

Research Article

Research on the Logistics Supply Chain in Port Logistics Transportation

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Abstract: The aim of this study is to improve and increase the logistics system effectiveness and to solve the problem of optimal movement of different flows. Logistics transport carrying the world on material resources transfer exchange important mission and economic development and our lives are closely linked, logistics chain logistics transport occupies an important position and in the e logistics chain in port logistics has play a decisive role. For many coastal countries port logistics is the economic lifeline of the country, on China's economic development role as important, port logistics transport bear the material exchange with the external communication of important role, so the Chinese port logistics transportation research, clear port logistics transportation, current situation, find the existing problems in the light of the problem, to find a suitable method for solving has great realistic meaning. To promote logistics development, improve the logistics supply chain system has play an important role in this filed.

Keywords: Construction, management logistics, port logistics, transportation system

INTRODUCTION

China's port logistics transport has a long history, very early emergence of port logistics and transport, but modern port logistics development relative lag; this has a close relationship with our country special basic national conditions. Through a long transition period, our country's current port logistics development is rapid, but with the developed world big harbor gap is also more obvious, at present foreign port logistics and become the coastal economy, they have advanced management, sophisticated transport strategy and advanced facilities, in the international port logistics transport competition advantages. In this instance, the flows of port logistics systems are distributed inside these logistics systems and the other proceedings have place, including the added value creation (Navickas *et al.*, 2011). But if we could manage the port logistics systems, the trade barriers have been decreased and the logistics services requirements as well as cost constantly raises, so various businesses, especially on international level, change attitude to material storage, production and product distribution (Rimiene and Grundey, 2007).

We know the process of globalization economy have important effect on the competitive advantages of logistics system in international level. Accordingly, the purpose of port logistics systems to solve management problems of optimal movements of various flows (informational, material and financial), it is necessary to manage not only physical movements of flows or suitable selection of its technological guidelines, but also it is very important to ensure a smooth decision-

making process for the selection of flows movements alternatives, to increase its effectiveness in a view of the effectiveness of port logistics systems. So it is important to improve the effectiveness of logistics system of China. But, China's port logistics development at the third generation port logistics in the initial stage, many aspects are not perfect, especially on management mode, operation strategy and the globalization of integrated port and gap. In the port logistics transportation have made some progress, but still has many deficiencies, such as China's port logistics transport efficiency, single mode, management way is not perfect, the service quality is not high, backward management idea.

With the development of economic globalization, China's port logistics transportation must be synchronized. With the world to long-term development, just have competition ability; get rid of single items displacement function, built with the influential world port logistics chain system. Play area advantage, advance the reform in order to long-term development, completed the integrity of the logistics supply chain system, to provide customers around the world the multifunctional integrated logistic service, let your port logistics transportation competitiveness and occupy their own long-term market is our country logistics path must complete objectives. The future of transport logistics must be more humanization of service and pay more attention to the emergence of new logistics demand, now the electronic commerce is an important logistics demand and it has great potential. At present, the intervention of the third party logistics of electronic commerce in the larger, traditional large-

scale logistics enterprises feel in e-commerce force later, third parties have occupied a large market share (Xie and Yang, 2010). China's port logistics must pass a stand on one's own developing its infrastructure and then continue to seek cooperation in various areas to enhance their comprehensive transport capacity of the process, from a single loading and unloading of goods, storage of goods, personnel transfer, developed to provide cargo plus workers to provide necessary places and facilities, each respect services continued to follow up, this requires the port logistics transportation continuous technology and the concept of innovation, from the traditional monopoly to the fair competition, logistics transportation confronted with hitherto unknown challenge and opportunity.

The objective of this study is to improve and increase the logistics system effectiveness and to solve the problem of optimal movement of different flows and give some advice on improving the effect of Chinese port logistics transportation.

MATERIALS AND METHODS

Port logistics transportation related definitions:

Port definition: In the past, we thought the port is used for the ship to provide goods up and down, personnel transfer, sea supplying and other aspects of natural harbor. It has a single function and the size of the mostly rely on haven nature condition. But the modern port is defined as a gap; the significance of modern port is a comprehensive concept, now we think port does not simply refer to the traffic hub, the distribution of goods and the personnel transfer. On the deeper administrative level, the port is a logistics base with many integrated functions. For port logistics and transportation, it provides the necessary infrastructure. Logistics support is the logistics hub and logistics node, which is one of the logistics enterprise's sets (Bao, 2012; Berruto *et al.*, 2011).

