



The Political Measures for Promoting Rail-ferry Service between Korea and China

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한국해양수산개발원
KOREA MARITIME INSTITUTE

Table of Contents

1

Introduction of Rail–ferry System

2

Rail–ferry Conditions and Its Prospect

3

European Rail–ferry Case and Its Implications

4

Analysis of the conditions for Chinese Rail–ferry

5

Project for Promoting Rail–ferry

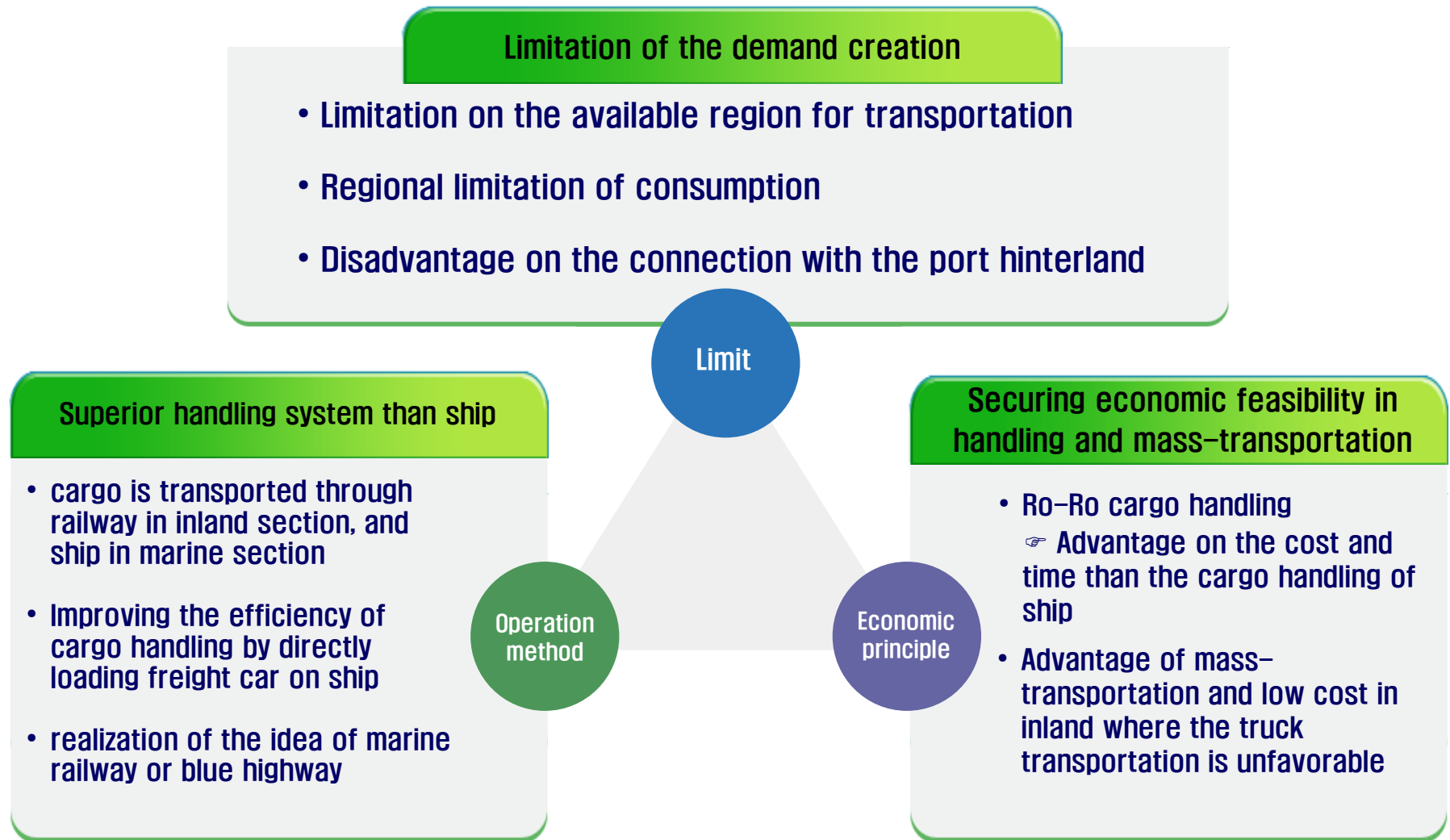
I. Introduction of Rail-ferry System

1. Concept of Rail-ferry
2. Classification of Rail-ferry
3. Advantages and Disadvantages of Rail-ferry System
4. Considerations on the introduction of Rail-ferry System



1. Concept of Rail–ferry

Rail–ferry is a complex unit load system of maximizing transportation unit and reducing cost by combining ship and railway as mass transportation method



2. Classification of Rail-ferry

Rail-ferry transportation system is basically similar to car ferry ship, and could be classified in various ways according to the transportation target, transportation process, and its method.

Transportation target

- Rail-ferry for passenger
- Freight rail-ferry for transporting passenger and freight at the same time
- Rail-ferry for freight

Direct freight

- Door To Door
- Direct loading of cargo rail on the ship for direct transportation
- Direct loading of freight car on the ship for direct transportation

Hub transportation

- Combination of rail and truck transportation(through transportation)
- transportation of freight rail or freight car between rail terminals
- connected to the truck transportation between rail terminal and shipper factory

3. The Pros and Cons of Rail–ferry System

Rail–ferry system has an advantage of maximizing the mass transportation of ship and railway and low-cost, but has a disadvantage of large investment cost and the regional limitation of consumption

Advantage

- Speedy transportation
 - Reduction of cargo handling time (Ro–Ro handling)
 - Simplification of customs procedures
 - Easy to create and check the documents through B/L
- Safety of transportation
 - Freight car and container box are functioned as outer package
 - Minimization of the breakdown and loss of freight
- Advantage in cost
 - low cost in marine insurance charge due to the safety of transportation
 - cost reduction by Ro–Ro cargo handling system
 - Cost reduction through the simplification of custom procedures
 - Cost reduction due to the additional package

Disadvantage

- Issue of securing demand
 - the demand is limited by region
 - difficulty of securing full demand
- Imbalance of freight
 - increase of the collection cost of empty container and freight car
 - Cost from the cargo type discordance (Clean VS Dirty)
 - Cost increase for ship' s standing–by
- Enormous investment
 - enormous investment on cargo handling through railway track, the dedicated wharf ,equipment and the dedicated ship

4. Considerations for Rail–ferry System

In case of the introduction of rail–ferry system, it is important to consider the conditions such as the efficiency of all of the logistics system, transportation demand, the feasibility of investment collection, and competitiveness

Feasibility of utilizing the logistics system

- Are the efficiency of the total logistics system and the cost reduction possible?
- Could the logistics infra in domestic and international regions be fully utilized?

Scale of Transportation demand

- Is the current and potential transportation demand in the target section enough?
- How is the trade cargo structure between two nation?

Investment collection

- How is the investment size on the wharf, ship, railway track, and etc.?
- Could the investment be fully collected?

Enhancing competitiveness

- Cost competitiveness from the perspective of the total logistics cost
- Cost competitiveness against the ship and truck transportation
- Cost reduction from the difference of cargo handling

II. Rail-ferry Conditions and Its Prospect Between Korea and China

- 1. Economic Prospect of Northeast Asia**
- 2. Changes of the Logistics
Environment in Northeast Asia**
- 3. Prospect on the Rail-ferry Container
Traffic Between Korea and China**
- 4. Problems of the Promotion of Rail-ferry
Between Korea and China**



1. Economic Prospect of Northeast Asia

The three countries in Northeast Asia are expected to be developed as one economic block and become the growth engine in the world logistics market due to the increasing economic inter-dependence among the nations while growing as the third economic block.

growing as
the third
economic
block

developed
as one
economic
block

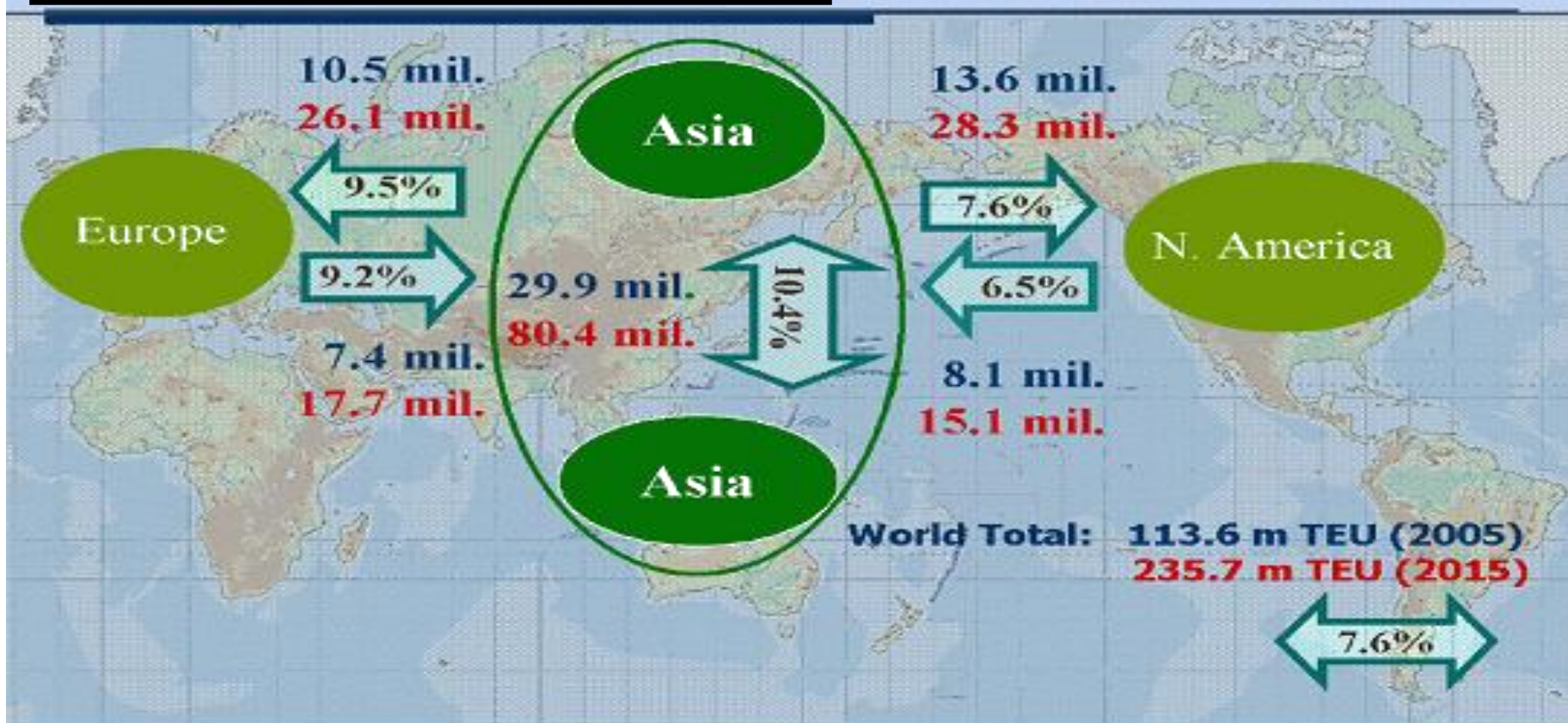
growth
engine in the
world
logistics
market

- accounts for 18% of the world trade in 2010, 1/3 of the world transportation cargo
 - beyond 50% of the trade volume within the region
 - The trade volume of the 3 nations accounts for 30% of the world trade volume as 577.4 billion dollar within the region in 2010
 - The trade volume between Korea and China increase by 5.9 times from 32 billion dollar in 2001 to 188.3 billion dollar in 2010
-
- Centralization of production and distribution around China growing as a world market
 - acceleration on the logistics network focusing on China
 - expected to grow as a production community due to the economic inter-dependence among 3 nations
 - expected to grow as an economic community through Korea–China FTA, and Korea–Japan FTA.
-
- accounts for 30% of the world container cargo traffic
 - The 3 nations have 4 ports among the world 5 ports.
 - The 3 nations have 8 liner shipping companies among the world 20 liner shipping companies

2. Prospect on the Logistics Market in Northeast Asia

The economic block of Northeast Asia accounts for 18% of the world trade volume, approximately 33% of the world transportation cargo, and is expected to become the third logistics market in the world along with NAFTA

Forecast on trade in container cargo (2005-2015)



Data: UNESCAP International Seminar, "Regional activity program for improving the transportation capacity in the Asia-Pacific region" , 2008. 6

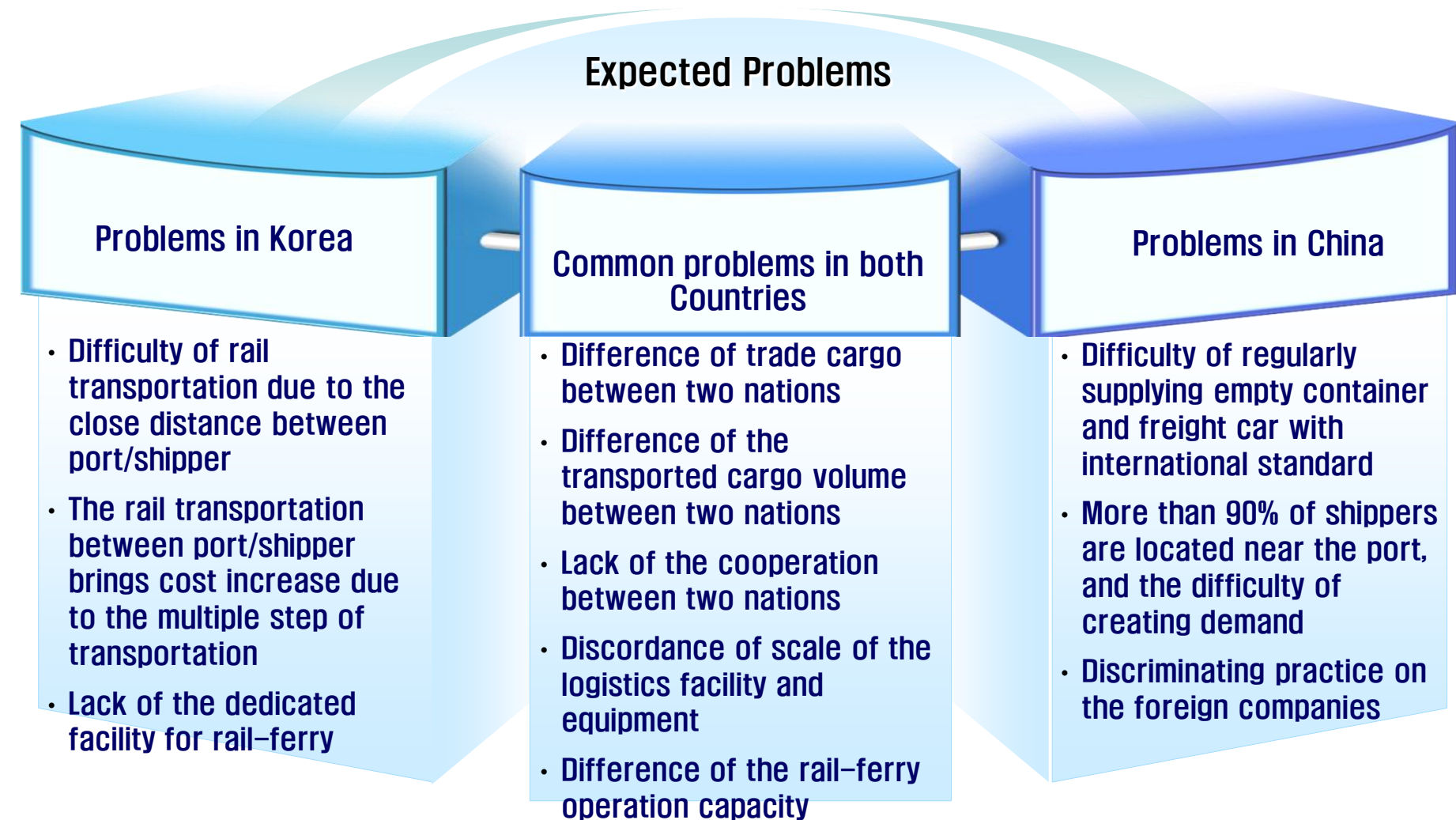
3. Prospect on the Rail–ferry Container Traffic Between Korea and China

Re-forecast slightly higher than the existing forecast based on the recent survey on the forwarder, growth trend of cargo traffic between Korea and China, growth trend of TCR cargo traffic, and (Kyeonggi-do, research on the economic validity of rail–ferry business in Pyeongtaek Port, 2009.2)

Classification	2015	2020	2030	2037
Existing forecast (thousand TEU)	62	109	161	192
New forecast (thousand TEU)	68	121	181	223
Dalian	14	27	38	45
Shanghai	7	10	15	19
Tianjin	14	23	36	44
Qingdao	12	23	37	48
RiZhao	12	22	33	41
Longyan	4	8	11	14
Yantai	1	1	2	2
Weihai	3	7	9	13

4. Problems of the Adopting Rail–ferry Between Korea and China

The projection of rail–ferry between Korea and China includes the unique issues of two nations and the common issues, but the most significant issue is the lack of the cooperation of both nations on the projection of rail–ferry



III. European Rail-ferry Case and Its Implications

1. Characteristics of Rail-ferry Service
2. Service Section of Rail-ferry
3. Cooperative Matters for Introducing Rail-ferry System
4. Main Implications



1. Characteristics of Rail–ferry Service

The European rail–ferry systems are activated in the section of long distance transportation, and the involved nations are cooperating each other for freight–oriented transportation structure and rail–ferry promotion

Activation in the long distance section

- Transportation section with normally less than 100 miles
- Rail–ferry is quite promoted in the transportation section with more than 300 miles

freight–oriented transportation structure

- normally utilized for only freight in the Black Sea region with long transportation section
- Be in competition with small container ship
- operated on the consideration of the linkage with Asia continental railway network

Cooperation among nations

- giving benefit in the custom procedures in two nations and the third nations as well
- Operation of the joint venture company with other foreign company (Finland and Germany)
- Simplification of the transportation–related documents and procedures such as B/L and load warranty

2. Service Section of Rail–ferry

Rail–ferry transportation section (Baltic Sea)

transportation section	Distance (mile)	Number of ship	Characteristics
Puttgarden – Rodby (Germany – Denmark)	10	5	relatively short distance but high economic value
Sassnitz(Mukran) – Trelleborg (Germany– Sweden)	43	2	
Rostock – Trelleborg (Germany – Sweden)	95	2	average passenger 141, automobile 25, cargo truck 45, freight car 12
Swinoujscie – Ystad (Poland – Sweden)	95	3 ~ 5	Eastlink Polferries company operates
Lubeck–Travemunde – Malmo (Germany – Sweden)	120	2	♦ Finnlines group, Malmo Link corp., Lubeck corp. offers joint service ♦ Nordoe link company is taking charge of marketing
Stockholm – Turku/Abo (Sweden – Finland)	138	3	♦ Finland SeaWind Line compay operates ♦ SeaWind ship and SktWind ship are operated
Sassnitz(Mukran) – Klaipeda (Germany– Lithuania)	274	1	
Lubeck–Travemunde – Turku/Abo (Germany – Finland)	540	2	Ferroviasped Holding company which is a subsidiary of Kuhne & Nagel is taking charge of marketing

2. Service Section of Rail–ferry

Rail–ferry transportation section (Black Sea and Mediterranean Sea)

Region	transportation section	Distance(mile)	Number of ship	Characteristics
Black Sea	Constanza –Istanbul (Romania–Turkey)	195	1	
	Ilichevsk(Odesa) – Varna (Ukraine–Bulgaria)	238	4	56 freight cars in average are operated per 1 shipping
	Constanza – Samsun (Romania–Turkey)	490		
	Ilichevsk(Odesa) – Poti/Batumi (Ukraine–Georgia)	530	4	
	Constanza – Poti/Batumi (Romania–Georgia)	560		
Mediterranean Sea	Villa San Giovanni – Messina (Italy domestic region)	7		connection between the mainland of Italy and Sicily land – Italian government operates – operation along with passenger service – under construction of marine tunnel since 2004
	Civitavecchia – Golfo Aranci(Sardinia island) (Italy domestic region)	86		connection between the mainland of Italy and Sardinia land – national railway company operates

3. Cooperation Between Nations

The national cooperation such as the basic considerations between European nations, the related documents, and the related procedure improvement was made to operate rail–ferry as follows.

Basic considerations

- selecting the base port and securing wharf facility
- calculation of the distance between ports and sailing time
- deciding the number of ship in the base port and loading and unloading time per week
- deciding the expected number of freight car and trailer per loading and unloading
- Securing switchyard
- deciding the number of freight car and trailer
- activity for cargo creation

Related document

- B/L, Bill of Lading
- Letter of Guarantee, L/G,
- Other Sea Waybill, Letter of Indemnity(L/I), Mate Receipt(M/R), Delivery Order(D/O)

Related laws and procedures

- custom procedures and quarantine
- entry and departure
- port entry and port departure
- inland transportation

4. Main Implications

The European countries cooperated on the basic considerations, the related documents and procedures to operate rail-ferry, and the followings are suggested as the basic considerations for the rail-ferry operation.

Specialization on the long distance transportation

- Rail-ferry is desirable to be specialized for long distance transportation, focusing on the inland
- When selecting the target region for rail-ferry between Korea and China, the selection of the long distance transportation section is needed

Inevitable cooperation between 2 nations

- It is important for 2 nations to closely cooperate to establish the dedicated facility and operation system
- It is important to simplify the related document and procedures

Project under the long term perspective

- Finding out the cooperative business to maximize the complementary relationship between 2 nations
- Proceeding the project based on the economic transportation section from the long-term perspective

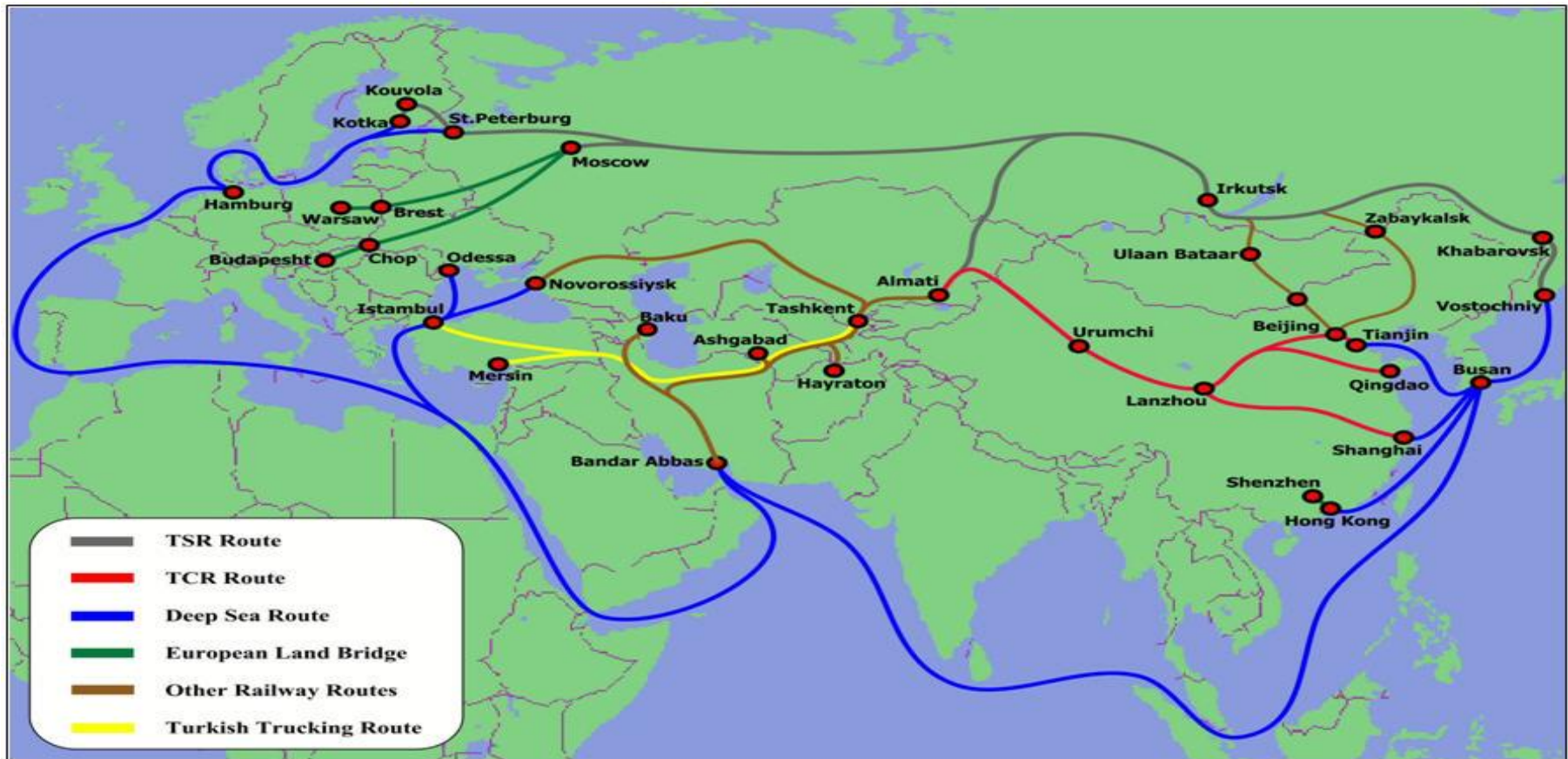
IV. Analysis of the conditions of Chinese Rail-ferry

- 1. TCR Route**
- 2. Prospect on TCR Cargo Traffic**
- 3. Main Cargo of TCR Hinterland**
- 4. Development Plan of Traffic Network in China**
- 5. Considerations on the Target Port for rail-ferry**



1. TCR Route

- Main line is 4,158km(Lianyungang–Alashankou), dualization of lines 3,423km(83%) , and electrification of railroad 3,563km(86%). The gauge of a track is the standard gauge
- Route full length consists of 50 main-line railway and 220 branch lines with 66,400km.
- The main transported goods are coal(28%), steel, grain, oil, and etc.



