

The GFA Experiment is Used to Plan the Storage Center in Liaoning Province

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Abstract: The competition among enterprises is reflected by sales and market share, so the procurement cooperation before production will not cause any damage to their own advantages. This paper analyzes the form and significance of alliance Procurement Based on Wal Mart and Carrefour alliance procurement, and uses anylogisticple software used in the training course to analyze various data, The number of virtual customers is arranged to analyze and locate the alliance procurement center.

Keywords: GFA; Storage Center; Storage Planning; Any Logistix.

1. Introduction

If the current procurement mechanism of Chinese enterprises is analyzed from the outside of the enterprise, its external feature is that the procurement of each enterprise is basically independent, the lack of joint and communication in procurement and related links or the procurement policy is not unified, the procurement efficiency is low, and it is difficult to achieve the economic and effective procurement goal. Wal-Mart and Carrefour have realized alliance procurement, reduced costs and increase benefits. However, I searched a lot of information, and did not find the form of its cooperation, as well as the relevant information of joint procurement, just from the textbook trace. Therefore, this paper envisions the establishment of a large storage center to realize the transfer or coordinating role of its alliance procurement.

System simulation technology, as one of the modern enterprise scientific management technologies, is used to model the object system and take the model as an experimental device to analyze the existing or planned system. System simulation is a tool for engineers, managers, and decision-makers to test, evaluate, and visualize the proposed operation, process, or dynamic system solutions. The characteristic of computer simulation is that the system itself can be tested without actual installation. It plays an important role in reducing losses, saving expenses, shortening the development cycle, improving production efficiency and improving product quality. Through the study of AnyLogistixPLE software, we realize that computer software can be tested without assembling actual systems, which can be run in a short time and at a low cost, and does not bring any danger of suspension or destruction to the current system. The configuration of logistics equipment and personnel, the composition of logistics engineering system and so on are a complex system of space, time and random variables. It is almost impossible to use equations or simple table calculation to solve these problems, and simulation technology is very effective in solving these problems. Through THE system simulation of AnyLogistixPLE, we can easily solve the problems such as where the bottleneck is and whether the resource allocation is reasonable. It can be visualized through the animation function to facilitate the communication of the opinions between operators, managers and operators, so as to speed up the decision-making speed [1]

If these problems are solved only by experience or

subjective, the first is too difficult, and the second accuracy is not high. A series of experiments with Any LogistixPLE software can simply and accurately solve a series of problems. This paper conducts GFA experiment, through all kinds of data analysis, virtually arranges the number of customers, and plans the storage center of Wal-Mart and Carrefour to realize the alliance procurement.

2. Theoretical Basis

2.1. Alliance Procurement

Alliance procurement means that different purchasers jointly purchase the same or the same procurement needs, or jointly entrust the same agency to conduct unified procurement. The purchaser who participates in the joint procurement signs the procurement contract with the winning bidder or the transaction person respectively according to the procurement results, and implements the procurement contract in accordance with the contract. Joint procurement among enterprises, the procurement demand increases greatly, which can attract more suppliers to bid and improve project competitiveness; make up for the deficiencies of some enterprises with limited procurement expenditure, small procurement scale and less procurement experience and create scale benefits; the common practice of joint procurement is to entrust one of the purchasing unit as the leading unit, the leading unit to organize procurement activities, shorten the procurement time and improve the procurement efficiency. At present, there is the practice of joint procurement in the practice of government procurement and state-owned enterprises. The content of joint procurement generally selects general goods and services with relatively uniform specifications or standards, such as hardware equipment, office software, insurance services, etc. In the communications industry, China Telecom Group Co., Ltd. and China United Network Communications Group Co., Ltd. launched the joint collection of 5GSA wireless main equipment in 2020 [2]

2.2. GFA Experiment with GFA Tissue

GFA member of A (GreenFreightAsia Green Asia Freight) environmental organization. GFA is an industry-leading Singapore nonprofit organization consisting mainly of shippers and carrier companies. Its main goal is to help reduce fuel costs for road freight in the Asia-Pacific region and

reduce carbon dioxide emissions from transport activities, thereby reducing transport costs across the supply chain. GFA certification helps companies identify their sustainable development goals and recognize their green efforts; GFA can organize member communication to help companies understand practical ways to reduce fuel consumption, reduce carbon dioxide emissions and help improve air quality.

GFA experiment is Greenfield Analysis. Greenspace analysis is an analysis type of experiment, which uses the center of gravity method to find the best location for the desired new site in the supply chain.