The port: Port structure generally includes the necessary elements, necessary technical support, infrastructure and good natural conditions. A place near the rivers and lakes cannot be called a port or transformed into port. The port has a land, which is used for personnel on the ship, cargo handling, storage loading and configuration of the area of land; the port also includes a port area and port hinterland. The general requirements of the deep water harbor area are the smaller natural conditions. Port hinterland is generally used for freight and personnel placement or provides necessary service facilities. The port hinterland has a flat terrain, convenient traffic conditions, which can save capacity. Port formed is shown in Fig. 1.

In addition, the port is also based on different criteria for classification as shown in the Table 1.

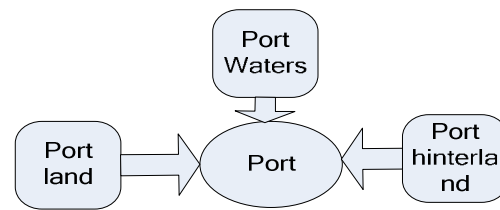


Fig. 1: Port formed

The definition of port logistics: Port logistics is a comprehensive definition, from a different perspective to the analysis of different definitions. Based on port logistics activities of port logistics definition can be, port logistics is to port as the center of the transport, storage, handling, packaging, distribution processing agent, information processing and logistics sectors organic combination, formed a complete logistics supply chain. For the vast number of users with multifunctional integrate logistics service system. In addition the port logistics can also function of the port and port operations in the respect (Martin, 2012). Such as mode to define, but integrated each respect of the argument, we can put the port logistics as defined in this way, the port logistics is to port as the center of a service platform, including traditional goods displacement function, transfer function, but also with the modern logistics of a comprehensive and integrated services, is one with its own characteristics of the particular way (Zhan and Guo, 2011).

Port logistics transport inquiring method:

To carry out effective market investigation: The accurate market information is get from the effective market survey. There are many market investigation methods, such as questionnaire, on-the-spot investigation, data analysis and other methods. Questionnaire survey comprises a closed questionnaire and open questionnaire or an online questionnaire. A general questionnaire has a certain reference value, but the inclusion of many subjective ideas, but not all lessons. To distinguish to capture the market demand and information, field research has great realistic, survey data has important reference value, field research is divided into different regions and customer regional survey and data analysis, including to operation data were analyzed, including the expected capacity prediction analysis. Questionnaire needs to design the questionnaire survey question. Whether the open or closed questionnaire, the questionnaire must carry on the reasonable setting of the problem, the simple on the service quality of investigation. Investigation object need only a yes or no answers to the questionnaire. We think that it is not level which can find out the actual problems the questionnaire should generally include the following contents (Table 2).

Table 1: Different criteria for classification

Classification standard	Port type
The nature of use	Commercial port, industrial harbor, fishing port, port, naval base and so on
Geographic location	River, lake port, harbor
Size	The world port, international port, regional port
Type of goods	Professional, comprehensive port
The role of international container transport	Regional port, trunk line, branch line harbor port

Table 2: Questionnaire survey shall include the following contents

Survey project	Survey contents
Customer demand investigation	<ul style="list-style-type: none"> • Transport area resource distribution and regional economic development level • Current customers to understand main geographical distribution and quantity • Customer classification, transportation, economic ability • Customers of the goods transport direction, distance, change rule • The customer's transportation habits and psychology • Customer satisfaction • Changes in customer needs
The current freight services so and quality investigation	<ul style="list-style-type: none"> • Transport service area logistics transport team to supply the market situation and development trend • Of all transport and logistics situation • Potential crisis investigations, including competition development strategy, market share and cost control survey

DATA ANALYSIS

Data points should be placed in the port logistics transportation data descriptive analysis, transportation data by linear regression analysis, variance analysis, transport transportation main component analysis and typical correlation analysis; In addition, it can also be used for data discriminant analysis, cluster analysis, Bayes statistics and analysis. Data analysis is very professional, but it has important guiding significance for the development of enterprises. So the data analysis adapts to the logistics and transport management trend.

For example, we want to make the logistics transport vehicles equipped with the least cost and maximum benefits. We can use the following method.