2. Prospect on TCR Cargo Traffic

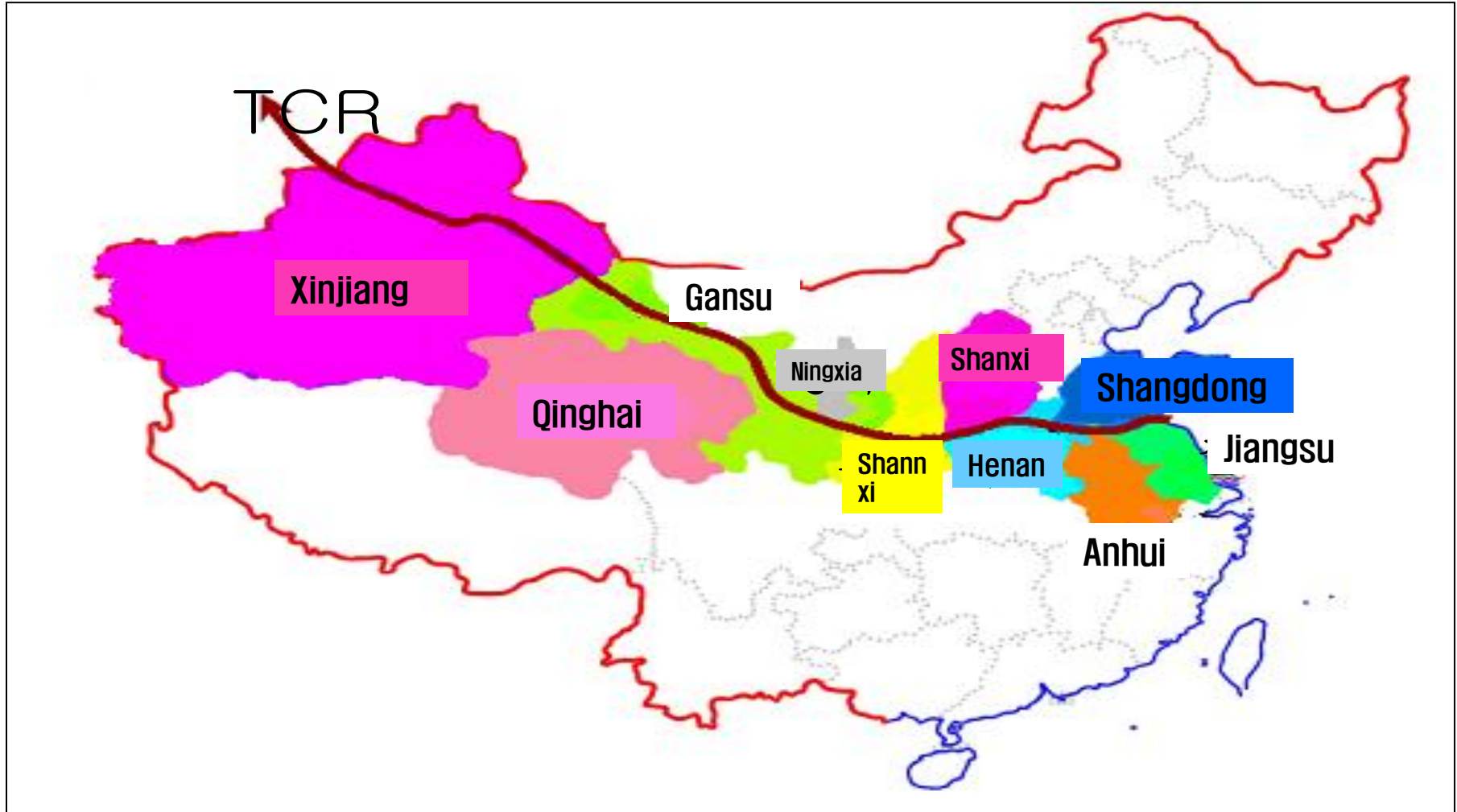
- 357 thousand TEU in 2008 ➡ 1.335 million TEU in 2020, and 2.184 million in 2020,
- The cargo traffic between Korea and Central Asia is expected to increase from 25 thousand TEU in 2008 to 64 thousand TEU in 2025 by almost 3 times

Classification	TCR cargo traffic in China		Korea–Central Asia	Total
	Export	Import		
2008	204	128	25	357
2010	261	164	29	454
2015	465	288	38	791
2020	801	485	49	1,335
2025	1,338	782	64	2,184

Data: Ministry of Maritime Affairs and Fisheries, reorganized with the research material of「Research on the business feasibility of the logistics infra investment on Lianyungang in China」

3. Main Cargo of TCR Hinterland

TCR hinterland



3. Main Cargo of TCR Hinterland

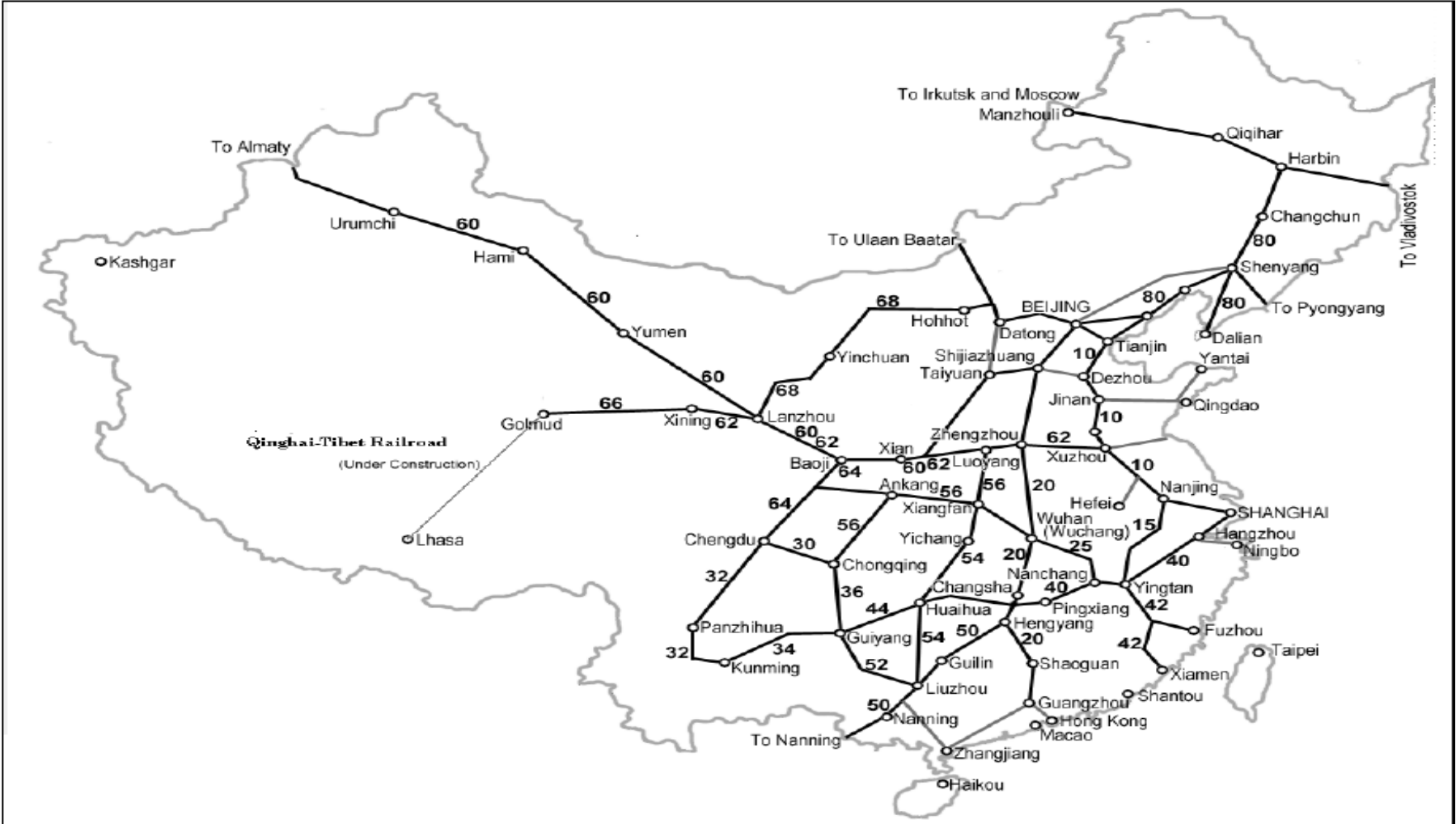
Main cargo in the TCR hinterland

Region	Main cargo
Northern part of Jiangsu	aluminium, steel products, plywood, blasting agents, chemical fertilizer, soda, food
Western and Southern parts of Shandong	furniture, glass products, tire, machine components, agricultural products(garlic), plywood, ceramics, brick, chemical fertilizer
Central part of Henan	glass products, agricultural products, food, juice, fire resisting materials, machine components, battery components etc.
Southern part of Shanxi	steel products, coal, blasting agents etc.
Xinjiang	raw cotton, tomato sauce, etc.
Sichuan	ore, plywood materials, aluminium products

Data : Ministry of Maritime Affairs and Fisheries, Research on the business feasibility of the investment on the logistics infra in Lianyungang in China, 2008

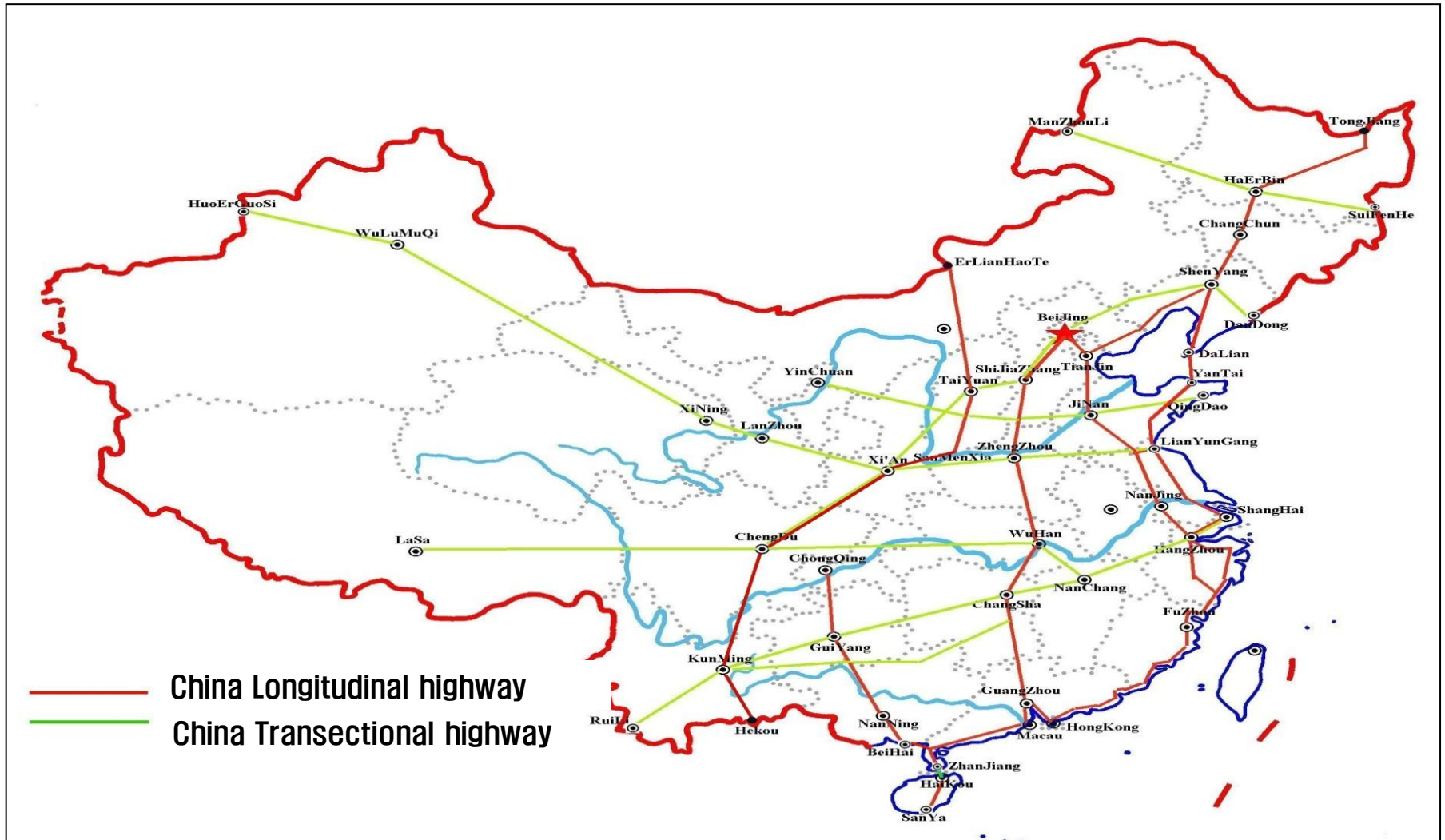
4. Plan of Traffic Network in China

Plan for expanding railway network (8 ends 8 crossways)



4. Plan of Traffic Network in China

Plan for expanding road network (5 ends 7 crossways)



5. Considerations on the Target Port for rail–ferry

- Limited to ports in the Balhae region and the Yangzi river regions where is easy to access to the Korean cities
- Selected based on the geological advantage and the current status of wharf operation, the industrial facility of hinterland, and etc.

Classification		Tianjin Port	Daline Port	Yantai(Weihai) Port	Qingdao Port	Lianyungang	Shanghai Port
Distance (Km)	Pyeong-taek	887	565	519	582	617	861
Railway organization		Branch office of the Railway Bureau of Beijing	Branch office of the Railway Bureau of Shenyang	Branch office of the Railway Bureau of Jinan	Brand office of the Railway Bureau of Jinan	Branch office of the Railway Bureau of Shejewoo	
Express way		Tianjin –Beijing Tianjin –Jilin	Dalian–Shenyang	Weihai–Yantai Yantai–Qingdao Yantai–Jinan	Qingdao–Ji nan Yantai–Qingdao Qingdao–Yinchuan	Lianyungang–Alashankou	Shanghai –Nanjing Shanghai –Hangzou Shanghai –Beijing Shanghai –Chengdu
International airport		Beijing and Tianjin	Dalian	Yantai	Qingdao	Lianyungang	Shanghai
Distance (km)	Beijing	137	1,138	1,021	890	1,037	1,463
	Taiyuan	650	1,65	1,056	925	1,072	1,498
	Wuhan	1,367	2,369	2,084	1,953	1,108	1,403
Railway Distance (km)	Ulanbator	1,698	2,699	2,582	2,451	2,598	3,024
	Moscow	8,002	8,557	8,886	8,755	8,902	9,328
	Almata	5,285	6,286	5,643	5,512	5,025	5,451
Industries around this region		automotive, machine, steel, electronic, textile, petrochemistry	shipbuilding, machine petrochemistry, chemical fertilizer	grain, food chemical fertilizer, cement	grain, food chemical fertilizer, cement	grain, food machine, electronic	automotive, shipbuilding, machine, electronic, grain, food
Berth facility		N/A	Yes	Yes	N/A	N/A	N/A

5. Considerations on the Target Port for rail–ferry

Advantage and disadvantage of target

Port	Advantage	Disadvantage
Shanghai Port	•installation of rail track to the wharf within port •could be connected to TCR main line and railway as the hinterland of TCR line •could be connected with western region through railway based on the 8 ends and 8 crossways	• enormous investment burden on the construction of rail–ferry dedicated wharf •expected to highly compete with the existing regular ship in price
Yantai Port	•The rail–ferry could be operated with relatively small investment •The first mover advantage is expected as the test operation of rail–feery •Expansion of the entrance of large companies	•low possibility of the linkage with TCR due to the long distance with western region •strongly competing with Tianjin port for the northern region •inconvenience in custom procedures
Qingdao Port	•securing the maximum cargo traffic among the related ports of Pyeongtaek Port •could be connected with TCR and western region through railway based on the 8 ends and 8 crossways	• enormous investment burden on the construction of rail–ferry dedicated wharf •need to invest on the installation of rail track within the port •inevitable competition with the existing container regular ship

V. Agenda for Promoting Rail-ferry

1. Considerations on the Rail-ferry Project
2. Feasibility Analysis of Rail-ferry from the Long-term Perspective
3. Long-term Project for Promoting Rail-ferry



1. Considerations on the Rail–ferry Project

- Expected to be difficult to proceed the project earlier due to the difference perspectives between Korea and China
- It is necessary to proceed the rail–ferry carefully based on the considerations on the possibility of creating demand and the investment size

Position of both nations

- easy to proceed for China due to the operation experience and the low level of investment burden on new facility
 - possible to create new demand based on the continuous increase of trade cargo between Korea and China
- difficult of early projection for Korea due to the high level of investment and the lack of operation experience

Possibility of creating demand

- Container cargo is not easy to be secured due to most of the direct hinterland region cargo in Chinese port
 - expected to be difficult to supply empty container and freight car due to the imbalance of moving freight between 2 nations
- In terms of bulk cargo, high level of cost is expected to incur for both nations due to the serious imbalance of cargo traffic in both nations

Investment size

- Rail–ferry ship is expected to take higher cost and much time than container ship
- Additional cost is expected to occur due to the supply of freight car and engine train unneeded to the container ship
- difficult to make sure that rail–ferry ship is better than container ship in terms of cost

2. Feasibility Analysis of Rail-ferry

- Expected to be developed as the transportation method for importing energy and resources and exporting industrial goods
- The western region in China is expected to be developed as a large industrial region and consuming market for rail-ferry in the long term.

Relationship with TKR

- The container-dedicated rail-ferry does not compete with TKR, but is in competition with TKR in case of general cargo
- The bulk cargo in the northeast China are transported through TKR and the container cargo and general goods in western region of China are transported through rail-ferry between Korea and China, so that these functions are complementary.

Sustainable development of the western region of China

- The construction of railway and express way connecting main ports and hinterland has been almost completed
- This region is the highly potential region to be developed as large industrial region and consuming market with hundreds of millions of people and enormous resources from the long-term perspective
- This region is highly expected to use rail-ferry from the long term perspective

Trade increase in Korea/Central Asia

- The trade between Korea and Central Asia is expected to increase based on the stable supply of energy and resources and export expansion due to the economic cooperation
- The rail-ferry between Korea and China is expected to be used as a transportation method for importing energy and resources and exporting industrial goods to Central Asia

3. Long-term Project for Promoting Rail-ferry

Proceed the long-term and phased projects on the conditions for the rail-ferry between Korea and China such as facility standardization, simplification of procedures and documentations, the establishment of the official organization

Goals

Standardization of
rail facility

Stable supply of
empty container
and lorry

Simplification of
procedures and
documentations

Establishment of
the official
organization

Co-foundtaion of
operation
company

Project

- Standardization of container and lorry with international standard
- Establishment of transshipment system overcoming the differences of the rail track between China and Central Asia
- Preparation of the plan for regular supply of empty container and freight car based on the trade cargo volume
- Reduction of time with the simplification of the procedures and the related documents such as custom procedures, quarantine, entry and departure, custom
- Establishment of the cooperative inter-government organization for discussing facility expansion, standardization of procedures and documentation, and route creation, ship supply, and etc.
- Consideration on the establishment of a JV company as the operation company together to share the business risk and promote the benefits of two nations



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The Development Strategy of Chinese Ports and the Inter-port Cooperation in the Pan Yellow Sea Rim

Dr. Hualong Yang

**Chairman of Logistics Department
Dalian Maritime University**

October 10, 2012





- **Lessons from the past : 30 years of unique growth of Chinese ports**
- **Ports & city gateways connecting to inland corridors: 3 development Phases**
- **The next great port logistics challenge**
- **The Inter-port Cooperation in the Pan-Yellow Sea Rim**



Chinese economy almost “self-sufficient” with essentially

Inter-regional trades deserved by small/mid size maritime/river vessels

into International Maritime Bulk & Containerized Traffics

Chinese economy not so much involved yet

Port-Gateways integrated into
ISO Containerized Commerce

Domestic Ports with
small-sized boxes
adapted to Chinese Railways

Coastal fringes mixing
International/Domestic
Traffics

Main International Flows

Main Domestic Flows





Domestic Ports not well-adapted to welcome large international fleets

Depth of water / Width of quays & terminals / Superstructures
No logistics integration between Coastal Regions

& Mainland Areas *Inland corridors / Railway Network / River infrastructures*

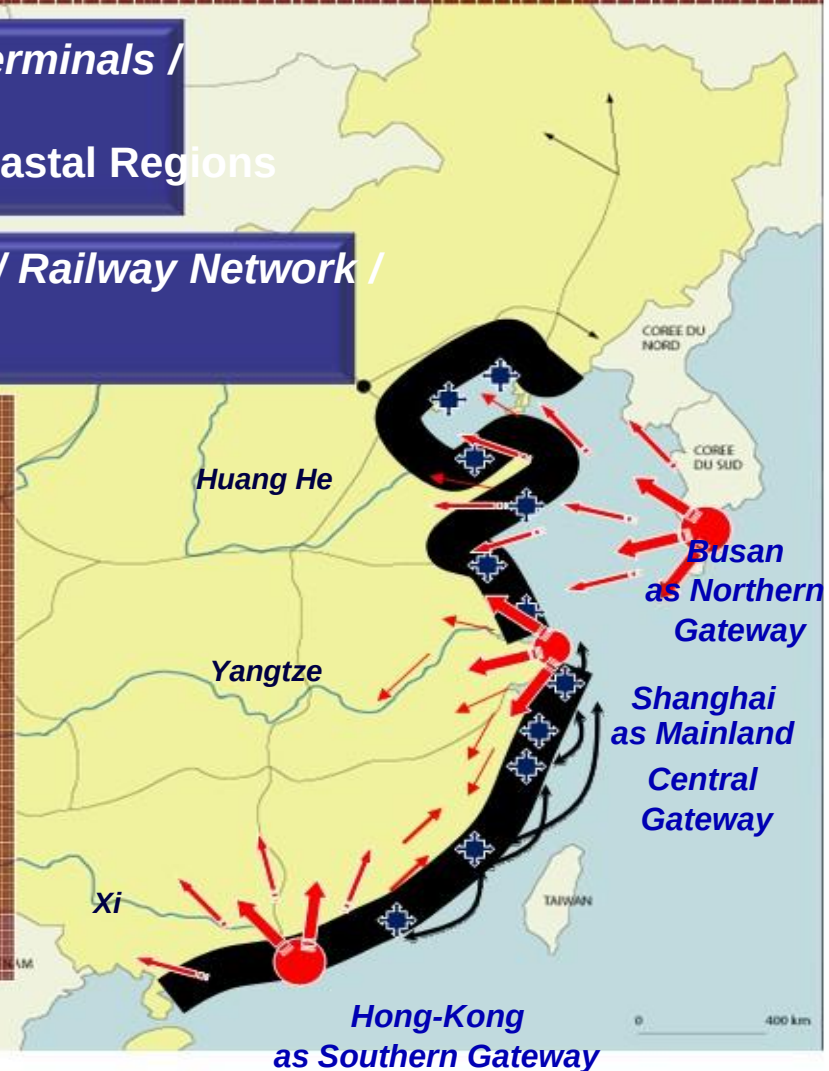
Port-Gateways integrated into ISO Containerized Commerce

Domestic Ports with small-sized boxes adapted to Chinese Railways

Coastal fringes mixing International/Domestic Traffics

Main International Flows

Main Domestic Flows



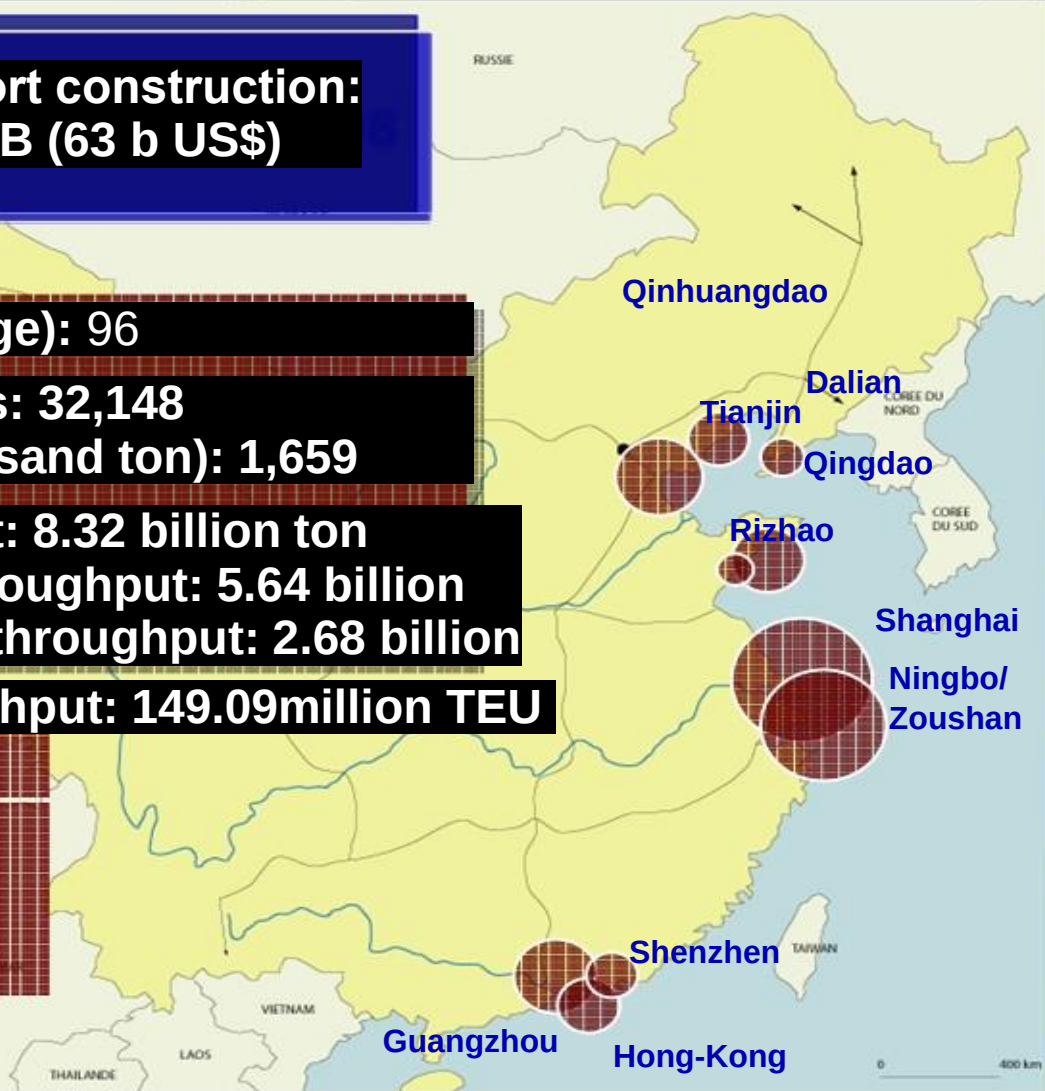


- Investment in port construction: 400 billion RMB (63 b US\$)

- Port number (Large): 96
- Production berths: 32,148
- No.berths(10 thousand ton): 1,659
- Cargo throughput: 8.32 billion ton
- Sea port cargo throughput: 5.64 billion
- Inland port cargo throughput: 2.68 billion
- Container Throughput: 149.09million TEU



600
450
300
150





- Major Multi-Port Complexes & Terminal

(YangTse River Delta Complex)

- Dry & Liquid Bulk Ports on the North

(Bohai Rim Multi Site Ports)