Objective: Find out the number and potential areas of the supply chain facilities.

Standard: find the minimum parameter value "transport flow".

Calculation formula: $\langle \text{distance} \rangle * \langle \text{Product quantity} \rangle$.

Hypothesis: The alignment is a straight line.

3. The Necessity and Realization Form of Alliance Procurement

3.1. Problems Caused by Purchasing Alone

If from the enterprise outside to analyze the present situation of our enterprise procurement mechanism, its external characteristics is the enterprise (both domestic and foreign) procurement is basically fragmented, between the lack of procurement and related links of joint and communication, procurement policy is not unified, low procurement efficiency is difficult to achieve economic and effective procurement goals. The main problems are as follows:

3.1.1. Enterprises have Execution and Management Departments for Procurement and Related Businesses

For example, from the perspective of enterprise groups, industries and the country, the overlapping procurement institutions and the repeated construction of supporting facilities, resulting in a significant increase in the management cost and fixed assets investment in the procurement link.

3.1.2. Multiple External, Decentralized Procurement

For general and similar equipment, it cannot be centralized and combined procurement, and the price concessions brought by large quantity procurement cannot be obtained, which makes the procurement cost of various enterprises high. The procurement management policy is completely formulated by the enterprise itself, which is based on the procurement needs and procurement environment of the enterprise itself. It basically has no horizontal connection with other enterprises, and does not understand the procurement status and needs of other enterprises.

3.1.3. Self-provided Inventory by Each Enterprise

And the lack of information exchange and unified coordination of inventory resources between enterprises, so that the reserve of general materials is repeated, resulting in the increase of the inventory of enterprises, and the increasing amount of precipitation and backlog of materials.

3.1.4. Repeat the Quality Control and Technical Management in the Procurement Process

The management cost is high, and the enterprises have not achieved consistency and standardization in the establishment and control of quality assurance system, supplier review and management, and the preparation and management of

equipment technical standards and acceptance specifications. Enterprises repeat the preparation and management work, the related management costs are difficult to reduce [3]

3.1.5. Poor Procurement Strain Capacity

For outsourcing production, the emergency demand for materials caused by the improvement of product design and manufacturing methods is inevitable, but due to the long period of procurement from abroad, the emergency demand for equipment is difficult to meet. Therefore, in the procurement work, it needs to break through the shackles of the current procurement mode, start from the procurement mechanism, and explore the new situation.

3.2. Advantages of Joint Procurement

The implementation of joint procurement in the procurement link can greatly reduce the cost of procurement and related links, and create considerable benefits for enterprises. The advantages of joint procurement are mainly reflected in the following aspects.

3.2.1. Procurement Link

Just like the price gap between wholesale and retail, the unit price of equipment purchase is inversely proportional to the quantity purchased, that is, the larger the quantity purchased, the lower the purchase price. For example, for aircraft manufacturing equipment, the price difference can sometimes be up to 90 percent. Joint procurement among enterprises can combine the purchase quantity of similar equipment, and the procurement unit price can be greatly reduced through unified procurement, so that the procurement cost of various enterprises can be reduced accordingly.

3.2.2. Management Links

Backward management is a common problem in Chinese enterprises, and the improvement of management requires enterprises to pay a huge price. For some enterprises producing similar products, if each enterprise in the procurement and quality assurance of the relevant links of the same requirements, the same needs of the goods, they can implement the joint in the management link, centralized management of related work. After the cost can be shared by each enterprise, so that the cost is greatly reduced [4]

3.2.3. Storage Link

By implementing the sharing of inventory resources and the unified allocation of equipment, the backlog of spare materials and capital occupation can be greatly reduced, the emergency demand satisfaction rate of enterprises can be improved, and the production pause loss caused by the shortage of equipment supply can be reduced.

3.2.4. Transportation Link

The unit weight transport rate of equipment is inversely proportional to the total amount of a single transport, especially for international transportation. The combination of enterprises in the transportation link can increase the single volume of goods by merging the cargo transportation of small weight, so that it can be charged at a lower transportation rate and reduce the transportation expenses [5]

3.3. Implementation Form

Wal-mart, carrefour development in the form of joint procurement, because the search more literature content, this paper imagines to build a logistics park --logistics warehousing center, the center is mainly responsible for alliance procurement cooperation and transit work, need to alliance procurement of goods can be shipped to the logistics

park, realize alliance procurement, as a core role. Take this as the center to establish a logistics park, to achieve the joint procurement of the two major department store industry in the world. Create a joint procurement platform, adopt a long-term joint and cooperative procurement method, to realize the "de-intermediation", "de-homogenization". And this combination is spontaneous and unmandatory. The joint parties still maintain the independence and autonomy of the procurement company, relying on mutual agreements and forming a loose whole for economic reasons [6]

4. Pre-experimental Design

4.1. Problem Assumptions

4.1.1. Experimental Questions

Location of Wal-mart, Carrefour alliance procurement warehouse center location.