The establishment of an appropriate mathematical model:

- If $P < Q$, namely the logistics delivery center daily necessary number of vehicles than the configuration of the vehicle is less, the cost is equal to the transport costs and the idle costs and, that is:

$$A = P * A1 + (Q - P) * A2$$

- If $P > Q$, namely the logistics delivery center daily necessary vehicle number than the configuration of the vehicle, the cost is equal to the cost of transportation and rental costs both and, i.e.:

$$A = Q * A1 + (P - Q) * A3$$

If $M(P)$ is day-to-day logistics transport must vehicle number corresponds to the probability, this objective function:

$$A(Q) = \sum_{q=1}^q [M(p) * \{p * A1 + (Q - P) * A2\}] +$$

$$\sum_{p=Q+1}^{\infty} [M(p) * \{Q * A1 + (P - Q) * A3\}]$$

On target function on both sides of P derivation, get the following equation:

$$M'(Q) = \frac{\partial}{\partial Q} \sum_{q=1}^q [M(Q) * \{p * A1 + (Q - P) * A2\}] +$$

$$\sum_{p=Q+1}^{\infty} [M(Q) * \{A + A1 + (P - Q) * A3\}]$$

According to the function's extremism principle: let $M'(P) = 0$
From equation:

$$\sum_{p=Q+1}^{\infty} M(Q) = 1 - \sum_{q=1}^q M$$

The $M'(P) = 0$ finishing:

$$\sum_{Q=1}^Q M(P) = \frac{A3 - A1}{A3 + A2 - A1}$$

$$\sum_{Q=1}^Q M(P) - A \text{ frequency coefficient}$$

Through the above function we get the conclusion. When $A1 < A3$, you can select the appropriate value of Q , makes the above function is established, which makes the final target cost function $A(Q)$ to get the minimum value.

In addition, according to the above function discussed, only when $A1 < A3$ and the logistics and transport enterprises owned vehicles less than the cost of Rental freight vehicle costs less, the conclusion is established. Conversely, when $A1 > A3$, namely the logistics transportation enterprises owned vehicles cost

above the vehicle rental fee when the conclusion, it makes no sense. This time, if the logistics transportation enterprises owned transport vehicles transport cost is increased.

**China's port logistics transport of SWOT analysis:
China's port logistics transportation advantage analysis:**

- China's port logistics has superior geographical position. Most of the ports have a good natural condition. The port's waters are deep, which is suitable for large ships to dock. They have a vast hinterland for goods distribution, warehousing and packaging processing. They provide a strong place as the port logistics transportation services provides a good material basis. The port construction in China started late, but the specification relatively high, port logistics technical equipment, ancillary facilities, for China's logistics and transport to the comprehensive integration of the development trend of evolution, provide a good foundation (Jin, 2008).
- China's logistics transportation price and the railway network and high-speed network advantages. Because the Dalian railway port logistics companies rely on the railway transportation, railway and highway and active freight rate compared with the industry has great advantages, due to the railway transportation energy consumption is low, so the rate is low and the highway, water age is roughly equivalent. The railway station has a complete logistics infrastructure in our country, with the opening of the Qinghai-Tibet railway, China Railway has almost all over the country's railway station, in each big city, an important port has a large freight station, enterprise special line, form modern logistics transportation required a strong logistics network entities, these for our modern logistics provides network management base.
- Our country logistics transportation volume is very big and has the advantage. In view of railway freight, car load is relatively large and marshalling train transportation, usually each column can achieve 3500-5000 tons, such a large load of aviation and highway transportation can't be compared. Rail transport is suitable for the transport of large amount of materials, such as coal, oil, food, steel and other bulk materials. Logistics and transport large customers save transportation costs, but also for the logistics transportation brought huge benefits.

China's port logistics transportation disadvantage analysis:

- China's logistics transportation cycle longer, efficiency is not high, the transport capacity is tight

and there are many unfavorable factors such as the presence of two short-distance transport advantage (Gu-Qing *et al.*, 2010). China's port logistics by railway transportation capacity, but the railway complex procedures, affect the cargo transport efficiency and speed. In addition, because our country railroad passenger and freight trains on the same line is mixed run. It has no professional freight rail system, which also influences the train speed of transportation. In order to save customers' time that have effect on efficiency and also have a loss, adverse to the material flow efficiency and timeliness security.

- China's port logistics transport logistics information management and technology behind and cosmopolitan port has a big gap with the improved country. Port information platform development lags behind that leading to the port railway transportation departments lack of effective and that means of communication the information cannot be timely and effectively transferred (Wu, 2011). That lead to this situation has resulted in China's port logistics and transportation links poor convergence. IN order to meet customer requirements and improve the logistics service quality.
- China's port logistics personnel lack professional especially with modern logistics consciousness of senior management personnel shortage. At present our country port logistics transport practitioners from the low level of education, educational classes do not focus many people from other industries and transformation, the professional qualities of the problem is very serious. Talent is to promote the development of the enterprise effectively, China's port logistics transport personnel lack of logistics professional services limited, logistics enterprise management level to improve, restricted the rapid development of port logistics industry and logistics supply chain system construction.