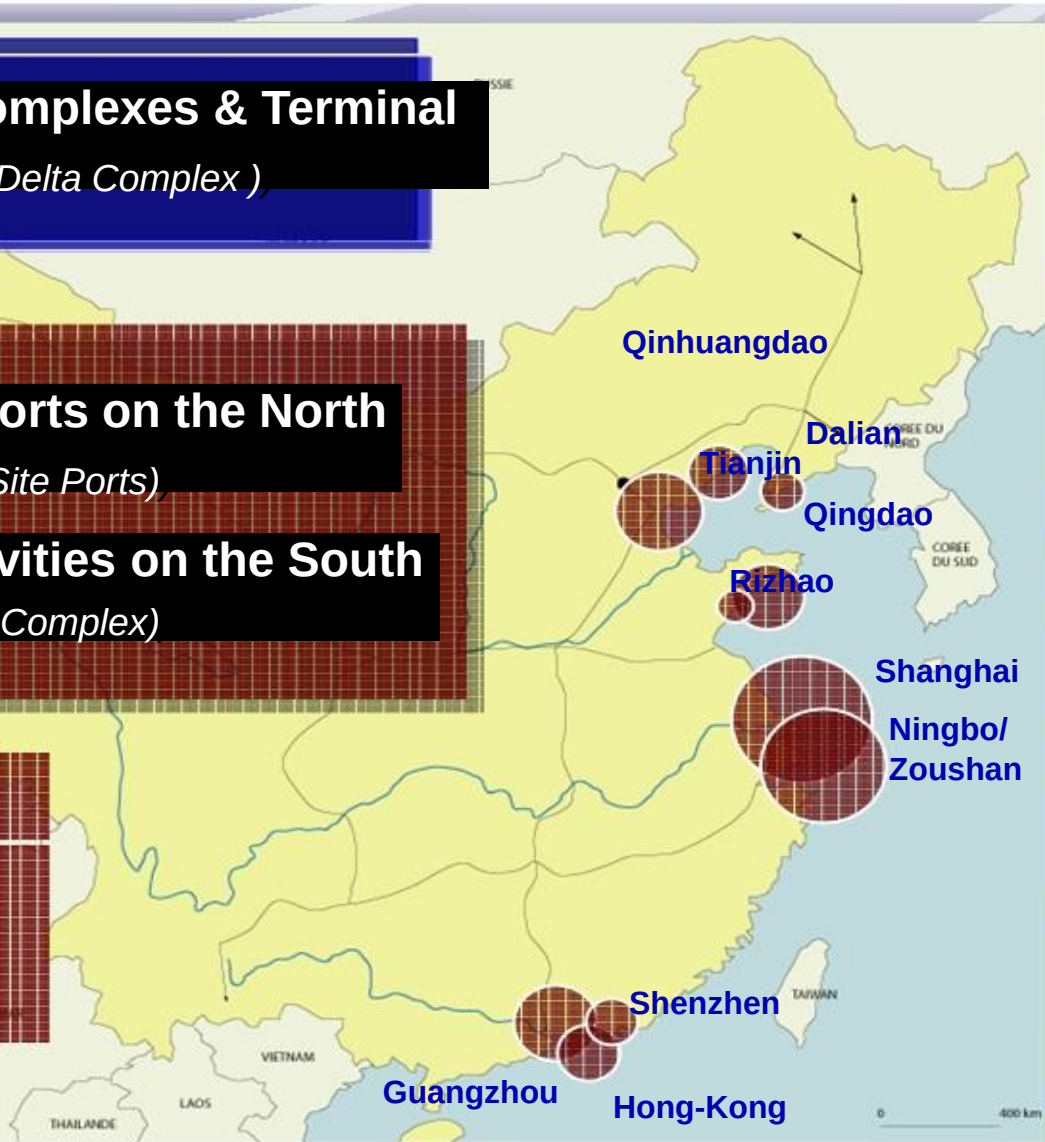
- General Cargo Activities on the South

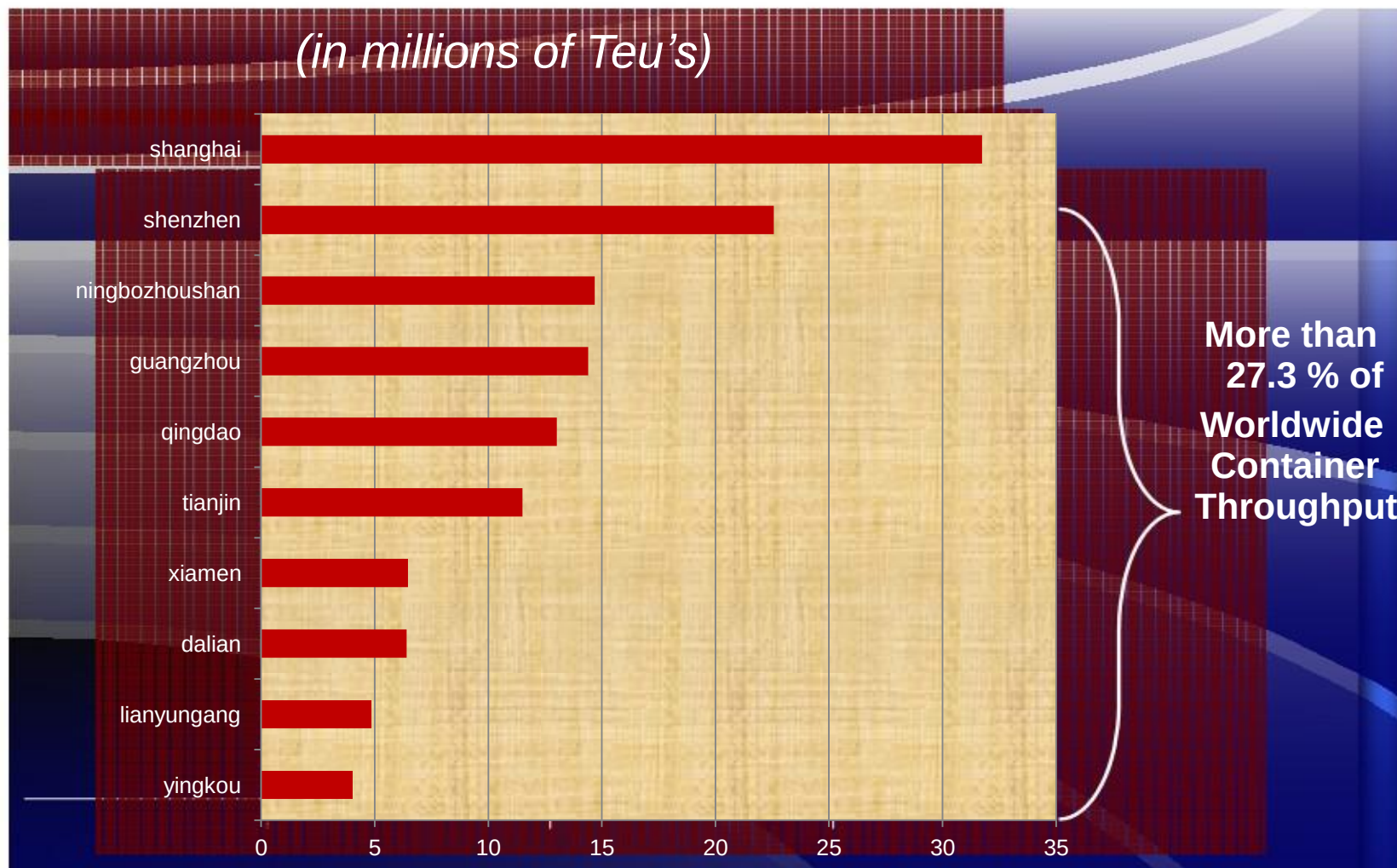
(Pearl River Delta Complex)

Total Throughput
(in millions of Metric Tons)



600
450
300
150





In 2011 shanghai Port is still No.1 with 31.74 million TEU



High Productivity with ZPMC using Chinese Terminals as “Living Lab”...



6 Teu's...
or 3 Feu's... for 120 T =
Up to 55 Teu's/hour as
registered in test...





Nos of Gantry-Cranes/ Large Containership with up to 40 mvts/hour !

3 Cranes for a mid-size vessel !



6 or 7 post-Panamax Cranes !





Terminal Capacities and Availability of berth : no time to waste



Reducing time from anchor (no congestion on channel or to have an access to a terminal)

+

Optimizing berth occupancy with a reliable & efficient turnaround of Ships (any kind of size)



- 1 Dalian
- 2 Qinhuangdao
- 3 Caofeldian (Tangshan)
- 4 Tianjin
- 5 Qingdao
- 6 Rizhao
- 7 Lianyungang
- 8 Shanghai
- 9 Ningbo
- 10 Shenzhen
- 11 Zhanjiang
- 12 Fangshen

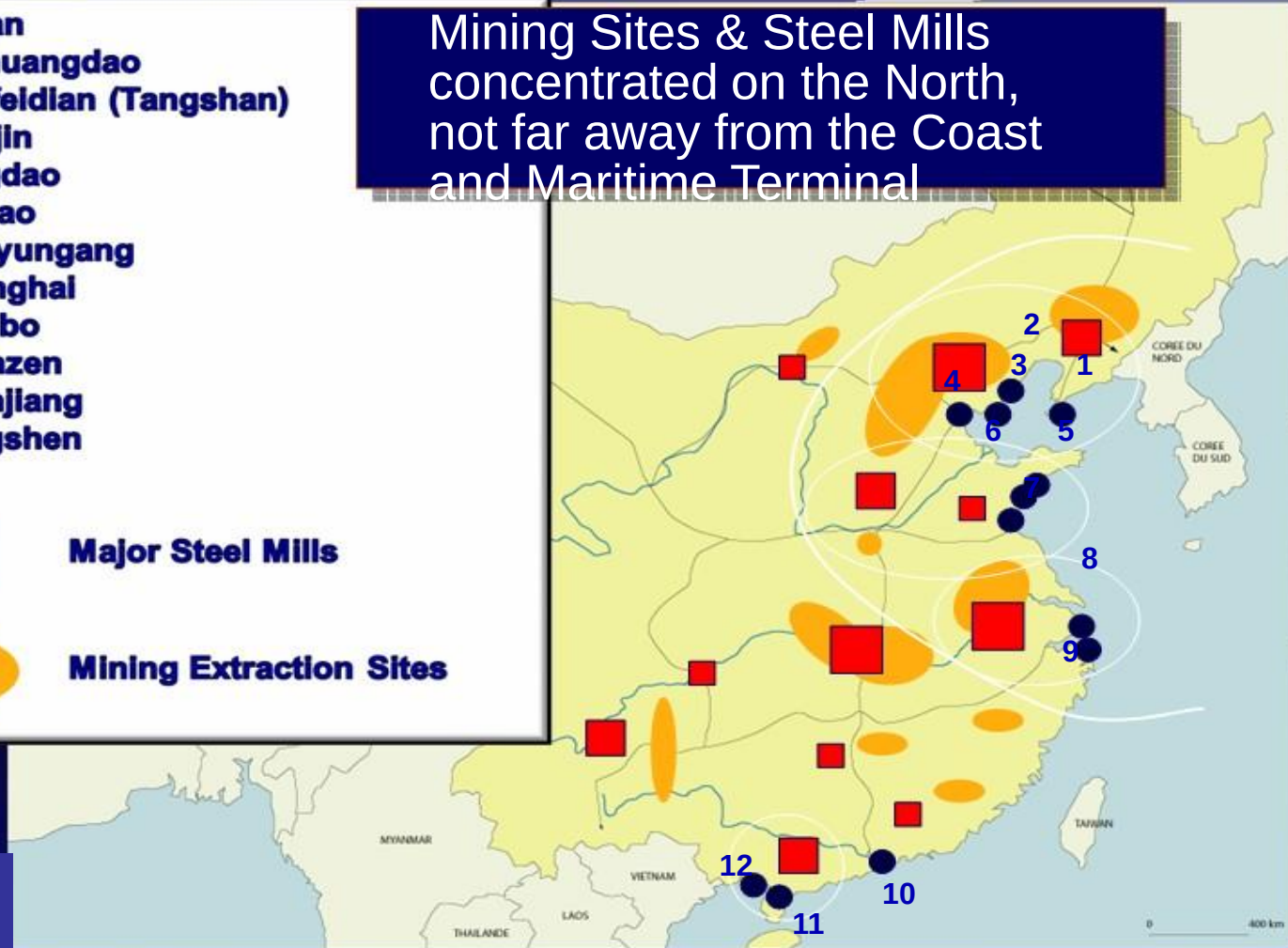


Major Steel Mills



Mining Extraction Sites

Mining Sites & Steel Mills concentrated on the North, not far away from the Coast and Maritime Terminal





*between China Iron Port Dvp / Competition
& Main International Origin of Importation*

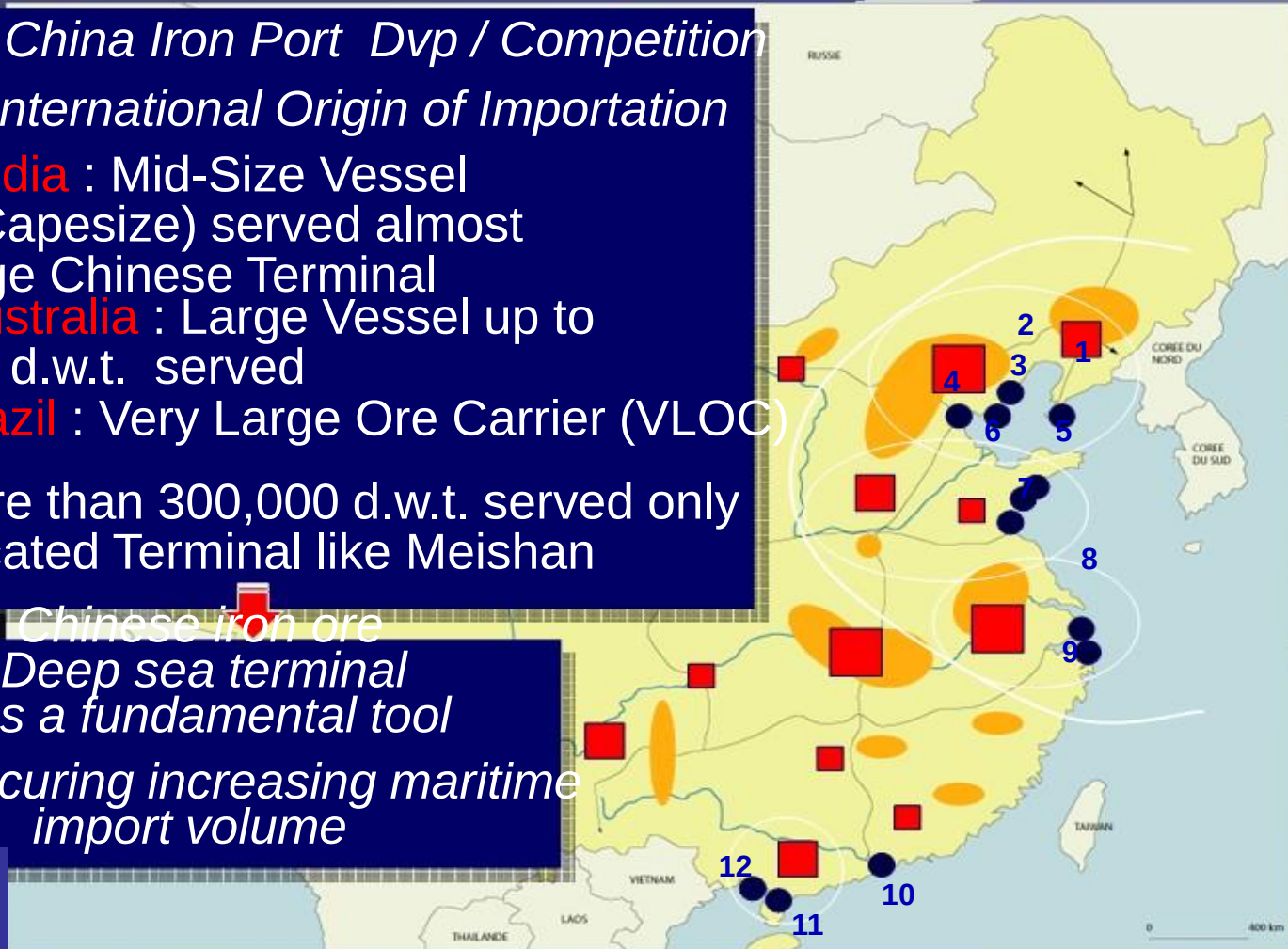
From India : Mid-Size Vessel
(up to Capesize) served almost
any large Chinese Terminal

From Australia : Large Vessel up to
275,000 d.w.t. served

From Brazil : Very Large Ore Carrier (VLOC)

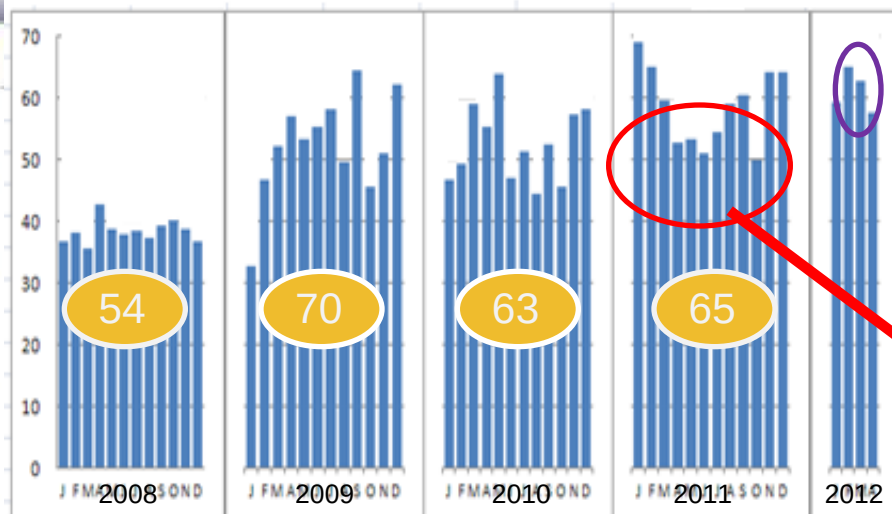
with more than 300,000 d.w.t. served only
by dedicated Terminal like Meishan

*Chinese iron ore
Deep sea terminal
as a fundamental tool
for securing increasing maritime
import volume*





Million tons



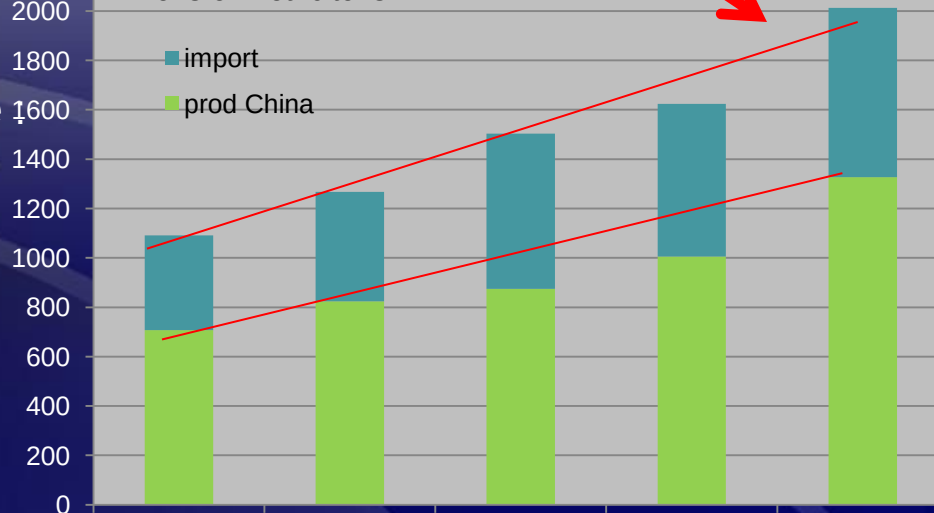
In 2011, imports
686 million :
65% of worldwide
maritime trade

34%

Huge needs to feed industries like

- Automobile
- Construction
- Shipyards

Millions of metric tons





Original domestic coal transshipment :

- by train for Redistribution into inland consuming areas

- by HandySizeMax (40 to 50,000 d.w.t.)

 - & SupraMax (60,000 d.w.t.)

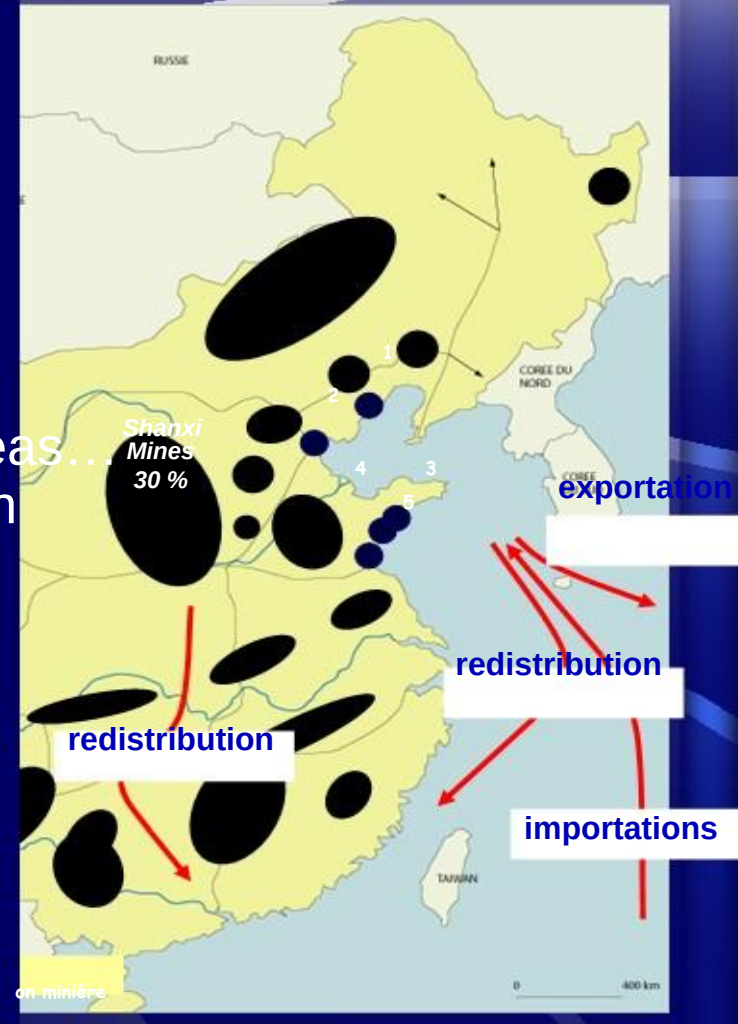
- to ship to coastal urban southern areas...

The «*Milk Run Distribution System*» in multiple terminal lack of efficiency

Huge coal hub center in several ports and inland depots in 2011

for « re-organizing » North/South domestic-international flows

(China Shenhua Energy Group invested in Log, Port and Rail into an integrated strategy)

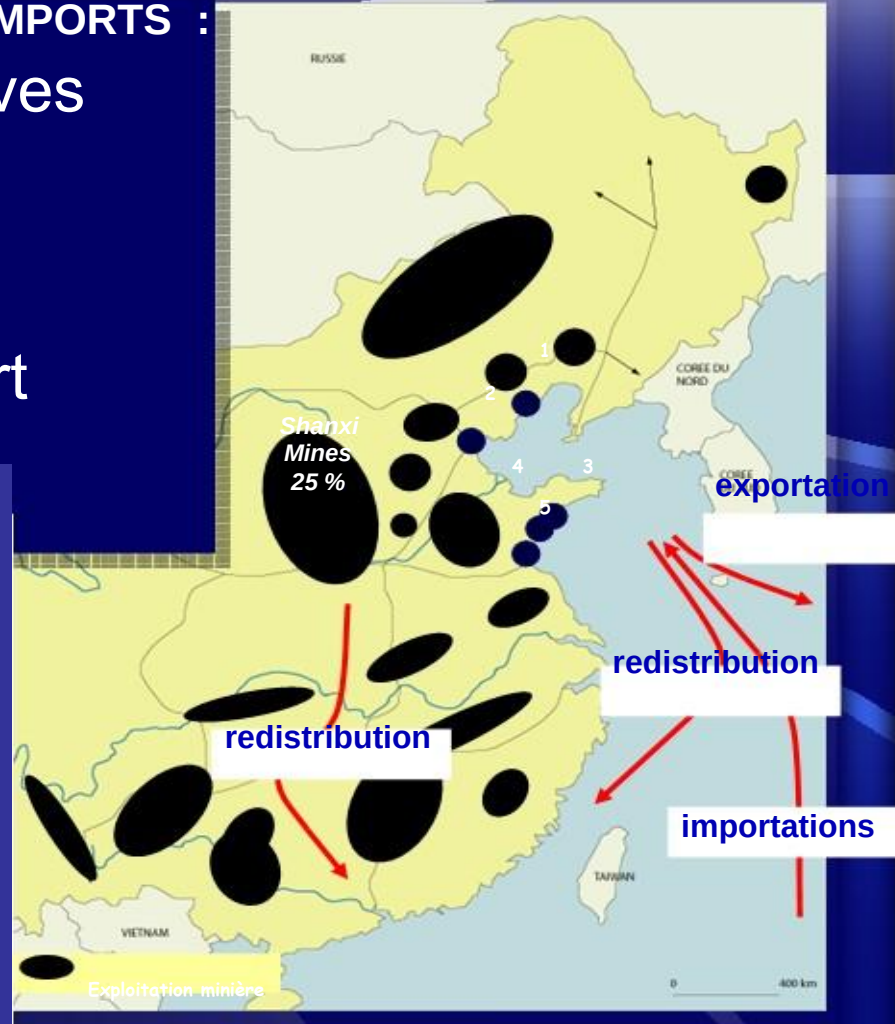


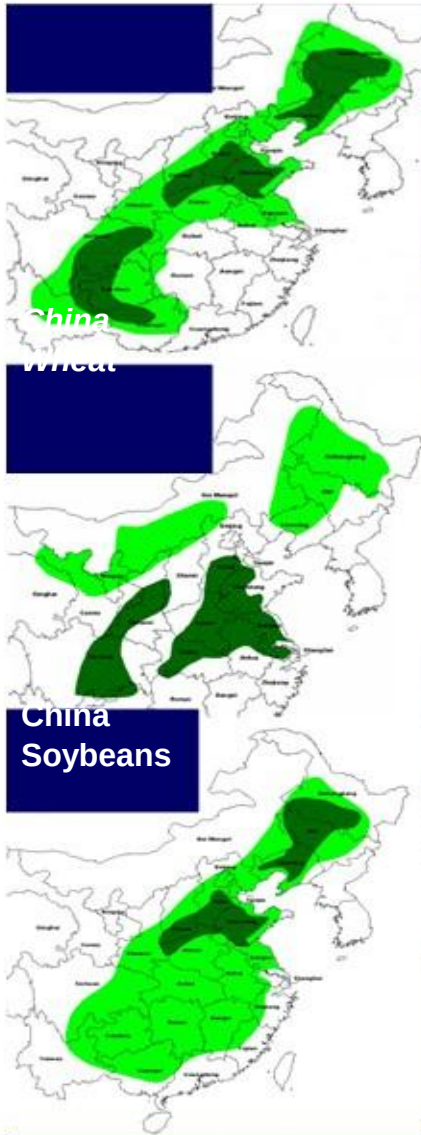


MAIN ADJUSTMENT FACTORS OF IMPORTS :

- Stocks & strategic reserves by Chinese Gvt
- Difference of quality of Chinese/foreign Coal
- Balancing import & export

In 2011, import 182.4 million tons, export 14.6 million tons, net import 168 million tons





