics service provider is selected by the way of bidding, which is good for the optimization of market resources, promoting the operation efficiency and reducing the cost.

3.2.1 Theoretical analysis

According to the theory of core capability, in the economy organization, the

corporation can only use the logistics resources for various purposes, which is scarce, difficult to imitated, valuable, and able to be extended core capability. If the logistics resources and capability of a corporation cannot meet the corporation and customers' needs, outsourcing should not be applied and the corporation should operate the logistics activity by itself. Otherwise, the corporation should outsource the logistics activity and apply 3PL for the operation.

The World Expo organization committee conducts the planning and management of the whole World Expo logistics system. As a governmental organization, it lacks the professional logistics equipments for World Expo and lacks the professional World Expo logistics personnel. Thus, only with the government and the World Expo organization committee, it is difficult to achieve the best effect for the logistics operation and management.

What's more, with the resources base theory, only under the situation that logistics has got the strategic value and has gained correspondent logistics operation resources, the corporation can take the in-housing logistics operation. Otherwise, no matter how many logistics resources it owned, with the situation that logistics resources are not the heterogeneity resources and core capability and the logistics is with low strategic value, the corporation should outsource the logistics activity.

As for the World Expo organization committee, logistics resources like logistics equipments, professional personnel, and logistics center for meeting the demand of World Expo logistics are not existed. The recruitment of professional personnel and purchase of logistics equipment is not reasonable for such a temporary and periodical logistics activity.

In China, the development of 3PL is so rapid. The number of 3PL is not small and abroad logistics service providers are popular now. Logistics equipment, tools, and personnel from all these logistics service providers are quite enough for the World Expo logistics operation. Thus, the World Expo organization committee can completely take advantage of the professional personnel and services from 3PL for the logistics operation so as to achieve the result of reasonable and effective social resources allocation. Theoretically speaking, the perfect operation mode for World Expo logistics to take is outsourcing.

3.2.2 Analysis for Shanghai World Expo logistics operation

The World Expo lasts for 6 months, which is a short period activity. And the World Expo logistics activity is complicated and needs modern logistics technology for the operation. Therefore, in the circumstance of limited technology, human resources and materials, the outsourcing of expo logistics with high quality technology is not only feasible but also has unique advantages. The World Expo is not an independent closed system, and it exists in a developed business society, so the exchange of various materials and energy with this business society is inevitable. To this extent, the World Expo is not only a large-scale exposition, but a great business event as well. So the World Expo logistics operation mode is decided by the social environment and the characteristics of the World Expo to be the logistics market oriented outsourcing mode. Therefore, the research for the World Expo logistics service operation mode is transferred into the research for the contract and subcontract on the basis of market oriented outsourcing mode.

3.3 Research of contract and subcontract

3.3.1 The analysis of World Expo contract mode

The World Expo contract mode refers to outsourcing the World Expo logistics activity to only one logistics service provider.

Advantages: as for the World Expo organization committee, it is convenient for the communication and management; as for the logistics service provider, the internal communication and coordination is easy to be conducted and the service provider is convenient to frame the internal structure for unified management and control. Meanwhile, it is much more convenient to conduct the whole logistics system in a macro way, thus facilitate the whole efficiency of the World Expo logistics.

Disadvantages: as for the World Expo organization committee, outsourcing the logistics service to one provider is risky and is not good for the control of the logistics provider, and the cost might be high; as for the logistics provider, the requirement for the comprehensive logistics service level is relatively high. Different logistics providers must have their different advantages and their professional degree must be various. Thus, the whole efficiency of contract mode doesn't mean that every aspects of the whole system have the highest efficiency and the optimized allocation.

The World Expo logistics contract mode can be classified into the following types: international logistics provider contract mode, domestic logistics provider contract mode, and domestic and international logistics provider cooperation contract mode.

1. The analysis of international logistics provider contract mode

International logistics provider contract mode refers to the World Expo logistics operation mode conducted by one or several international logistics service providers which integrated as a whole.

After China entered into the WTO, the logistics field is on the process of opening and aspects like market access have been opened greatly. Because of the huge logistics market and develop space in China, international logistics companies all favor the Chinese logistics market. Now there has been some large scale international logistics companies entering the Chinese logistics market and competing with the domestic logistics providers. These companies include UPS, FedEx, DHL, Maersk, TNT and extra. For those worldwide known international logistics companies that not entered into the Chinese logistics market have already prepared for competing with the existed providers in China.

Foreign capital logistics companies have a strong abroad network, abundant logistics knowledge and logistics operation experience, and good corporation relationship with international logistics customers. These companies can get the capital support from their parent company and they will provide the customers with comprehensive and trans-regional services. However, these foreign capital logistics companies don't have perfect network system in China, thus they cannot satisfy the requirement of local network set from the World Expo logistics. On the other hand, the World Expo has its unique culture characteristics. Those foreign capital logistics companies should take the planning of local development and quickening the web layout in the Chinese logistics market so as to be the World Expo contract for logistics services.

The advantages of this kind of mode is that using the excellent abroad networks, abundant logistics knowledge and logistics operation experience, and rich capitals from those foreign capital logistics companies will support to achieve the excellent service level for World Expo.

2. The analysis of domestic logistics provider contract mode

The domestic logistics provider contract mode consists of one or more domestic logistics providers to form an integrated entity that can provide the services for World Expo.

(1) Introduction of domestic logistics service providers

At present, the development of 3PL in China is still in the early stage. With the penetration of logistics logos, more and more enterprises pay attention to outsourcing services, which may provide the possibility and market opportunity for the development of 3PL. In the past few years, the growth of 3PL provider is so rapid. More than 70% logistics providers increase more than 30% in 3 years from 2000. For some of them, the revenue is increased tremendously. The market pattern also has changed a lot. So there are three types of logistics providers:

a. Traditional transport and warehousing enterprises

The existing logistics enterprises in China are mainly transferred from the traditional transport and warehousing companies. So there is the absolute proportional advantage in quantity. These enterprises mostly are the state-owned ones, and often possess relative large-scale transport and warehousing assets. While, there are some shortcomings of them. They are the redundant employees, the inefficient operation, the neglect of customer resources and service performance, and the deficiency of flexibility. These enterprises can be divided into two categories: the regional transport-warehousing company and the national logistics group.

The regional commercial transport-warehousing company often depends on original warehousing system, which can provide the regional basic logistics services and

partial value-added services. While, this kind of logistics enterprises still operate on their own; the cooperation don't have close relationship with other logistics enterprises, which can not form the logistics network. The equipment is also out-of-date. And because of the system problems, most enterprises shoulder the heavy burden. The service items are the traditional, independent basic operation, so the important competitive advantage is the low-cost logistics service.

The national logistics groups mainly include COSCO, SINOTRANS, China Shipping Logistics, China Post, China Railway Logistics, and China Merchants Logistics etc. Due to the large scale, sufficient capitals, improved logistics infrastructure and the powerful competitiveness, these enterprises play the monopoly or leading role in relative industry field. Because the regional subsidiary company is independent accounting, most of customers can not engage into the comprehensive cooperation and the integrated coordination. Furthermore, the logistics service price is high, which impose the negative influence on the competitiveness.

b. The emerging logistics enterprises

The emerging logistics enterprises are mainly the individually-running logistics enterprises. The operation, service region and the services are relatively concentrated. With the efficient service performance, the growth of them is very rapid. The shortcomings of the emerging logistics enterprise include insufficient capital resources, the deficiency of service performance, logistics management, and the application of technology and information. Also, there is no powerful capital support for them. The representative ones are BaoSteel Logistics, South Logistics, Datian Logistics, ZJS Express and so on. The orientation of them is providing the professional logistics service, and for the aspects of operation scale, equipment investment and the price, having the competitive power compared with the large 3PL

providers. Then, they should have the good adaptability and flexibility in the regional logistics market.

c. The logistics enterprise and logistics department established by the business enterprise

Many large-scale manufacturing industry enterprises extend their operation scope to the circulation field, build professional logistics companies, improve their own logistics system and then develop into the 3PL gradually. Qingdao Haier, Little Swan and GM are the typical ones. At the same time, there are also some business enterprises to establish internal logistics department, extend their functions to the socialized service and develop 3PL, such as Shanghai Bailian Logistics and Beijing Wu Mart Logistics. These enterprises mainly provide the service to internal customers. Although the capital is limited, the network cover focus on the customer is perfect. Unfortunately, due to the limitation of scale, strength, capital and the service scope, it is difficult for these enterprises to attract more external customers.

3. The analysis of international and domestic logistics provider cooperation contract mode¹

The international and domestic logistics provider cooperation contract mode refers to the logistics service provided by domestic and foreign logistics companies that integrated as a whole.

Now in the Chinese logistics market, international and domestic logistics providers have their own characteristics, which are showed as follows:

(1) Now Chinese 3PL and foreign 3PL have focused on different aspects in the

¹ The following data are from *The 6th Supply and Demand Situation Research Report for China's Logistics*, 2005.10

process of operation. The foreign 3PL pay more attention on import and export, which account for 70% incomes; Chinese 3PL pay more attention on the domestic opportunities, which account for 88% incomes.

