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WORLD MARITIME UNIVERSITY

Shanghai, China

**RESEARCH ON CRUISE SUPPLY CHAIN IN
CHINA-THE CASE OF SHANGHAI**

By

ZHAO DANBI

China

MASTER SCIENCE

ITL-2015

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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Abstract

Cruise tourism is a mature industry in western countries while it is still a developing industry in Asian countries especially in China. As the most fast-developing country in the world, China is becoming stronger and stronger. On the other hand, more and more Chinese people are willing to accept cruises tourism and afford this kind of expensive tourism pattern nowadays. In China, coastal cities like Shanghai, Dalian, Qingdao, Sanya want to build and develop cruises ports to welcome more cruises to berth so that bring more benefit to local government. However, cruises supply chain in China is not so sophisticated compared with those mature cruises port cities like Miami and Barcelona. In cruise supply chain, Shanghai is relatively sophisticated especially in the ports infrastructures and urban atmosphere in China.

Shanghai was the first harbor city could berth international cruises and with most international cruises to berth nowadays in China. As the most sophisticated cruise port in China, Shanghai has obvious regional advantages like natural good ports and governmental assistance. On the other hand, except for the natural advantages, as the richest city and with the strongest economic foundation in China, Shanghai is able to develop cruises tourism industry better compared with other domestic harbor cities. Nowadays, all the 4 largest cruise companies have set agencies and

subsidiary corporations in Shanghai, which means shanghai has already been one of the most important cruise port cities in the world. What's more, Shanghai has been an important travel destination in the world for a long time and with an increasing number of exit. Therefore, the future of Shanghai cruises industry is bright and wide.

Key words: cruise, supply chain, Shanghai, cruise industry chain

1.Introduction

1.1Background of cruises supply chain in China-the case of Shanghai.

The original meaning of cruise was those large passenger ships which sailing on fixed routines and period in the sea. However, with the appearance and development of plane industry, the original transatlantic cruise had vanished from the history stage. Nowadays, cruise means tourism liner which sailing in the sea. Modern cruise is with nature of tourism like moving large hotels. On the other hand, it is actually a travel destination with every kind of entertainment facilities. It is a large-scale industry in European countries and America currently. There are 300 to 400 cruises bearing large amount of tourists sailing at the Caribbean, the Bahamas, Bermuda, Alaska, Hawaii, the gulf of Mexico, the Mediterranean Sea, North Europe and other countries or regions. In terms of cruise ship type size, cruise can be divided into major cruise (over 2000 tourists), mid-sized cruise (1000-2000 tourists) and small cruise (less than 1000 tourists). In terms of the waters of the vessel sails, cruise can be divided into ocean cruise, near-sea cruise and inland cruise. The voyage of ocean cruise is longer usually between 10 to 15 days while near-sea and inland cruise are always under 7 days.

With the fast development of China, mysterious cruise is getting close to us. The first time an international luxurious cruise berthed Chinese ports was in 1980s. In the past 10 years, more and more international large cruises chose to berth in China. In 2006, Italian Costa cruise opened the first cruise liner service in China which took Shanghai as cruise home port. At the same time, many other international cruise companies focused on China to develop emerging cruise market. In 2007 and 2008, world cruise conference was held in China. Different luxurious cruises got together and were ready to enter into Chinese market massively. It meant China would going to become a wonderful new world in the cruise history. The 2008 Beijing Olympics and 2010 Shanghai Expo not only improved China's international influence but also attracted more tourists to China. It was a huge boosting to Chinese cruise economy. According to the prediction of international tourism organization, China will become the largest travel destination in the world until 2020.

In China, coastal cities like Shanghai, Dalian, Qingdao, Sanya want to build and develop cruises ports to welcome more cruises to berth so that can bring more benefit to local government. However, cruises supply chain in China is not so sophisticated especially compared with those mature cruises port cities like Miami and Barcelona. Shanghai is relatively sophisticated in cruises supply chain especially in the ports facilities and urban atmosphere in China.

Shanghai was the first harbor city could berth international cruises and with most

international cruises to berth nowadays in China. As the most sophisticated cruise port in China, Shanghai has obvious regional advantages like natural good ports and governmental assistance. On the other hand, except for the natural advantages, Shanghai is the richest city in China and with the strongest economic foundation, Shanghai is able to develop cruises tourism industry better compared with other domestic harbor cities. Nowadays, all the 4 largest cruise companies have set agencies and subsidiary corporations which means shanghai has already been one of the most important cruise port cities in the world. What's more, Shanghai has been an important travel destination in the world and with an increasing number of exit tourists. Therefore, the future of Shanghai cruises industry is bright and wide.

1.2Significance of analyzing the cruise supply chain in China.

Cruises is an old and traditional industry while supply chain is relatively a new concept. To research it we need to combine the two concepts together. Putting cruises and supply chain together is helpful to understand what the whole supply chain is.

It is important to study cruises supply chain because we need to understand cruises industry from the aspect of supply chain and know how to combine and optimize it with the supply chain horizon rather than traditional horizon.

Due to the fact that cruise supply chain is relatively a new concept, it is difficult to

find more available data and papers to research it. Therefore, through analyzing the cruise supply chain, we can understand deeply about this concept and contribute to the research of cruise supply chain.

1.3 Research status of cruise supply chain in domestic and overseas.

The history of cruise is not so long but cruise industry has developed quite fast and sophisticated especially in western countries. The major market of cruise industry is in North America and Europe especially in Caribbean. In terms of Asia, it is the most potential and fast-developed area in the world including cruise industry. Since 1960s, more and more cruises were put into use to service more tourists. The length and tonnage also developed rapidly. On the other hand, the number of passengers also increased at a surprise speed.

Accordingly, the research on cruise supply chain in western countries is much more sophisticated while Asian countries like China are just at the beginning stage. Singapore, Hong Kong and Malaysia were the three largest cruise ports and Shanghai is developing rapidly to build mature cruise home port. In America and Europe, some famous universities and agencies set professional cruise courses to spread the professional knowledge. However, in China, especially in Shanghai, professional cruise education is getting more and more attention. For example,

Shanghai Maritime University has set an EMBA program majored in cruise.

Obviously, this EMBA program will offer more and more professional talents to help developing cruise industry in China.

In terms of sophisticated cruise economy development, professional cruise port, standard cruise tourism market and appropriate cruise development environment are necessary. It was also an important step for Shanghai to develop cruise economy to build North Bund cruise port.

1.4 Research purpose

According to past research, they were either focus only on cruise economy or focus only on supply chain. Only little paper put the two concepts together to research its economy meaning and potential benefit.

This paper is going to research the potential benefit will bring to Shanghai of cruise supply chain. In the whole supply chain, there are lots of nodes that each node is too important to be ignored. Travel intermediaries put cruises, cruise home-ports, each port of call and the products and service of transport service provider with cruise home-ports and tourists places together to satisfy the multiple demand of tourists. At the same time, the four kind of service suppliers face to the tourists directly in the cruises supply chain and develop core competence better in each service link to satisfy personal demand of tourists. Tourists are the main body while travel

intermediaries is the core factor of the tourism supply chain. Travel intermediaries should not only purchase required products and service from relevant enterprises according to the demand of tourists but also need to integrate the service of each service provider and coordinate between different services to achieve the purpose of tourism supply chain optimization.

1.5 Research methods

In order to finish the paper completely, data collection and data analysis are significant.

The variables and related data requirements of the research questions and hypothesis are listed as below:

- List of cruise supply types
- Foods consumption of a 140,000 tons international luxury cruise on the 7th voyage
- The number of international cruise voyages and passengers of entry and exit Shanghai ports from 2002 to 2014
- The purchase quantities in Shanghai of Costa Atlantica's voyage
- Cruise industry related policies of Shanghai FTA
- Shanghai figure compared with cruise port of Miami in 2014
- Person-time chart of 2014 Shanghai Cruise Terminal's tourists
- 2002-2012Shanghai port international cruise and the number of passenger entry number
- Shanghai 2008-2012 overseas travel and cruise control table

- Comparison of the law of CLIA and the nation

Data should be specific and this paper will use Stackelberg model to calculate the derivatives and finally calculate the profit proportion to prove the current situation of Shanghai cruise industry chain.

1.6 Structure arrangement

This paper is divided into five parts. The first part is the introduction including the background of cruise supply chain in Shanghai, the significance of analyzing cruise supply chain in Shanghai, the current research status in domestic and overseas. On the other hand, this paper also stated the purpose and research methods of this research paper.

The second part is mainly focus on cruise supply chain. It is going to talk about the basic knowledge of this new concept like components, concept, operational pattern and potential benefits. It also analysis the cruise supply chain in detail from different angles like cargo owners, ship owners, ports and shipping lines. At last, it analyze the potential benefits of cruise supply chain will bring to local ports and government.

The third part is mainly talking about the case of Shanghai. It analyze from the history of Shanghai as a cruise port, locational factors, hardwares and current situation. On the other hand, the paper also compare Shanghai lenthways (before

and after developing cruise home port) and compare Shanghai with other

sophisticated cruise cities like Miami and Singapore.

The fourth part is mainly talking about the opportunities and challenges of Shanghai to develop cruise supply chain. As the fast-developed metropolis in the world, Shanghai has its own advantages and also restrictions to develop cruise supply chain. In the fourth part it talks about the current situation in domestic and overseas of cruise supply chain. Lastly, it offers some available suggestions to boost the development of cruise supply chain.