↔ Radical changes in cultural domestic consumption into urban areas (Meat, Fresh

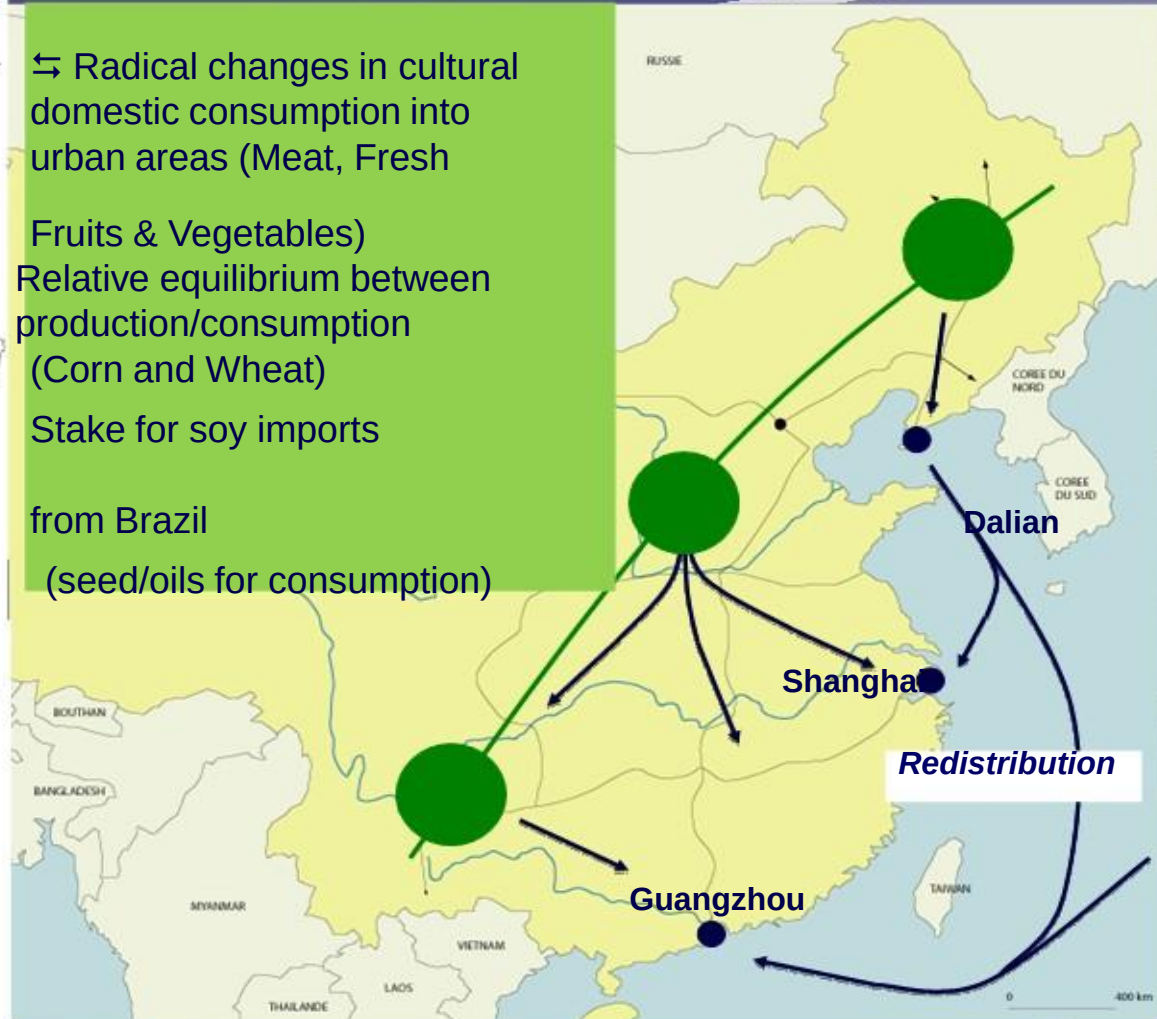
Fruits & Vegetables)

Relative equilibrium between production/consumption (Corn and Wheat)

Stake for soy imports

from Brazil

(seed/oils for consumption)





- ⇒ Increasingly dependent of international maritime importation
- ⇒ National production/refineries in the North
- ⇒ International refineries developed & planned in the South

In 2011, imports
253.78 million tons:
55.8% of total
consumption
11% of worldwide
maritime trade





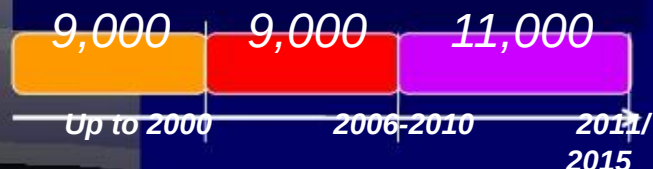
⇌ Light crude oil from Persian gulf (42%) & Angola (23%) by VLCC

⇌ Still almost 10% by train from Russia !

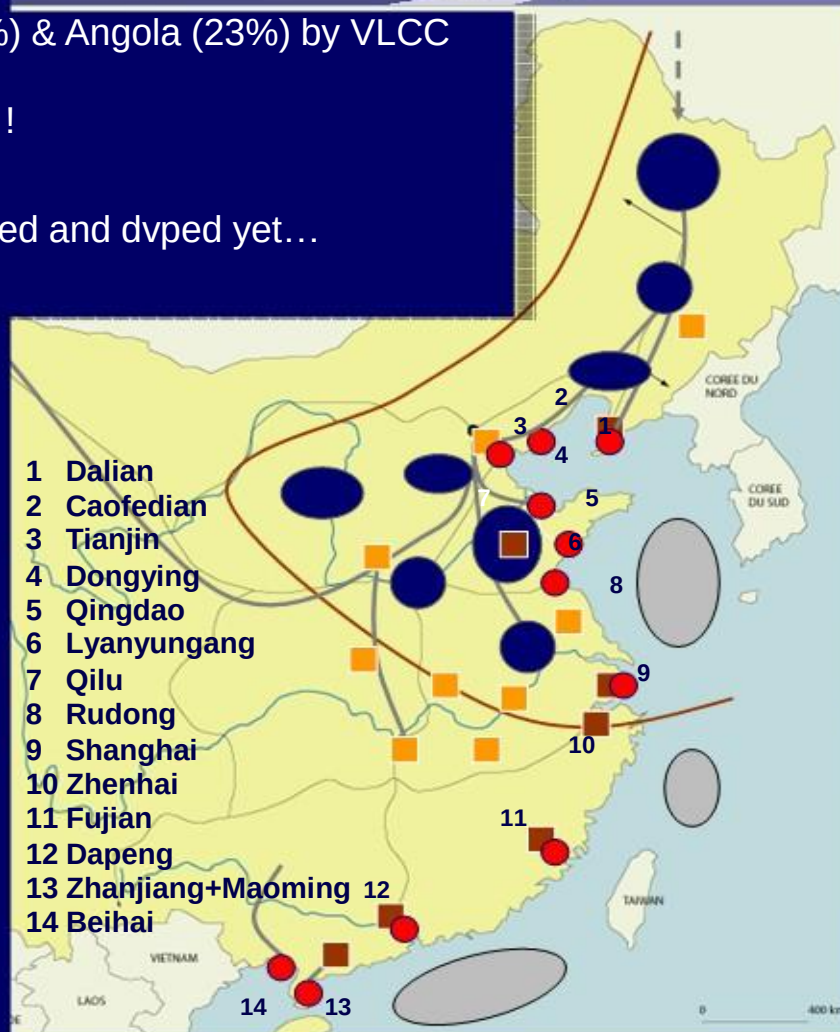
⇌ Off-shore oil fields not so much explored and dvpd yet...

⇌ Pipelines under big inv.

Domestic oil pipeline network (in kilomètre)

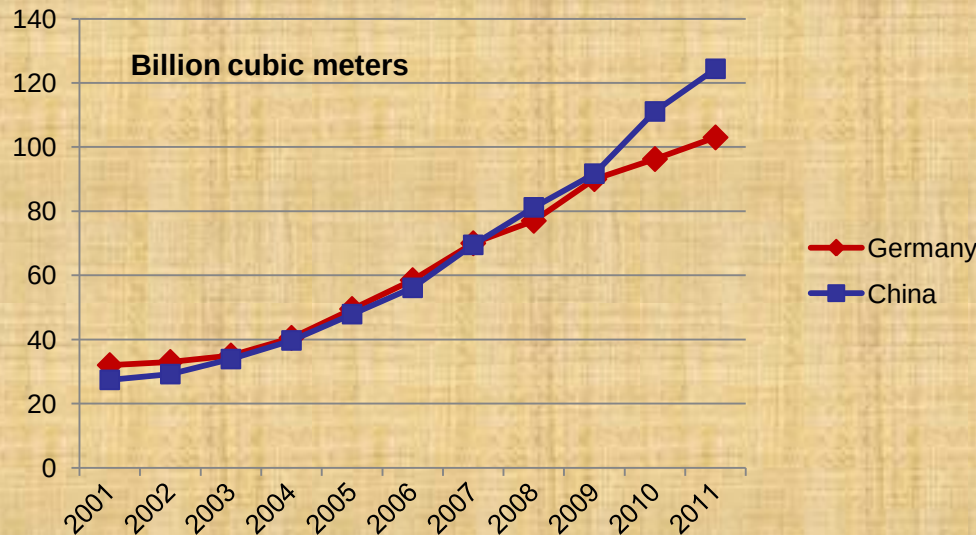


- Inland oil fields
- Offshore oil fields
- Existing pipelines
- Projected pipelines
- Oil terminal
- Oil refinery - China oil
- Oil refinery - Middle East oil





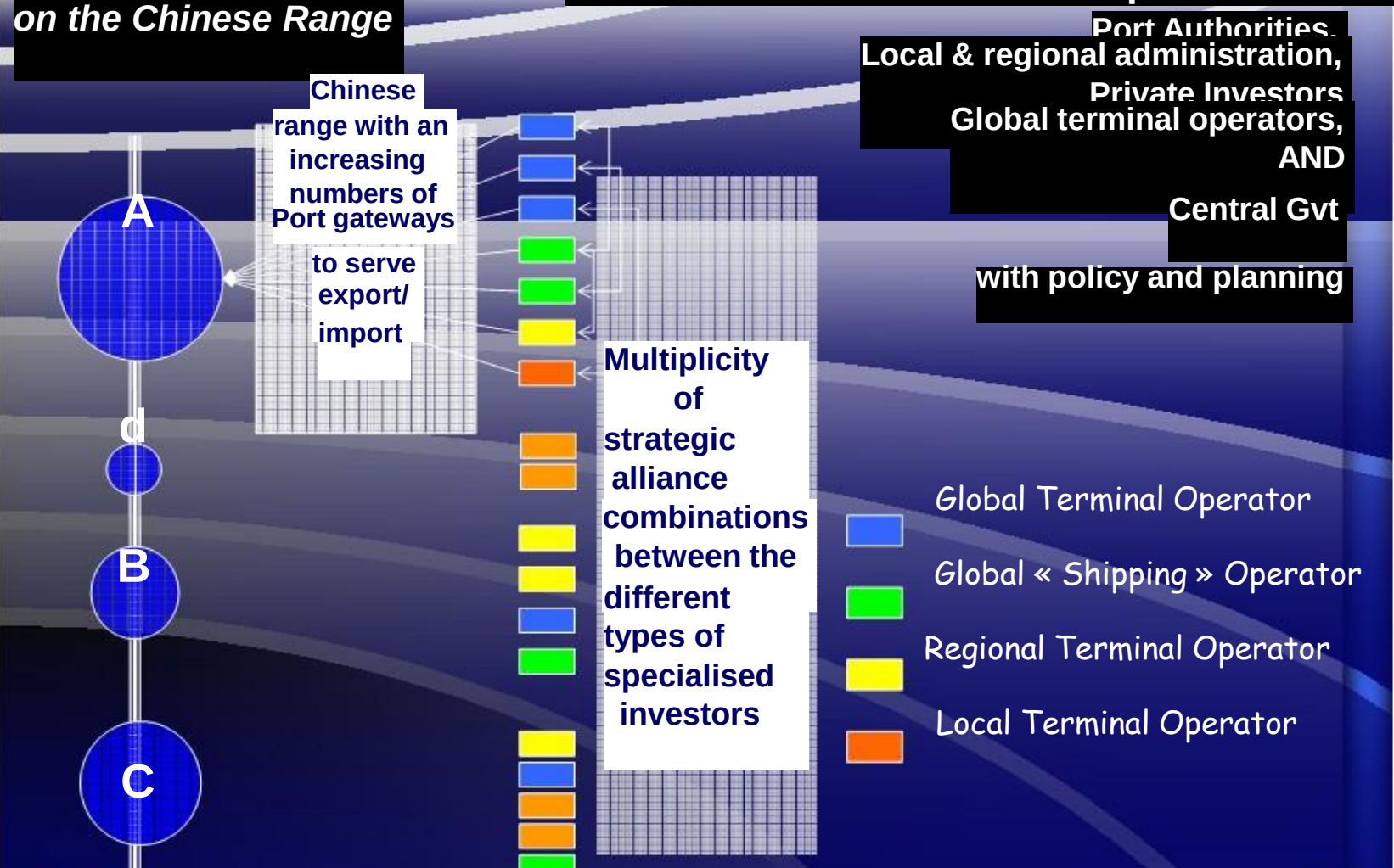
- ↪ China as a small player with an annual consumption comparable to Germany
- ↪ Recent massive investments in new very large port infrastructures to receive the largest vessels
- ↪ LNG as a strategic opportunity in the case of a general sustainable dev orientation by the Central Govt (to reduce pollution by Coal)





on the Chinese Range

An intensive multi-scale competition with :



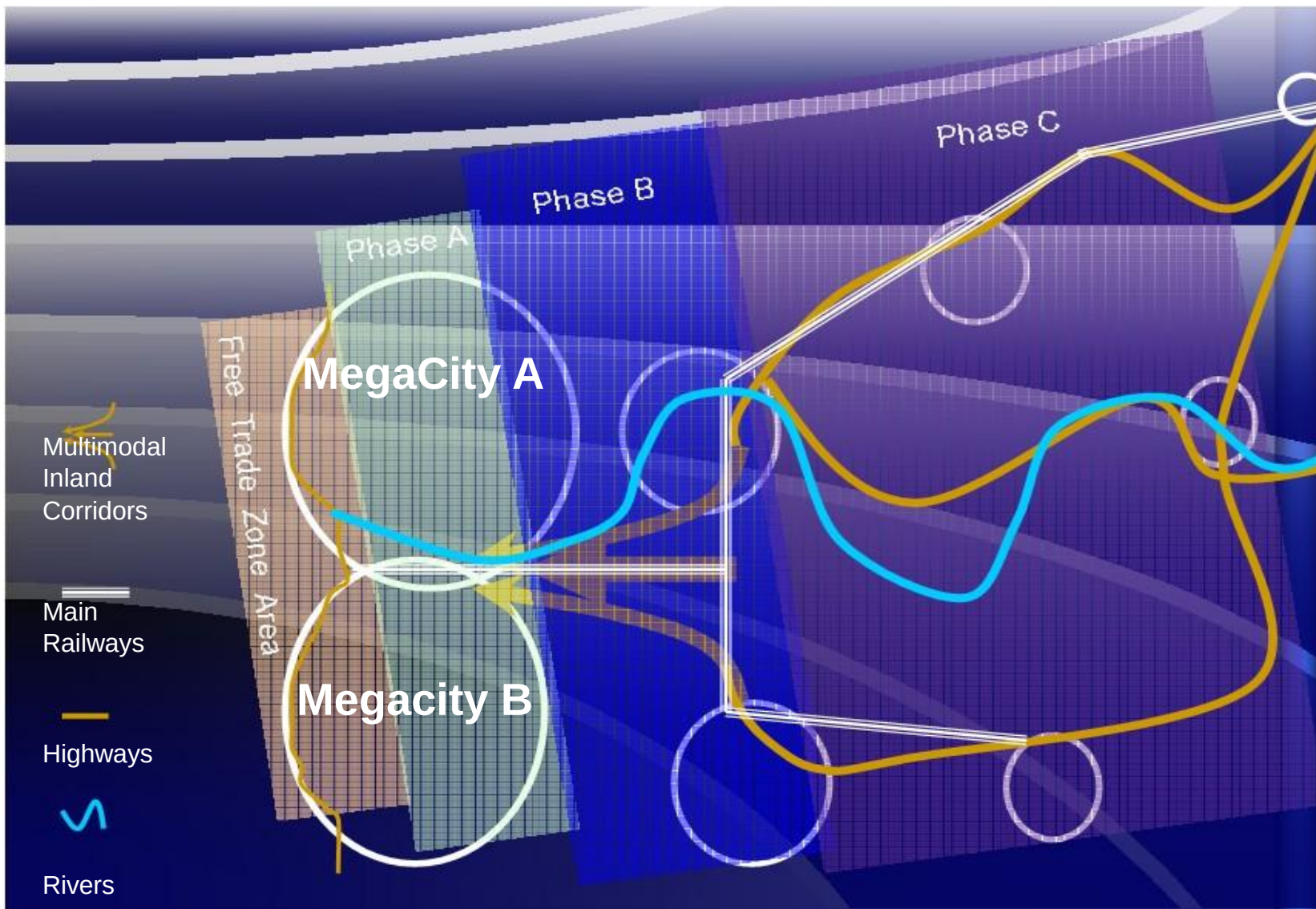


© Alix, 2008

© AIX, 2006



Ports/Cities & Value Chain Corridor - 2010'



Phase A: Foreign investments in the port/city contact zone:

- industry
- Spatial consumption
- Production activities destined to international consumption markets



Phase B: Foreign and domestic investment in the second zone or immediate hinterland of the port/city contact zone

- Spatial consumption in the second zone (lesser costs / phase A zone) along the main corridors at the interface of secondary urban zones
- Production and logistics activities extensively destined to the international market and for local populations of the first port/city contact zone



Phase C: Foreign and domestic investments in the third hinterland zone far from port/city interfaces

- Industry and services
- Spatial consumption in the third zone (lesser costs / A and B zones) at the end of the main multimodal corridors which converge towards river port-city of phase B
- Production and logistics activities destined to the international and domestic markets (Phase A and B with economic impact on phase C populations)

Feeding the future domestic demand market by an adapted continental port infrastructure network



The "homogenization" tendency of port development:

- Fight for centers
- Overlap of the economic hinterland
- Excessive development
- Inefficiency in multimodal transport

Development patterns:

- Rotterdam model, New York model, or Singapore model?

----- **Chinese-style**



Dilemma:

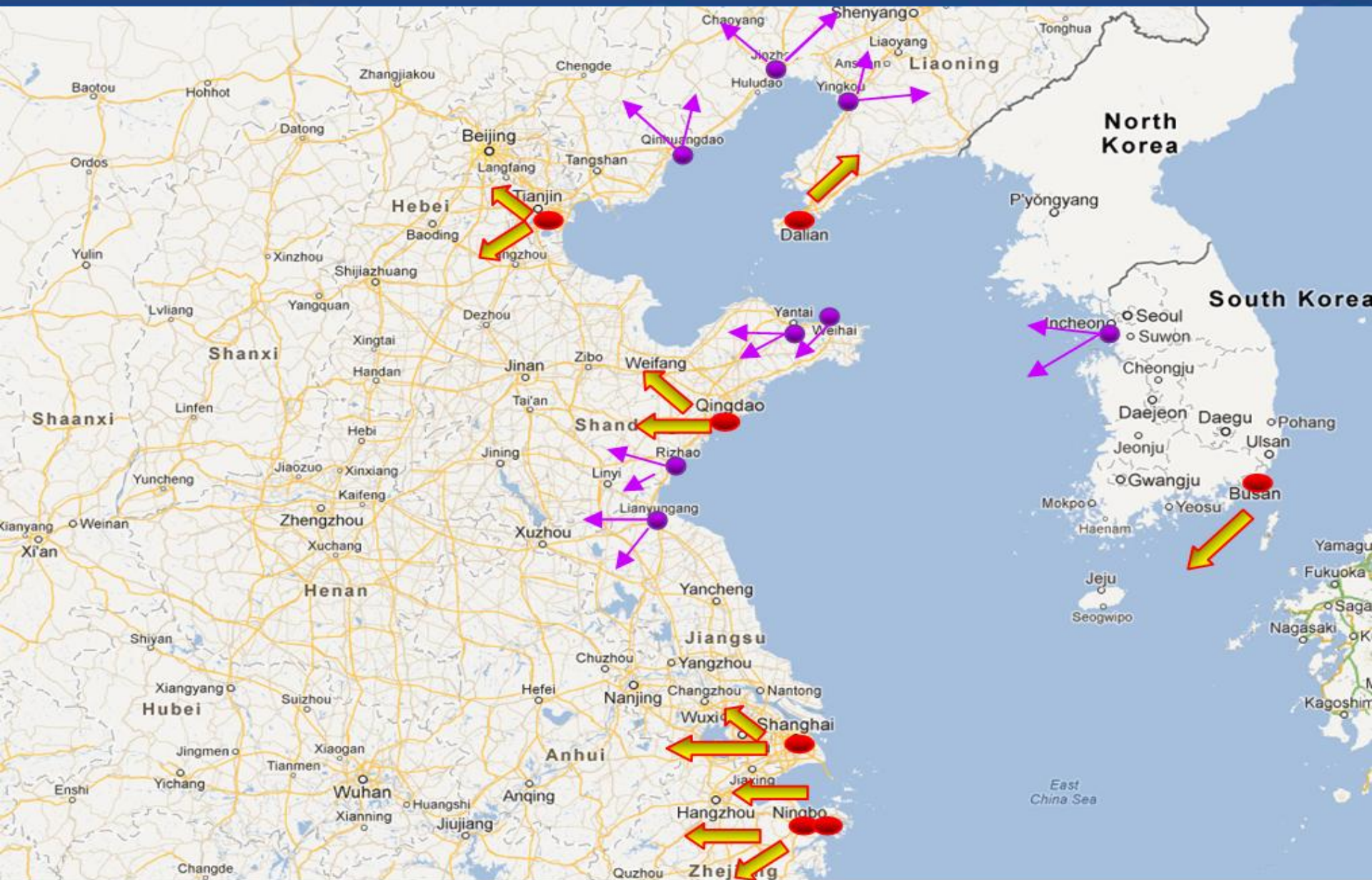
- Big but not strong, large market share while lack of rights:
- Competition between businesses in low-end chain of logistics, such as freight forwarding, shipping agency, customs clearance
- Lack of capacities to involve in high-end chain of logistics, such as shipping, insurance, maritime law
- Lack of port and shipping logistics development strategies and tactics



- The national port system as a cornerstone of the Chinese Gvt strategy to become the strongest economy of the 21th Century
- A sector which is still consider as highly strategic one even if international & private investments are allowed since almost 2 decades...
- Central government perfectly aware of the need to shift the Chinese economy way from dependence on Exports & toward Stronger domestic consumption

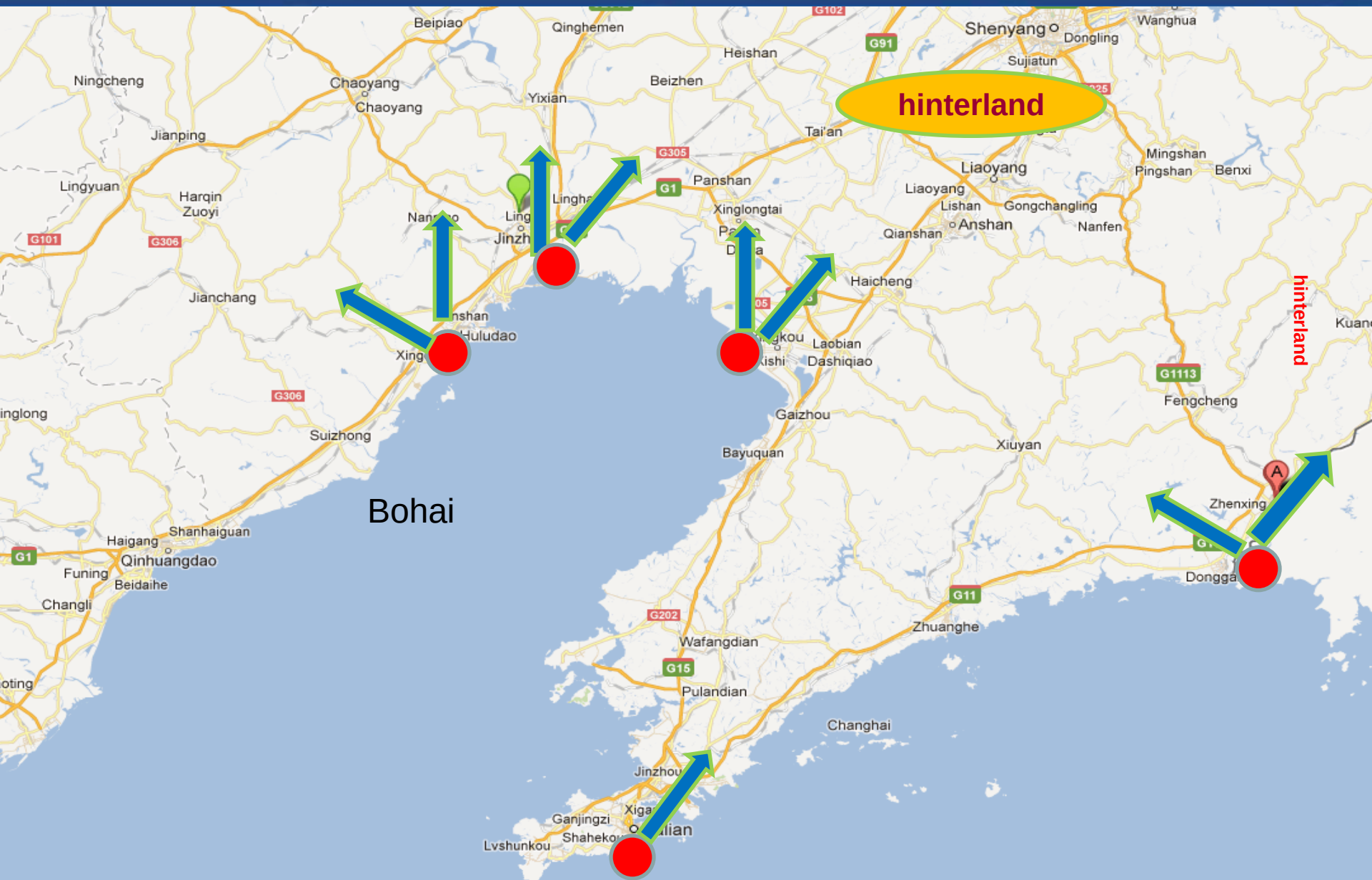


- By financing Huge DOMESTIC transportation & energetic infrastructures + strong support to the manufacturing exporting sector
- The competitions in future are not in businesses of low-end chain of logistics, scales or port nodes;
- The competitions lie in chains, quality of service and the logistics and supply chain network of ports