Table 3-1 The incomes percentage of import, export and domestic logistics

	Chinese logistics service providers	Foreign logistics service providers
import	5%	11%
export	7%	58%
Domestic logisitics	88%	31%

(2) Because of the lack of abroad network support, Chinese 3PL pay more attention on the domestic opportunities. As the case study shows, 56% of them provide the services for foreign customers and 44% of them provide the services for Chinese customers. While foreign 3PL pay more attention to the VIPs in China, so 88% of their customers are foreign customers like foreign-owned enterprises or sino-foreign joint ventures.

Table 3-2 Incomes percentages classified according to the customers

	All the 3PL providers	Chinese 3PL providers	Foreign 3PL providers
Domestic customers	33%	4%	2%
Foreign customers	67%	56%	98%

(3) About 30% customers, especially those TNCs, prefer to outsource to the foreign 3PL providers. While more than 20% customers, especially those Chinese customers, prefer to outsource to the domestic 3PL providers. Their selection criteria is shown in Figure 3-1

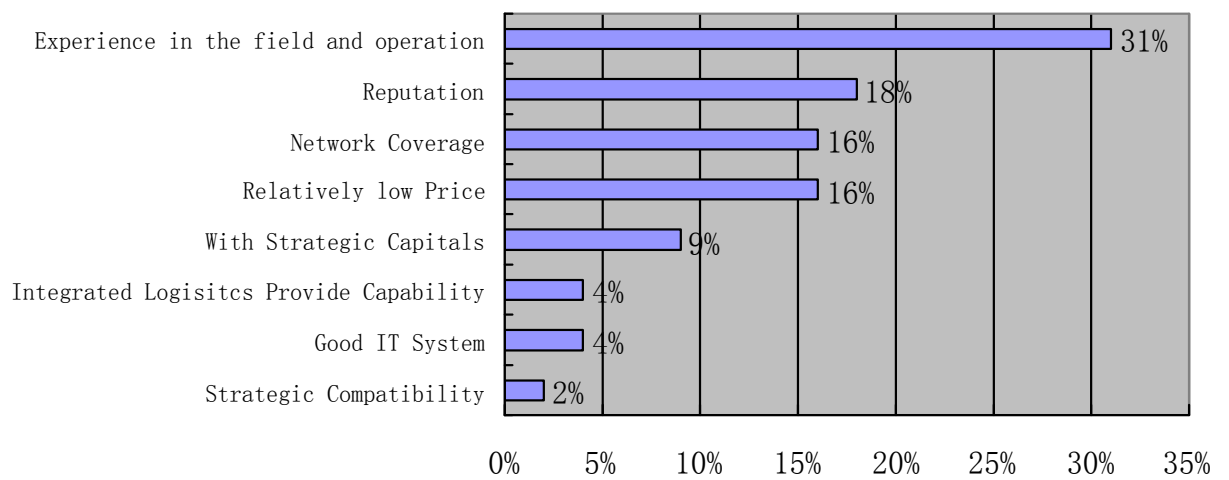


Figure 3-1 Criteria for the choice of 3PL providers

(4) The comparison for the advantages between Chinese and foreign logistics providers