China's port logistics transportation opportunity analysis:

- In recent years, economy of our country region development and optimization of industrial structure, especially in the western development, mid rise abruptly the strategy implementation, as well as the revitalization of northeast old industrial base facilities, to the logistics market in our country has brought the huge opportunity. In recent years, China's e-commerce development is rapid, but the logistics transportation has brought new opportunities, logistics for the long-term development with huge market, our own auto industry development, also led to the development

of port logistics and transport, to the logistics and transport industry has brought huge profits.

- The national policy supports our country logistics. In recent years, the country has defined the logistics industry in the service industry in the industrial position, have issued a series of supporting the development of the logistics industry policies and the revitalization of the logistics industry development planning, to promote the rapid development of the logistics industry. In support of policy at the same time, the government promulgated the logistics related standard, promoted China's port logistics transport standard, China's port logistics integration into the world markets laid the foundation for the development of the logistics industry, to provide a favorable external environment.
- The Chinese government introduced the policy to accelerate haven construction. With the implementation of state policies, China's coastal areas using its dominant position, developing port logistics and transportation industry, the haven of our country construction has achieved good performance. Many ports enter the world big harbor ranking.

China's port transportation challenges:

- China's port logistics face the large-scale logistics enterprises in the competition. Along with the economic globalization and region economy collectivize acceleration, international logistics and Transportation Division constantly refining, distribution services, transport services and warehousing, freight forwarding services open to the outside world, the international and domestic well-known large-scale logistics enterprises have entered China. The logistics soil formed huge impact. So far, China's logistics industry has ranked the top 10 COSCO, Sinotrans, storage and transportation, G. logistics, international well-known Maersk, ProLogis, FedEx, DHL, TNT have been in China established a branch, covering the growing network.
- As China's port logistics transport internal logistics capability development and enhancement, large enterprises to reduce logistics costs, will continue to extend the depth of its business, since the formation of the integrated logistics system. This kind of system to guarantee the quality of service is a significant challenge.

China's port logistics transportation overview:

Transport logistics is the supply chain in the main function of one of the elements. The port logistics has developed rapidly in recent years and has been involved in all aspects of economic life. Capacity with the development of science and technology are constantly improving. In recent years, our country highway and railway construction have achieved significant results.

Table 3: In 2011 before the whole world big harbor container handling capacity (unit: million TEUs)

Port name	2010	2011	Growth rate (%)
1 Shanghai	2905.00	3173.90	9.30
2 Singapore	2842.50	2993.70	5.30
3 Hong kong	2343.20	2422.40	3.40
4 Shen zhen	2250.97	2249.90	0.00
5 Busan	1419.40	1617.50	14.00
6 Ning bo	1315.12	1463.93	11.30
7 Guang zhou	1252.00	1430.80	14.30
8 Qing dao	1201.17	1302.04	8.40
9 Du bai	1160.00	1200.00	3.40
10 Rotterdam	1110.00	1190.00	7.20
11 Tianjin	1008.00	1149.41	14.90
12 Kaohsiung	918.12	945.70	3.00
13 Klang	887.00	890.00	0.30
14 Antwerp	848.30	866.40	2.10
15 Hamburg	790.00	860.00	8.90

The corresponding transport capacity has also been upgraded. Chinese shipbuilding technology has made great progress. The harbor construction ability was significantly improved and various ancillary facilities are also equipped with the relatively perfect. But because our country carries a career started late, the economic strength of the support, but in the management and operation of the concept of soft strength is not mature, it still have very big difference. In general, the haven of our country transportation system has been formed, but its connotation also need filling. There is a great promotion space and the service quality still needs to be improved; on the other hand, China's port logistics transportation needs with the development of economy unceasing enhancement, our logistics enterprises such as bamboo shoots after a spring rain as development rapidly, but has certain blindness, on their own market position has defects, transport network construction relative lag, resulting in a large number of waste. Information delivery and use of the degree is not high, only alone, without the market dominance. But from 2005 to 2011, the world big harbor container handling capacity, our country's logistics transportation quantity is very big, also occupied a certain world market. China makes the world big country, many countries foreign trade partner. This is our country's logistics transportation which means both opportunities and challenges (Wang, 2010).