5 main ports in Liaoning Province





Main ports in North China





Ports in Shandong Peninsula



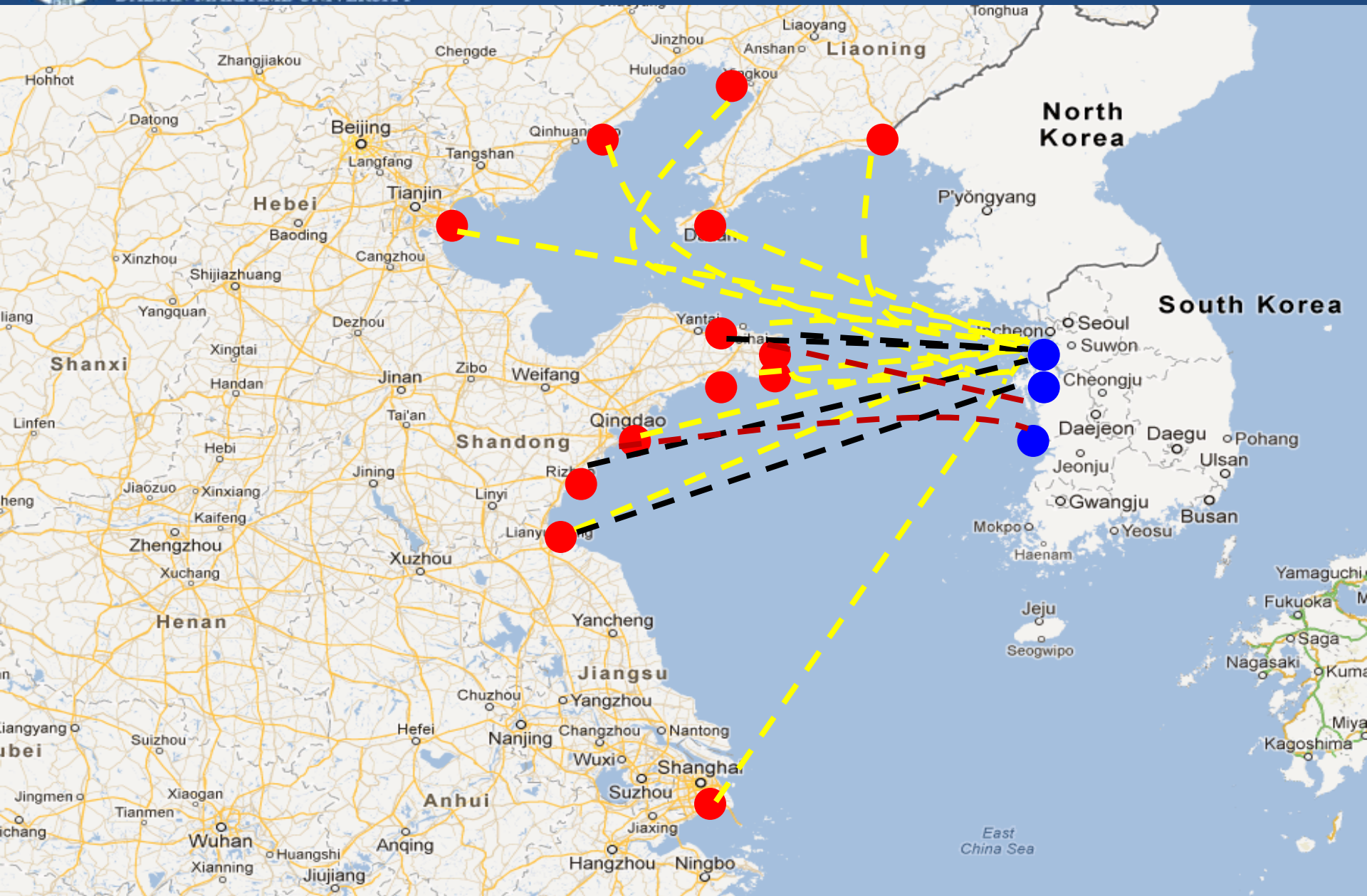


Main ports in East China





Ro-Ro routes of China-Korea



- **Geographical advantage**
- **Thousands of years history/culture of communication**
- **Friendly political relationships**
- **Economics development**
- **Resources complementary**

- ◆ Improve customs clearance policies
- ◆ Improve infrastructure
- ◆ Promote the economic development of the hinterland, creating demand for port logistics
- ◆ Establish China and Korea Port Logistics Alliance
- ◆ Establish China-ROK Free Trade Zone
- ◆ Standardize port logistics system(e.g. pallet)



大连海事大学
DALIAN MARITIME UNIVERSITY

学汇百川 德济四海

Thanks for your attention

Q & A



Baltic Sea Region: The Logistics Hub in Northern Europe and its Implications

Gunnar Prause, Prof. Dr.

Wismar University & TU Tallinn

South-Korea, 10.10.2012

Some back ground Infos

- Gunnar Prause

- Professor at Wismar University / Germany and Tallinn University of Technology / Estonia
- Member of Institute for Cooperative Studies at Humboldt University Berlin / Germany
- Member of Institute for E-Government at Potsdam University
- Vice-Rector of Research at Wismar University (2007-2010)
- Vice-Dean at Wismar Business School (2005-2007)

- Since 2000 active in European Projects

- Topics:**

- » SME – Management & Internationalisation of SME
 - » Regional Development & Innovation
 - » Logistics & Management in Shipbuilding
 - » E-Government

Wismar and Tallinn in the European Area



- **Participating States:** Denmark, Estonia, Finland, Germany, Latvia, Lithuania, Norway, Poland, Sweden and Russian Federation
- **Area:** 374,000 km²
- **Population:** ca. 85 Mio.
 - 23% of EU population
 - 16% of total EU GDP
- **Depth:** average of 57 m (max 200-450 m)

➔ The Baltic Sea is one of the world's smallest seas, still it is among one of the busiest and most polluted seas in the world, accounting for 15 % of the world's maritime cargo

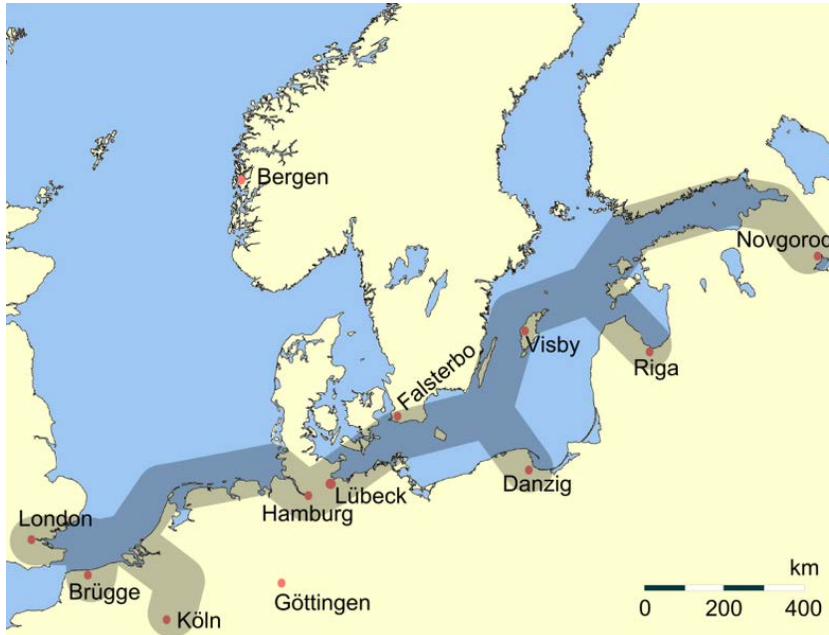
Wismar

Tallinn

BSR Specifics

- Hanseatic League & EU as a common background
- Hinterland links are very important
 - Production & population in South & East
- Safety & Ecology are very important
 - intensive maritime traffic
 - Low water exchange with Atlantic Ocean
- Different intra & extra BSR traffic schemes
- Unbalanced cargo flows
 - Westbound: mainly natural resources & oil products
 - Eastbound: industrial products, equipment, containers
- Inhomogenous development of logistics infrastructure and competence

Hanseatic Heritage



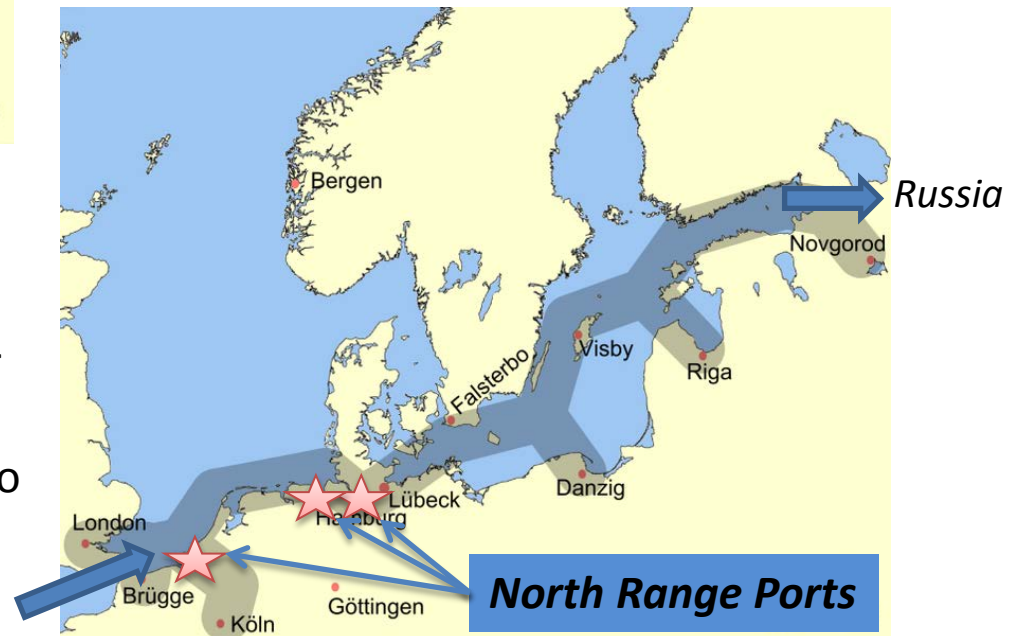
History:

Hanseatic League during the Middle Ages was dominating trade network in Northern Europe with Lübeck as the headquarter

Nowadays:

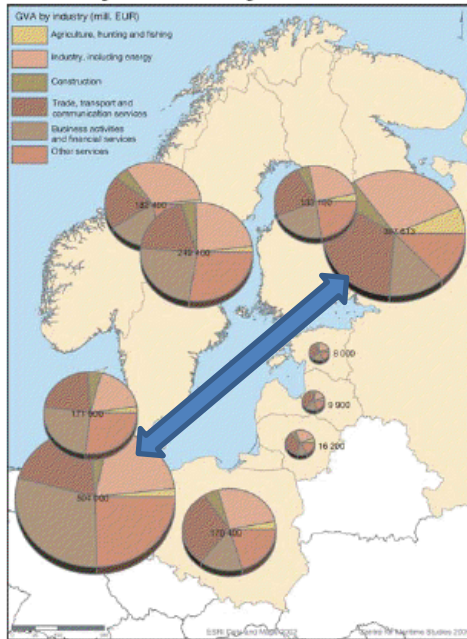
North Range Ports (Rotterdam, Antwerp, Bremen, Hamburg) are entrance door for containers from Asia/China to Western & Central Europe and especially Hamburg to Baltic Sea Region & Russia

Asia/China

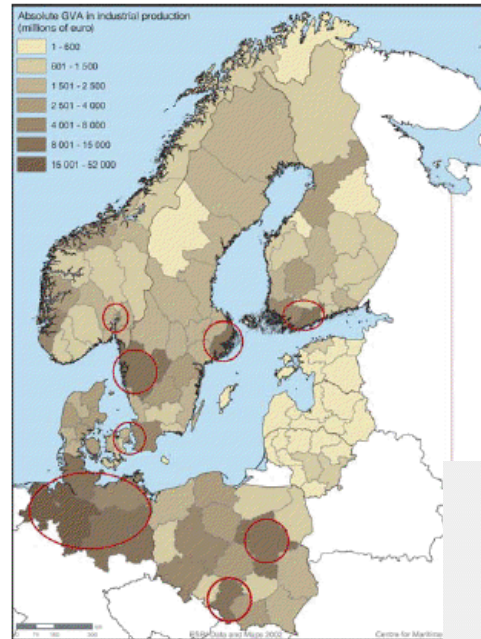


Baltic Sea in Europe

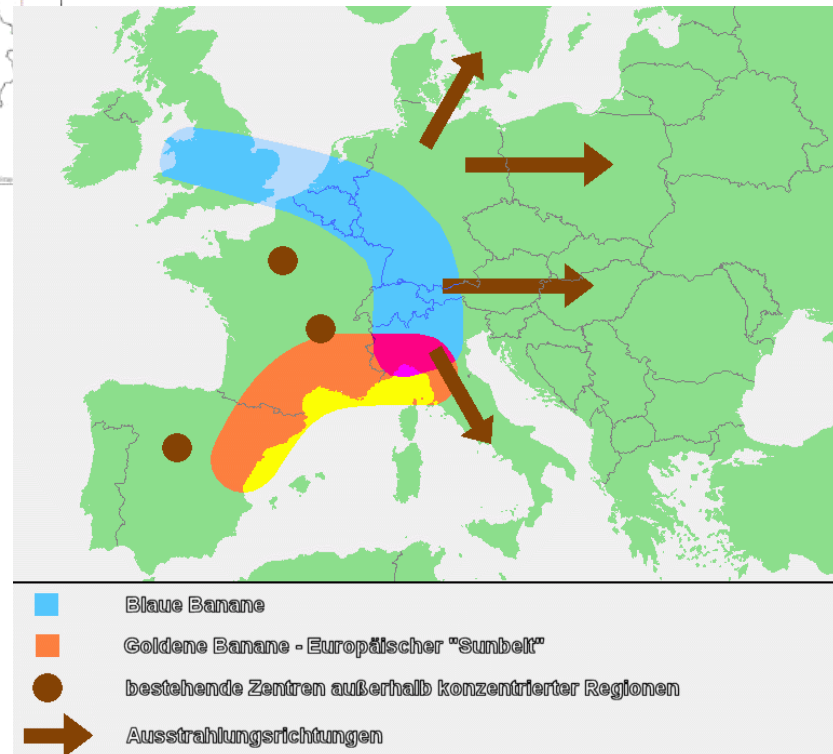
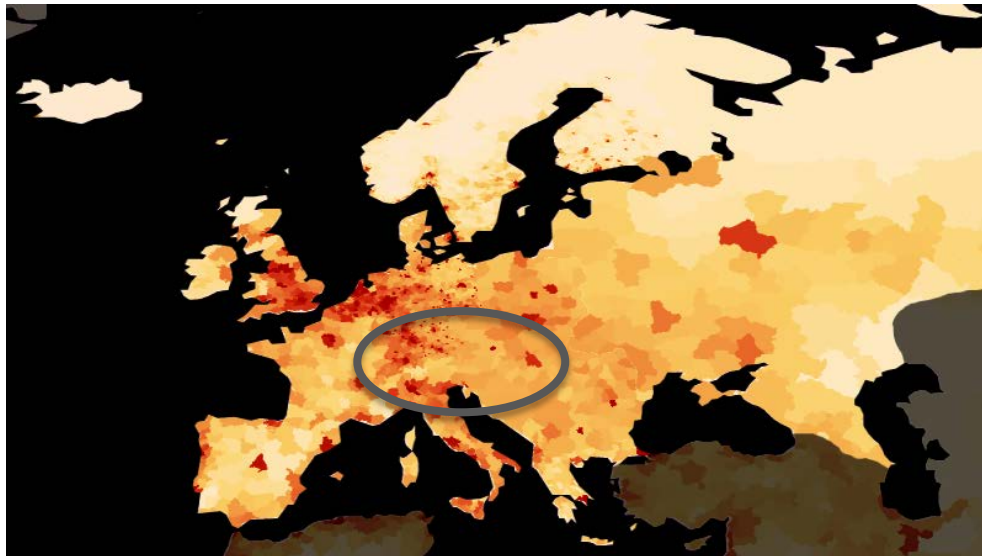
Gross value added (GVA) by industry



Industrial GVA in regions



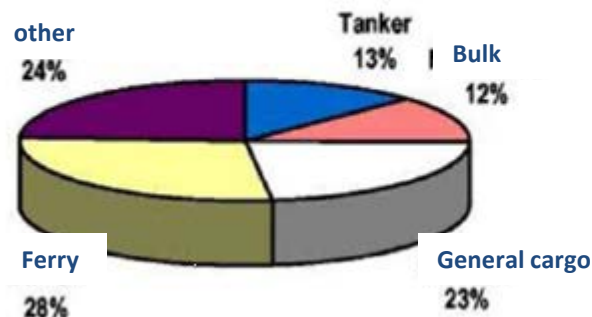
- Part of EU except Russia
- Population and Production Centers are located in the South and the East
- Hinterland links are important
- Incoming Asian cargo from North Sea ports (North Range)



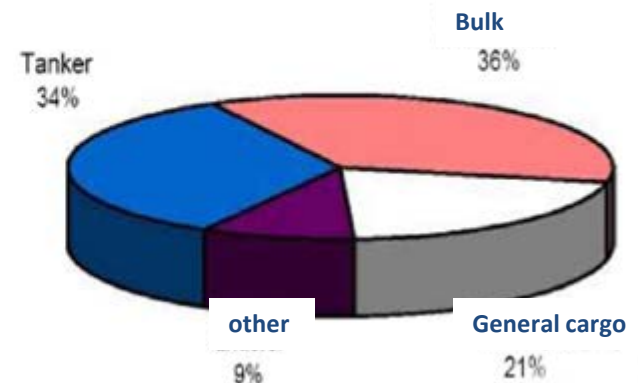
Structure of Baltic maritime transport depending on type of cargo (2008)

Type of cargo	Total mio tons	Share (%)	External Baltic transport (mio tons)	Internal Baltic transport (mio tons)
Liquid bulk goods	256,8	44,2	201,8	55,0
Dry bulk goods	139,8	24,1	103,6	36,2
Container	50,6	8,7	46,2	4,4
Ro/Ro	69,7	12,0	13,5	56,2
Other cargo (breakbulk cargo)	63,7	11,0	48,0	15,7
Total	580,6	100,0	413,1	167,5

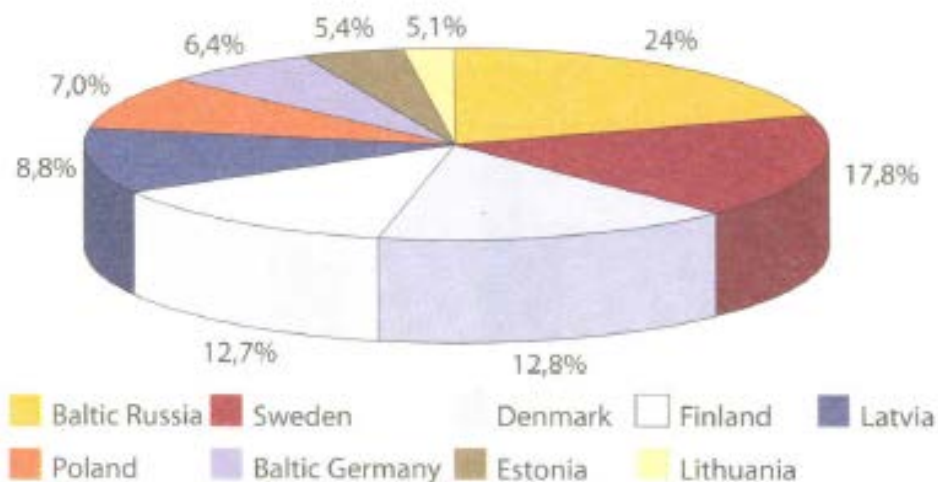
Internal



External



Top 20 Baltic Ports 2009



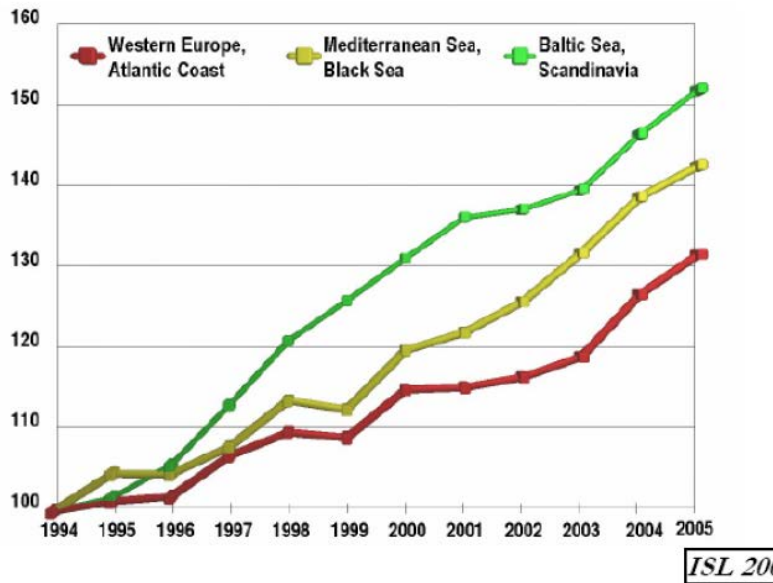
Cargo Handling

No.	Nat.	Port	Total cargo (mln tonnes)	Annual change
1	RU	Primorsk	79.1	+4.7%
2	RU	St. Petersburg	50.4	-16.3%
3	SE	Göteborg	38.9	-8.0%
4	EE	Tallinn	31.6	+8.7%
5	LV	Riga	29.7	+0.6%
6	LT	Klaipėda	27.9	-6.7%
7	LV	Ventspils	26.6	-6.8%
8	DE	Lübeck	24.1	-18.3%
9	DE	Rostock	21.5	-21.0%
10	FI	Sköldvik	20.8	+17.3%
11	PL	Gdańsk	18.9	+6.0%
12	PL	Szczecin/Świnoujście	16.5	-14.1%
13	PL	Copenhagen/Malmö	15.0	-16.7%
14	DK	Fredericia	13.3	-7.9%
15	PL	Gdynia	13.3	-14.3%
16	RU	Kaliningrad	12.4	-19.6%
17	RU	Ust-Luga	10.3	+50.0%
18	SE	Trelleborg	10.2	-17.9%
19	FI	Helsinki	9.8	-17.6%
20	DK	Aarhus	8.9	-25.0%
Total top 20 ports			481.0	-7.2%

Container Ports

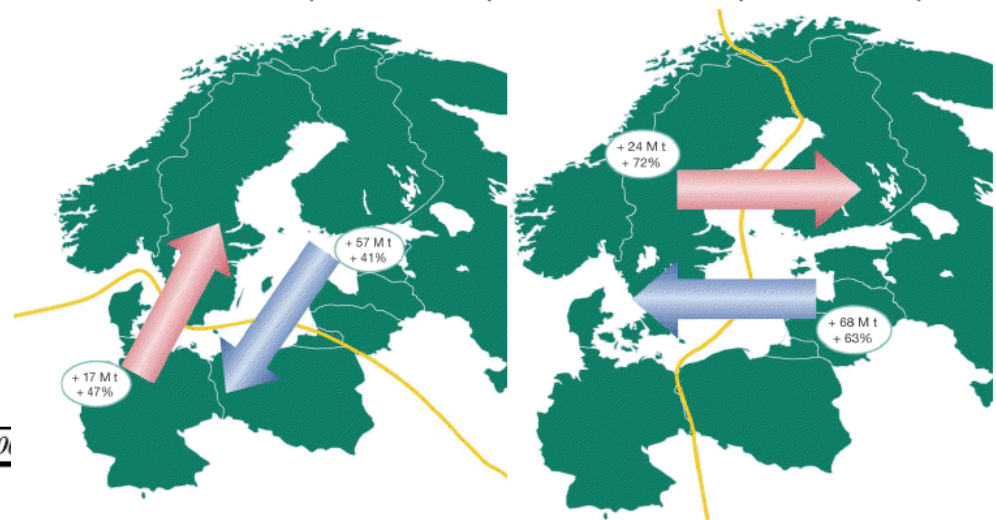
No.	Nat.	Seaport	TEU (thou.)	Annual change
1	RU	St. Petersburg	1,343.7	-32.2%
2	SE	Göteborg	824.2	-4.4%
3	DK	Aarhus	385.0	-15.1%
4	PL	Gdynia	378.3	-38.0%
5	FI	Helsinki (Vousaari)	357.2	-14.9%
6	FI	Kotka	345.9	-48.1%
7	LT	Klaipėda	248.0	-33.6%
8	PL	Gdańsk	240.6	+29.6%
9	LV	Riga	183.0	-13.2%
10	DK/SE	Copenhagen/Malmö	156.2	-19.5%
11	FI	Rauma	143.3	-16.8%
12	EE	Tallinn	130.9	-27.6%
13	SE	Helsingborg	112.0	-17.6%
14	SE	Gävle	108.5	+4.5%
15	FI	Hamina	108.1	-39.5%
16	RU	Kaliningrad	94.5	-55.7%
17	DE	Lübeck	79.4	-17.4%
18	DK	Aalborg	58.0	-10.8%
19	PL	Szczecin/Świnoujście	52.6	-16.4%
20	FI	Hanko	38.1	-16.8%
Total top 20 ports			5,387.5	-25.0%

Baltic Sea traffic development



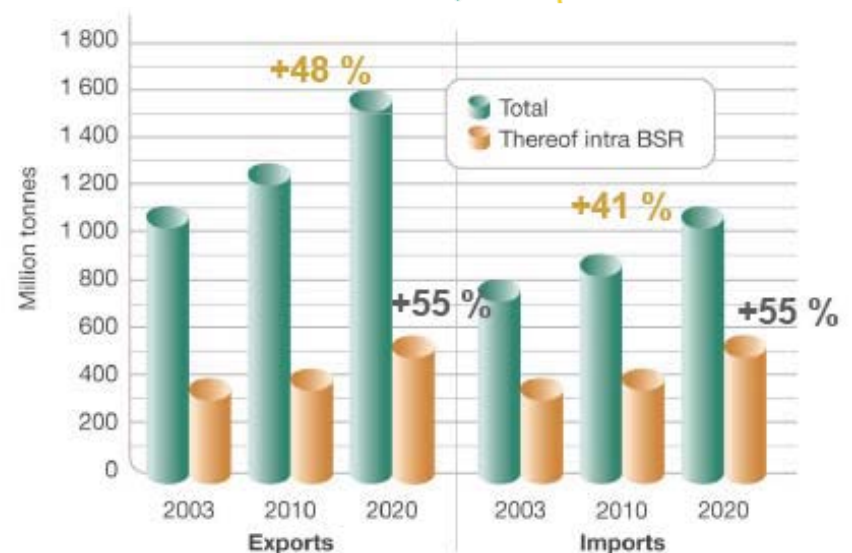
Estimated trade between sub-regions

North – South (2003 to 2020) East – West (2003 to 2020)



Outlook 2020

- Increase transport volume 58% (2020)
- 71% of transport through Skagerrak
- Higher increase compared to land transportation



Logistics Performance Index

Finland	3	4,05
Germany	4	4,03
Denmark	6	4,02
Sweden	13	3,85
Norway	22	3,68
Poland	30	3,43
Lithuania	58	2,95
Estonia	65	2,86
Latvia	76	2,78
Belarus	91	2,61
Russian Federation	95	2,58
Korea, Rep.	21	3,7



Unequal Logistics infrastructure and performance due to different histories

EU Strategy for Baltic Sea Region

- An integrated approach to identify needs, solutions and match them to available resources
- Three objectives
 1. Save the Sea
 2. Connect the Region
 3. Increase Prosperity
- 4 Cornerstones to make BSR more:
 - Environmentally sustainable (e.g. reducing pollution in the sea);
 - Prosperous (e.g. promoting innovation in small and medium enterprises);
 - Accessible and attractive (e.g. better transport links);
 - Safe and secure (e.g. improving accident response).