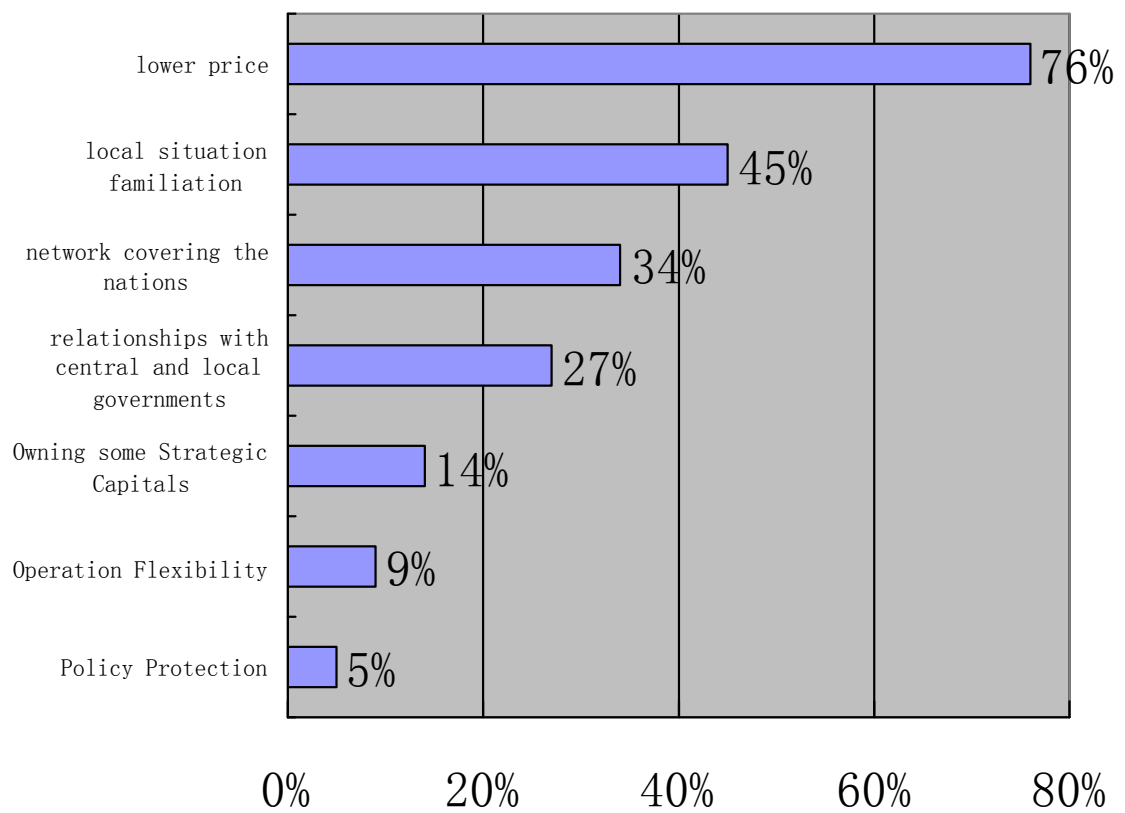


Figure 3-2 The advantages of Chinese providers

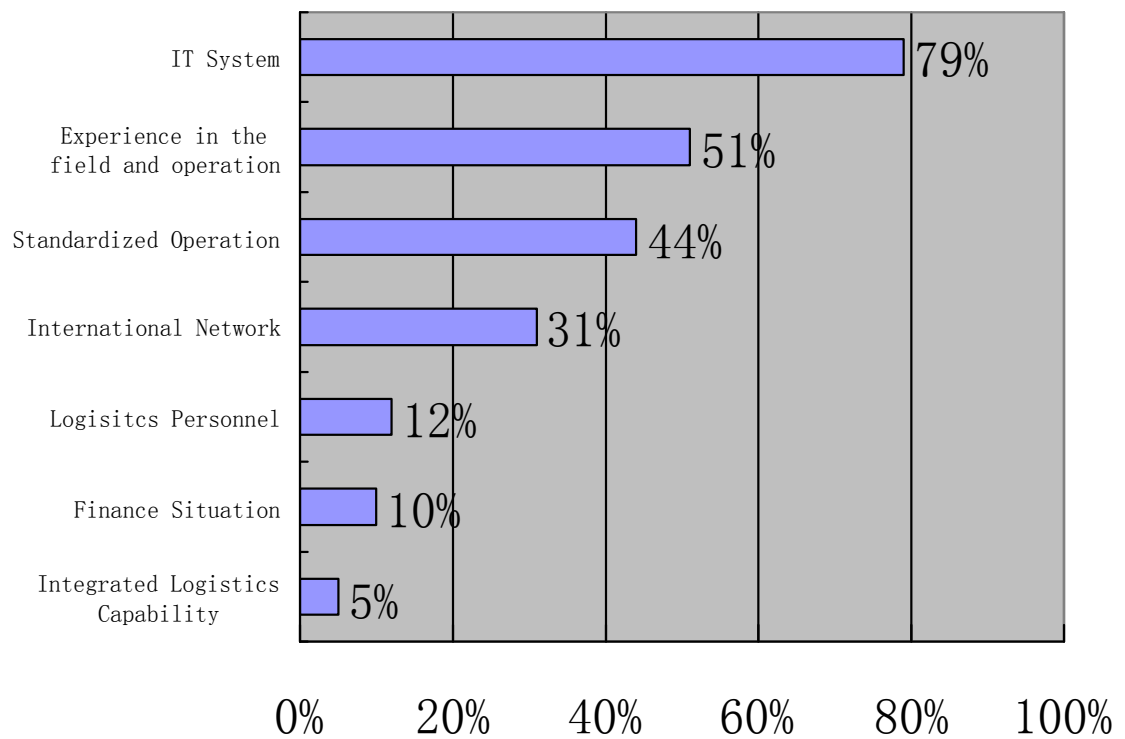


Figure 3-3 The advantages of Foreign providers

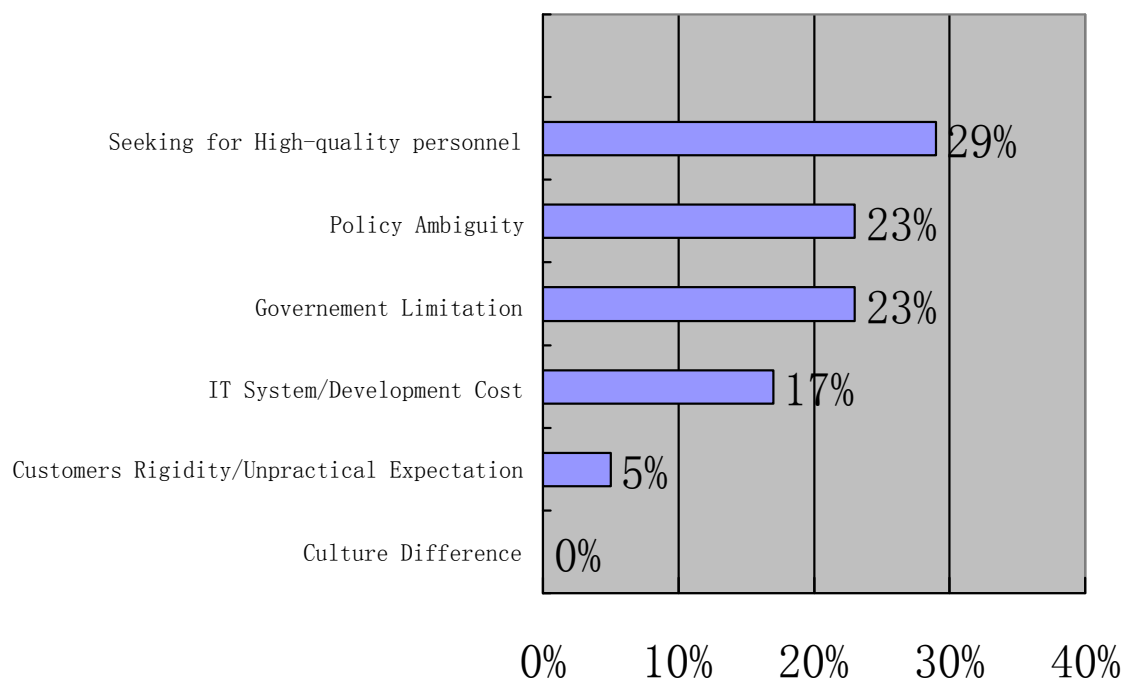


Figure 3-4 The challenges for domestic providers

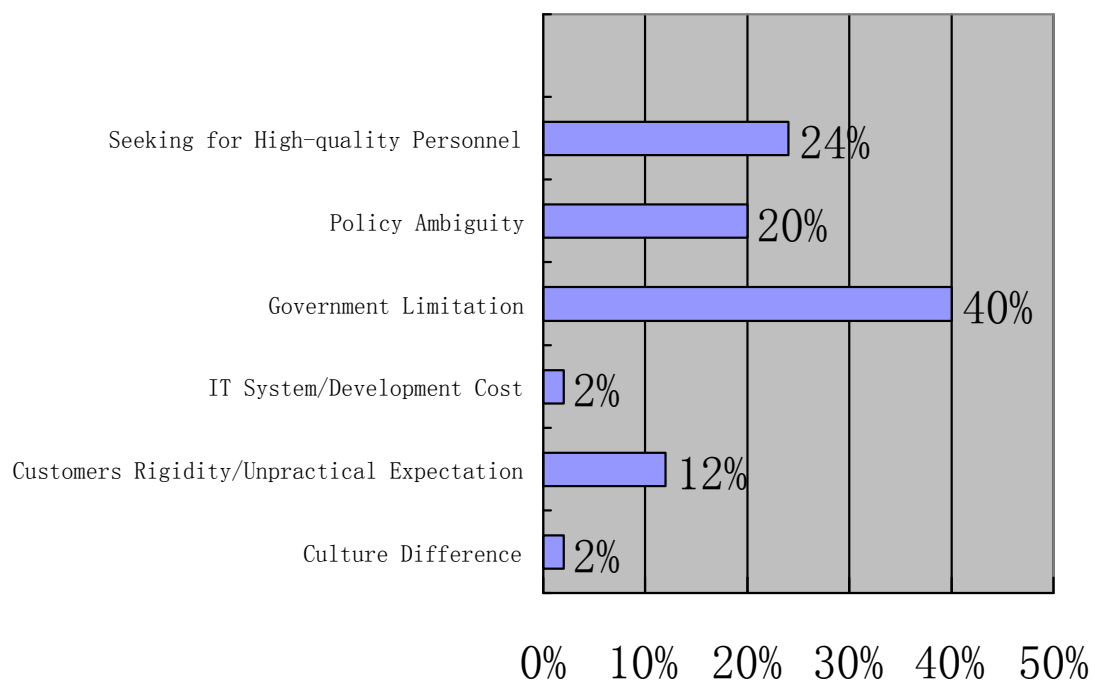


Figure 3-5 The challenges for foreign providers

From the above analysis, domestic and foreign 3PL providers focus on different aspects and with different advantages. Applying the international and domestic logistics provider cooperation contract mode can exert the advantages of Chinese 3PL providers like cost, local experience and domestic network and on the other hand the advantages of foreign 3PL providers in the fields of IT system, logistics field and professional experience can be perfectly exerted. By the complementariness of capabilities and effective coordination, customers' needs will be effectively meted. The disadvantage for this mode is that the culture difference between the logistics providers might add the cost for communication.

3.3.2 The analysis for World Expo logistics subcontract mode

The World Expo logistics subcontract mode refers to subcontracting the World Expo logistics services to different logistics providers according to some certain standard.

Advantages: The subcontract mode will offers the World Expo organization committee stronger control for the logistics providers because the logistics activities are separately provided and their impact is relatively small; as for the logistics service providers, the subcontract mode can well take the advantages of different logistics providers.

Disadvantages: As for the World Expo organization committee, the definition of different subcontractors' responsibility should be clearly made. For the increasing of the subcontractors, the organization committee has to take more efforts to coordinate among them; as for the logistics service providers, the communication among them is very difficult because each subcontractor is an individual interest entity.

In common, the World Expo logistics subcontract mode can be classified into the

following types: foreign logistics provider subcontract mode, domestic logistics provider subcontract mode, domestic and foreign logistics provider subcontract mode. The selection criteria for the logistics service provide for subcontract mode is the same as that of that of the contract mode. The subcontract mode can be regarded as a special case for the united contract mode of logistics corporations. While the subcontract mode is a loose alliance, the united contract mode is a close alliance.

3.4 The Risks Prevention of World Expo Logistics Operation

Because of the complication of World Expo logistics system, various risks in the operation of World Expo logistics is inevitably exist. Thus, the prevention of World Expo logistics risks is necessary for the success of the host of World Expo. According to the above analysis of Shanghai World Expo logistics, the 3PL operation mode will be applied. So the risks prevention for the World Expo logistics operation is mainly for the risks prevention for 3PL operation.

3.4.1 Different Types of Risks in the Operation of 3PL

The causes of the risks for the operation of 3PL are various. They might be the nature disasters like earthquake and fire; they also might be man-made causes like loss and mistakes. To be specific, the causes are shown as follows:

1. The Risk from Providing Logistics Plan

In the World Expo logistics system, because of the safety requirement of the principal part of World Expo logistics, the diversity of the objective part, the different logistics stages and the complication for the World Expo logistics demand, it is necessary for the 3PL to make the logistics operation plan especially for World Expo logistics, to classify the different demand of the principal part, to decide the demand

model according to the characteristics in different logistics stages, to design the logistics operation plan according to various demand models, and to take full consideration for the failure of plan. If it is testified by the practice that the plan provided by the 3PL cannot achieve the expected requirement or even serious mistakes occur, 3PL should take legal response for its plan.

2. The Risk from Accidents

The operation of logistics services is always affected by accidents. In the period of the World Expo, there will be many accidents with the World Expo logistics or without the World Expo logistics and all these accidents require urgent solution. Thus, the accidents with the World Expo logistics or without the World Expo logistics will affect the effect of the logistics operation.

3. The Risk from Commodity Characteristics

Every step for logistics service is related to the commodity, thus the characteristics have close relationship with the responsibility of 3PL providers which will directly affect the degree of commodity damage risks and will lead to the claim for compensation. In World Expo logistics service, because of the specialty of World Expo, the principal part of World Expo logistics service—exhibits and living materials are all the important commodities which require high level of safe requirement. Therefore, the risk for providing logistics services is so high.

4. The Risk from Property Loss

In World Expo logistics service, 3PL providers will do the work of transport, warehousing, and storage for World Expo materials. However the materials might be

damaged or lost for some unexpected and uncontrollable accidents. Even the loss of expected profit and the loss of related cost might occur.