From 2011, in the ten largest port world rankings, which is shown in Table 3, China's Hongkong and Kaohsiung are in the top ten only. This indicates that China's port logistics market share with the international is a gap, but from 2005 to 2011 World Congress of port container through put in China. We find that the port logistics develop quickly (2005 to 2011 the world's ten largest port container throughput as the Table 4).

The impact of China's port logistics transport factor:

- Transport links are too complex, resulting in the low efficiency. Too much transportation cause the

Table 4: 2005-2010 the world's 15 largest port container throughput (/TEU standard list box)

Ranking	Port	Country or area	2010	2009	2008	2007	2006	2005
1	Port of Shanghai	China	29,069,000	25,002,000	27,980,000	26,168,000	21,710,000	18,084,000
2	Port of Singapore	Singapore	28,431,000	25,866,000	29,918,200	27,932,000	24,792,400	23,192,000
3	Hongkong	Hongkong	23,699,000	20,983,000	24,248,000	23,881,000	23,538,580	22,602,000
4	Port of Shenzhen	China	22,510,000	18,250,000	21,413,888	21,099,000	18,468,900	16,197,173
5	Port of Busan	The republic of Korea	13,144,000	10,502,000	13,425,000	13,270,000	12,038,786	11,843,151
6	Ningbo Zhoushan port	China	13,144,000	10,502,000	11,226,000	9,349,000	7,068,000	5,191,000
7	Port of Guangzhou	China	12,550,000	11,190,000	11,001,300	9,200,000	6,600,000	4,684,000
8	Port of Qingdao	China	12,012,000	10,260,000	10,320,000	9,462,000	7,702,000	6,310,000
9	Port of Dubai	United Arab Emirates	11,600,000	11,124,000	11,827,299	10,653,026	8,923,465	7,619,222
10	Port of Rotterdam	Holland	11,140,000	9,743,000	10,783,825	10,790,604	9,654,508	9,286,757
11	Tianjin Port	China	10,080,000	8,700,000	8,500,000	7,103,000	5,950,000	4,801,000
12	Port of Kaohsiung	China	9,180,000	8,581,000	9,676,554	10,256,829	9,774,670	9,471,056
13	Port Klang	Malaysia	8,870,000	7,309,000	7,970,000	7,120,000	6,326,294	5,543,527
14	Port of Antwerp	Belgium	8,470,000	7,309,000	8,662,890	8,175,951	7,018,899	6,488,029
15	Port of Hamburg	Germany	7,910,000	7,007,000	9,737,110	9,889,792	8,861,804	8,087,545

whole system running slower and greatly affected the capacity to make full use of and make personnel and transport double waste (Zhang and Chuan-Zhong, 2012; Rongsheng *et al.*, 2010).

- The transportation distance positioning unreasonable, logistics enterprises to broaden the market when there is no reasonable planning and led many to grasp the reasonable distance and causes the enterprise the burden.
- Many enterprises of the transport logistics transport replacement did not keep up with demand, leading to technical service lag to restrict enterprise capacity upgrade, which broaden the market and the strength of their own do not adapt to.
- The carriage, unreasonable planning, a lot of transportation enterprises blindly increase their coverage; ignore the quality guarantee, logistics safety prompt is not effectively protected.
- Logistics and transport enterprises are lack of emergency security system. This resulted in a surge of goods when the goods appear insufficient capacity and large stranded adverse consequences.

RESULTS AND DISCUSSION

- Enhance corporate decision makers and staff quality, to update the concept. Active absorption of foreign advanced management mode, professional training for staff, enhances professional quality, establish a better service consciousness. Strengthen the cultivation of logistics talents in port logistics development to catch up with the world advanced countries and regions of the port logistics development level, the key is to cultivate a large number of master modern logistics management technology specialization and compound talents. Modern logistics management personnel can be introduced, but the more essential is to rely on their own culture. We should establish a set of powerful logistics management talent education mechanism, the reality of education and university education organically, through a variety of ways to cultivate a large number of adapting to the development of modern logistics industry talents.
- Improve the transport division of load rate. In the transport process, in order to avoid the no-load,

reasonable allocation of existing resources make full use of the function of transportation with no vacancy transport.