4.1.2. Target

Products will be delivered to various Walmart and Tesco stores within two days, which means the store should be located within 800 kilometers of the distribution center.

4.2. Urban Demand Hypothesis and Data Analysis

In order to ensure the credibility of this experiment, it is necessary to assign the needs of Wal-Mart and Carrefour in each city to determine the number of customers set in the system simulation.

According to the second-hand data for the distribution of Wal-mart in Liaoning province: Wal-mart shopping plaza, Dalian week water store, Wal-mart shopping plaza Dalian south China branch, Wal-mart shopping plaza Dalian Olympic store, Wal-mart shopping plaza, Dalian Dalian new world plaza, good and more department store commercial plaza co., LTD., academy branch, Dalian good and more department store commercial plaza co., LTD., branch, Wal-mart shopping plaza, Wal-mart shopping mall, Wal-mart shopping mall in Shenyang Shenyang evergreen branch, Wal-Mart (Liaoning) Department Store Co., Ltd. Dandong Jinhai Road branch, Wal-Mart (Liaoning) Department Store Co., Ltd. Huludao Haibin Road branch, Wal-Mart (Liaoning) Department Store Co., Ltd. Jinzhou Jiefang Road branch.

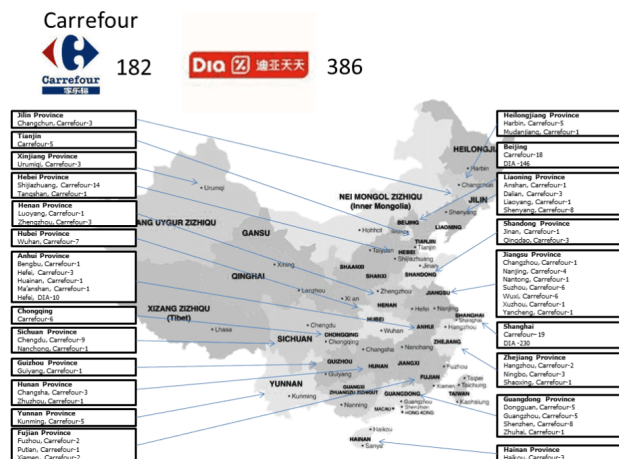


Figure 1. Carrefour quantity

Still based on second-hand data, find the distribution of Carrefour in Liaoning Province, Shenyang eight, Dalian three, Anshan one, Liaoyang one.

Next, the number of customers in the experiment can be assigned according to the above data. Assign the value according to the total number of Wal-Mart and Carrefour in each region.

Table 1. City customer assignments

| city | Number of assigned values |
|----------|---------------------------|
| Shenyang | 4+8 |
| Dalian | 6+3 |
| Anshan | 1 |
| Jinzhou | 1 |
| Huludao | 1 |
| Danton | 1 |
| Liaoyang | 1 |

4.3. Geographic Chart of Urban Longitude and Latitude

It requires accurate positioning of the location of each city to obtain accurate data.

Table 2. Urban longitude and latitude geographical table

| city | longitude, latitude |
|----------|------------------------------------|
| Shenyang | Longitude: 123.38, latitude: 41.8 |
| Dalian | Longitude: 121.62, latitude: 38.92 |
| Anshan | Longitude: 122.85, latitude: 41.12 |
| Jinzhou | Longitude: 121.15, latitude: 41.13 |
| Liaoyang | Longitude: 123.17, latitude: 41.28 |
| Danton | Longitude: 124.37, latitude: 40.13 |
| Huludao | Longitude: 120.86, latitude: 40.76 |