3.4.2 The Risk Control in the Operation of 3PL

In order to prevent the risks mentioned above, it is necessary to take measures to control the 3PL providers' performance. Detailed measures in practice are as follows:

1. Control the implementation of contract

The contract of 3PL is the base for cooperation and also the basis for the World Expo organization committee to control 3PL providers. The contract normally consists of main contract and several sub-contracts. The main contract is for the purpose of defining the cooperation relationship in two parts and for the specific item sub-contract will be made in which detailed information about the cooperation styles will be set including the service content, the requirement of service indicate, rewards and punishment, the calculation for service costs, way of payment, etc. 3PL providers should in the indication of the main contract to provide logistics services according to the regulations in sub-contracts. The World Expo organization committee will inspect the service provided according to the contract.

2. Service Level Inspection

In the World Expo logistics service, the requirement for service quality like safety, veracity, and timeliness is very high. Thus the World Expo organization committee should inspect the logistics service level in real time for the purpose of taking timely measures to rescue those services that fall short of the standards.

3. Cost control

Because of the complication of World Expo logistics system and occur of unexpected accidents, planning is quite important for preventing high-cost logistics activities like urgent transport and urgent distribution from happening. For those replenishments, examine and approve from financial department is the premise for purchasing. Therefore, the purpose of cost saving can be achieved.

4. The Research of World Expo Logistics Centre Model

4.1 The Concept of World Expo Logistics Centre

Logistics centre can be called as logistics beachhead, circulation centre, distribution center and collection and distribution centre. The concept of logistics centre can be classified into macro-concept and micro-concept. The macro concept of logistics centre includes harbor, railway freight station, transport warehouse, collection centre for commodities, and the logistics equipment owned by the corporation itself. The micro concept of logistics centre doesn't include railway freight station, harbor, and other logistics infrastructure like airport establishment and roads but especially refers to the comprehensive logistics management, control and allocation organization built for the guarantee of commodity circulation. We take the micro concept here.

4.1.1 The definition of World Expo logistics centre

The World Expo logistics centre refers to the organization that realizes the adjustment of tracing service in the process from supply to consumption with the way of ordering, storing, packing, processing, distribution, transport, clearing and information management so as to meet the World Expo logistics demand

The storage of the World Expo logistics centre has 2 stages: in the World Expo logistics centre, which is an important material storing point before those pavilions can work as sub-warehouse, there is only flow-in of the materials. According to this characteristic, it can be called as "hard-warehousing"; in the other stage, pavilions can work as sub-warehouses. However, as the space for warehousing in pavilions is comparatively small, the World Expo logistics centre will distribute the materials to different pavilions and at the same time is the warehouse. This stage can be called as

“safe-warehousing”.

4.1.2 The main function of World Expo logistics centre

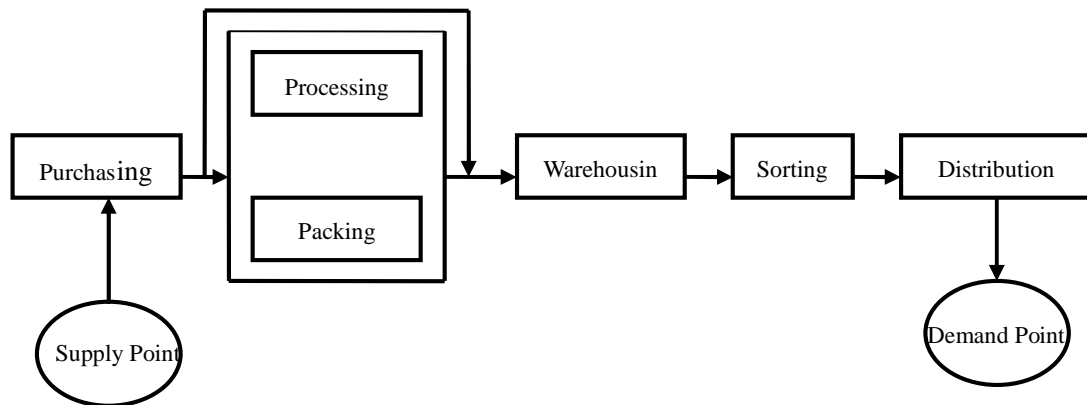


Figure 4-1 The structure for the main function of World Expo logistics centre

1. The function of collection

Collection is the basic function for the World Expo logistics centre. The expo materials have to be stored in 2 stages. The first stage is “hard-warehousing”, that is the expo materials supplied from different supply points should be gathered in the expo logistics centre and then according to the different demand in the pavilions the materials will be distributed. From the expo materials to be collected in the expo logistics centre to the period of allocation, the logistics centre works as the collection centre. In order to work as a good collection centre, the logistics centre must be equipped with warehouse equipments for the storage and preservation of different materials.

2. The function of packing

Packing is the important function of World Expo logistics centre. After the expo materials are gathered in the expo distribution centre, most of the materials will be processed and packed. Thus the efficiency of material distribution can be improved so as to ensure the punctual distribution for different pavilions.

3. The function of allocation

Allocation is the core function of World Expo logistics centre. Logistics centre is a intermediate service organization. Articles that are gathered in the logistics centre and are processed will finally be allocated according to the requirement of the demand points and then be distributed to the demand points.

4. The function of replenishment

The purpose for the establishment of World Expo logistics centre is to ensure the success of the host of World Expo. Thus the establishment of replenishment function is very important for the continuous demand of World Expo living materials.

5. The function of information

The logistics centre is the gathering place for the transfer, collection, management, and dispatch of the information for whole logistics system. It plays a very important role for ensuring the operation of the whole World Expo logistics system. For example, the information about the time, quantity, and frequency for the in and out of materials is quite important for World Expo logistics managers. This information with other management centre makes up to be the information network for the coordination and dispatch of World Expo logistics system.

6. The function of management

The World Expo logistics centre works for the in and out of various kinds of materials, thus the logistics system is quite complicated. How to effectively manage the operation of logistics centre and how to reasonably arrange the in and out of materials to ensure the value of the materials are all the management functions of World Expo logistics centre.

4.2 The analysis for the operation mode of World Expo logistics centre

The operation mode for logistics centre refers to the systematic method that is used in the process of the logistics centre operation. The operation mode of the logistics centre can be classified into two types: new-building and using existed equipments

4.2.1 The introduction of World Expo logistics centre operation mode

1. New-building

The new-building for logistics centre refers to the mode of using the internal and social resources to build a new logistics centre for the purpose of meeting the requirements from the logistics services. The method for new-building can be classified into self-building and bidding in the society.

Advantages: Because the logistics centre is build according to the logistics demand, the services it provide targeted to the certain demand and is convenient for the complete satisfaction of logistics demand.

Disadvantages: The cost for new-building must be high, especially for the short-period and temporary logistics item. High cost, the post management issues and great risk are all the disadvantages.

2. Using existed equipments

Using existed equipments refers to the mode of using the existed logistics centre in the society to meet the demand of logistics services. This mode can be classified into purchasing existed equipments and leasing existed ones.

Advantages: The operation cost can be reduced and the financial burden from those new-building can be released, thus the operation of the company will be much more flexible.

Disadvantages: As the existed equipments are not designed for the demand of the company, far-distance, inconvenient traffic situation, and non-standard logistics centre equipment might be the problems.

4.2.2 The analysis for the operation mode of Shanghai World Expo logistics centre

As the World Expo is temporary and operates in one time, the construction of logistics centre for the host of World Expo requires large investment and the waste of the infrastructure might occur. Thus the planning and location decision of World Expo logistics centre should stick to the principles of economy that is fully making use of the existed logistics points for reconstruction and thus reducing the capitals and territorial investment costs. In the premise of market oriented operation mode and with the characteristics of World Expo, the operation principle for Shanghai World Expo logistics centre is planning the layout on the basis of existed infrastructure and taking the following factors for considering the selection:

(1) The area of logistics centre for using should meet the logistics demand

As for the characteristics of intensive and periodical for the World Expo logistics, the

amount of logistics services will happen in a short period. Thus the logistics centre must be equipped with ample space for warehousing and car-parking.

(2) The perfection of logistics centre facilities

In the process of logistics operation, as the logistics centre is far away from the pavilions, perfect official facilities including management control centre and information centre are necessary to be equipped. Only with perfect facilities, the logistics operation can be guaranteed to be successfully and efficiently conducted.

(3) The favorable geology and traffic environment

Materials that stored in the World Expo logistics centre require high-level of safety, thus the requirement of geology will be high. The location to be decided must be with no geological fault, and landslide. Preferable accommodation like drainage, electric power and communication equipment is indispensable. In addition, as the World Expo logistics has high-level requirement for the service provided, convenient traffic system between the logistics centre and other freight station and comprehensive traffic networks is another requirement, which is convenient for the collection and transmission of goods and the distance for transportation and transportation cost will be reduced. The distribution centre usually is decided in the area of the intersection of ring roads and main roads and the regionalization and rationalization for the transport of good are also taken into consideration.

(4) The price for logistics centre

In the selection of the logistics centre, besides the above factors, the price is another very important factor. Inexpensive rent and convenient traffic environment are the most important factors to be considered.

Therefore, the analysis for the operation of World Expo logistics centre now translates into the location decision for World Expo logistics centre.

4.3 The summary for the logistics infrastructure in Shanghai

The infrastructure in Shanghai ranged domestically first-class and is scale-issued now.