Finally, in the fifth part, this paper will give the conclusion of this research paper.

2.CRUISE SUPPLY CHAIN

2.1Concept of the cruise supply chain (from the aspect of cruise companies and ports)

Cruise tourism industry is that cruise undertake the sea tour and leisure travel of main transportation function. Nowadays, research tourism industry from the aspect of supply chain has developed rapidly. In 1997, C.J.Horward defined tourism industry

as an industry which aims to satisfy different services of tourism demand and offer a core department major in tourism industry: transportation department, accommodation department, scenery department and tourist organization department analytical framework.

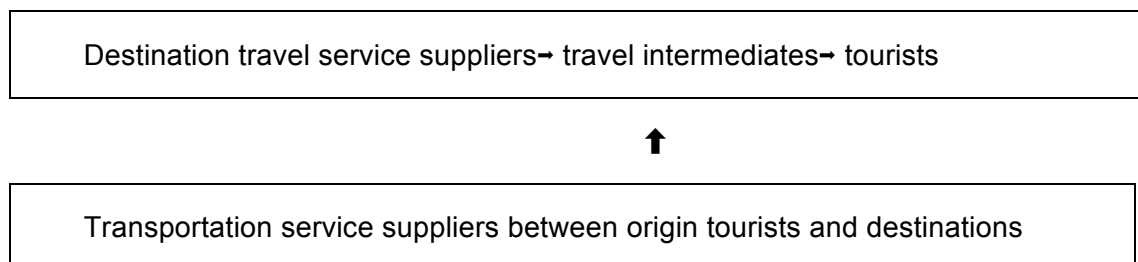
Generally speaking, the constituent elements of tourism products can be divided into three items: The first one is destination resources like manmade attractions and ancient spots. The second one is destination facilities like hotels, restaurants and resorts. The last one is the transportation from original tourists to destinations like different kind of transportation ways.

Cruise tourism products consist of transportation services between original tourists and cruise home ports, cruise home port services, cruise and cruise lines. In the cruise tourism, cruise is not only the transportation tools but also the different kind of service suppliers like food and beverage, entertainment, gyms and accommodation. On the other hand, cruise itself sail on the sea to let tourists appreciate the scenery along the sea. Therefore, cruise itself has covered the three constituent elements of ordinary tourism products (transportation, facilities and resources). Actually, cruise itself is a travel destination. Each cruise has its own theme and suit for tourists from different ages and interests.

Cruise home port mainly offer connection services for tourists and through fully satisfying different products and demand of cruise to offer services to tourists

indirectly. In cruise lines, each port of call undertakes the function of land sites and tourists can choose shore activities to increase travel experiences.

According to the traditional travel supply chain:



In fact, the operation of domestic tourism industry takes travel agencies as core, for the node each related industry enterprise link into together to become vertical integration mode to serve tourists. This is a typical traditional supply chain mode. Research shows that during the transition period of tourism, current domestic traditional supply chain mode (takes travel agencies as core) will change significantly. Core enterprises in tourism supply chain will change and become near the customers. In the new pattern, nearly all the related industries and department enterprises (catering, accommodation, shopping, entertainment, touring, etc.) can touch the tourists directly, travel supply chain core enterprises shows the changing tendency of multi-directivity evolution.

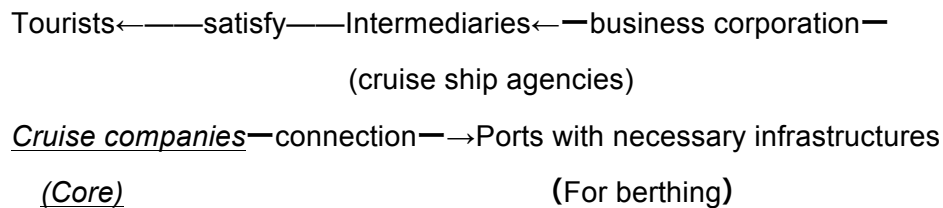
Obviously, cruise tourism supply chain consist of two service supply chain which take cruise companies as core. The first one is that cruise companies build coordinating business corporation relationship with those intermediaries like cruise

ship agencies, as the spokesman of cruise companies, travel agencies focus on customers' individual demand, integrating products from suppliers like food, accommodation, travel, shopping and entertainment of the supply chain and offer satisfying service for customers. Cruise agents play a significant role in cruise operation and are called "the guide and consultant of the cruise market", their main job is to coordinate the relationship among ports, harbors , cruise companies and each travel agent. The trust of cruise companies on ports is mainly depends on the agents' coordination ability.

The second supply chain is that with the aid of basic and auxiliary infrastructure of cruise home ports or ports of call, cruise companies offer some necessary infrastructure for berthing. For instance, channel with enough water depth, berth with enough tonnage and necessary navigation facilities to offer good condition for cruise berthing; offering related supplies service like fresh water ,fuel ,marine material, food and goods; on the other hand, a complete set of garbage disposal system is required to handle the garbage or waste of cruise immediately to maintain the environment clean of ports and build perfect green tourism supply chain system. However, auxiliary institutions like financial institutions, emergencies treatment mechanism , information agency are also necessary.

Two supply chains from different angles to complete this paper and correlation analysis for related different areas of cruise tourism industry. Obviously, each link of

the cruise supply chain exist closed relationship, once one link failed, it will affect the effect of the whole supply chain significantly. The concept of cruise supply chain can be clearly demonstrated as below:



2.2 Components of cruise supply chain

Cruise supply chain is a complicated system which consist of leisure and recreation, entertainment, shopping, banks, food and drink supply, public transportation system, travel agencies, ports and so on. Each component is equally important and all of them play significant roles in the cruise supply chain. Cruise tourism is developing rapidly in China, therefore, improving and completing the efficiency of cruise supply chain is necessary. First of all, food and drink supply is the most basic link in cruise supply chain. Due to the fact that each modern cruise can contain about 2,000-3,000 travelers and voyage is about between 5 days to 10 days or even longer, and large cruise companies are willing to offer variety of substantial delicious food to satisfy their customers. Therefore, it is significant but also difficult to offer customers variety of substantial delicious food and drink. According to Maslow's hierarchy of needs theory, it is the first level.

Table 1:List of cruise supply types

Types	Variety
Grain and oil	Rice, oil, flour, grain, noodle, bread, cookies, etc.
Vegetables	Fresh vegetables, frozen vegetables, canned food, etc.
Fruits	Fresh fruits, frozen fruits, canned food, etc.
Meat	Beef, pork, mutton, poultry, meat and other kind of meat, etc.
Aquatic product	Raw or cold food, process cold food, etc.
Beverage	Water, soft drinks, juices, wine, etc.
Dairy product	Yogurt, fresh milk, cheese, ice cream, other dairy products
Miscellany	Snacks, tea, coffee Seasoning (spices, sauce, honey, yeast, baking soda) Dry goods (beans, nuts and dried fungus mushroom, etc.) All kinds of snacks, snack food, etc.) Eggs .
Hotel supplies	Office supplies, daily necessities, electrical appliances, textile and other.

Source: harbor shipping service (Shanghai) co., LTD

**Table 2:Foods consumption of a 140,000 tons
international luxury cruise on the 7th voyage**

Foods	Consumption	Foods	Consumption
Beef	10 tonnes	Pork	2.5 tonnes
Chicken	6 tonnes	Lobsters	700 kg
Flour	7.5tonnes	Eggs	28000
Fruit	17.5tonnes	Coffee	750 kg

Vegetable	32.5tonnes	Ice cream	8000 gallons
Milk	1500 gallons	Cheese	2900 kg
Pizza	18000 pieces	Bottled beer	10700 bottles
Wine	2900 bottles	Bottled soda	11500 cannes

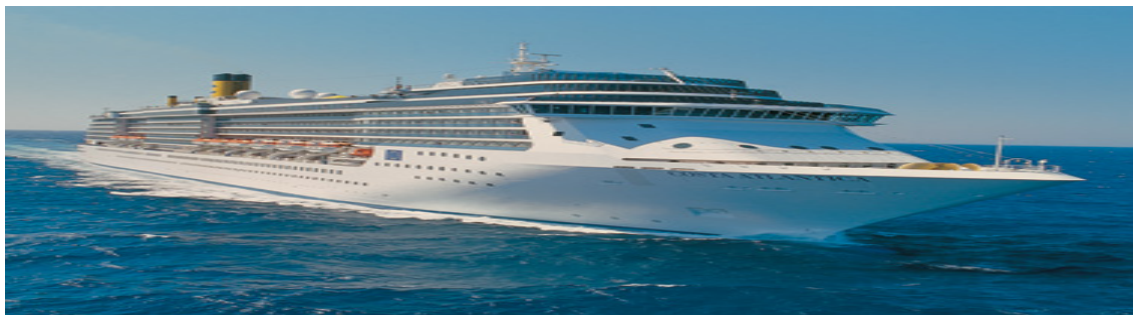
Source: Shanghai tendril shipping technology service co., LTD

Table 3:The purchase quantities in Shanghai of Costa

Atlantica's voyage

Purcha se types	Fruits	Grain s	Drink s	Condi m-ent s	Animal meats	Articles for daily use	Office supplies	Other s	Total
Purcha se amount /kg	13586 .0	18078 .1	4179. 5	2623. 4	7951.6	1542.9	753.7	45.0	48760. 2
Purcha se amount / Yuan	77779 .4	80655 .6	35044 .7	22202 .1	182462 .8	49500.1	152687.6	2722. 0	60305 4.1

Data sources: Shanghai traffic committee



From the three tables we can see that each cruise voyage need huge amount of goods and materials, and the variety is also quite complicated and much. Therefore, the supply and purchase job is quite difficult to do well.