- Reducing the power input and improving the transport capacity. Reasonable planning their own market, in the market the best later, accumulated strength to broaden the market.
- Reasonable billabong, avoid the accumulation of goods. On the rational allocation of resources, to shunt can improve transportation mobility; ensure transport logistics at any time can be timely to ensure the safety of customers demand. Combined with regional port, enterprise resources, organizing logistics alliance to use area advantage, build and the ports of good relations of cooperation; strengthen the supply business contact and understanding, to identify the core customer. Due to the current northeast logistics enterprise dimensions is general and lesser, actual strength is weaker, low management level and enterprise internal limited resources, development rate is slower, can be absorbed by the external resources, complement each other, in a relatively short period of time to maximize the realization of the whole benefit, help improve the competitiveness of enterprises.
- Try to develop direct transportation. Roundabout transport will cause a lot of waste of resources that direct can be enhanced the efficiency. To improve the enthusiasm of the staff can also reduce the working burden. The development of logistics business customs clearance operations carried out smoothly, make goods in situ real-time transportation port, port logistics can accelerate speed, shorten the imported goods demurrage time, possibly even to achieve "zero inventory" production and thus savings down warehousing space and the transportation time is the sense that develops to the enterprise be no trivial matter.
- Through the circulation processing rationalize transportation. On the circulation of information integration can create efficiency, so that the logistics transportation information degree, timeliness be protected effectively and enhance the capacity.

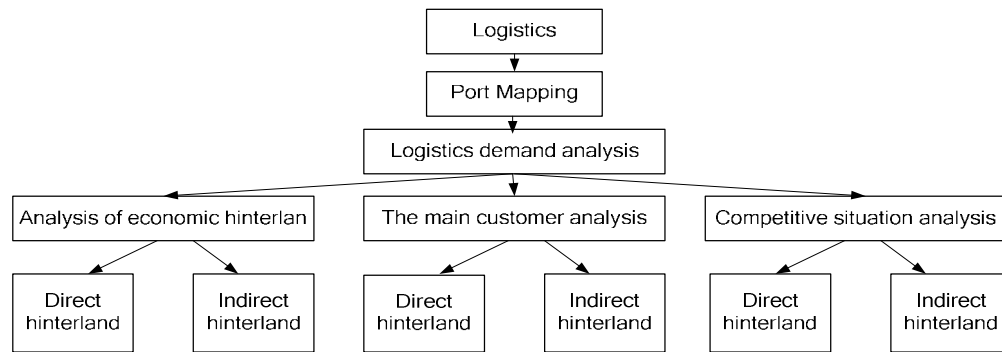


Fig. 2: General survey of port logistics mode

The world port logistics and transport are actively engaged in upgrading and transformation and gradually to the comprehensive integration of the mode change. China's reform has begun. In recent years, our country third party on our traditional transportation logistics formed huge impact. To cast off this kind of predicament to must be in the industry service good circumstances, be innovative in order to break through the bottleneck of the development of the logistics, now more and more human-oriented service. Constantly improve the level of logistics services; the industry standard in the competition also has been improved. With the rapid development of electronic commerce, the logistics development presents individual more, these individuals are also important as potential customers, logistics transportation enterprises, must make a reasonable strategy to integrate these resources, do not put fine timber to petty use nor guest of inn big bully. In view of the increasing development of electronic commerce developed in line with market demand of transport strategy is a very potential direction, is also a new direction. With the development of transport, competition to cooperation, various logistics enterprises in competition at the same time and more exchanges, enhance regional cooperation is the logistics transportation sustainable development is an important node. On the right of the advantage of oneself, master first-hand market and customer data, comprehensive analysis, bold prediction industry prospects, reasonable to avoid potential risks. General survey of port logistics mode is shown in Fig. 2.

Through the analysis of the information feedback, we can better analyze its position is reasonable. To know their advantages and disadvantages make reasonable deal with competitors. China's port logistics innovation in the current level of the first thing to do is based on its own characteristics of the market, improve their service quality, absorb the advanced management concept and accelerate oneself into the third generation of logistics market footsteps. To innovation will have to according to the market demand for the introduction of the characteristic service and efficient operation mode

to promote the development of their own strength, direct express logistics transport is a good direction, but in terms of cost control needs a lot of improvement.

CONCLUSION

Port logistics has great potential to grow with each passing day and the market demand China port of the upgrade process. Logistics and transport are the important part of the update. In order to strengthen the port logistics transport management, enhancing the ability of logistics transport is an important way to improve the Support logistics transportation safety and timeliness. And paying attention to content to shed carriage economy and environmental protection consciousness is the logistics transportation development must face the problem of logistics. In our country, the market is huge with rapid economic development and improvement. The logistics supply chain system is built to guarantee the economic development lifeline. We must improve themselves and the world synchronization and innovate their logistics transportation mode can be in the strong competition in the market to find their own way to live.

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