(1) The waterway. Shanghai has the longest domestic coastline berths, and has golden inland waterways like Yangtze River, Huangpu River and Suzhou Creek. The domestic waterways in Shanghai has the regional extension of Yangtze River and Shanghai has already formed the ports like Zhangjiagang, Nantong, Zhenjiang, Nanjing, Jiujiang, Wuhan, and Chongqing into a whole system, thus the comparative perfect collection-distribution-transport network is formed; Shanghai now is the largest container port in China, with the opening routes of coastal container liner transportation from Dalian, Qindao, Tianjin, Yantai, Lianyungang, Wenzhou, and Yulin, thus the strong coastal collection-distribution-transport capability is formed; Shanghai is located in the communication center of the international waterways. The routes are north to Vladivostok, south to Kaohsiung, Hong Kong east to the foreshore Beijing, Osaka-Kobe, New York and west to London, which cover the whole world.

(2) The airway. Shanghai is one of the airway transport centers in China and is the only city that owns two international airports. The tourists throughput and goods throughput ranks first in China; Shanghai is located in the west coast of the Pacific Ocean, large passenger planes that take off from Shanghai can economically and conveniently arrive at other main cities in the world. Meanwhile, Shanghai is in the center area of far east, the airplanes that take off from Shanghai to other main cities in Asia only take about 2 to 5 hours; Shanghai, as the center of Chinese economy

development, has opened numerous national airways which cover the main cities in China.

(3) The land transportation. Shanghai is located in the intersection of two main railways, i.e. Beijing-Shanghai and Shanghai-Hangzhou railways. Shanghai Railway Bureau has two routes and 16 hub extensions and contact lines, which are 1365.33 km long across 11 municipality jurisdiction districts and 7 cities in Jiangsu Province and 2 cities in Zhejiang Province; the road transportation network of Shanghai has an extension of eastern region, and the whole country. 5 highway routes connect Shanghai to other cities, which are north to Harbin, south to Shenzhen, directly delivered or transmitted to 30 cities in China. The internal traffic in Shanghai city has been reconstructed and constructed in the near 20 years, which formed the urban road network, track network, and “three networks” over the Huangpu River including inner ring, outer ring, Nanpu Bridge, Xupu Bridge, Yangpu Bridge, cross-river tunnels, and subway line 1, 2, 4 and pearl line.

(4) Shanghai government has already put the construction of three main logistics parks, i.e. Waigaoqiao Harbor Bonded Logistics Park, Pudong Airport Logistics Park, and Pudong Northwest Integrated Logistics Park into start.

4.4 The Layout for Shanghai World Expo pavilions

Shanghai World Expo Park is located in the waterfront of Huangpu River between Nanpu Bridge and Lupu Bridge downtown Shanghai. The planning area covers 5.4km². Pavilions are located in both sides of Huangpu River, which covers 3.1 km². The expo villages and park areas cover 0.9 km². The traffic condition around the expo park area is good. The north-east and west part is covered with main roads which can directly and conveniently connect to the highway system, airport, railway

station, ports and harbors, and other external traffic systems. Three subways and light rails, M4, M8, and M5 with 7 stations are in the planning area of World Expo park. M4 and M8 will be completed till the end of year 2007, and M5 has been completed yet.

The expo park can be divided into 5 regions:

Region A: It covers 54.9 hectare, and is located in the east area of Pudong expo axis east from Yutai Road and west from Bailianjing. China pavilion and foreign country pavilions (including independent self-built pavilions, independent leasing pavilions and united leasing pavilions) are located in this region.

Region B: It covers 87.8 hectare, and is located in the west part of region A, east from LuPu Bridge. The theme pavilions, public activity centers and art performance centre are all located in this region.

Region C: It covers 104.3 hectare, and is located in the west part of Lupu Bridge. In this region, foreign countries pavilions (including the above 3 pavilions) and international organzaiton pavilions are planned to be constructed. The foreign countries pavilions are planned to be those of European, American, and African countries.

Region D: It covers 49.7 hectare and is located in the west part of the expo axis in Puxi. The former area is the location of Jiangnan shipyard, where a lot of constructions and equipments are reserved to be reconstructed into enterprise pavilions.

Region E: It cover 25.1 hectare and is located in the east part of the expo axis in Puxi.

New-built independent enterprise pavilions are located in this region.