Secondly, public transportation system is also important. From tourists place to destinations, different kinds of transportation ways like trains, buses, ships and planes need to be combined together to meet the demand of customers. After tourists go ashore for sightseeing, local transportation system will make an impression for tourists whether good or bad. Therefore, perfect local transportation system is such an important link in the cruise supply chain.

Table 4:Business parking lot (library) operating conditions (2011-2013)

Indicators	2011	2012	2013
Timing to park	10 053	11 259	13 004
Month to park (ten thousands)	3 443	4 340	5 120
Vehicle parking trains in total (ten thousands)	14 053	17 231	20 638
Operating vehicle parking revenues (one hundred millions)	12.64	14.92	17.83

Thirdly, travel agencies also play such an important role in cruise supply chain.

Due to the complexity of cruise tourism and speciality of Chinese government policy, all the Chinese tourists need to participant in cruise tourism through travel agencies.

Reliable and high-reputation travel agencies can help tourists handle complicated procedures and arrange perfect journey for them.

Fourthly, abundant entertainment facilities on cruise is also a huge attractive point for tourists. Tourists will spend several days on cruise except go ashore for sightseeing. Different entertainment facilities for different age groups are required to satisfy customers. Because tourists range from children to old people and obviously they prefer different entertainment facilities. On cruise, there are swimming pools, gyms, restaurants, casinos, duty-free shops, children's parks, chess rooms, theatres, computer rooms, libraries, etc. These facilities can meet the demand of different customers and satisfy them.

Fifthly, shopping, no matter ashore or aboard shopping, will bring huge benefit to local government or cruise companies. And this is also an important link in cruise supply chain to let customers get relaxed and enjoy cheaper goods overseas.

Sixthly, bank is also an important link in cruise supply chain. Cruise ship leasing is a high-investment and high-risk activity. Financing and loans are important for both cruise companies and ports when doing financial activities. In cruise tourism developed countries and areas, there are always equipped with financial policies which support leasing and purchasing cruises.

Lastly but also most importantly, ports especially ports management facilities are significant and cannot be ignored for cruise supply chain. Good and well-equipped

ports can berth huge cruises and also can offer better services. On the other hand, convenient custom policy is also a strong and attractive selling point.



Leisure activities on cruise

2.3Operational pattern of cruise supply chain.

A whole set of cruise supply chain is quite complicated. There are three core factors: cruise industry body, cruise repair technology and cruise supply system.

Each factor can extend to many sub-factors. Through forming local cruise companies, fostering the subject of the cruise industry, completing those links with

core control in cruise supply chain; learning available experiences from mature and experienced European teams, buying technology from European cruise repair enterprises in the form of project buying, after that, Shanghai shipyards do cruise ship repair on a large scale and learn to acquire advanced cruise repair technology gradually; increasing support of customs and other government authorities, offering convenient and preferential cruise purchasing ways, enhancing cruise supply competitiveness of Shanghai, actively involved into global cruise supply system and push the Asian procurement center moving to China.

Generally speaking, cruise supply chain needs to base on the complete public transportation system, complete ports functions and facilities, change development philosophy and focus more on terminal function of traffic distribution ability and check-in hall capacity. Moreover, satisfying customers through business supporting facilities like entertainment, recreation, shopping, accommodation and banks to build Shanghai cruise tourism center.

In recent years, Chinese government started to pay more attention on cruise tourism industry, and some related government authorities also release some policies and laws to help developing cruise tourism industry in China.

**Table 5: National ministries and local government
policy measures list Cruise since 2008**

Release unit	Release content	Release time
The national development and reform commission	On the guidance to promote the development of domestic cruise industry	2008-06
The ministry of education	Cruise professional should be brought into the national enrollment directory for the first time	2009-01
The general administration of quality supervision, inspection and quarantine bureau	International sailing ship mass disease of emergency disposal technology solutions	2009-03
The ministry of public security	In view of the cruise passengers immigration border management measures	2009-10
The ministry of transport	Foreign cruise charter to carry out the multipoint affiliated business in China	2009-10
The ministry of transport	Cruise across the Taiwan straits development policy research	2009-11
China national tourism administration,	Will cruise tourism into the waterfront tourism plan system	2010-02
The general	International cruise customs clearance policy	2010-09

administration of customs	research	
China national tourism administration,	Port international cruise travel service specification	2011-06
The ministry of transport	China international cruise ships to construction and management policy research	2011-12
The Shanghai municipal government	Shanghai cruise industry twelfth five-year development plan	2011-06

Source: "China cruise development report, 2011-2012

2.4 Analysis of cruise supply chain in detail from multi-angles like tourists, cruise companies and ports.

From the aspect of tourists, a complete and perfect cruise supply chain system can guarantee their legal interest and offer more thorough service to satisfy them. For instance, seasonable food and drink supply can guarantee tourists' basic life on board, especially nowadays, the variety of food and drink are becoming more and more abundant, enjoying these amazing food and drink is also a huge attractive point for tourists. On the other hand, entertainment and recreation facilities on board are extremely important for tourists. Spending several days on the sea is quite boring, therefore, different kind of entertainment facilities on the cruise is quite necessary. Tourists can spend their leisure time on using those entertainment facilities like

casinos, duty-free shops, children parks, gyms, swimming pools, libraries, computer rooms, theater, etc. It is significant in cruise supply chain because cruise ships are naturally scenic spots for tourists. For cruise companies, a complete and perfect supply chain also can guarantee their legal interest. Based on the cruise supply chain, the complete law and financial system can protect cruise companies for suffering some risks and dangers. A healthy and wholesome cruise supply chain is required because with the development of cruise tourism industry, the requirements for each link in cruise supply chain are more and more strict and higher. Through offering nice cruise ships and services on board, cruise companies make earnings and built their reputation in cruise industry. On the other hand, cruise companies are also willing to expand their cruise fleet to become stronger and stronger to compete in the market.

From the aspect of ports, especially cruise home ports and ports of call, they play a significant role in cruise supply chain. An excellent cruise home port has comprehensive service facilities for many large ships berth and in/out, they can also offer a complete set of service and infrastructures. Cruise home port is also the base of cruise ships, cruise ships can operate their supply procedures, waste disposal, repair and maintenance, cruise companies are willing to set the company's headquarters in the cruise home port city. Cruise home ports can push regional economy strongly, generally speaking, economic benefits of cruise home ports are

10-14 times than ports of call.

2.5 Benefits of cruises will bring to local ports and local governments.

According to the historical data, cruise home ports can push regional economy strongly, generally speaking, economic benefits of cruise home ports are 10-14 times than ports of call. Therefore, building a strong and competitive cruise home port is necessary. Through the operation of a mature cruise home port, when cruise ships berth in the ports, tourists go ashore and sightseeing. Under the circumstance, they have to spend time and money in the city like restaurants, hotels, shopping malls, public transportation facilities, travel agencies, duty-free shops, commercial exhibitions, etc. These activities will bring huge economic benefits to local government and authorities. On the other hand, it is also helpful for completing the financial support system for cruise industry and gradually open the cruise insurance and credit field. What's more, in terms of cruise law field, a complete cruise supply chain is also helpful for building perfect cruise law system to support and push the development of cruise tourism industry.

Generally speaking, a complete and perfect cruise supply chain can bring huge benefit for local cruise home port city not only economic but also reputation. On the other hand, China is not so sophisticated on industry regulatory and laws, we can

see it from the below table.

Table 6: Comparison of the law of CLIA and the nation

Operation safety	Domestic	Abroad	Other policy	Domestic	Abroad	Industrial policy	Domestic	Abroad
Emergency collection and guidance	√	√	Anti-corruption principles		√	Access specification		√
Through the bridge		√	Gambling		√	Industrial environment		√
Life jackets	√	√	Customers reception	√	√	Financial responsibility		√
Bridge program coordination		√	Sounding smoke alarm		√	Industry supervision	√	√
The lifeboat load training	√	√	Medical equipment		√	Passenger service	√	√
Life jacket storage location		√	Public services and medical skills	√	√	Ship's health system		√
Passenger loading plan	√	√	Children's safety		√			
Passenger gathering	√	√	Safety guarantee	√	√			

Passenger nationality registration	√	√	Security factors		√			
The weight loading safety	√	√	Deck work rules		√			
Assigned office location	√		Garbage management	√	√			
Related vehicles	√							

3. THE CASE OF SHANGHAI

3.1 History courses of Shanghai as a cruise home port city

Shanghai was the first port city which developed cruise economy in China. Its cruise home port scale and development level are lead in the whole country , Shanghai also give an excellent leader example to other cruise port cities in China. Building cruise home port has become an important component in construction Shanghai as an international shipping center and a famous worldwide tourism city. It is also helpful for Shanghai to improve international competitiveness and preemption strategic resources so that can effectively promote the development and transformation of Shanghai.