Priority area 11: Transport

- Aims at improved internal and external transport links
- Five goals:
 - 11.1. Complete the agreed priority transport infrastructures
 - 11.2. Implement the Northern Dimension Partnership on Transport and Logistics
 - 11.3. Develop the Baltic Motorways of the Seas network
 - 11.4. Shorter plane routes
 - 11.5. Cooperate for smarter transport

Implementation

- Simple implementation system: making better use of existing institutions, funding and legislation – no new EU structures, EU laws, or EU money
- Policy development: European Council and high-level group
- Special initiatives
 - TEN-T incl. Motorways-of-the-Sea
 - White Paper 2011
 - Baltic Transport Outlook 2030
 - BSR Interreg Programme

Traditional pillar of EU Transport Policy: Trans-European Transport Network

TEN-T timeline

1990

Commission adopts first action plan on trans-European networks (transport, energy and telecommunications).

1993

TENs given legal base in Maastricht Treaty.

1994

Essen European Council endorses list of 14 TEN-T 'specific' projects, drawn up by a group chaired by then Commission Vice-President Henning Christophersen.

1995

Financial regulation for TEN-T support adopted.

1996

Adoption of TEN-T guidelines.

2001

Extension of TEN-T guidelines to port infrastructure (seaports, inland ports and intermodal terminals) adopted.

2003

A group chaired by former Commission Vice-President Karel Van Miert proposes new priority projects and calls for new means of funding.

2004

Revised guidelines and financial regulation adopted, with a list of 30 priority projects (including the original 14) and a higher maximum funding rate of 20 % in certain cases.

2005

Nomination of the first six European coordinators

2005

A group chaired by former Commission Vice-President Loyola de Palacio due to propose axes linking TEN-T to neighbouring countries outside the EU.

...

2010/2011

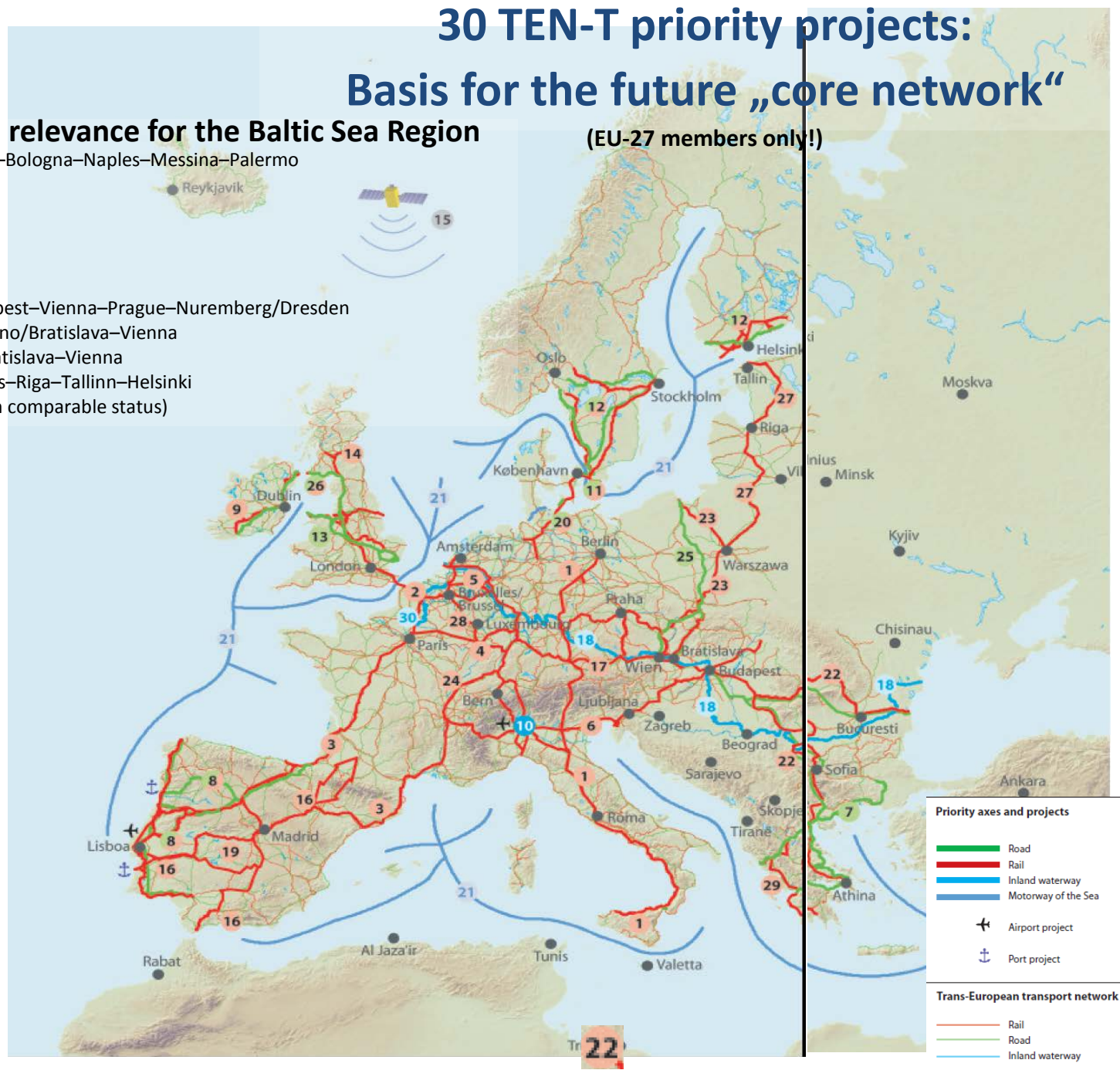
TEN-T revision: Introduction of „core network“

30 TEN-T priority projects: Basis for the future „core network“

Projects and axes with relevance for the Baltic Sea Region

(EU-27 members only!)

1. Railway axis Berlin–Verona/Milan–Bologna–Naples–Messina–Palermo
 11. Øresund fixed link
 12. Nordic triangle railway/road axis
 15. Galileo
 20. Fehmarn belt railway axis
 21. Motorways of the sea
 22. Railway axis Athens–Sofia–Budapest–Vienna–Prague–Nuremberg/Dresden
 23. Railway axis Gdansk–Warsaw–Brno/Bratislava–Vienna
 25. Motorway axis Gdansk–Brno/Bratislava–Vienna
 27. ‘Rail Baltica’ axis Warsaw–Kaunas–Riga–Tallinn–Helsinki
- + ERTMS (not TEN-T project but with comparable status)



Motorways of the Sea:

More than pure infrastructure

- 2001 – White Paper puts forward the Motorways of the Sea initiative
- Aim: Foster integrated intermodal options, based on shortsea shipping, providing frequent, high-quality alternatives to road transport
- 2004 - MoS concept in TEN-T has been made concrete
- 2010 examples in the Baltic Sea Region:
Sassnitz-Trelleborg, Karlshamn-Klaipeda, Gdynia-Karlskrona

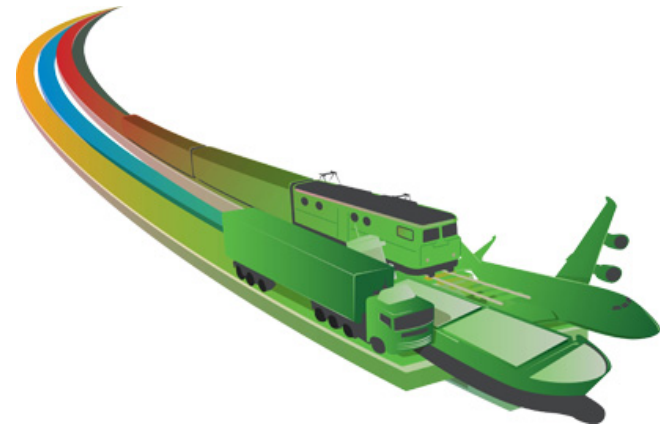
Three main objectives:

- concentrate freight flow on sea-based routes
- increase cohesion
- reduce road congestion through modal shift

New idea: MoS as quality label for line services – like „blue flag“ for beaches?

Freight Transport Logistics: „Green Transport Corridors“

- „Green transport corridors will reflect an integrated transport concept where short sea shipping, rail, inland waterways and road complement each other to enable the choice of environmentally friendly transport.
- They will be equipped with adequate transshipment facilities at strategic locations (such as seaports, inland ports, marshalling yards and other relevant logistics terminals and installations) and with supply points initially for biofuels and, later, for other forms of green propulsion.
- Green corridors could be used to experiment with environmentally-friendly, innovative transport units, and with advanced ITS applications.“
- Characteristics of „Green Transport Corridors“
 - „high-volume, high-capacity transport corridors“
 - „24/7 service“
 - „pipeline“, „conveyor belt“



„Greening transport“ / „greening economy“

- 20-20-20 targets (2007) – „Climate and energy package“:
20% less greenhouse gas emissions 2020/1990,
20% of energy consumption from renewable sources,
20% less primary energy use compared with projected levels
- „Greening Transport Package“ (2008):
Internalisation of external costs, proposal of road tolls for lorries etc.
- „Europe 2020“ (2010): To recover from economic crisis, the strategy puts forward three mutually reinforcing priorities:
 - * Smart growth: developing an economy based on knowledge and innovation.
 - * Sustainable growth: promoting a more resource efficient, greener and more competitive economy.
 - * Inclusive growth: fostering a high-employment economy delivering social and territorial cohesion.

Baltic Transport Outlook

- The Baltic Transport Outlook 2030 (BTO2030) is a shared view on the common transport system in the Baltic Sea Region (BSR).
- The study to describe the current transport flows used by all transport modes in the Baltic Sea Region, infrastructure status and take into account forecasts until year 2030.
- The BTO2030 reveals the bottlenecks and gives recommendations on how to solve them. One important recommendation is that the involved countries need to continue working together, in order to obtain a transport system that can increase the competitive-ness of the region in a global perspective.

Logistics EU – Projects at Wismar

LogOn Baltic

INTERREG III B

Logistics Competence and Regional Development

OVERSIZE

INTERREG IV A „South Baltic“

Oversize and heavy transport in South Baltic Sea

East-West-Transport-Corridor II

INTERREG IV B

Linking South Baltic and Black Sea Logistics

Baltic.AirCargo.Net

INTERREG IV B

Improving Air Cargo Logistics in Baltic Sea Region

Baltic Bird

INTERREG IV B

Improving Air Passenger Logistics in Baltic Sea Region

MarTech_LNG

South Baltic Interreg IV A

Establishing LNG in South Baltic Region

BSR Logistics Cluster Project

INTERREG IV B Umbrella Project

Special other Projects in Wismar

- **Special Projects:**
 - Management Training for Shipbuilding Industry in St. Petersburg, 2007
 - National Research Project “Innovation Network” Logistics Center Wismar Harbour
- **EU-Projects on SME-Management**
 - Baltic Business Development Network
 - ASAP
 - Virtual Campus for SME
 - EGOPRISE
 - DesignSHIP
 - TEMPUS: SIIM & Green Engine

IMPORTANT BSR LOGISTICS PROJECTS



Developing Regions through Spatial Planning and Logistics & ICT Competence

Submitted to the 8th call for applications

Baltic Sea Region INTERREG III B

Measure: 2.2. Creating sustainable communication links for
improved spatial integration

Community Initiative Programme 2000-2006



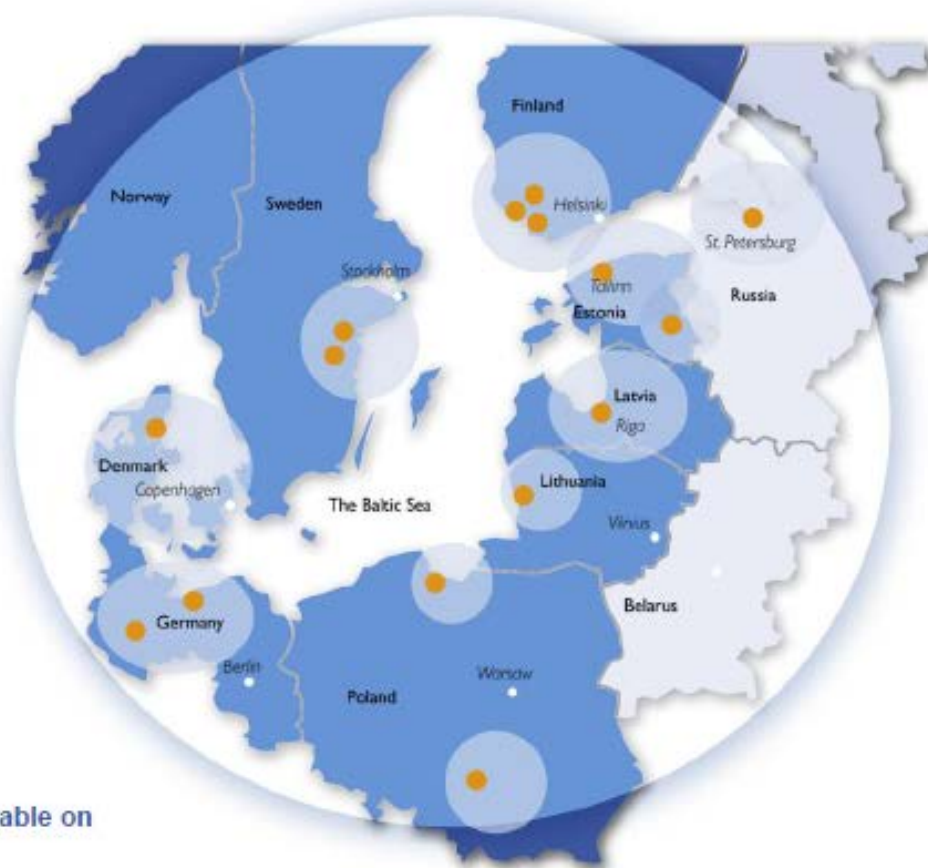
Key objectives of LogOn Baltic

LogOn Baltic aims at improving regional development and spatial integration by transferring knowledge on ICT and logistics competence.

The main objective is to produce and disseminate information for regional development agencies on how to support region's enterprises in their effort to improve ICT and logistics competence, thus improving regional development.

Geographical coverage

LogOn Baltic is
joined by
30 Partners
from 9 countries



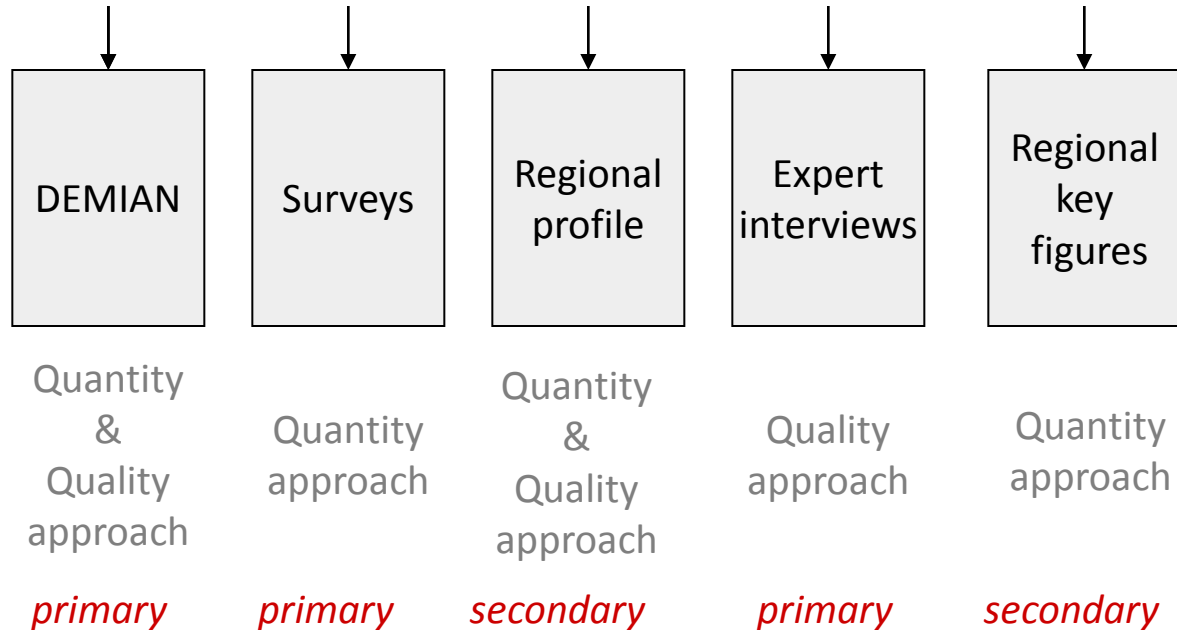
A detailed list of Partners is available on
www.logonbaltic.info

LogOn Baltic Management structure





Activities





KX. Bitte wählen Sie eine Sprache/ Please choose the language you would like to use. *

- ☐ Deutsch
☐ English



Sehr geehrte Damen und Herren,

vielen Dank für Ihre Teilnahme an der von der EU geförderten Umfrage zur Studie "LogOn Baltic" (On and Logistics & ICT Competence).

Als Dank für Ihre Unterstützung erhalten Sie auf Wunsch kostenlos einen detaillierten Bericht mit den für LogOn-Baltic. Die ausgewählten Ergebnisse werden im Dezember 2006 in elektronischer Form an alle E-Mail-Adressen angegeben haben.

Die Beantwortung des Fragebogens wird max. 20 Minuten in Anspruch nehmen. Es ist jederzeit möglich, während Zeitpunkts mit der Beantwortung der Fragen fortzufahren.

Wir bedanken uns im Voraus für Ihre hilfreiche Unterstützung und Kooperationsbereitschaft!

G1. Allgemeine Informationen:

Name Ihrer Firma bzw. Geschäftseinheit

Postleitzahl *

E-Mail-Adresse (nur elektronisch, falls der Bericht zugesandt werden soll)

Ihre Position in der Firma:

(Bitte wählen Sie)

G2. Aus welcher Perspektive beantworten Sie diesen Fragebogen?

(Im Folgenden wird allgemein die Bezeichnung „Unternehmen“ verwendet)

- ☐ Ich antworte für ein Unternehmen/einen Konzern
☐ Ich antworte für eine einzelne Geschäftseinheit

G3. Wie viele Mitarbeiter waren Ende 2005 in Ihrem Unternehmen beschäftigt? *

(Bitte wählen Sie)

25 questions - pre-tested in Southwest Finland - about:

- Logistics costs
- Outsourcing of logistics operations
- Costs and performance measurement
- Use of information and communication technologies



A total of about **1,050 answers** in the whole BSR

Results of LogOn Baltic

- The results of the LogOn Baltic project enable first-time comparative analyses on logistics data.
- In Western European countries, logistics plays a major role as a key source of competitive advantage in manufacturing companies.
- Logistics costs has proven to be one of the most important topics for companies from all industry groups and are expected to increase.
- There is, however, also a tendency towards more individualized logistics services and higher quality.
- Future development needs differ from operative to strategic depending on the level of the logistics competence.
- The expert interviews show that regional competences and political support are evaluated differently.

Scandinavian – Adrian Corridor

Modern Intermodal Infrastructure and Innovative Logistics

The Scandinavian-Adriatic Corridor provides the shortest link between Northern Europe and the Mediterranean Sea, connecting Scandinavian, Central and Southern European metropolises in the most efficient and ecological way.

Offering first class transport infrastructure, the Corridor is challenging natural barriers such as the Baltic Sea and the Alps.

The Scandria Corridor® is also home to leading logistic services. Many of Europe's top 20 freight villages, e.g. near Berlin, Leipzig, Nuremberg and Verona, are located here.

The Scandria Corridor® is an important part of the Trans-European Transport Network, connecting a dozen metropolitan regions with about 100 million inhabitants in the heart of Europe that stick out by their innovative power.

The Scandria Corridor® provides developed infrastructure at the latest standards, sufficient capacities and the best technologies available to handle cargo and passengers smoothly.

The Scandria project is focusing on the northern part of the Scandria Corridor® and involves 19 project- and 16 associated partners from the Baltic Sea Region that strive for greener transport and a better link from Scandinavia to Central Europe via North-East Germany.

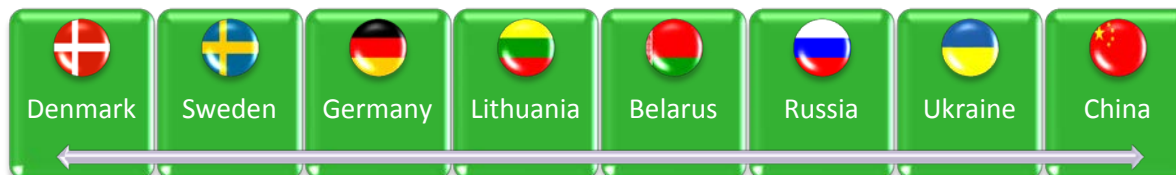
With a focus on the northern part of the Scandria Corridor®, this brochure gives an idea of this fascinating, powerful and innovative region at the cohesion interface of an enlarged Europe.



2. The East West Transport Corridor



- EWTC is geographically defined infrastructure linkages and intermodal transportation route between
 - » Asian countries,
 - » Russia, Belarus, Ukraine,
 - » countries of Southern Baltic and Black Sea Region
 - » and the markets of Central, Western and Northern Europe.



EWTC I

"East-West Transport Corridor I" started in 2006 as a cooperative venture between 42 different partners in Denmark, Lithuania, Russia and Sweden.

Goals:

- to form the effective transnational supply chain
- providing a variety of transportation and logistics services
- to achieve the synergy effect

Main focus:

- infrastructure improvements,
- new solutions for business,
- logistics and co-operation between researchers.

EWTC II

Started in September 2009 and will run until September 2012.

Around 70 partners from Sweden, Lithuania, Germany, Russia, Italy, China and Denmark.

Three main focuses:

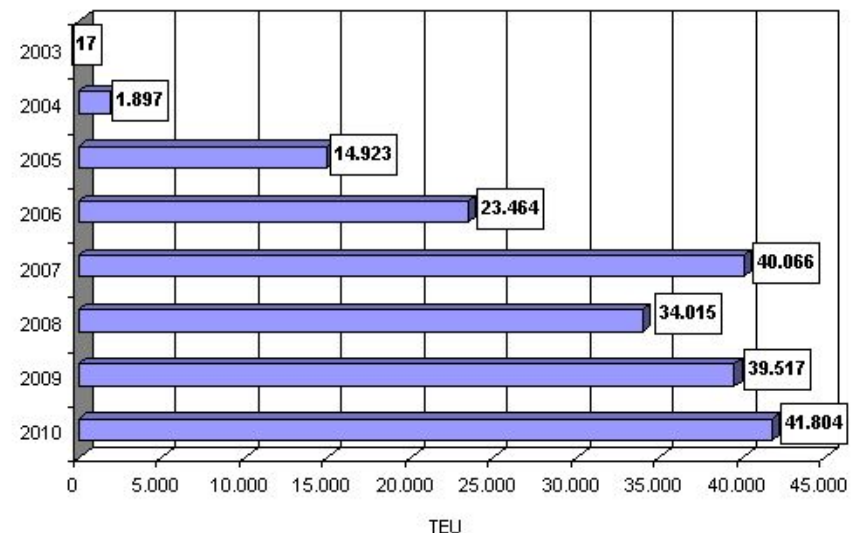
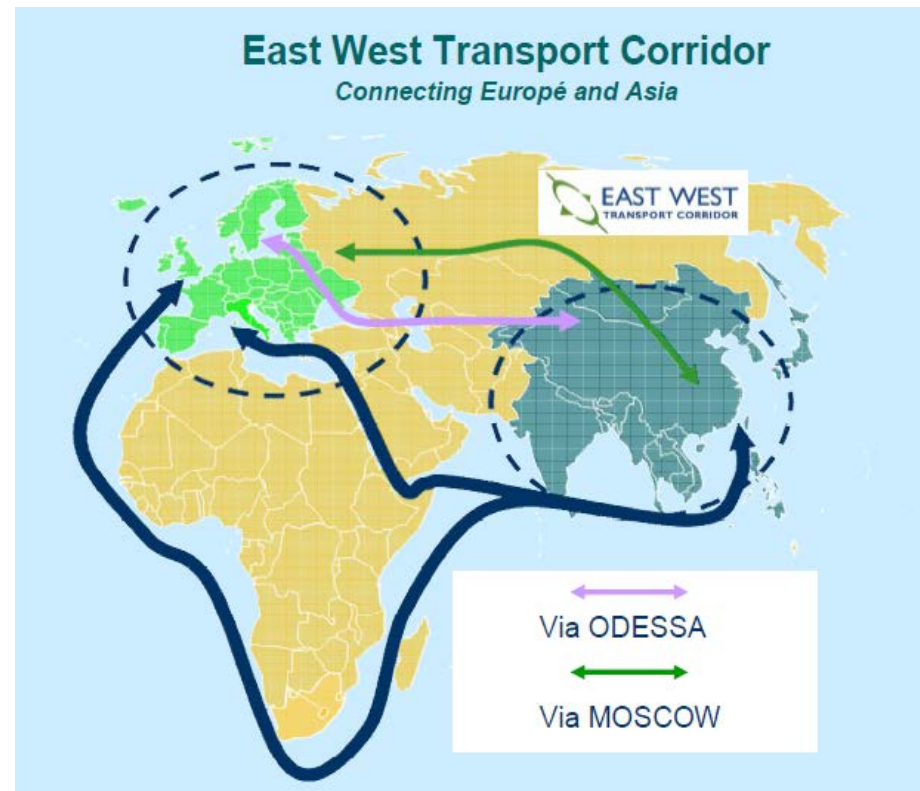
- To make East West TC a good example of a Green Transport Corridor in line with EU's latest transport policies also meeting market demands for more efficient and environmental friendly transports.
- To develop an innovative pilot testing ground where modern technology and information systems contribute to increased efficiency, traffic safety and security as well as reduced environment impact in the corridor.
- Supporting economic growth within the corridor particularly in ports and inland hubs by stimulating new business models for e.g. railway transport.

EWTC Perspectives



Container Shuttle Train „Viking“

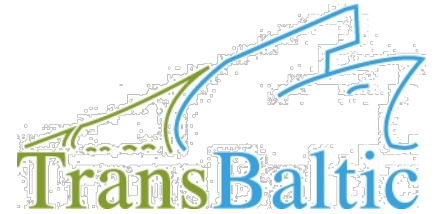
Distance Klaipėda - Ilyichevsk -
1734 km, Journey time: 55 hours



TransBaltic

Towards an integrated transport system in the Baltic Sea Region

- A STRATEGIC project co-financed by the Baltic Sea Programme 2007-2013
- Lead Partner: Region Skåne
- Duration: 1 June 2009 to 31 December 2012
- The overall objective of TransBaltic is to provide regional level incentives for the creation of a comprehensive multimodal transport system in the BSR. This is to be achieved by means of joint transport development measures and jointly implemented business concepts.