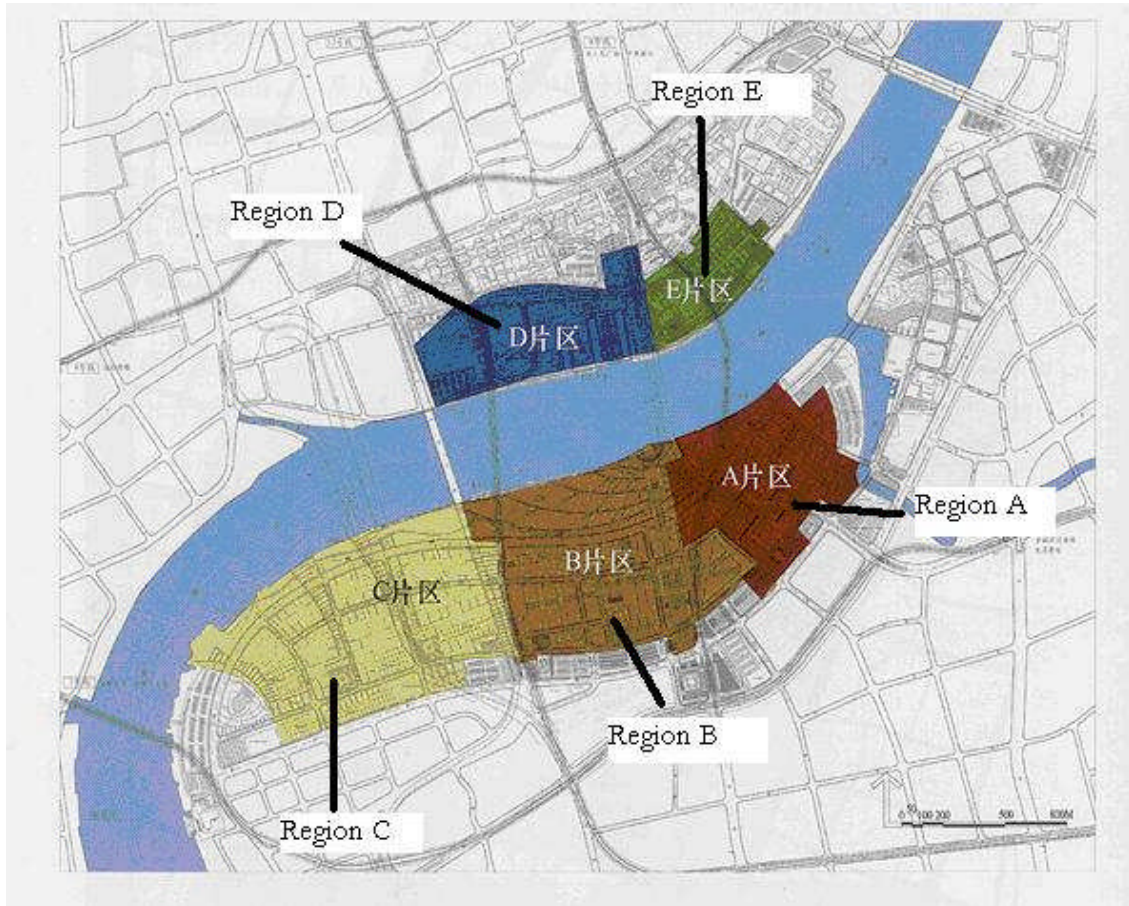


Figure 4-2 The Layout for 2010 World Expo Park

Source: www.expo2010china.com/expo/shexpo/index.html

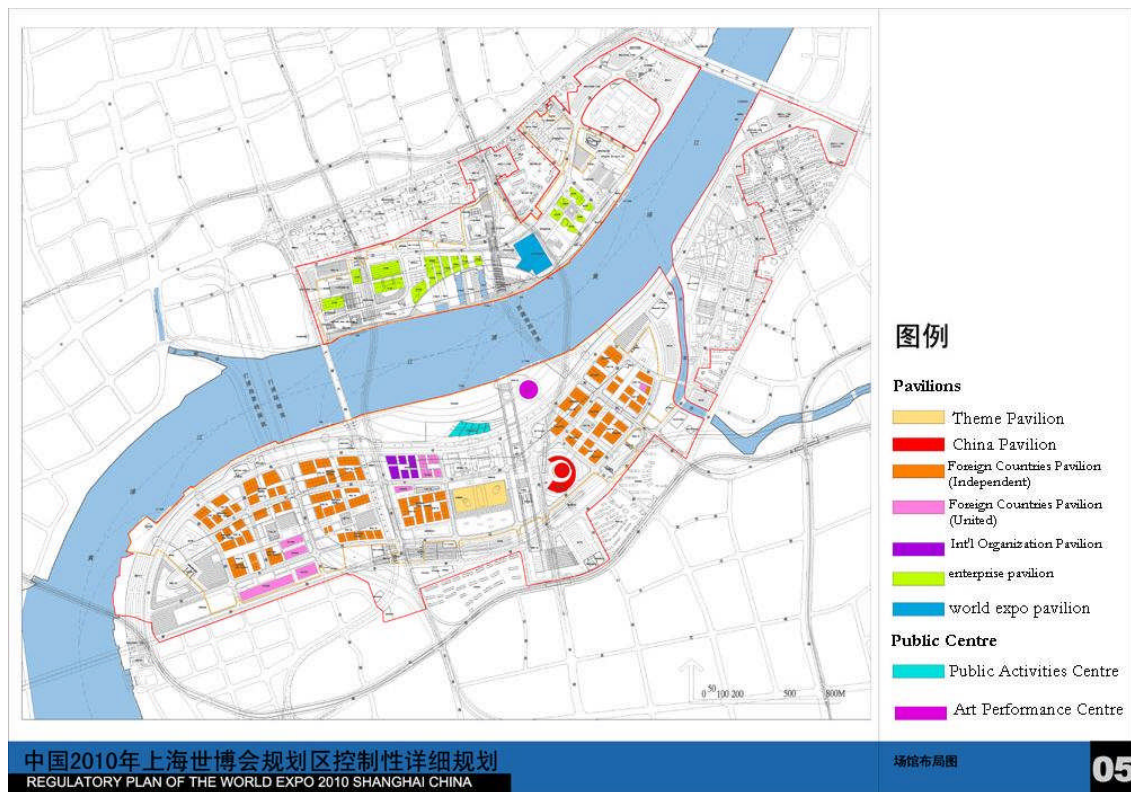


Figure 4-3 Regulatory Plan of the World Expo 2010 Shanghai China

Source: www.expo2010china.com/expo/shexpo/index.html

4.5 The analysis for the location decision of World Expo logistics centre

4.5.1 The location decision for World Expo logistics centre

As forecasted, the visitors for 2010 World Expo will be more than 70 million and up till May 23rd 2007 there have been 139 nations and international organizations confirmed to attend the expo. In the holding of the World Expo, large numbers of international participants, international representatives, journalists and visitors will attend the World Expo, thus the large amount of international logistics activities are indispensable. Taking the consignors market for World Expo organization committee and other international representative groups as the example, most import and export

goods are first arrived at Shanghai Port and then import through Waigaoqiao Free Trade Zone. Thus the goods of World Expo organization committee and international representative groups should be transported by sea. Other World Expo materials should be transported by air.

Thus, the author proper believes that the Expo logistics center should be built at the access to the seaborne port and airborne port that the Expo logistics materials transited. Reasons are shown as follows:

There should be a demand plan for the Expo exhibition. The Expo materials received at the hinge of the two transportation modes should be distributed according to the demand plan, which can rationally arrange the individual demand for logistics materials of the different Expo exhibition. And then it can meet the demand of Expo exhibition and make sure the favoring operation process.

(1) There are two shortcomings if the Expo materials are distributed directly to each exhibition without the temporary warehousing after the customs declaration. On the one hand, the Expo exhibitions convert to the passive receivers from the active demanders, which may increase the operation difficulties. On the other hand, due to the irrational materials stowage, it increases the transportation burden and creates the traffic congestion, which may affect the distribution efficiency, increase the transport cost. Also there are some problems related to the noise and environment pollution that should be solved in this condition.

(2) Some exhibitions are built within the inner ring. Because of the communication limitation, it is impossible to distribute the materials according to the demand of cargo-collection point. So it is necessary to build the temporary warehousing

facilities.

As stated above, it can be concluded that under the circumstance of short transportation distance and materials diversification, it is not feasible and uneconomical to distribute the materials from abroad that without stowage after custom declaration to the different exhibitions directly. On one hand, due to the limited warehousing capacity, it can not accommodate to all Expo materials. On the other hand, it may increase the quantity of distributing vehicles access to the city. And the problems such as voiture noise and powder pollution may impose the negative influence on the residents around. Also it may increase the communication burden that has already overloaded, which can create the traffic congestion and affect the distribution efficiency. Therefore, for the purpose of meeting the Expo logistics demand, it is necessary to build the Expo logistics center at the point of cargo customs declaration by utilizing the existing facilities.

According to the analysis on Shanghai logistics facilities, it can be found that the constructions of Shanghai Waigaoqiao Harbor Bonded Logistics Park, Pudong Airport Logistics Park and Pudong Northwest Integrated Logistics Park have been started. Therefore, based on the consideration of demand, the site of Expo logistics center should be focused on the above three logistics parks.

In the circumstance of lack of research data, supposing that the daily average amount for transport from the World Expo logistics centre in this stage is A ton and the World Expo logistics starts 1 month earlier than the opening of World Expo, adding the periods of World Expo 184 days, the expo logistics period is 214 days. Thus, the total amount for Shanghai World Expo logistics=daily amount for transport * days= $A \times 214 = 214A$ tons.

According to the experience of 1998 Kunming World Expo, it is forecasted that 90% expo materials will be imported from Shanghai Port and the other 10% will be transported by air. Thus with the forecasted logistics amount, the amount of goods need to be distributed from Waigaoqiao Free Trade Zone and Pudong Northwest Integrated Logistics Park is $214A \times 0.9 = 192.6A$ tons. Supposing that the amount should be distributed from Waigaoqiao and Pudong Northwest is the same, the amount for distribution is $192.6A \times 0.5 = 96.3A$ tons respectively. And the amount needs to be distributed from Pudong Airport Logistics Park is $214A \times 0.1 = 21.4A$ tons.

The expo pavilions gathered in the 5 regions: region A, B, C, D, and E. The foregone total amount for transportation we got is 214A tons, and with the percentage of distribution amount according to the number of pavilions: the amount for transportation = $Q_f/Q_z \times 214A$, in which Q_f represents the number of pavilions in the certain region, and Q_z represents the total number of pavilions. As the total number of participants and the organization style of the participants cannot be exactly estimated, symbols are used here to represent the number of pavilions. They are Q_{fA} , Q_{fB} , Q_{fC} , Q_{fD} , Q_{fE} , and the total number of pavilions is Q_z . Thus the daily amount for transportation in each region is as follows:

The amount for the expo materials transported to Region A is $Q_{fA}/Q_z \times 214A$

The amount for the expo materials transported to Region B is $Q_{fB}/Q_z \times 214A$

The amount for the expo materials transported to Region C is $Q_{fC}/Q_z \times 214A$

The amount for the expo materials transported to Region D is $Q_{fD}/Q_z \times 214A$

The amount for the expo materials transported to Region E is $Q_{fE}/Q_z \times 214A$

The daily amount to be distributed from Waigaoqiao Free Trade Zone and Pudong

Northwest Integrated Logistics Park to different pavilions is shown as follows:

The amount for the expo materials transported to Region A is $Q_{fA}/Q_z \times 96.3A$

The amount for the expo materials transported to Region B is $Q_{fB}/Q_z \times 96.3A$

The amount for the expo materials transported to Region C is $Q_{fC}/Q_z \times 96.3A$

The amount for the expo materials transported to Region D is $Q_{fD}/Q_z \times 96.3A$

The amount for the expo materials transported to Region E is $Q_{fE}/Q_z \times 96.3A$

Alike, the daily amount to be distributed from Pudong Airport Logistics Park to different pavilions is shown as follows:

The amount for the expo materials transported to Region A is $Q_{fA}/Q_z \times 21.4A$

The amount for the expo materials transported to Region B is $Q_{fB}/Q_z \times 21.4A$

The amount for the expo materials transported to Region C is $Q_{fC}/Q_z \times 21.4A$

The amount for the expo materials transported to Region D is $Q_{fD}/Q_z \times 21.4A$

The amount for the expo materials transported to Region E is $Q_{fE}/Q_z \times 21.4A$

As forecasted, the participant countries will be over 200 in 2010 World Expo and the number of visitors will exceed 70 million, the scale of which certainly is the new record. In order to more effectively arrange the logistics activities and meet the demand of the expo pavilions, a distribution centre built in the gathering area of pavilions might be taken into consideration. The following part shows the advantages:

- (1) Service level can be improved. To set a distribution center in the gathering area of expo pavilions will be convenient for the distribution centre to get timely and complete information about the pavilion's demand, thus the organization work

will be much more efficient. Besides, for the transport distance is close, it is easy to meet the pavilions' urgent demand.

(2) Gathering collection and unified distribution can be conducted. To set a distribution centre and collecting, controlling and distributing the goods according to the demand of pavilions will be easy for the control and track for the materials each pavilion needs and the controlling for transportation and storage will be strengthened.

While, whether the World Expo logistics centre should take the role of temporary storage of goods at the logistics port and distribution for the pavilions in the Expo Park? Is it necessary for 2010 Shanghai World Expo to set a professional logistics center (it is called expo distribution centre for the prevention of confusion) to distribute the materials? The following part will give the analysis.

4.5.2 The analysis for the setup of World Expo distribution centre

In order to setup the expo distribution centre, location decision should be done first. Here gravity method is applied for the location decision.

1. Introduction of gravity method

Gravity method is used for the layout of single establishment. If the gravity method is chosen, consideration about the distance between existed establishment and the total quantity for transportation should be taken. The gravity method is usually used for the location selection of single distribution centre. It is easy for calculation, but it lacks comprehensive consideration for the practical operation of land-used and for the candidate locations. Thus cost analysis should be taken at the same time.