In recent years, with the help of related government authorities, Shanghai cruise home port has achieved greatly and cruise service system has gradually been completed. For instance, ports facilities has become more perfect and convenient. Reception capacity for very large cruises has improved greatly. In 2011, Wusongkou international cruise port (with 2 berth positions) put into use. On the other hand, cruise tourism market has developed flourishingly. The number of cruise berthed and tourists throughput ranked 1st in China. Lastly, cruise economic factors gathered quickly, more and more cruise companies thought highly of the prospects of development in Shanghai and expand their market share in Shanghai. For example, large and famous cruise companies like Costa and Royal Caribbean operated based on Shanghai cruise home port. Both of them took Shanghai as strategic center and were willing to invest more. What's more, the supporting service system of cruise is becoming more and more complete, for example, travel agencies, duty-free shops and business exhibitions operate very well. On the other hand, the operation environment of cruise industry has become more and more sophisticated with the help of national departments at all levels. Policies like more connections and openness of vessel supply market promote the development of Shanghai, China national tourism administration approved Shanghai set "Chinese cruise tourism experimental area" to offer precious opportunities for cruise industry in Shanghai; port services are making huge progress, each kind of inspection mode can be used

flexible to speed up the customs clearance speed. In 2012, the tourists number of group visa in Shanghai was approved from 5 to 2; in 2014, 72 hours transit visa-free policy has been approved. It was quite a huge progress in Shanghai cruise tourism industry and promoted the development of shanghai significantly.

Generally speaking, after several years' development, Shanghai cruise home port has achieved greatly and maintained leading position in China, presenting a strong development momentum. With the development of Wusongkou international cruise port, hardware capabilities of cruise home ports have been improved significantly and also improve the attractiveness of Shanghai cruise home port.

**Table 7: The number of international cruise voyages
and passengers of entry and exit Shanghai ports from
2002 to 2014**

Year	The number of international cruise voyages	The number of international cruise passengers
2002	33	31559
2003	15	16493
2004	29	26602
2005	25	48526
2006	29	54905
2007	43	80207

2008	60	130000
2009	111	183000
2010	168	341808
2011	161	217309
2012	180	470000
2013	195	759000
2014	269	1215200

Source: "China cruise development report, 2013-2014, Shanghai municipal transportation committee

Table 8: Cruise industry related policies of Shanghai

FTA

Release time	Release agency	Release policies	Cruise industry related policies
2013/9/18	The state council	Under the state council concerning the China (Shanghai) free trade area overall plan	Allow international shipping enterprise with foreign investment shares than can be more than 49%; Allow the ship registration of foreign investment ratio above 50%; Foreign investors can set up wholly-owned

			enterprises operate the international ship management business
2013/9/27	The ministry of transport and the Shanghai municipal people's government	China (Shanghai) free trade area, the overall solution	Encourage the development of cruise industry economy, support the development of the preparation cruise funds, promote the development of the cruise ships in our country, and drive the shipping, financial, insurance industry development; Encourage sino-foreign joint venture was established in Shanghai cruise lines extend cruise business, supporting the construction of Shanghai cruise

			<p>home port;</p> <p>To encourage the Chinese flag of convenience cruise engaged in with the home port of Shanghai on both sides of the four in the liner shipping business;</p> <p>The Treasury to carry out; In the import and export tax policy under the premise of strictly carry out the goods, allowed in a specific area to set up bonded show trading platform</p>
2014/6/28	The state council	China (Shanghai) free trade area, further measures of opening wider to the outside	<p>Allow foreign investors in the form of sole proprietorship engaged in cruise and yacht design</p>

Table 9: Cruise economy development (2011~2013)

Indicators	2011	2012	2013
Cruise ship berthing times (times)	113	180	197
Berthing at the port of Shanghai as a home port	81	128	167
Cruise passengers (ten thousands people)	20.44	35.03	75.66
Throughput at the port of Shanghai as a home port	13.80	25.58	69.79

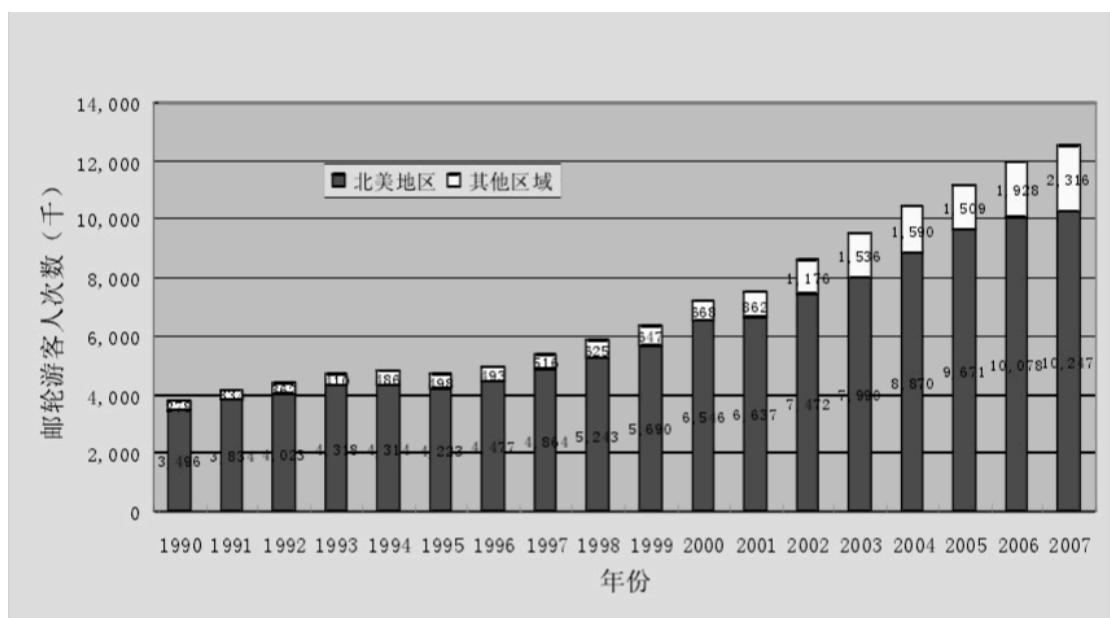
3.2 Current international and domestic cruise industry situation

Cruise industry developed from 1920s as passenger transportation tools.

However, after the appearance of jet planes, cruise industry declined. Since 1980s, cruise companies changed their strategies in order to survive. According to the research of CLIA, the rise of cruise tourism industry attracted more and more attention. After over 30 years' strong development, cruise tourism industry have been the biggest increase part in international tourism industry. The development trend of

international cruise tourism industry is obvious: from North America and Caribbean to Asia. At the beginning, the important cruise development region was in North America and Caribbean, in other words, they were hotspots in world cruise industry. Currently, hotspots are moving to the east like Asia, especially China.

Table 10:World cruise tourism market overall size and regional distribution



We can see from the picture that in 2007, the overall size of global cruise tourism market reached to over 12,000,000 and North America area was the biggest market in the world and in the absolute leading position. In recent years, although the percentage of North America tourists are declining, they can still be more than 80% in the market share. On the other hand, the average age of North American tourists was 50 years old, it was younger than 2003. Younger trend is

obvious. What's more, the educational level was higher than before. Lastly, the income of tourists was a little less than before but remained high, which means cruise tourism was also high-consumption. As for the length of journey, in North America, it is usually more than 7 days because they have longer holiday.

In terms of domestic condition, currently, the percentage of Chinese cruise tourism industry in the world is relatively low but thriving. The reasons are various like average residents consumption is still low and they cannot afford cruise trips or Chinese tourists don't know cruise tourism very well. On the other hand, in the past, international cruise companies ignored Chinese cruise market and they didn't pay attention to it or advertise; China also lacked professional cruise companies to support domestic cruise tourism development. However, with the rapid development of cruise supply chain, the construction of related supporting facilities and links also developed fast. There are huge opportunities and challenges for Chinese cruise tourism industry. Domestic cruise tourism includes two parts: one part is entry cruise tourists while the other part is domestic cruise tourists. Currently, entry cruise tourists are the main component of domestic cruise tourism market. On the other hand, in recent years, Shanghai received more and more cruise ships. With abundant tourism resources and increasingly perfect cruise tourism service system, in the future, the entry tourists part will grow significantly. What's more, with the development of domestic economy,

more and more tourists can afford cruise journey and accept this kind of new form of journey. Besides, the length of cruise journey is about between 3 to 5 days (short-term and short-range) .

Table 11:Major travel reception year operating condition

Indicators	2005	2010	2012
Reception of domestic and international tourists in Shanghai (thousands of people)	750.89	1 239.28	1 000.00
International tourists	95.11	158.25	158.25
Foreigners	90.01	147.79	147.79
Hong Kong	1.48	4.47	4.47
Macau	0.01	0.08	0.08
Taiwan	3.51	5.91	5.91
Domestic tourists	655.88	1 081.03	841.75
Outbound tourists (thousands of people)	51.71	116.86	116.86
Operating and financial conditions			
Operation income (one hundred million Yuan)	132.43	341.88	500.00
Profit total (one hundred million Yuan)	1.61	4.02	4.02

3.3 Current situation of Shanghai port

The second decade of 21st century is the key period of Chinese economy transformation development and enter into world leading economy countries, it is also a perfect timing for Chinese cruise tourism development. Taking Shanghai as example, the construction of International shipping center and international financial center are important working during “Shierwu” plan. Shanghai has been built as the third largest cruise center in Asia (following with Singapore and Hong Kong) and the best international cruise home port in Eastern Asia. Developing cruise industry and cruise economy have been listed into project, and government has tailored cruise development plan. Currently, government constantly strengthen the cooperation with domestic and international enterprises, publish some measures and support related industries development.