5. Green Space Analysis

5.1. Experimental Process Flow

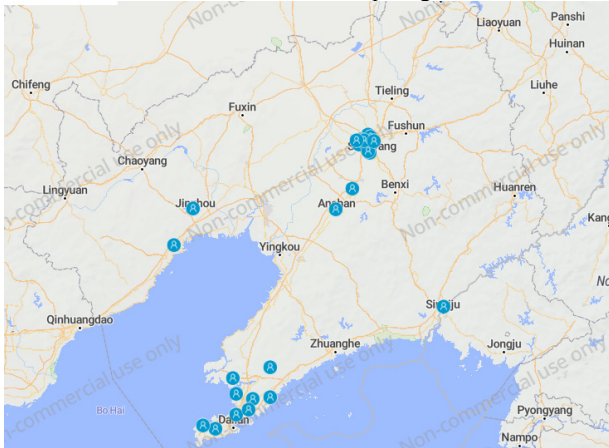
5.1.1. Design of the New GFA Experiments

Table 3. Parameter setting diagram

The contents include: experiment naming, LNGFA, select green space analysis (Greenfield Analysis) mode, text description as, Analysis of warehouse location in Liaoning Province (analysis of the location of the central warehouse in Liaoning area). And set the number of customers according to the number of Carrefour and Wal-Mart. Set the program to have order requirements every day.

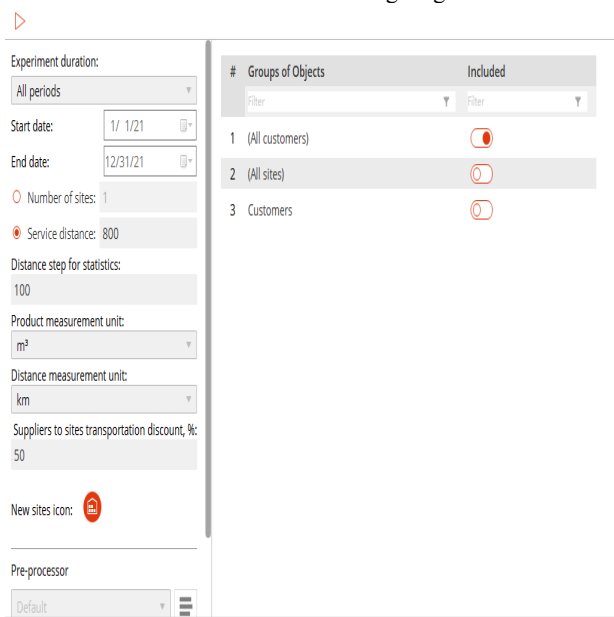
Based on the assignment, plan the customers on the simulation diagram.

Table 4. Customer setup diagram



Set the remaining parameters:

Table 5. Parameter setting diagram



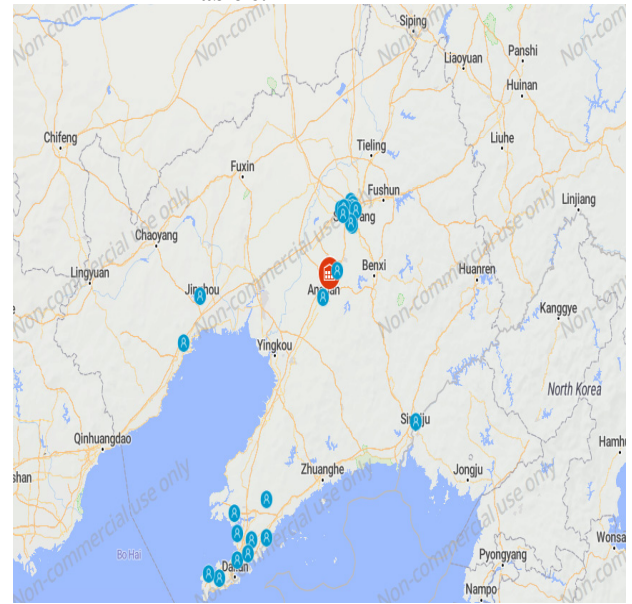
In the operation experiment, it can be seen that the warehouse location is located in Wenxiang Town, Anshan City.

5.1.2. Select the Optimal Solution

The solution selected by the simulation system is: Liaoyang City.

Liaoyang is located in northeast China, Liaoning Province, central China, is the sub-central city of Shenyang economic Zone, the emerging modern petrochemical and textile industry base, China's excellent tourism city, national historical and cultural city, is one of the earliest cities in northeast China.