2. The application of gravity method in the location decision of World Expo distribution centre

Supposing Region A as 1, Region B as 2, Region C as 3, Region D as 4, and Region E as 5, Shanghai Waigaoqiao Free Trade Zone as 6, Pudong Northwest Integrated Logistics Park as 7, Pudong Airport Logistics Park as 8. Then set the coordinates with Region A as the origin point, thus $X_1=0$, $Y_1=0$. According to the data provided by the website “Shanghai Electronic Map”, $(X_2, Y_2)=(-3.4, -0.8)$, $(X_3, Y_3)=(-6.7, -1.2)$, $(X_4, Y_4)=(-0.4, 2.4)$, $(X_5, Y_5)=(-3.2, 1.7)$, $(X_6, Y_6)=(28.1, 28.3)$, $(X_7, Y_7)=(-26.5, 19.2)$, $(X_8, Y_8)=(38.5, 9.3)$.

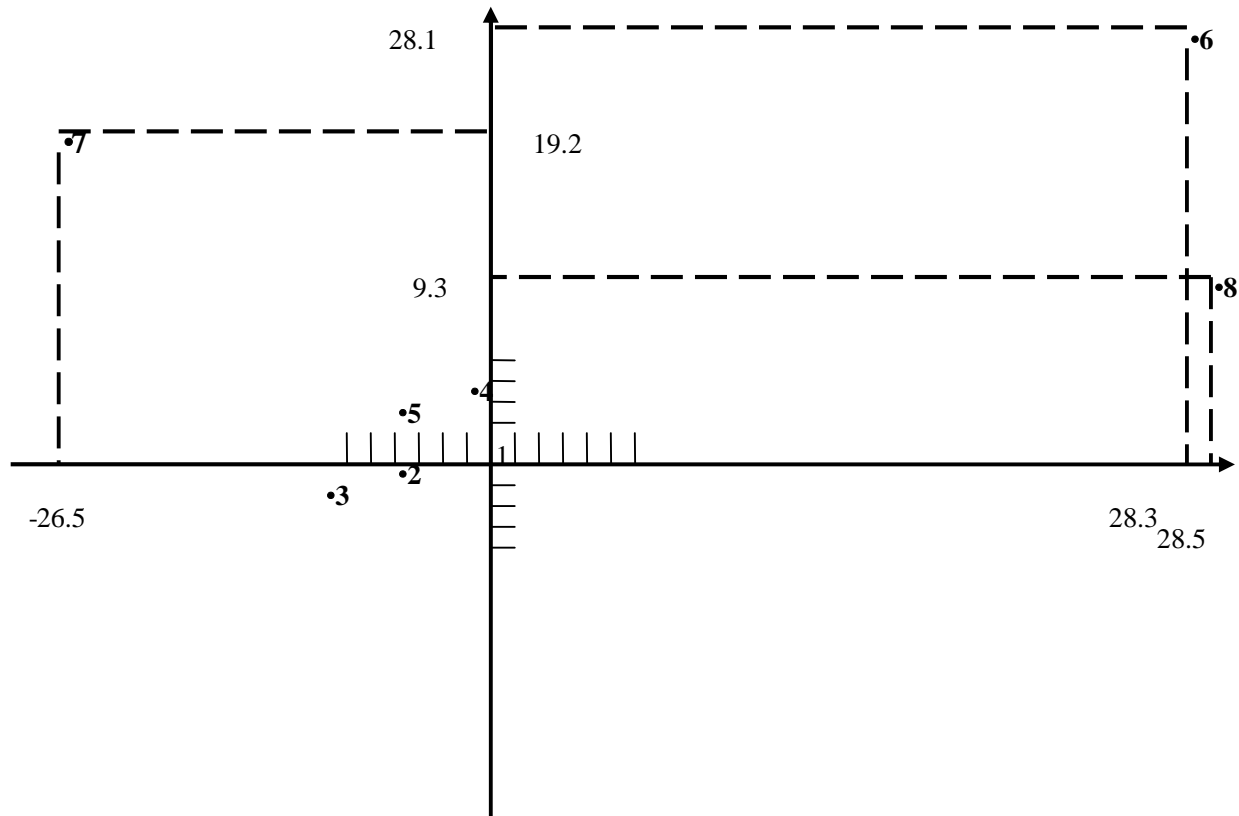


Figure 4-4 The coordinates of gravity method application

According to the formula of gravity method:

$$C_x = [0 * Q_fA / Q_z * 214A + (-3.4) * Q_fB / Q_z * 214A + (-6.7) * Q_fC / Q_z * 214A + (-0.4) * Q_fD / Q_z * 214A + (-3.2) * Q_fE / Q_z * 214A + 28.1 * 96.3A + (-26.5) * 96.3A + 38.5 * 21.4A] / (214A * 3)$$

$$C_y = [0 * Q_fA / Q_z * 214A + (-0.8) * Q_fB / Q_z * 214A + (-1.2) * Q_fC / Q_z * 214A + 2.4 * Q_fD / Q_z * 214A + 1.7 * Q_fE / Q_z * 214A + 28.3 * 96.3A + 19.2 * 96.3A + 9.3 * 21.4A] / (214A * 3)$$

According to the Regulatory Plan of the World Expo 2010 Shanghai China, $Q_fA=28$, $Q_fB=22$, $Q_fC=46$, $Q_fD=9$, $Q_fE=15$, and $Q_z=120$.

Thus $C_x=0.3$, $C_y=7.4$

The result of the calculation is located in the area of the crossway of Fuxing Dong Road and Henan Nan Road. Fuxing Dong Road tunnel, Nanpu Bridge, and the Tibet Nan Road tunnel under construction are in the area, thus the traffic is convenient. It is advisable to choose an existed warehouse centre in that area as the temporary World Expo distribution centre.

In conclusion, there are two choices for the operation mode of World Expo logistics centre: the first one is not setting up a World Expo distribution centre and the materials will be distributed directly from the World Expo logistics centre to each pavilion; the second one is with the comprehensive consideration of the infrastructure in Shanghai and using the gravity method choosing the area of the crossway of Fuxing Dong Road and Henan Nan Road to set up a World Expo distribution centre.

4.6 The comparison between the location decision modes for World Expo logistics centre

4.6.1 Cost comparison

For the purpose of calculation, the conditions are supposed here:

(1) As for the particularity of World Expo, it is possible that there is no restriction for the World Expo trucks. Thus the following analysis is done in two conditions:

Supposing that there is no restriction for the World Expo trucks: 8 (or more than 8) tons trucks can be selected for the transportation and we choose trucks with the capability of 10 tons, thus the daily frequency for distribution is $A/10=0.1A$

Supposing that there is restriction for the World Expo trucks: 8 (or more than 8) tons trucks cannot be selected for the transportation and we choose trucks with the capability of 4 tons, thus the daily frequency for distribution is $A/4=0.25A$

(2) Supposing that the frequency for each pavilion's distribution is the same, thus
For 10 tons trucks, the daily frequency for each pavilion's distribution is $0.1A/Qz$

For 4 tons trucks, the daily frequency for each pavilion's distribution is $0.25A/Qz$

(3) According to the average level of freight rate in Shanghai, supposing that the freight rate of 10 tons trucks is $P1$ Yuan/km, and the freight rate of 4 tons trucks is $P2$ Yuan/km.

The first decision: not setting up World Expo distribution centre and materials being directly distributed from the World Expo logistics centre to each pavilion

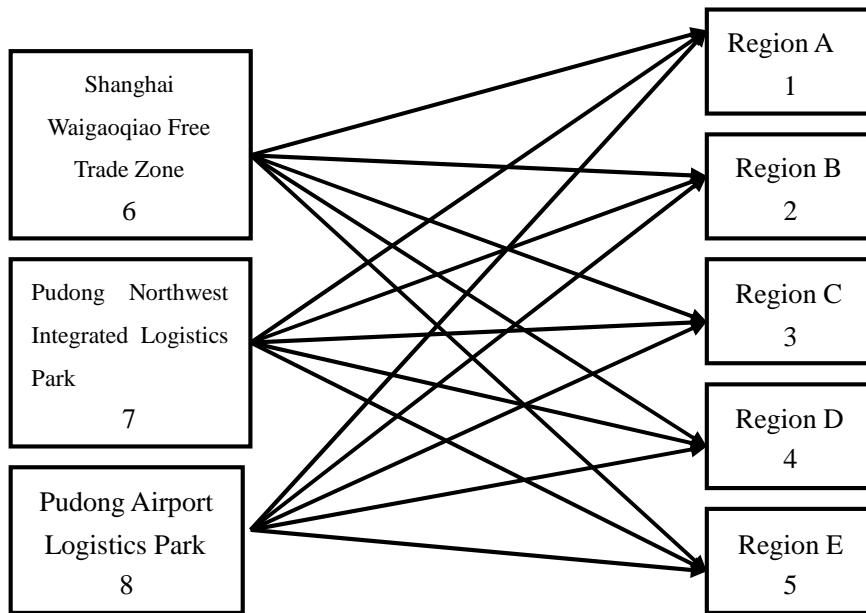


Figure 4-5 The Operation Mode for not Setting up World Expo DC

Supposing that Z represents for the distance, then $Z_{16}=39.9$, $Z_{26}=42.9$, $Z_{36}=45.6$, $Z_{46}=38.5$, $Z_{56}=41.1$, $Z_{17}=32.7$, $Z_{27}=30.6$, $Z_{37}=28.4$, $Z_{47}=31.0$, $Z_{57}=29.1$, $Z_{18}=39.6$, $Z_{28}=43.1$, $Z_{38}=46.4$, $Z_{48}=39.5$, $Z_{58}=42.4$