TransBaltic Outcomes

- TransBaltic Policy Report 2010 + 2011
- TransBaltic TEN-T Position Paper
- Macroregional Transport Action Plan
 - strategic process run by TransBaltic in cooperation with several transport corridor projects, the pan-Baltic networks, the national governments of the Baltic Sea countries and the European Commission
- Guidelines on BSR-specific transport intermodality and interoperability solutions (BSR transport blueprints)
 - test and verify EU transport and cohesion policy proposals

NECL II - Midnordic Green Transport Corridor

- Development project co-financed by the Baltic Sea Region Programme 2007—2013
- Lead Partner: County Administrative Board of Västernorrland
- Duration: 2010-2013
- The overall objective is to show and proof the potential and benefits of the Midnordic Green Transport Corridor. Effective goods transport networks must be better coordinated at transnational level with supplementary regional links and nodes. The proposed investments in NECL II will be entered in each of the national transport infrastructure planning programmes.



NECL II Outcomes

- A fully working operational ICT-system for transport operators and cargo owners.
 - to transform an existing ICT system prototype to a transport matching system that works in the daily operations at freight managers and logistical centers
- A transnational Action Plan will be a joint output of all efforts to eliminate bottlenecks within the Mid Nordic Region.

Implications I

- LogOn Baltic (Interreg 2000-2006)
 - Status Report of Logistics Costs & Competences around the BSR
 - » Including regional status, needs & future demands
 - » DEMIAN: Evaluation of important logistic infrastructure projects
 - » Training of sufficient qualified logistics work force
 - Benchmarking & best practice models for transferring knowledge & successful development scenarios inside BSR
 - » Including outsourcing models & logistics performance indicators
 - Base for regional action plans to improve regional logistic infrastructure & competences in order to establish performing transnational supply chains around BSR
 - » Regional Logistic competences are as important as infrastructure
 - Foundation of regional logistics initiatives (f.e. M-V) in order to improve and control regional logistics competences
 - » Implement & support regional logistics networks
 - » Improve support for logistics on regional policy level
 - » Increase awareness of logistics as a competitive advantage
 - Development of transnational logistics initiatives for next EU project period which resulted in Green Transport Corridor projects

Implications II

- Green Corridor Projects (Interreg 2007-2013)
 - Preparation & Implementation of pilot transnational green transport corridors within BSR in accordance with EU policy (TEN-T, White Paper 2011,...)
 - Implementation of Baltic Sea Strategy in Logistics (PA11)
 - Defining standards & indicators for green corridors
 - Develop and implement multi-modal supply chain solutions within the green corridors by focussing on short sea shipping & trains
 - » F.e. Karlshamn – Klaipeda & Sassnitz-Trelleborg ferries
 - » Support modal shift away from roads
 - » F.e. Container Shuttle trains for crossing EU border
 - Develop Hubs and smart IT systems for improving green corridor performance (f.e. information broker system)

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SYNERGIES AMONG PORTS

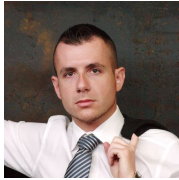
COOPERATION AND COMPETITION EXPERIENCES
IN THE EUROPEAN PORTS

DR. MICHELE ACCIARO

AGENDA

Competition and Cooperation in the Port Sector	04-06
Expericne from Europe	10-15
Concluding Remarks	16-23





A FEW WORDS ABOUT ME



Work

- 1st of January, Assistant Professor of Maritime Logistics at the KLU in Hamburg
- Currently: Senior Researcher – Green Shipping at the Research and Innovation department of Det Norske Veritas AS (DNV) in Høvik, near Oslo
- Past: Deputy Director/Research Associate at Erasmus University Rotterdam, Center for Maritime Economics and Logistics (MEL), with which he is still associated
- Michele has lectured at several institutions around the world, he authored over thirty publications and has been invited speaker at industry events such as TOC Europe and Intermodal.

Education

- Education:
 - BSc and a MSc (cum Laude) in Statistics and Economics from the University of Rome “La Sapienza”;
 - a MSc in Maritime Economics and Logistics from Erasmus University Rotterdam for which he was awarded the NOL/APL Prize for Student Excellence;
 - and a PhD in Logistics also from Erasmus University Rotterdam.
- Michele was awarded the Young Researcher Best Paper Prize at the IAME Annual Conference in Cyprus in 2005

COMPETITION AND COOPERATION IN THE PORT SECTOR

WE HAVE BEEN TAUGHT TO COMPETE...

Competition is at the basis of many government policies

Competition has delivered substantial benefits in the industrialised world

Also in transportation the introduction of competition has favoured lower transport costs, that in the end allowed for globalisation



THE BENEFITS OF COMPETITION ARE WELL ESTABLISHED

Establishing free market access

- Reduces inefficiencies
- Reduces monopoly profits
- Improve quality
- lower user costs.

As a form of internal competition within a cluster, intra-port competition fosters specialisation, innovation, and diversity (De Langen and Pallis, 2006)

INTRA-PORT AND INTER-PORT COMPETITION

Intra-port competition

In the case of ports, intra-port competition has been fostered by the landlord port model in those cases where demand conditions allowed multiple operators to share a market

Not always an easy choice, several port authorities have opted for intra-port competition

Well-known examples are Rotterdam and Antwerp

Inter-port competition

As transport infrastructure develops, ports start sharing their hinterland, that from captive becomes contestable

Inter-port competition becomes a reality since several chains can make use of different ports

Port compete within ranges among different countries and within the same country

BUT COMPETITION IS NOT ALWAYS THE SOLUTION

Several important issues though require various forms of cooperation in the port industry

- Environmental protection
- Improvement of chain cooperation
- Improvement of clustering effects
- Avoidance of waste of resources
- Infrastructure development coordination
- Counterbalance power of other stakeholders

These are some of the issues that cannot be solved by increasing competition alone

AN EXAMPLE FROM THE TERMINAL INDUSTRY

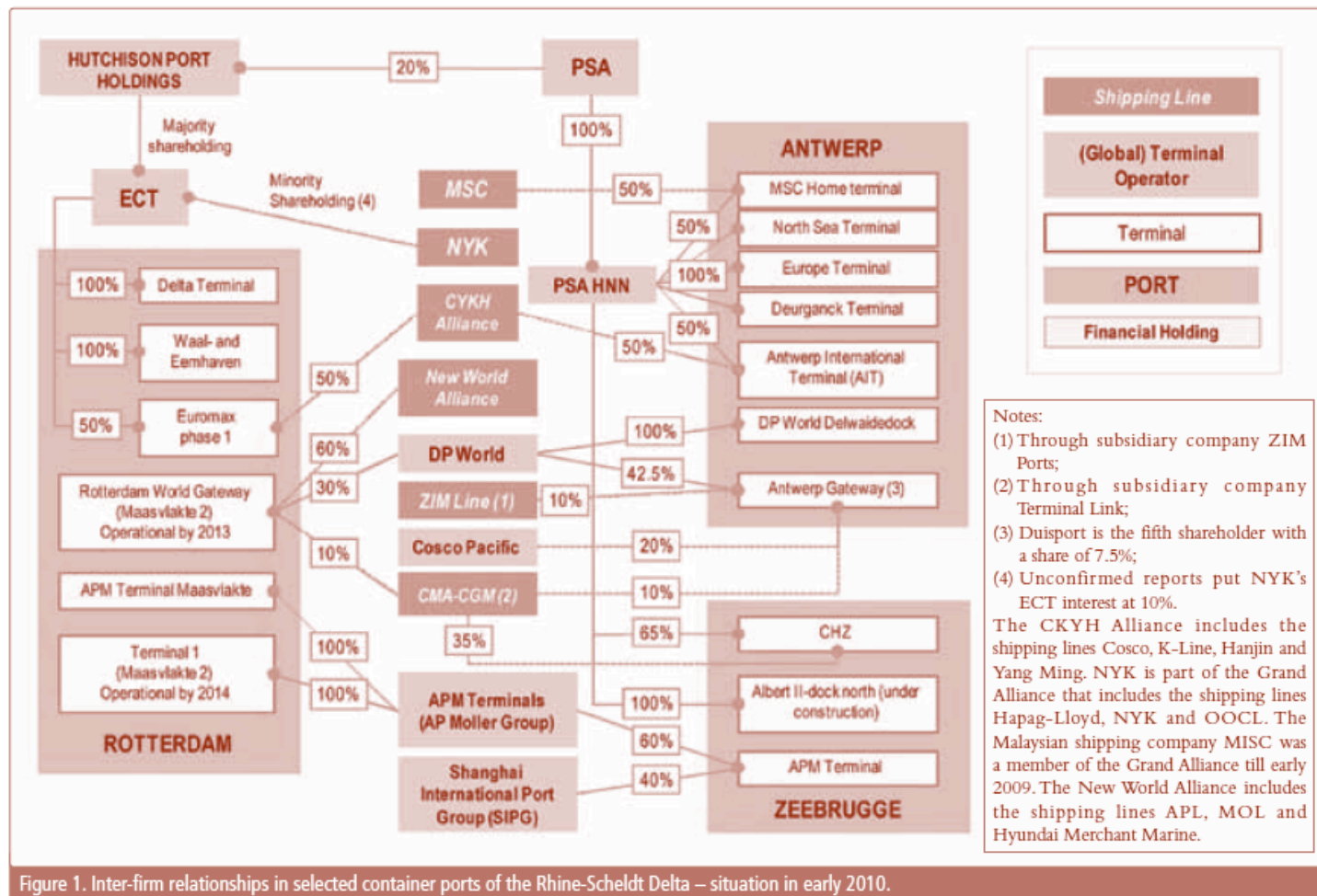


Figure 1. Inter-firm relationships in selected container ports of the Rhine-Scheldt Delta – situation in early 2010.

Source: own elaboration based on company information.

Source: J.P. Rodrigue and T. Notteboom, Global networks in the container terminal operating industry

LEAN PORT NETWORKS

- Streamline operations
- Assessment of waste within processes
- Perfect customer service
- Cost control and reduction

The lean port concept is favored by competition

Lean port networks

The development of networks of lean ports that cover global routes

Source: Marlow and Paixao, 2003, Peasuring lean port performance, Int.J.Transp.Mgmt, 1, pg 189–202



THE BENEFITS OF COOPERATION

1. Efficiency improvements/cost reduction
 - Prevention of overcapacity
 - Partitioning of risks
 - Economies of scale/scope
 - Reduction of transaction costs
2. Additionality of competencies
 - Access to each others competencies
 - Encouraging knowledge exchange
3. Positioning of company
 - Use of each others brand name reputation
 - Market positioning (i.e. access to new markets)
 - Reduction of (international) competition
 - Creation of a market standard
 - Countervailing power
 - Joint political protection of interests

Source: Wortelboer and Kolkman (2010)

THE BENEFITS OF COOPERATION (1)

Social benefit	Explanation	Type of cooperation
Lower production and/or consumption costs	Higher utilisation rates for terminals and hinterland infrastructure	Bundling/redistribution of flows at terminals and hinterland infrastructure
	Optimisation of investment, including government investment	Joint ventures in hinterland links and/or terminals, for example, to avoid excess capacity
	Economies of scale achieved by sharing facilities	Joint research and development, purchasing, marketing, waterway facilities, IT, standardisation of procedures, safety and security
	Economies of scale and scope through specialisation	Ports specialise, in particular, cargo types or services

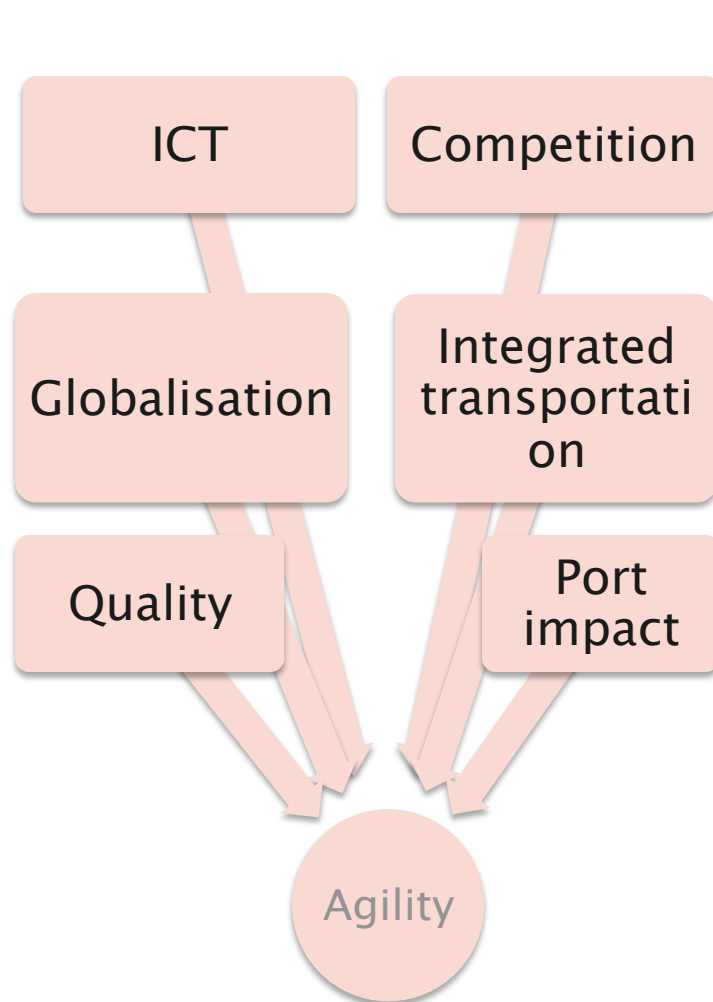
Source: Wortelboer and Kolkman (2010)

THE BENEFITS OF COOPERATION (2)

Social benefit	Explanation	Type of cooperation
Less impact on the environment, safety and space	Better use of space and more efficient use of terminals and transport infrastructure	Bundling/redistribution of flows at terminals and hinterland infrastructure, and as a result of specialisation
Indirect	Facilitating/accelerating successful innovations	Joint research and development
	Contributing to the competitive position by preserving critical mass in port	Cooperation to offer counter-vailing power to shipping companies and stevedores
	Contributing to the competitive position through increased activity at the expense of foreign ports	Joint services lead to a more attractive product and in turn to greater demand
	Increased income from foreign users of the port	Higher rates based on market power

Source: Wortelboer and Kolkman (2010)

PORTS IN THE SUPPLY CHAIN – THE FUTURE?



Ports have to become
Agile



Mangan, et al 2008, Port-centric logistics,
Int.J.Logist..Mgmt, 19(1), pg 29-41.

WHAT DOES AGILITY IMPLY?



CAN COOPERATION INCREASE THE AGILITY OF A PORT?

Without doubt cooperation can improve the ability of a port to offer a better service to its customers

The right type of cooperation depends on the strategic focus of the port

Areas where cooperation can be successful are connected to:

- Innovation
- Environmental action
- Learning best practices
- Supply chain improvements
- Marketing
- Communication and chain visibility



DIFFERENT TYPES OF COOPERATION

- Cooperation with adjacent (more or less equivalent) ports, possibly both with a main port function
- Cooperation between seaports in corridors (this means the overseas port on the other hand of the sea route)
- Cooperation between sea ports and ports in the hinterland
- Cooperation between a main port and ports in the surrounding area with a satellite function. These are smaller ports in the region of a larger port where less network connections and services are available.

Source: Kearney (1995)



EXPERIENCES FROM EUROPE

THE MEDITERRANEAN



THE MEDITERRANEAN

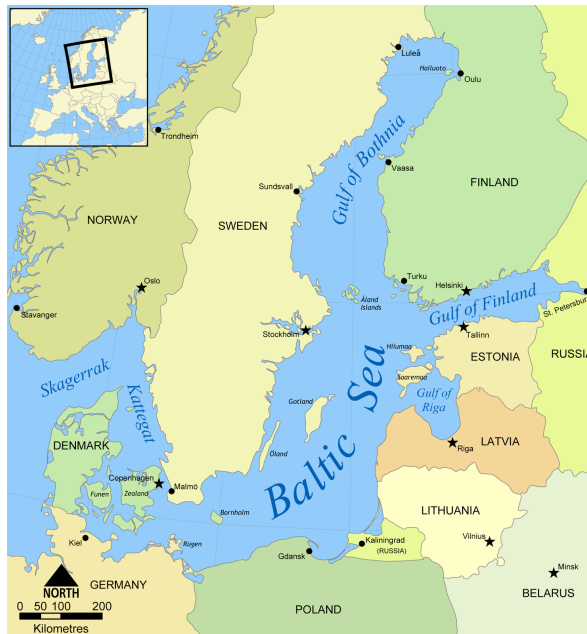
The Mediterranean basin is a complex system of ports

- EU countries and non-EU countries
- Developed and developing countries
- Main differences in terms of market structures, demand, infrastructure, quality of port services, policy and governance systems

TRENDS

- Increasing competition from the South and the East
- Competitive pressure from northern Europe
- Economic recession

THE BALTIC



The Baltic is an important part of European waterways.
Multiple countries are connected to the Baltic Sea

Main issues are related to:

- Environmental protection
- Investment
- Development of logistics infrastructure
- Marketing and maintaining attractiveness of the Baltic

THE BALTIC PORT ORGANISATION

Vision

Our vision is to promote the Blue Maritime Highway in the Baltic Sea. The Baltic Region is one of the most important and fastest growing markets in the world. The Baltic is dependent on extensively new developed intermodal logistic solution with the member ports in main focus.



The main objective for BPO is to **improve the competitiveness** of maritime transport in the Baltic region by **increasing the efficiency of ports**, marketing the Baltic region as the strategic logistics centre, improving the infrastructure within the ports and the connection to other modes.

Also improving co-operation with the port users/operators, applying new technology in the port sector in order to improve the performance and the integration of ports into the transport chain, improving cost efficiency, **good environmental behavior**, organizational development, co-operation with authorities and interest groups.

THE CASE OF COPENHAGEN MALMÖ



The history of Copenhagen Malmö Port is a story about a unique cross-border alliance. For the first time in history, two ports in two different countries have joined all their port operations into one company, one organisation and one legal entity.

- 1997 first discussion
- 2001 opening of the CMP

THE PORT TODAY

CMP is a major busy port operator offering customers and companies modern services and facilities for efficient distribution and transhipment of their products

A great number of ships call every day, and CMP services about 7,800 vessels a year

Annual turnover 2010 was SEK 675 million



CONCLUDING REMARKS

Port competition

The European experiences makes a strong case for competition

- Keep price pressure at bay
- Stimulate innovation
- Increase service quality
- Maintain the competitiveness of the sector

There is agreement that competition requires regulation and important issues cannot be resolved by competition alone

There is recognition also among governmental institutions that cooperation in some circumstances is desirable

Port cooperation

Port cooperation is still relatively new in the European context although several examples of port cooperation can be found

- Joint Port Authorities
- International port associations
- Groups and initiatives aiming at bringing forward ports in various countries on several fronts

It appears that it is necessary port authorities to cooperate to some extent in order to counterbalance the negative sides of competition

Environmental protection or improved supply chain coordination are clear examples the benefits of cooperation among ports

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- Graphics are © Michele Acciaro

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MICHELE ACCIARO – THE KÜHNE LOGISTICS UNIVERSITY



CTB-CTW Container Terminal Burchardkai, Port of Hamburg-Waltershof



The Structural Features and Change of the Container Ports in the Pan-Yellow Sea Rim

2012. 10. 10

Lee, Dong-Hyon, Prof. Dr.

Pyeongtaek University



Contents

Background of The Research

Logistics Trade between Korea and China

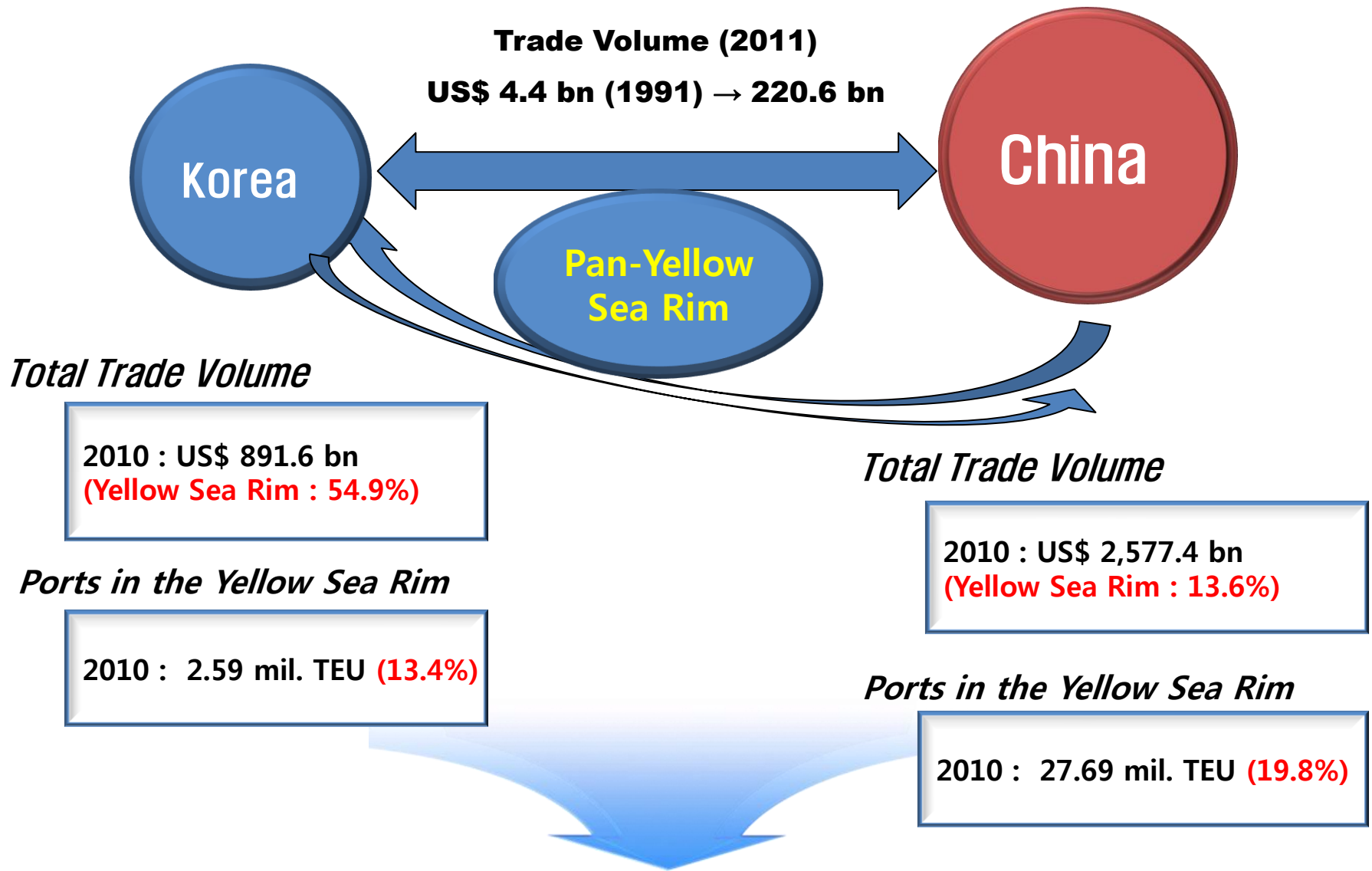
Structure and its Changes of Port Services

Implication for Korean Ports



Background of the Research

Trade b/w Korea and China



**Need for establishing maritime Logistics Network
in the Yellow Sea Rim**

Scope of Analysis



Space

- Korea : Incheon, Pyeongtaek, Gwangyang
- China : North of Shanghai
- CI Yearbook 2006 & 2012

Time

- 2004
- 2010

**Structural Features & Change
of the Yellow Sea Rim**

Global Bloc and Ports

- **Regional Bloc Network**
- **Ocean Shipping => Littoral Shipping**
- **Maritime Logistics Network in the Yellow Sea Rim**

Free Trade Area	Customs Union	Common Market	Economic & Monetary Union	Complete Economic Integration
ASEAN				
MERCOSUR				
GCC				
EU				
Supranational Government				

Scope of the Pan-Yellow Sea Rim



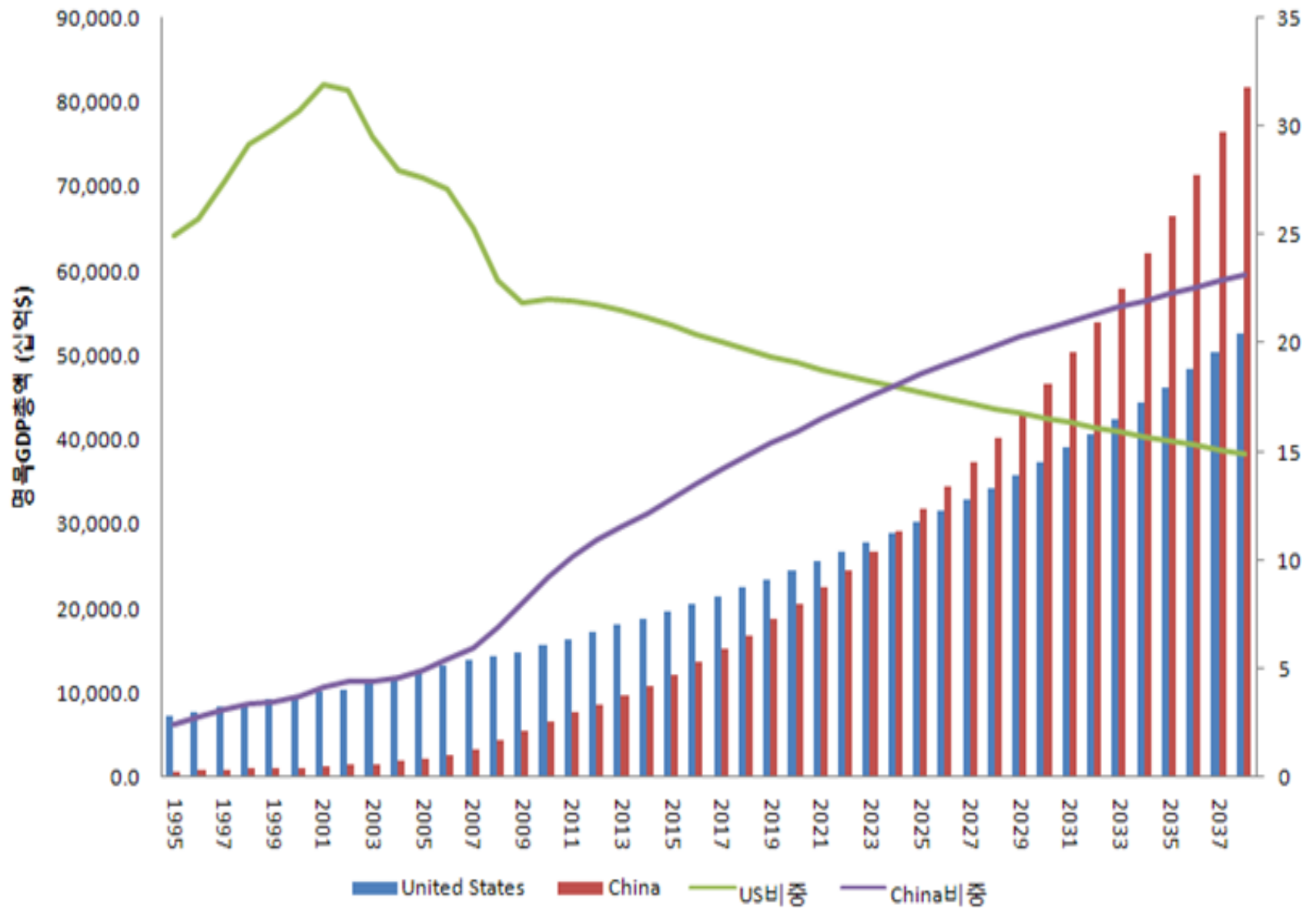
Not clearly defined yet

*The Organization for the East Asia
Economic Development, 2012*



Pan-Bohai Area
(Dalian, Qingdao, Tianjin, Yantai)
+
Incheon, pyeongtaek, gwangyang
+
Taicang, lianyungang, Zhangjiagang