According to the data from CCYIA, in 2010, China received 223 international cruises and increased 42.9% year-on-year growth; took domestic coastal cities as departure ports, international cruises were 95 in the whole year and increased 18.8% year-on-year growth. On the other hand, in 2010, the amount of Chinese tourists who took cruises went abroad were about 790,000 and increased 20.1% compared with 2009; the amount of tourists took cruises came to China were about 462,000. The leader of CCYIA said that Greater China Area cruise market has huge interactivity.

Taiwan and Hong Kong will become the sixth active area in the world and important point of Asian cruise industry. In the future, Chinese cruise industry will welcome creative leap development. No matter in reasonable layout of cruise ports, research and draft of related laws, training of cruise professionals or development environment of cruise economy, will get huge breakthroughs in these years.

Generally speaking, currently, Shanghai has three huge advantages that other domestic cities cannot compare with.

Firstly, Shanghai has enough passenger resources. The population in Shanghai has reached 16 ,000 ,000 and GDP per capita are always the highest in China, which means people have enough money to afford leisure tourism like cruise tourism. On the other hand, each year, Shanghai received foreign tourists year-on-year growth, tourism expenditure population took up about 15% in the whole population.

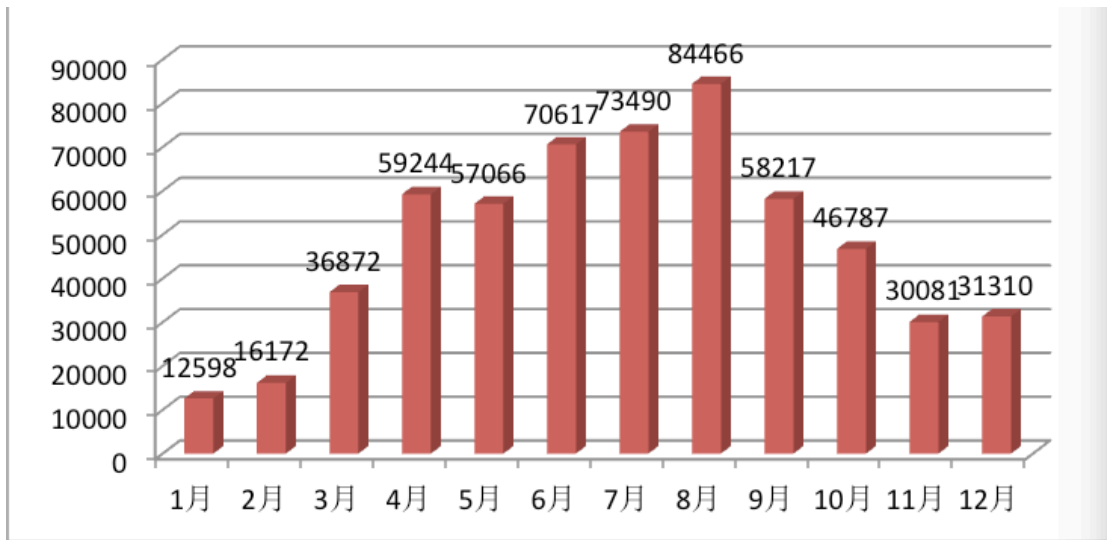
Secondly, increasing expenditure power is also a huge advantage. As well as known, Shanghai and Yangtze River Delta are the richest area in China. GDP per capita in Shanghai is 4.3 times compared with domestic average GDP per capita. And average increase speed is also higher than domestic average level. The rapid development of economy and changing consumption concepts will promote the development of cruise economy. With the development of international financial and shipping center, Shanghai will attract more and more foreign tourists and investors.

Thirdly, with complete stereoscopic transportatin network, Shanghai is more competetive than other cities. There are two international airports in Shanghai, over 10 domestic plane companies and 20 international plane companies open flight routes in Shanghai. Land transportation in Shanghai is also sophisticated, railways, national roads and highways are connected very conveniently among nearby cities.

Lastly but most importantly, with deep historical basis, Shanghai has the huge advantage to develop international cruise economy. In the past, Shanghai was always the large Asian cruise port, its cruise history can dated back to 1845. In the past 20 years, the rapid economy development and abundant tourism resources of nearby areas are attracting more and more worldwide tourists come to Shanghai. Due to the fact that 2010 EXPO was held in Shanghai, it can be predicted that Shanghai will welcome a cruise arrival peak in the future 10-20 years.

Table 12: Person-time chart of 2014 Shanghai Cruise

Terminal's tourists



cruise passengers



Shanghai Wusongkou International Cruise Home Port

**Table 13: 2002-2012 Shanghai port international cruise
and the number of passenger entry number**

Year	The number of cruise ship	Total
2002	33	31559
2003	15	16493
2004	29	26602
2005	25	48526
2006	29	54905
2007	43	80207
2008	60	130000
2009	111	183000
2010	168	341808
2011	161	217309
2012	180	470000

Source: "China cruise development report, 2012-2013

**Table 14: Shanghai 2008-2012 overseas travel and
cruise control table**

Year	Outbound tourism trips		The number of cruise tourists		Cruise passenger s accounted
	Person-tim e	Growth rate	Person-tim e	Growth rate	

					for the total number of overseas %
2008	1475642	/	65000	/	4.40
2009	1717286	+16.38	91500	+40.77	5.33
2010	2264912	+31.89	170900	+86.78	7.55
2011	2788807	+23.13	108650	-36.42	3.90
2012	3844659	+37.86	176000	+61.99	4.58

Data sources: 2009-2013 statistical bulletin of national economy and social development

3.4 Locational conditions of Shanghai-from the natural aspect and social aspect(pros and cons)

Shanghai has huge geographical advantages, for example, Shanghai is located in the middle of China's coastline and the Yangtze River. Cruise tourism can follow the Yangtze River from the end to the beginning. Shanghai is also a service hinterland; from the aspect of Asian tourism map, with Shanghai as center, luxurious cruises can reach Japan, Korea, Hong Kong and Taiwan in 48 hours. In summer China also can

develop cruise lines to northern areas and Russia while in winter, it can develop cruise lines to Southeast Asian areas to minimize the risk and maximize the benefit. On the other hand, developed economic region advantage is also an attractive advantage. Cruise tourism is a high-class ocean leisure tourism product, from the world experience, it is an associated product with the GDP US \$15,000 to US \$20,000 per capita. From 2008, GDP per capita in Shanghai has been over US \$10,000, with Shanghai as the center of the Yangtze River delta urban, main social economic level has been in the forefront of the country. Strong economic base offers strong support, cruise tourism has satisfied the tourists' leisure holiday tourism demand.

Currently, Shanghai cruise ports have formed "two main ports and one spare port" mode. It has two main international cruise ports which are Shanghai International Passenger Transportation Center and Shanghai Wusongkou International Cruise Port respectively. At the same time, Waigaoqiao Six Dock Port also increase temporary passenger transportation facilities and offer temporary of urgent berth service for cruise ships. This kind of mode has fully satisfied the berth demand of different kind of cruise ships, it is helpful for Shanghai to develop cruise tourism industry and offer nice hardware facilities. Carnival cruise company, Royal Caribbean cruise company and Star cruise all opened new cruise lines in China.

As the most developed city in China, Shanghai has the most sophisticated urban facilities like parking lots. Even though there are lots of cars pass through the city everyday, car owners don't have to worry about their parking problems because parking lots in Shanghai are mature and enough. For those cruise tourists, it is quite convenient for them.

3.5 Compare Shanghai lengthways (before and after developing cruise industry)

The cruise development history of Shanghai can date back to 1845. At that time, it was Qing Dynasty, the First Opium War broke out and China was enforced to open Shanghai as a open port for developing trade with Britain. After that, Shanghai port had been opened and developed rapidly, and started to develop cruise tourism. Some cruise ships berthed into Shanghai and brought some foreign tourists and benefit. However, after been through the 2nd World War and KMT-CPC civil war, China was significantly wounded and locked for a long time. Even new China was built in 1949, China reformed and opened after 1978 thanks to Deng Xiaoping. In the last 20 years, especially after 2005, cruise tourism industry have developed flourishingly, more and more international cruise companies were willing to open new market in Shanghai, which means Shanghai has already been an important cruise port in the world.

With the development of cruise tourism and the construction of international shipping center in Shanghai, cruise tourism industry gradually attract more and more attention from all over the world. After the two main cruise ports in Shanghai were built, more and more supporting facilities were constructed nearby to satisfy the increasing number of tourists. Especially when 2010 Shanghai EXPO was held, shanghai attracted huge attention from all over the world. After that, more and more companies, investors and tourists were willing to come to Shanghai and looked for more opportunities. On the other hand, to some extent, it means Shanghai has become a real international metropolis after opening and developing cruise tourism industry. In 2010, quite a lot of tourists came to Shanghai by cruise ships. It was definitely accelerate the development of cruise tourism industry in Shanghai, and meantime, Shanghai also made a huge progress.

3.6 Compare Shanghai and other mature cruise home ports

There are several mature cruise home port cities like Miami, Hong Kong and Singapore.