(1) In the condition of using 10 tons trucks:

$C6x = \sum (\text{distance} * \text{number of pavilion}) * \text{frequency} * \text{percentage of distribution} * \text{unit price}$

$$\begin{aligned}
 &= \sum (\text{distance} * \text{number of pavilion}) * 0.1A/Qz * 90\% * \text{unit price} \\
 &= (39.9 * 28 + 42.9 * 22 + 45.6 * 46 + 38.5 * 9 + 41.1 * 15) * 0.1A/120 * 45\% * P1 \\
 &= 1.9206A * P1
 \end{aligned}$$

$C7x = \sum (\text{distance} * \text{number of pavilion}) * \text{frequency} * \text{percentage of distribution} * \text{unit price}$

$$\begin{aligned}
 &= \sum (\text{distance} * \text{number of pavilion}) * 0.1A/Qz * 10\% * \text{unit price} \\
 &= (32.7 * 28 + 30.6 * 22 + 28.4 * 46 + 30.1 * 9 + 29.1 * 15) * 0.1A/120 * 45\% * P1 \\
 &= 1.3509A * P1
 \end{aligned}$$

$C8x = \sum (\text{distance} * \text{number of pavilion}) * \text{frequency} * \text{percentage of distribution} * \text{unit price}$

$$= \sum (\text{distance} * \text{number of pavilion}) * 0.1A/Qz * 10\% * \text{unit price}$$

$$= (39.6*28+43.1*22+46.4*46+39.5*9+42.4*15) *0.1A/120*10\%*P1 \\ =0.4320A* P1$$

$$\text{Total Cost: } C1=C6x+C7x+C8x=3.7035A*P1$$

(2) Similarly, in the condition of choosing 4 tons trucks, then $C6x=0.4802A*P2$, $C7x=0.3377A*P2$, $C8x=0.108A*P2$

$$\text{Total Cost: } C1=C6x+C7x+C8x=0.9259A*P2$$

The second decision: setting up the World Expo distribution centre in the area of the crossway of Fuxing Zhong Road and Henan Nan Road and the materials being distributed from the centre to each pavilion

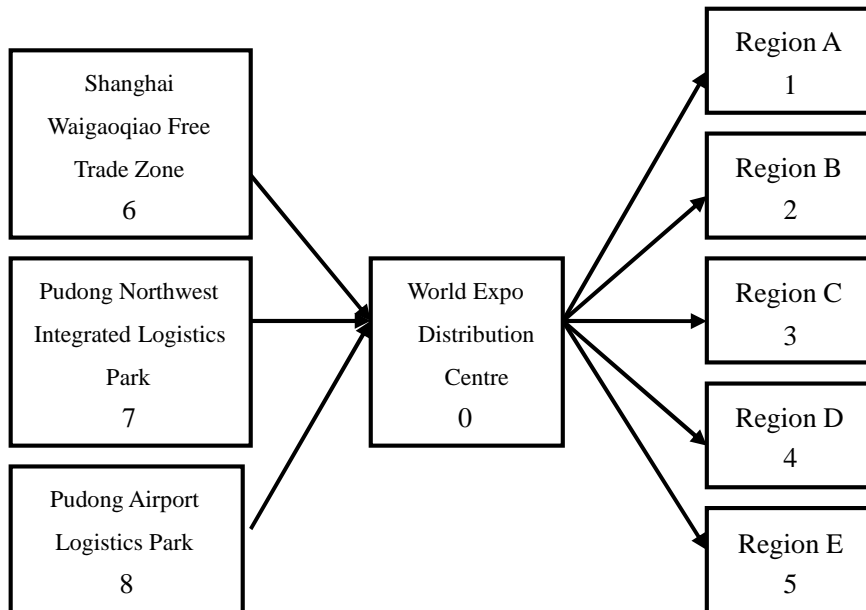


Figure 4-6 The Operation Mode for Setting up World Expo DC

(1) In the condition of choosing 10 tons trucks

Supposing that V represents for the distance, then $V_{6,0}=34.78$, $V_{7,0}=29.28$, $V_{8,0}=38.25$, $V_{0,1}=7.41$, $V_{0,2}=9.00$, $V_{0,3}=11.09$, $V_{0,4}=5.05$, $V_{0,5}=6.69$.

$$C0=V_{6,0}*\text{frequency1}*unit \quad \text{price}+V_{7,0}*\text{frequency2}*unit \quad \text{price}+$$

$$V_{8,0} \times \text{frequency}_3 \times \text{unit price} + \sum (V_{0,x} \times \text{number of pavilion}) \times \text{frequency} \times \text{unit price} \\ = (34.78 \times 45\% \times 0.1A + 29.28 \times 45\% \times 0.1A + 38.25 \times 10\% \times 0.1A + 7.41 \times 28 + 9.00 \times 22 + 11.09 \times \\ 46 + 5.05 \times 9 + 6.69 \times 15) \times 0.1A / Q_z \times P_1 = 0.885A \times P_1 (3.69A + 1)$$

(2) Similarly, in the condition of choosing 4 tons trucks, then $C_0 = 0.8163A \times P_2 (0.27A + 1)$

Because $C_2 = C_0 + \text{the hire of distribution centre}$, $C_2 > C_1$.

4.6.2 The comparison for advantages and disadvantages

1. The advantages of the first decision of not setting up World Expo distribution centre:

(1) The step for the location decision of distribution centre is not necessary.

(2) The hire for the distribution centre is not necessary, thus cost is reduced.

(3) Materials can be directly distributed from the logistics centre to each pavilion, thus transshipment and re-distribution are not necessary and the process is simplified and the operation is simply and convenient.

(4) It is not necessary to assign someone to manage and operate the distribution centre.

The disadvantage is that logistics centre is far away from pavilions, thus the urgent demand from the pavilions is difficult to meet.

The advantages of the second decision of setting up World Expo distribution centre.

(1) It is convenient to know the pavilion demand in a comprehensive way by setting up a distribution centre in the area of pavilions. It is easy to meet the demand for the short distance.

(2) The collection and united distribution of materials can be achieved. It is convenient for the united control and tracing back for the materials as the distribution centre can store reasonable amount of materials, and distribute the materials in a united way.

Disadvantages:

(1) It costs a lot of energy for the location decision of distribution centre.

(2) It costs a lot to hire the distribution centre.

(3) Transshipment, re-distribution and new process are added for the materials to be distributed from the destitution centre to each pavilion.

(4) Someone must be assigned to take for the management and operation of the distribution centre.

From the above analysis, the table for the comparison between two decisions is shown as follows:

Table 4-1 The comparison between two decision

	First decision: not setting up DC	Second decision: setting up DC
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Advantages	<ol style="list-style-type: none"> 1. Simple process 2. Human resources, capitals and materials can be saved 3. Low freight rate 	<ol style="list-style-type: none"> 1. Short distance for transportation, easy to meet the demand 2. Collecting warehousing, united distribution can be achieved; convenient for the control, inspection, tracing back for the materials
Disadvantages	<ol style="list-style-type: none"> 1. Far distance for transportation, difficult to meet the urgent and temporary demand 	<ol style="list-style-type: none"> 1. Location decision and hire work are necessary, human resources, capitals and materials will be added 2. Complicated operation 3. High freight rate

5. Conclusion

The significance for the host of World Expo is not only for showing the advanced science and technology and culture of the host nation but also shows the comprehensive power of the nation. Thus how to ensure the success host of the World Expo is the issue that focused by the host nation. While, as logistics is still in the beginning stage in China with the situation of small-scale logistics companies, out-of-date logistics equipments, it is really a big challenge for China, which is host nation of World Expo in the first time. So the research for World Expo logistics is of its unique significance.

In this dissertation, the operation mode for World Expo logistics is selected as the theme of research. World Expo is of short-period, and is complicated, so modern logistics technology is necessary for the support of World Expo logistics. In the condition of limited resources of technology, personnel, and materials, outsourcing those high-technology parts is practicable and is with specific advantages. World Expo in the modern society is not only an exhibition, different materials and powers will be exchanged in the exhibition. To this extent, the operation mode for the principal part of World Expo should be market oriented outsourcing. As for the operation mode of logistics centre which is of large amount of investment and great significance, quantitative and qualitative analysis are used.

In the dissertation, further analysis for various operation modes for World Expo logistics is discussed from management and technique levels. This is not only a good reference for the related study with World Expo logistics; it also provides theoretical and practical instruction for the flourishing exhibition logistics and logistics operation in other fields as well.

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