Table 6. Center location



The rapid construction of traffic road has laid a foundation for the development of logistics industry. At present, Liaoyang city has initially formed a modern transportation network with railway, highway and pipeline and a relatively developed collection and distribution system. With 7 national and provincial roads, a total of 401.393 kilometers. There are 633 rural roads at all levels, with a total of 2,634.339 kilometers. The city has 700 Bridges, a total of 20.913 kilometers. Southeast around City Road 11.87 km. Benliao expressway across Liaoyang city east and west. Shen-da expressway longitudinal through Liaoyang city north and south. Liaoyang city has 53 special railway lines, with a total length of 303 kilometers. The whole city to achieve every village road. The circulation of business continues to innovate and develop. Modern commercial enterprises led with New Century Shopping Plaza, Kyoto Shopping Center, Tongerbao Haining Leather City, Liaoyang Fuhong International Hotel Co., LTD., Dafu Senior Catering and Entertainment Co., LTD., and Chengda Fangyuan Pharmaceutical Chain Co., LTD., are constantly developing and expanding. Tesco, Pizza Hut, Carrefour, Suning Appliance and other well-known chain enterprises at home and abroad have settled in Liaoyang, which has improved the consumption environment and consumption quality of Liaoyang city. Enterprises in the pharmaceutical, oil, tobacco and other industries have set up logistics and distribution centers. Chain operations, supermarkets, professional stores and convenience stores and other new forms of business throughout the urban and rural areas. A number of logistics enterprises with the characteristics of modern logistics industry development are formed. Liaoning Huasheng Logistics Port, bonded warehouse project, covering an area of 400,000 square meters, with a total investment of 600 million yuan, at present, the office building and the first phase of the warehouse of 9,500 square meters have been completed. Liaoyang Tonghui Logistics Co., Ltd. under construction, plans to invest 201.2 million yuan, has invested 50 million yuan, has completed 5500 square meters of color steel warehouse. Gongchangling Longxing Logistics Co., LTD., with a total investment of 100 million yuan, covers an area of 88.67 mu, storage area of 26,000 square meters, mainly engaged in large and small vehicle parts, parking, repair, washing, storage and related logistics business, with comprehensive logistics service

function. Liaoyang Didijia Storage and Logistics Co., Ltd., covers an area of 110,000 square meters, with a construction area of 30,000 square meters, with a storage capacity of 300,000 cubic meters, and a total investment of 97.2 million yuan. Liaoyang Sanli Logistics Co., Ltd., covering an area of 10,000 square meters with a construction area of 5,400 square meters, has 432 freight vehicles, an approved tonnage of 6,000 tons and an annual freight volume of 3 million tons. These enterprises have become the backbone of Liaoyang to develop the modern logistics industry.

Liaoyang has obvious logistics industry development advantages, perfect transportation and infrastructure, Shenhuan highway, Liaofeng highway, small line across the east and west, Harbin railway and highway, Shenyang-Dalian expressway through the north and south, away from Dalian, Yingkou port and Shenyang Taoxian airport is 332 kilometers, 162 kilometers and 60 kilometers respectively. Liaoyang is located in the Liaodong Peninsula and "Shenyang Economic Zone". It is one of the eight cities in the central Liaoning province, including Benxi, the city of coal and iron, Anshan, the capital of steel in the south and the provincial capital Shenyang in the north. Industrial products are rich in resources. Liaoyang has liaohua, Qinghua and other large state-owned enterprises and so on, at the same time, a large number of private enterprises rising in recent years to provide a broad space for the development of Liaoyang logistics industry. CNPC Liaoyang Petrochemical Company, a large state-owned enterprise, covering an area of nearly 16 square kilometers, is the largest petrochemical and chemical fiber raw material production base in northern China. With Liaoyang as the center of Liaoyang, Shenyang, Anshan, Benxi within a radius of 50 kilometers, the jurisdiction is the most densely industrial area in central Liaoning. With Liaoyang within the radius of 150 kilometers in the city, there also include Fushun, Yingkou, Tieling and Fuxin, which is the strongest economic strength in Liaoning --Shenyang Economic Zone [7]

6. Conclusion

Using AnyLogistixPLE software to design GFA

experiments, through various data analysis, virtually arrange the number of customers, plan the warehousing centers of Wal-Mart and Carrefour to achieve alliance procurement, and analyze the advantages of alliance procurement. It solves the problem of inefficient procurement and difficulty in achieving cost-effective procurement. The experiment concluded that the solution selected by the simulation system was: Liaoyang City. Liaoyang City has initially formed a modern transportation network based on railways, highways and pipelines and a relatively developed collection and distribution system. The convenience of transportation has laid a certain foundation for the establishment of a storage center, and Liaoyang is close to Shenyang, Anshan, Benxi, Fushun, Yingkou, Tieling and Fuxin. The warehouse center set up in Liaoyang serves the Shenyang Economic Zone, and the strong location advantage also proves the feasibility of setting up a warehouse center in Liaoyang.

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