Taking Hong Kong as an example, Hong Kong was the most fast development cruise industry city after Singapore, its great economy offered good basis for local cruise development. On the other hand, warm climate, perfect port conditions, international cruise lines were all over the world, famous travel city, good public

transportation system, clean streets and spot sightseeing attracted worldwide tourists. Currently, Victoria cruise port is facing shortage of facilities service and berths. Generally speaking, Hong Kong cruise home port construction and cruise tourism service emerges advantages like:

- 1) Public transportation system is convenient and developed. Hong Kong has developed transportation network, buses, taxis, subways are all connected with each other and tourists from Victoria cruise port can go to any places they want;
- 2) Airports are busy and service are good. Hong Kong international airport is one of the busiest airports in the world and operate 24 hours all the day. Through seamless connection of different kinds of transportation ways, tourists can get to downtown with 24 minutes and it is also convenient for them to transfer cruises;
- 3) Tourism shopping is convenient. As well as known, Hong Kong is known as shopping heaven, duty-free products and exchange rates advantages always attract many tourists choose Hong Kong as their first choice of cruise destination. Besides shopping, Disneyland and Ocean park also attract tourists.
- 4) Related policies preferential. Hong Kong government gives lots of supporting policies like tax exemption for cruise companies which were set up in Hong

Kong, local government also open high seas tourism to promote the development of cruise industry.

In terms of Miami port which is actually an island, it is connected with Miami downtown through a bridge. In 1999, Miami international cruise port was put into use, the port had 12 super cruise port buildings and coastline was 2000 meters, the depth of berth water was 12 meters and could berth 20 cruise ships at the same time. Advantages are listed below:

- 1) Cruise port is close to the airport and transportation service is convenient.

Miami has two international airports which is less than 10 km and 50 km far away from two airports respectively. Two airports operate busily and over 80% cruise passengers come to Miami by air. Therefore, strong transportation capability offer guarantee and support for the development of cruise industry.

- 2) International tourism industry is sophisticated. There are 15 international large cruise companies which have set up their headquarters in Miami, a complete system offers different kind of suitable cruise lines for tourists to satisfy their different demand. The sunshine beach in Miami is always an important factor which attract constant tourists. It is quite convenient in Miami because there is a bathing beach which is close to cruise exit (less than 10m).

- 3) Multiple ports are subordinated to each other policy attract more tourists.

Tourism department in Miami had a deal with those governments along the route to offer multiple countries ashore inbound tourism. In other words, with domestic passport and US visa, tourists can enter into those cities along the route rather than going back to cruise ships.

- 4) Cruise terminal use marketing operation pattern. Since 1990s, Miami started to cooperate with cruise companies to build new ports and use marketing operation pattern in cruise terminals. The facilities are quite humanity and considerable.

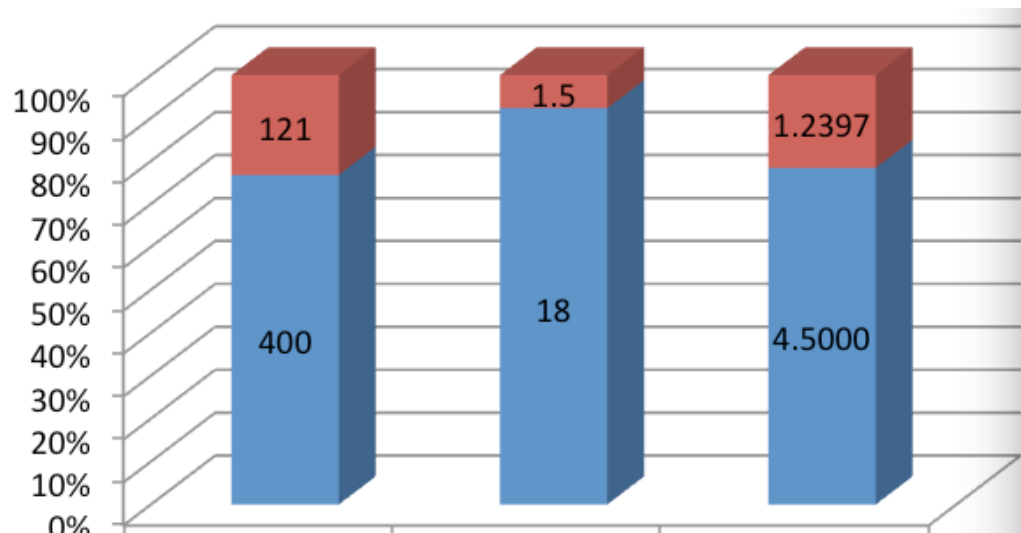
After listing such advantages of Hong Kong and Miami, it is necessary to compare Shanghai with them from these aspects:

- 1) In terms of cruise home port location. The service facilities in current Hong Kong cruise port are nervous and Hong Kong government is willing to build Qide port. Shanghai is also facing the same problem, the North Bund cruise port in downtown has limited conditions while Wusongkou international cruise port is well-equipped, but it is far away from downtown area.
- 2) In terms of docking with the airport. Viewing the two cruise home ports, they both depend on airports and form linkage passenger transport system. There have been two international airports in Shanghai, but the transportation between the two airports and the two cruise ports is not convenient. The main public

transportation tools are buses and metros in downtown and they don't connect to cruise ports directly so that it is not convenient for tourists. Therefore, during the construction of cruise home ports, transportation factor should be considered to avoid repeated construction.

- 3) In terms of cruise tourism market positioning. Hong Kong and Miami focus on different aspects and each has its own characteristics. Miami focus on natural tourism while Hong Kong focus more on shopping tourism. Currently, the market positioning of Shanghai is unknown and uncertain, depending on hinterland tourism resources or developing its own commerce and trade to cooperate with cruise companies to design tourism routes is an urgent problem to be solved.
- 4) In terms of cruise policies. Multiple ports are subordinated with each other policy in Miami let tourists from all over the world are willing to take planes come to Miami to start cruise journey. Although Shanghai started to implement the multi-ports subordinated with each other policy, but the content is different from international practice and there are still many limitations. Tourists cannot leave the cruise ship during the journey, therefore, the effect of Shanghai's policy is still limited.

Table 15: Shanghai figure compared with cruise port of Miami in 2014



Cruise passengers (people) / Cruise ship for income (billion) / Each person cruise for income (Yuan)

Shanghai

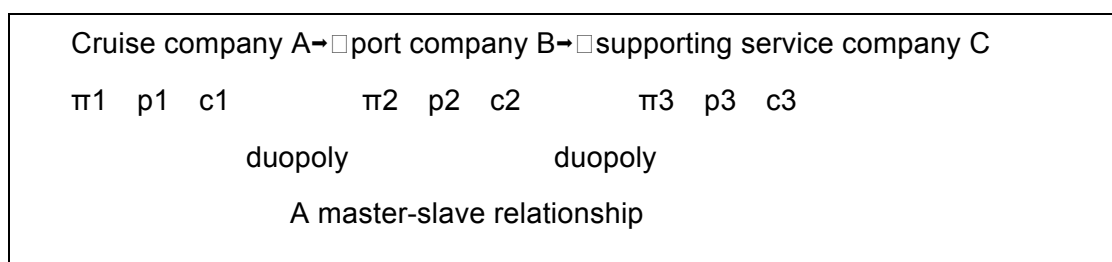
Miami

3.7 Construction of cruise industry chain profit distribution model——Shanghai cruise industry chain game analysis

For convenient research, this paper assumes that Shanghai cruise industry chain consists of three enterprises (A, B, C), among them, A stands for cruise company, B stands for port wharf company (the dominated status of A and B will change with the development of industry chain), C stands for supporting service company which is in

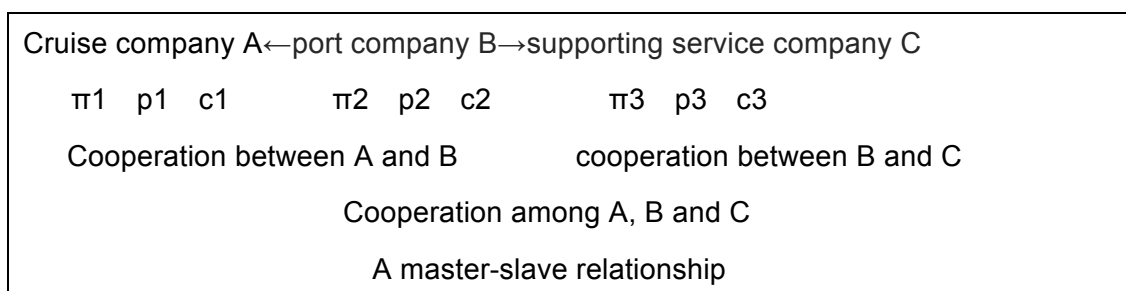
the following position. In other words, in the beginning of industry chain, cruise company as the core enterprise, port and supporting service company as the non-core enterprise formed a master-slave game relationship, and this game relationship between these enterprises can be seen as a typical Stackelberg oligopoly game model. And currently, it is obvious that Shanghai cruise industry chain structure is not close and among these enterprises , they can not form cooperation. As the below picture, we can take cruise company, port company and supporting service company as the participants in the two stage of game. At the next higher level, it is the optimal decision problem of cruise company, and the next lower level is the optimal decision problem of port company and supporting service company, among them , cruise company with absolute dominance, and port company is also with dominance position compared with those local supporting service enterprises.

Table 16: Cruise company leading industry chain model structure diagram



However, with the development of Shanghai cruise industry, under this pattern, the cooperation of industry chain, combining with the below diagram, it is easy to find out that game relationship of Shanghai cruise industry chain form cooperation game, it is a typical Shapley game model, we can calculate the specific proportion value profit distribution.

Table 17: Port company leading industry chain model structure diagram



In the beginning stage of Shanghai cruise industry chain, cruise company A at the core position decide the distribution of the whole industry chain, and can first select action. And followers will act after leaders, at the same time, followers can observe that leaders take what kind of actions. In the beginning stage of industry chain, cruise company A has higher decision right, and it decides the cruise ship voyage and quantity. Although port company B at a disadvantage, compared with supporting service company C, under the support of government it has more advantages.

Model hypothesis

- 1) The three member enterprise A, B and C all match rational man hypothesis, they share their information with each other and their target are pursuing max profit; when in game, dominant position will first take action;
- 2) Assuming that sales unit price of cruise company is p_1 , unit service charge of port company is p_2 , and unit service charge of supporting service company is p_3 ;
- 3) Assuming that unit cost of cruise company is c_1 , unit cost of port company is c_2 , and unit cost of supporting service company is c_3 ;
- 4) Assuming that unit profit of cruise company is p_1 , unit profit of port company is p_2 and unit profit of supporting service company is p_3 , the unit gross profit of Shanghai cruise industry chain is p ;
- 5) Assuming that market demand function is $Q=a-b(p_1+p_2+p_3)$, (4-1).
 $a>0, b>0$, and a, b are both constant number.
- 6) Assuming that after the complete of Shanghai cruise industry chain, it is possible for each member enterprise to cooperate with nearby members, and it may form the four cooperation situation: port company, cruise company and supporting service company operate independently(A, B, C); cruise company cooperate with port company and supporting service company operate independently ((A, B), C); port company cooperate with supporting

service company and cruise company operate independently (A,(B, C)); the

whole Shanghai cruise industry chain all participate with union((A, B, C)).

Based on Stackelberg model with cruise companies dominate the profit distribution of industry chain:

1.Construction and calculation of the two-stage Stackelberg model.

At the beginning stage of Shanghai cruise industry chain, at the dominant position, cruise company industry chain distribution matches the Stackelberg game model, when A, B, C all didn't cooperate with each other:

$$P1=Q(p1-c1)=[a-b(p1+p2+p3)](p1-c1) \quad (4-2)$$

$$P2=Q(p2-c2)=[a-b(p1+p2+p3)](p2-c2) \quad (4-3)$$

$$P3=Q(p3-c3)=[a-b(p1+p2+p3)](p3-c3) \quad (4-4)$$

Now, Shanghai cruise industry chain gross profit is the sum of three profit:

$$P=P1+P2+P3. \quad (4-5)$$

Therefore, A, B, C all pursue its own maximum profit, we can calculate the derivative maximum allocation proportion.

$$\text{Max}P1=Q(p1-c1)=[a-b(p1+p2+p3)](p1-c1) \quad (4-2)$$

$$\text{Max}P2=Q(p2-c2)=[a-b(p1+p2+p3)](p2-c2) \quad (4-3)$$

$$\text{Max}P3=Q(p3-c3)=[a-b(p1+p2+p3)](p3-c3) \quad (4-4)$$

Firstly, calculate the derivative of the lowest position C :

$$\frac{\partial \Pi_3}{\partial p_3} = a - b(p_1 + p_2 + 2p_3 - c_3) \quad (4-6)$$

Let $\frac{\partial \Pi_3}{\partial p_3} = 0$, we can get:

$$p_3 = \frac{a}{2b} - \frac{1}{2}(p_1 + p_2 - c_3) \quad (4-7)$$

Bring (4-7) into (4-3), calculate the function between port company and cruise company, which is:

$$\Pi_2 = \left[\frac{1}{2}a - \frac{1}{2}b(p_1 + p_2 + c_3) \right] (p_2 - c_2) \quad (4-8)$$

$$\frac{\partial \Pi_2}{\partial p_2} = \frac{1}{2}a - \frac{1}{2}b(p_1 + 2p_2 + c_3 - c_2) \quad (4-9)$$

Let $\frac{\partial \Pi_2}{\partial p_2} = 0$, we can get

$$p_2 = \frac{a}{2b} - \frac{1}{2}(p_1 + c_3 - c_2) \quad (4-10)$$

Bring (4-10) into (4-2), we can get the best sales price of cruise company p_1^* .

$$\Pi_1 = \left[\frac{1}{4}a - \frac{1}{4}b(p_1 + c_2 + c_3) \right] (p_1 - c_1) \quad (4-11)$$

$$\frac{\partial \Pi_1}{\partial p_1} = \frac{1}{4}a - \frac{1}{4}b(2p_1 + c_2 + c_3 - c_1) \quad (4-12)$$

Let $\frac{\partial \Pi_1}{\partial p_1} = 0$, we can get

$$p_1^* = \frac{a}{2b} - \frac{1}{2}(c_2 + c_3 - c_1) \quad (4-13)$$

Bring (4-13) into (4-10), we can get the port company best strategy when cruise company get its best strategy p_2^* , which is

$$p_2^* = \frac{a}{4b} + \frac{1}{4}(3c_2 - c_1 - c_3) \quad (4-14)$$

Bring (4-13), (4-14) into (4-7), we can get the best strategy of supporting service company as the lowest follower p_3^* , which is

$$p_3^* = \frac{a}{8b} - \frac{1}{8}(c_1 + c_2 - 7c_3) \quad (4-15)$$

Bring (4-13), (4-14), (4-15) into (4-1) we can get the best solution Q^* of demand function, which is

$$Q^* = \frac{a}{8} - \frac{b}{8}(c_1 + c_2 + c_3) \quad (4-16)$$

Bring these best solutions into (4-2)、(4-3)、(4-4) and then we can get each company's highest profit data, which is

$$\pi_1^* = \frac{1}{16} \times \frac{[a-b(c_1+c_2+c_3)]^2}{b} \quad (4-17)$$

$$\pi_2^* = \frac{1}{32} \times \frac{[a-b(c_1+c_2+c_3)]^2}{b} \quad (4-18)$$

$$\pi_3^* = \frac{1}{64} \times \frac{[a-b(c_1+c_2+c_3)]^2}{b} \quad (4-19)$$

$$\text{Let } \frac{[a-b(c_1+c_2+c_3)]^2}{b} = \Delta, \text{ and}$$

$$\pi_1^* = \frac{\Delta}{16}, \pi_2^* = \frac{\Delta}{32}, \pi_3^* = \frac{\Delta}{64}, \pi = \pi_1^* + \pi_2^* + \pi_3^* = \frac{7\Delta}{64}, \pi_1^* : \pi_2^* : \pi_3^* = 4 : 2 : 1$$

For the validation of the model:

For the solution of the distribution of two phase proportion, this paper will through dismantling its structure to two duopoly game problem and analyze it to validate the correction of the calculation.

Taking cruise company and port company as example,

$$Q = a - b(p_1 + p_2)$$

$$\pi_1 = Q(p_1 - c_1) = [a - b(p_1 + p_2)](p_1 - c_1) \quad (4-20)$$

$$\pi_2 = Q(p_2 - c_2) = [a - b(p_1 + p_2)](p_2 - c_2) \quad (4-21)$$

$$\begin{cases} \text{Max } \pi_1 = Q(p_1 - c_1) = [a - b(p_1 + p_2)](p_1 - c_1) \end{cases} \quad (4-20)$$

$$\begin{cases} \text{Max } \pi_2 = Q(p_2 - c_2) = [a - b(p_1 + p_2)](p_2 - c_2) \end{cases} \quad (4-21)$$

Firstly, calculate the derivative of the lower position port company and get:

$$\frac{\partial \pi_2}{\partial p_2} = a - b(p_1 + 2p_2 - c_2) \quad (4-22)$$

$$\text{let } \frac{\partial \pi_2}{\partial p_2} = 0, \text{ we can get}$$

$$p_2 = \frac{a}{2b} - \frac{1}{2}(p_1 - c_2) \quad (4-23)$$

bring it into (4-21) and get,

$$\pi_2 = \left[\frac{1}{2}a - \frac{1}{2}b(p_1 + c_3) \right] (p_1 - c_1) \quad (4-24)$$

$$\frac{\partial \pi_1}{\partial p_1} = \frac{1}{2}a - \frac{1}{2}b(2p_1 + c_2 - c_1) \quad (4-25)$$

let $\frac{\partial \pi_1}{\partial p_1} = 0$, we can get

$$p_1 = \frac{a}{2b} + \frac{1}{2}(c_1 - c_2) \quad (4-26)$$

$$p_2 = \frac{a}{4b} - \frac{1}{4}(c_1 - 3c_2) \quad (4-27)$$

Get: $\pi_1 : \pi_2 = 2 : 1$

According to the same principle, we can get $\pi_2 : \pi_3 = 2 : 1$

Therefore, $\pi_1 : \pi_2 : \pi_3 = 4 : 2 : 1$, it is the same answer with above paper, it proves that this method is available.

Practical significance of modeling results:

According to the results, profit proportion is A:B:C=4:2:1, cruise company earn most of the money and it matches the actual situation. Under this pattern, the total profit of Shanghai cruise industry chain local enterprises cannot even compare with cruise companies, this kind of monopoly situation must be broken. Therefore, current mission is to complete the structure of Shanghai cruise industry chain and built upstream link and run cruise business by themselves. But they can learn experiences from sophisticated cruise cities like Barcelona and Venice to gradually develop home port economy. Only through this way, Shanghai can really develop cruise economy and Shanghai cruise industry chain can go to the right track. Taking cruise home port as dominant enterprises, local enterprises and cruise companies can form closer relationship network and cooperation pattern can be various.

4.OPPURTUNITIES AND CHALLENGES OF SHANGHAI

4.1Exclusive opportunities of Shanghai for developing cruise industry

As the fastest developing country in the world, currently, China is facing many opportunities and challenges. On the one hand, the GDP growth of China is the fastest in the world, Chinese residents become richer and richer, and the whole economy condition is getting better and better, people have the ability to afford expensive cruise journey. On the other hand, with the development and open of Chinese cruise tourism market, more and more large cruise companies were willing to open new market sector in China and Chinese tourists could gradually accept the strange form of tourism.

Viewing the whole China, only Shanghai has the exclusive advantages to develop and strengthen cruise supply chain. First of all, with the deep cruise history base, Shanghai is the most suitable city to develop cruise supply chain. The cruise tourism history of Shanghai can date back to 1845 and though it has its own advantage. On the other hand, Shanghai held the 2010 EXPO and attracted all over the world, and

Shanghai got cruise tourism income about \$3 billion in 2010. It means Shanghai has basic conditions of becoming a successful cruise home port several years. Shanghai is also the most developing potential city in China and has huge customers market compared with other domestic cities. Education, culture, entertainment, tourism, health care and other consumption continue to grow, has bred the holiday leisure consumption demand. Tourism consumption accounts for 15% of the total population and it is 17 times the national average. With the construction and development of international financial, trade and shipping center, GDP per capita in Shanghai is much higher than other cities. It is predicted that in the future 3 to 5 years, foreign cruise tourists will increase significantly.

The rapid development of economy and people's consumption concept changing, will promote the rising power of consumption and changes in consumer behavior of Chinese people. Besides, relatively complete three-dimensional transportation network make cruise tourists have more choices to better plan their journey in Shanghai.

Lastly, with the construction and development of Shanghai free trade zone, more and more international companies and individuals are willing to explore and invest this magical city to find out more possibilities. It means in current time and in the future, shanghai have more opportunities to develop those links in cruise supply chain.

Table 18:Year of major international tourist arrivals

Indicators	2000	2010	2012
International tourist arrivals (thousands of people)	181.40	851.12	800.6
Foreigners	139.14	665.63	633.6
Japan	53.76	152.47	136.6
Singapore	5.29	23.50	21.6
Germany	7.11	29.52	30.6
France	5.39	24.86	21.6
Britain	1.69	20.94	21.6
Italy	1.88	11.49	11.6
Canada	2.25	20.97	19.6
USA	13.78	80.79	80.6
Australia	3.23	21.33	21.6
Hong Kong and Macau	17.62	77.47	63.6
Taiwan	19.88	108.02	104.6
Average number of tourists come to Shanghai	4 970	23 382	21 970
Average number of days stay in Shanghai (day/people)	3.92	3.51	3.3
International tourism income (foreign currency) (one hundred thousand dollars)	16.13	64.05	55.1

4.2 Restrictions and challenges of Shanghai for developing cruise industry

Even Shanghai has such advantages in developing cruise supply chain, there are still many restrictions and challenges especially compared with those mature cruise home port cities like Hong Kong Miami.

For instance, first of all, customer resource and routes are relatively single , there are little ocean routes. Currently, Shanghai focuses more on Japan& Korea routes, most cruise ships berth in Fukuoka and Jeju Island. However, Taiwan, Hong Kong and Southeastern routes haven't been covered much. Routes cover Pacific Rim and even European& American are less.

Secondly, the percentage of foreign tourists is still less. According to the newest research, in 2014, foreign cruise tourists accounted for 16% in the total cruise tourists. From the aspect of effect of cruise economy and attractiveness of Shanghai international shipping center, it is not fit for the rapid development of cruise industry in Shanghai. To attract more foreign tourists, the construction of cruise home port need supported transportation facilities and complete of urban function. It is not only related to berth areas, port routes and construction of public transportation but also gather of freight forwarding, finance and tourism culture. A good cruise home port is an important factor of construction of international shipping center, with the

development of competing supporting facilities of cruise ports, the urban function of Shanghai will also improve.

Thirdly, the domestic fierce competition also put many pressure on Shanghai. Currently, there are 5 classic cruise ports in China which is Shanghai, Tianjin, Xiamen, Sanya and Dalian respectively, all of them have inborn advantages like perfect location and depth of water. On the other hand, other costal cities like Guangzhou, Shenzhen, Zhuhai, Haikou and Qinhuangdao are also planning to develop their cruise economy. Even right now, Shanghai is the largest and most developed cruise home port city in China, but facing the fierce competition from other cities, how to maintain current situation and improve its leading status is important.

Fourthly, the percentage of Shanghai cruise economy account for little in global cruise market. Even though cruise tourism is developing rapidly in Shanghai, in fact, the whole Asian cruise market accounted for only less than 10% in global cruise market, which means Shanghai market is a huge potential market in the future years.

Lastly, large cruise ships will bring severe environmental problems. The ship pollutants including life waste, solid waste, oil seawage and the accidental spill will be harmful to nearby ecological ocean and rivers. For example, cruise companies like Royal Caribbean and Costa equip cruise ships two to three oil cylinder, when they sail in the open sea they use cheap diesel, once entering into restricted sea like Europe and America, they use environmental diesel oil to replace. However,

currently, there are no related policies and restrictions in Shanghai to protect the environment.

4.3 Suggestions to boost the cruise development in Shanghai

There are several available suggestions to take to promote the development of cruise supply chain in Shanghai.

First of all, giving full play to the advantages of Shanghai characteristics, developing feature routes, attracting domestic and international tourists and promoting cruise economy flourishing. Specifically, based on the geographical and economic advantages, cruise companies should target developing feature routes. Shanghai is the Yangtze River estuary, within 48 hours from Shanghai, cruise can arrive in South Korea, Japan, Singapore and other countries and Hong Kong, China, Taiwan and other regions. Different from Sanya city with "warm in winter and cool in summer" such characteristics of the cruise market, from Shanghai home port, to the north in summer and to the south in winter, the period of the off-season season can be shrunk to minimum. It is suggested that within years, it is expected to start drawing the international cruise port of the second phase of construction and speed up the development of the global ocean route and offshore characteristic line.

Secondly, to comply with the global cruise market east trend, seize the historical opportunity and speed up the cruise market development. Shanghai cruise economy

is facing a rare historical opportunity, mainly manifested in two aspects: One is the global cruise market shift to Asia, the global cruise market demand continues to expand, North America and Europe cruise consumer market gradually saturated, cruise industry is moving to east, and Asia market become new vitality cruise economy growth point, and Shanghai is the center of Asia cruise line. On the other hand, it is the cruise economy development policy support. Drifted along with our country to cruise the "gold industry" in the sea, step by step on the policies and regulations for the cruise economy development provides the convenience. On July 1, 2013, for example, the newly revised law of the People's Republic of China referred to entry or exit to relax the transit visa-free means of transportation, including cruise ships. It is understood that in 2012, in Shanghai, more than 98% of the country's home port cruise passengers take the form of group tourism, group members are from all over the country, a centralized line boarding time is long, cruise travel tour group can choose the whole mass concentration, has brought great convenience to cruise visitors. It should be said that during "twelfth five-year", for Shanghai, it is a golden opportunity of economic development to strengthen the confidence, seize opportunities and speed up the market development, it is the theme of development of Shanghai cruise economy in a relatively long period of time.

Thirdly, perfecting the relevant technology, reducing the pollution of the cruise ship berthing and realizing sustainable development. In terms of pier construction in

Shanghai, there are strict environmental controls, on the pier construction of water pollution, noise pollution, air pollution and solid waste disposal there are detailed rules. It is suggested that environmentally friendly development strategy should be applied to expand the cruise ship berthing. In Hong Kong, for example, as the most important cruise home port in Asia, the world's major cruise lines Asia tour of Asia and the world transit "will stop", Hong Kong is in the process of legislation to standard that all ocean-going vessels into Hong Kong waters pollution should use lighter low sulphur diesel and build the shore power supply to reduce air pollution. It is suggested that Shanghai should follow up Hong Kong to perfect the relevant policies and regulations, technology development, reduce air pollution, after ship berthing in environmentally friendly to promote sustainable development.

5.CONCLUSION

According to the statistics data, in June 2014, the amount of domestic cruise port exit and entry tourists was 178,000 and increased 64% than last year; accumulated passenger flow volume in the whole year was 770,000 and increased 68% compared with last year. In June, among the amount of domestic cruise port exit and entry tourists, Shanghai occupied 135,000. In terms of home port operation, Shanghai can operate 5 home port cruise ships at the same time. From the aspect of the whole

nation, the amount of cruise home port ships are increasing constantly, and cruise routes are becoming more and more abundant; besides, domestic cruise home port market is more and more sophisticated to promote the development of cruise industry.

Generally speaking, developing cruise tourism industry is really important and necessary. Cruise tourism industry is a complicated system and composed of many links in cruise supply chain like hotels, restaurants, public transportation, scenic spots, etc.

To complete the cruise supply chain, each link in cruise supply chain should be paid equal and much attention to be improved so that the whole cruise supply chain can be improved significantly. Through improving the efficiency of cruise supply chain, it will bring more tourists from all over the world come to Shanghai and also bring more economic benefit.

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