China's Economic Growth



Economic Potential of the Pan-Yellow Sea Rim

Mega City-Region

**Location of Urban
Cluster**

High Potential of the Pan-Yellow Sea Rim

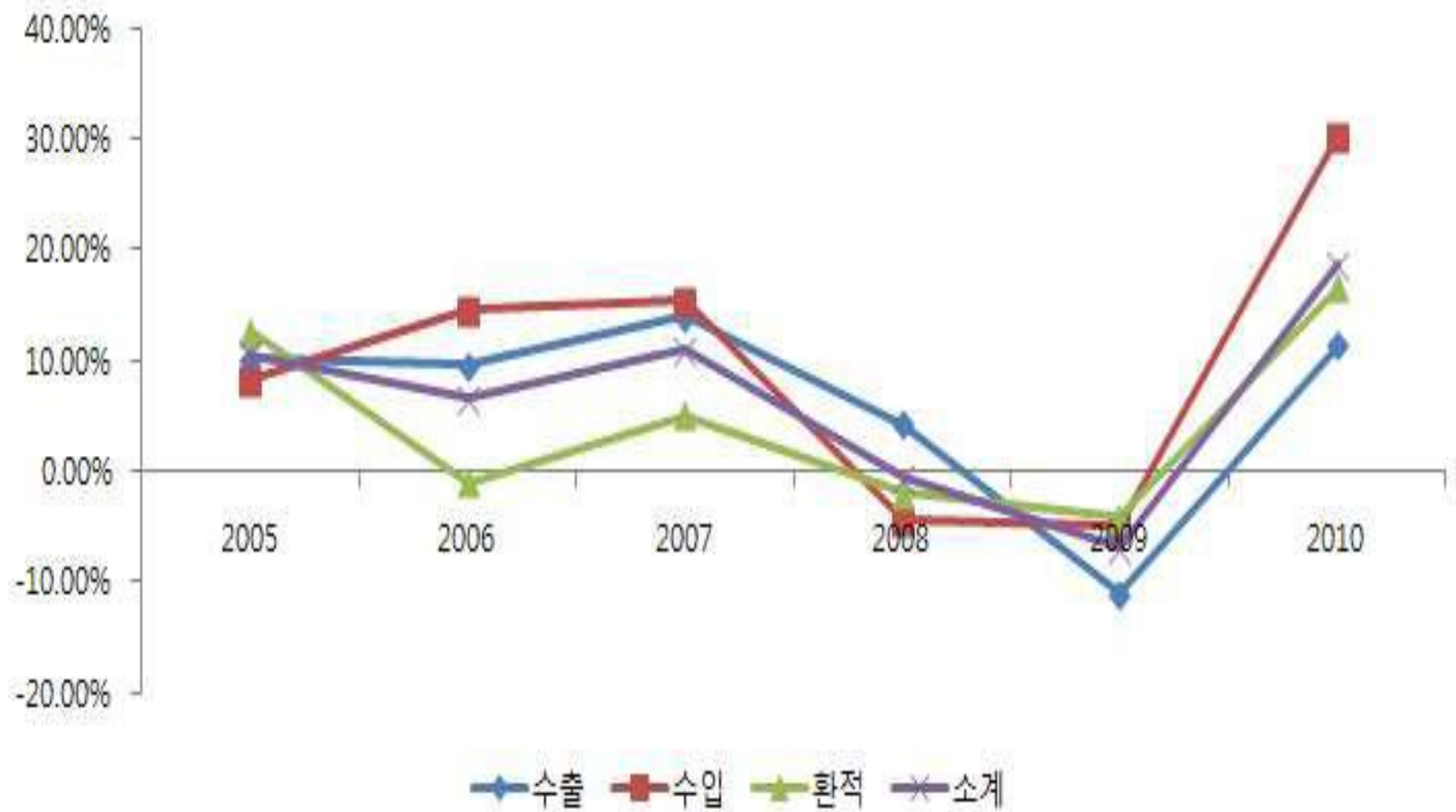
**Continuous Growth of
the Pan-Bohai Area**

**Concentration of the
Korean FDI on the
Bohai Area**



Logistics Trade between Korea and China

Container Trade Volume b/w Korea and China



Container Trade Volume b/w Korea and China

Export + Import

Unit : TEU

	2006	2007	2008	2009	2010
Busan	1,383,201 (48.3%)	1,499,533 (46.7%)	1,491,420 (46.1%)	1,231,491 (42.7%)	1,489,705 (44.4%)
Incheon	892,078 (31.2%)	1,106,946 (34.5%)	1,134,546 (35.0%)	1,006,788 (34.9%)	1,180,057 (35.1%)
Pyeongtaek	241,512 (8.4%)	300,896 (9.4%)	312,623 (9.7%)	312,938 (10.8%)	380,794 (11.3%)
Gwangyang	344,984 (12.1%)	302,255 (9.4%)	299,006 (9.2%)	335,414 (11.6%)	306,693 (9.1%)
Total	2,861,775 (100%)	3,209,630 (100%)	3,237,595 (100%)	2,886,631 (100%)	3,357,249 (100%)

Container Trade Volume b/w Korea and China

Export + Import + Transshipment

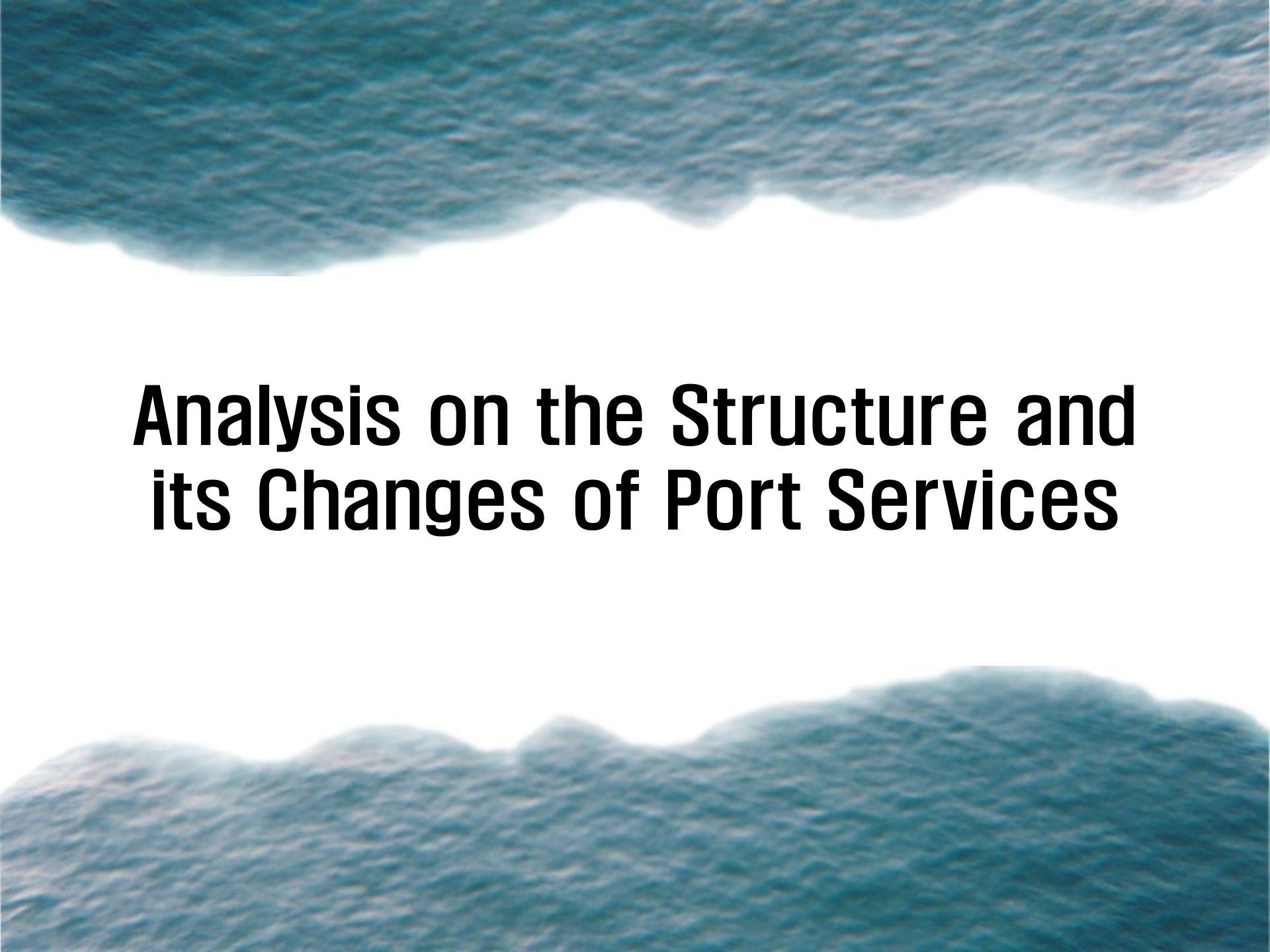
Unit : TEU

	2006	2007	2008	2009	2010
Busan	2,933,256 (63.2%)	3,198,847 (63.6%)	3,143,113 (62.9%)	2,826,433 (61.7%)	3,369,653 (63.2%)
Incheon	959,748 (20.7%)	1,139,952 (22.7%)	1,155,316 (23.1%)	1,023,898 (22.4%)	1,196,477 (22.4%)
Pyeongtaek	247,857 (5.3%)	305,946 (6.1%)	317,192 (6.4%)	315,996 (6.9%)	386,253 (7.2%)
Gwangyang	500,659 (10.8%)	391,866 (7.8%)	377,862 (7.6%)	413,568 (9.0%)	378,971 (7.1%)
Total	4,641,520 (100%)	5,036,611 (100%)	4,993,483 (100%)	4,579,895 (100%)	5,331,354 (100%)

Container Trade Route b/w Korea and China

Transshipment





Analysis on the Structure and its Changes of Port Services

Key Variables

- Container throughput
- Service Concentration
- Port Connectivity
- Average Service Capacity



**Providing an important Directions for Marketing Strategies
of a Port Authorities**

Container Throughput

• Incheon	1,902,733 TEU	(103.5%)
• Pyeongtaek	446,550 TEU	(134.9%)
• Gwangyang	2,087,890 TEU	(54.8%)
• Total	4,437,173 TEU	(79.4%)

Yellow sea (Korea)
Avg. annual growth rate : 10.2%

• Dalian	5,242,000 TEU	(168.1%)
• Qingdao	12,012,000 TEU	(144.2%)
• Qinhuangdao	340,041 TEU	(313.1%)
• Weihai	443,000 TEU	(1214.3%)
• Yingkou	3,136,806 TEU	(437.2%)
• Dandong	319,724 TEU	(254.5%)
• Rizhao	1,061,009 TEU	(773.9%)
• Yantai	1,326,811 TEU	(356.0%)
• Tianjin	10,086,000 TEU	(195.5%)
• Tangshan	276,700 TEU	(5014.6%)
• Jinzhou	754,787 TEU	(630.3%)
• Longkou	200,497 TEU	(149.3%)
• Total	35,199,375 TEU	(201.4%)

Pan-Bohai Area
Avg. annual growth rate : 20.2%

• Taicang	596,472 TEU	(547.0%)
• Lianyungang	3,835,773 TEU	(663.8%)
• Zhangjiagang	1,088,809 TEU	(231.7%)
• Nanjing	1,245,558 TEU	(939.8%)
• Wenzhou	370,184 TEU	(80.4%)
• Total	7,136,796 TEU	(472.0%)

Yangtze River Delta
Avg. annual growth rate : 33.2%

Ranking of Container Throughput

2004

1. Qingdao
2. Tianjin
3. Dalian
4. Gwangyang
5. Incheon
6. Yingkou
7. Lianyungang
8. Zhangjiagang
9. Yantai
10. Pyeongtaek
11. Rizhao
12. Jinzhou
13. Taicang
14. Qinhuangdao
15. Longkou
16. Weihai
17. Tangshan

2010

1. Qingdao
2. Tianjin
3. Dalian
4. Lianyungang
5. Yingkou
6. Gwangyang
7. Incheon
8. Yantai
9. Zhangjiagang
10. Rizhao
11. Jinzhou
12. Taicang
13. Pyeongtaek
14. Weihai
15. Qinhuangdao
16. Tangshan
17. Longkou

Increase in TEU

1. Qingdao
2. Tianjin
3. Lianyungang
4. Dalian
5. Yingkou
6. Yantai
7. Incheon
8. Rizhao
9. Zhangjiagang
10. Gwangyang
11. Jinzhou
12. Taicang
13. Weihai
14. Tangshan
15. Qinhuangdao
16. Pyeongtaek
17. Longkou

Increase Rate

1. Tangshan
2. Weihai
3. Rizhao
4. Lianyungang
5. Jinzhou
6. Taicang
7. Yingkou
8. Yantai
9. Qinhuangdao
10. Zhangjiagang
11. Tianjin
12. Dalian
13. Longkou
14. Qingdao
15. Pyeongtaek
16. Incheon
17. Gwangyang

Service Concentration

- Number of Liners
- Number of Services



Port Connectivity

- Number of Partner Ports
- Number of Linkage



Service Capacity

- Vessel Size
- Service Frequency



**Port
Performance**

Service Concentration

Number of Liners

Number of Services

**Number of Service Concentration
= Number of Services / Number of Liners**

Number of Liners

• Incheon	20 → 27	(35.0%)
• Pyeongtaek	2 → 4	(100.0%)
• Gwangyang	32 → 38	(18.8%)
• Total	54 → 69	(27.8%)

• Dalian	43 → 43	(0.0%)
• Qingdao	55 → 59	(7.3%)
• Qinhuangdao	0 → 1	(-%)
• Weihai	2 → 4	(100.0%)
• Yingkou	2 → 1	(-50.0%)
• Rizhao	3 → 1	(-66.7%)
• Yantai	6 → 8	(33.3%)
• Tianjin	17 → 20	(17.6%)
• Jinzhou	1 → 1	(0.0%)
• Longkou	3 → 2	(-33.3%)
• Total	132 → 140	(6.1%)

• Taicang	0 → 1	(-%)
• Lianyungang	6 → 12	(100.0%)
• Zhangjiagang	2 → 1	(-50.0%)
• Total	12 → 14	(16.7)

Ranking

2004

1. Qingdao
2. Dalian
3. Gwangyang
4. Incheon
5. Tianjin
6. Yantai
7. Lianyungang
8. Nanjing
9. Rizhao
10. Longkou
11. Pyeongtaek
12. Weihai
13. Yingkou
14. Zhangjiagang
15. Jinzhou
16. Qinhuangdao
17. Taicang

2010

1. Qingdao
2. Dalian
3. Gwangyang
4. Incheon
5. Tianjin
6. Lianyungang
7. Yantai
8. Pyeongtaek
9. Weihai
10. Longkou
11. Rizhao
12. Yingkou
13. Zhangjiagang
14. Jinzhou
15. Qinhuangdao
16. Taicang
17. Nanjing

Ranking

2004

1. Qingdao
2. Gwangyang
3. Dalian
4. Tianjin
5. Incheon
6. Lianyungang
7. Yantai
8. Pyeongtaek
9. Yingkou
10. Weihai
11. Rizhao
12. Longkou
13. Zhangjiagang
14. Jinzhou
15. Qinhuangdao
16. Taicang

2010

1. Qingdao
2. Gwangyang
3. Dalian
4. Incheon
5. Tianjin
6. Lianyungang
7. Yantai
8. Pyeongtaek
9. Weihai
10. Yingkou
11. Qinhuangdao
12. Longkou
13. Jinzhou
14. Taicang
15. Rizhao
16. Zhangjiagang

Number of Services

- Incheon 37 → 63 (70.3%)
- Pyeongtaek 5 → 6 (20.0%)
- Gwangyang 121 → 115 (-5.0%)
- **Total** 163 → 184 (12.9%)

- Dalian 87 → 97 (11.5%)
- Qingdao 168 → 238 (41.7%)
- Qinhuangdao 0 → 3 (0%)
- Weihai 4 → 6 (50.0%)
- Yingkou 5 → 4 (-20.0%)
- Rizhao 3 → 1 (-66.7%)
- Yantai 9 → 9 (0.0%)
- Tianjin 38 → 23 (-39.5%)
- Jinzhou 1 → 2 (100.0%)
- Longkou 3 → 2 (-33.3%)
- **Total** 318 → 385 (21.1%)

- Taicang 0 → 2 (0%)
- Lianyungang 10 → 21 (110.0%)
- Zhangjiagang 2 → 1 (-50.0%)
- **Total** 16 → 24 (50.0%)

Service Concentration

• Incheon	1.9 → 2.3	(26.1%)
• Pyeongtaek	2.5 → 1.5	(-40.0%)
• Gwangyang	3.8 → 3.0	(-20.0%)
• Total	3.0 → 2.7	(-11.7%)

• Dalian	2.0 → 2.26	(11.5%)
• Qingdao	3.05 → 4.03	(32.1%)
• Qinhuangdao	0 → 1.03	(-%)
• Weihai	2.00 → 1.50	(-25.0%)
• Yingkou	2.05 → 4.00	(60.0%)
• Rizhao	1.00 → 1.00	(-%)
• Yantai	1.50 → 1.13	(-25.0%)
• Tianjin	2.24 → 1.15	(-48.6%)
• Jinzhou	1.00 → 2.00	(100%)
• Longkou	1.00 → 1.00	(-%)
• Total	2.4 → 2.8	(14.2%)

• Taicang	0 → 2.00	(-%)
• Lianyungang	1.67 → 1.75	(5.0%)
• Zhangjiagang	1.00 → 1.00	(0.0%)
• Total	1.3 → 1.7	(28.6%)

Ranking

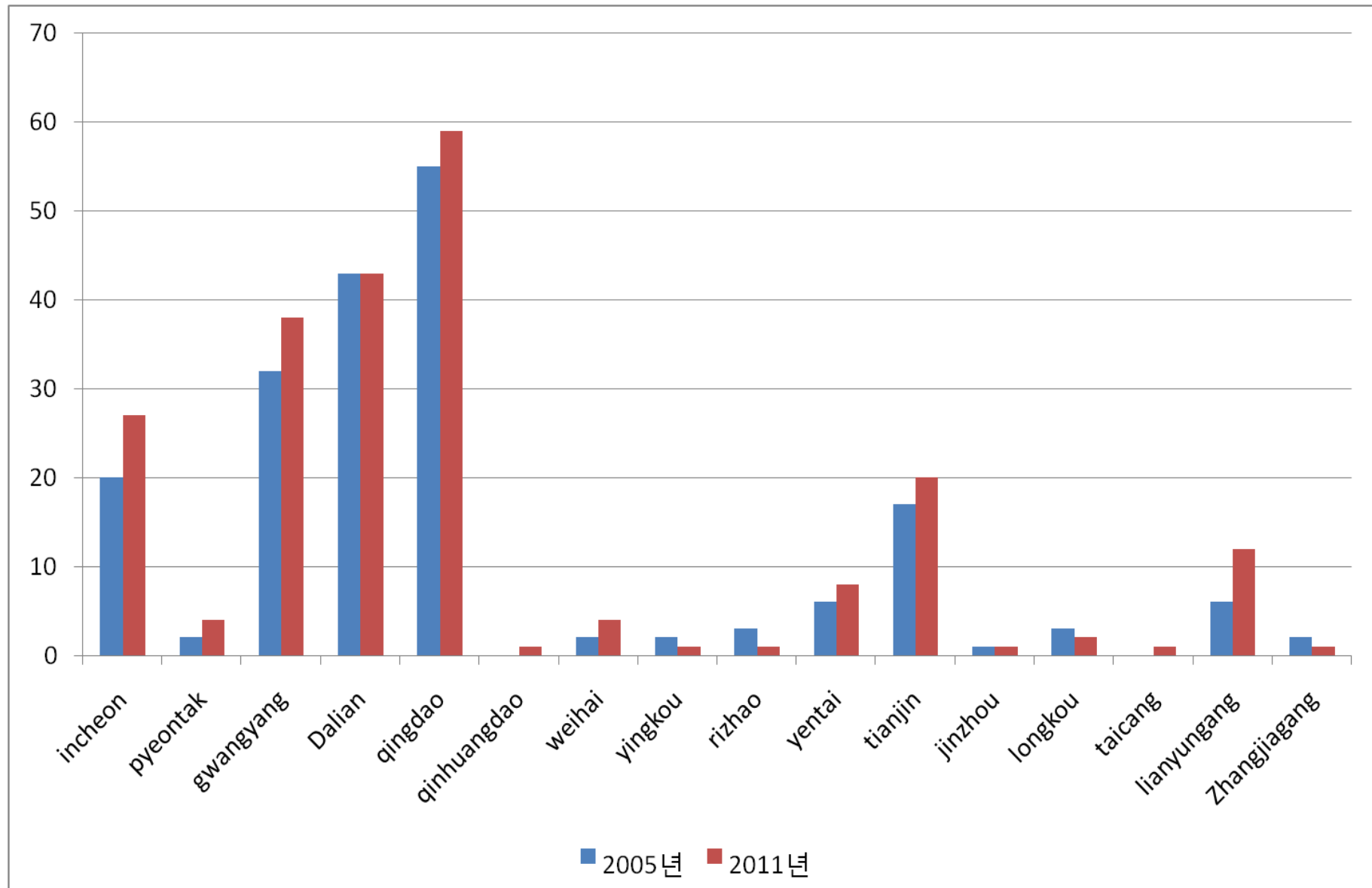
2004

1. Gwangyang
2. Qingdao
3. Pyeongtaek
4. Yingkou
5. Tianjin
6. Dalian
7. Weihai
8. Incheon
9. Lianyungang
10. Yantai
11. Rizhao
12. Jinzhou
13. Longkou
14. Zhangjiagang

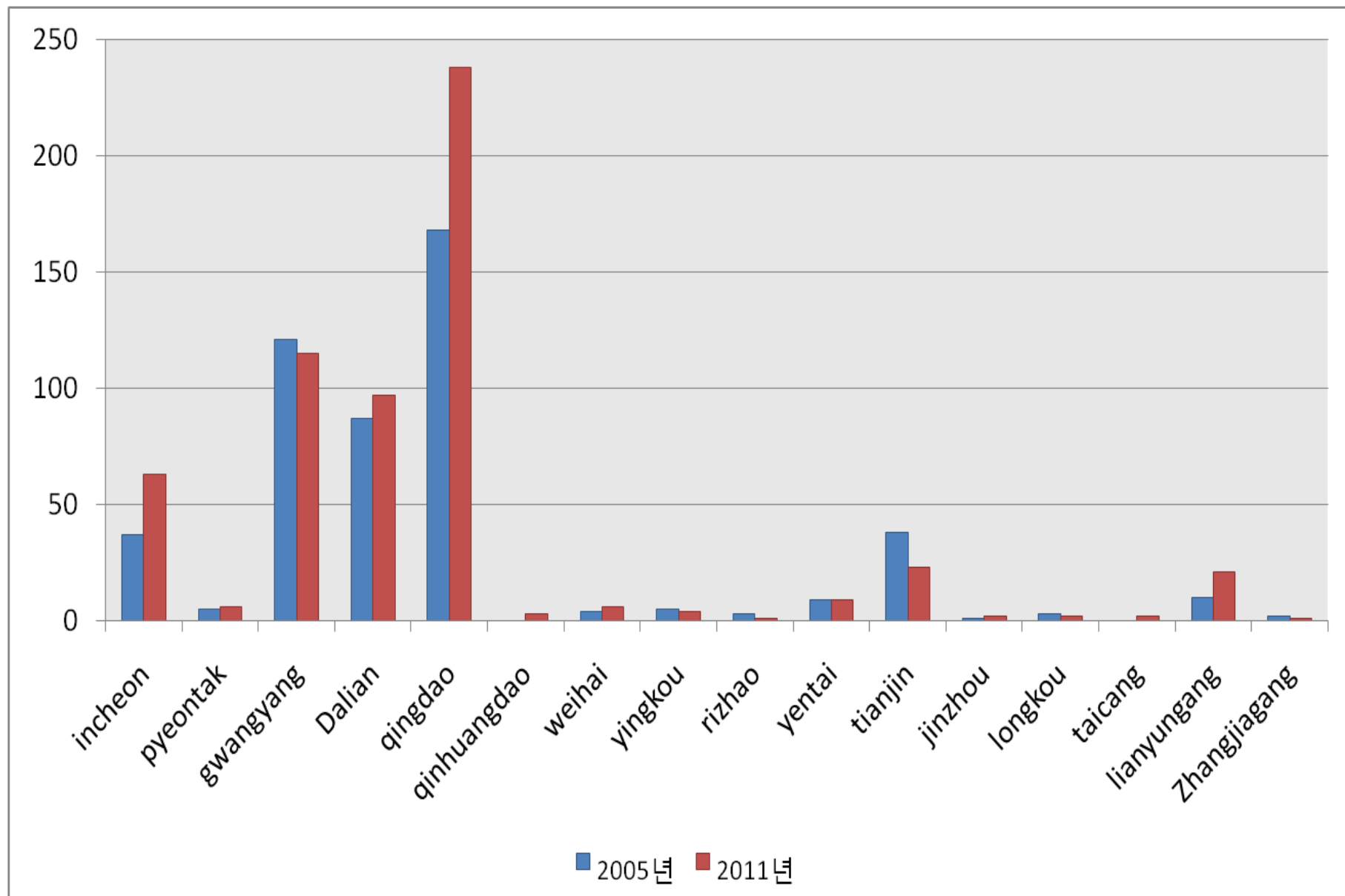
2010

1. Qingdao
2. Yingkou
3. Gwangyang
4. Incheon
5. Dalian
6. Jinzhou
7. Lianyungang
8. Pyeongtaek
9. Weihai
10. Tianjin
11. Yantai
12. Rizhao
13. Longkou
14. Zhangjiagang

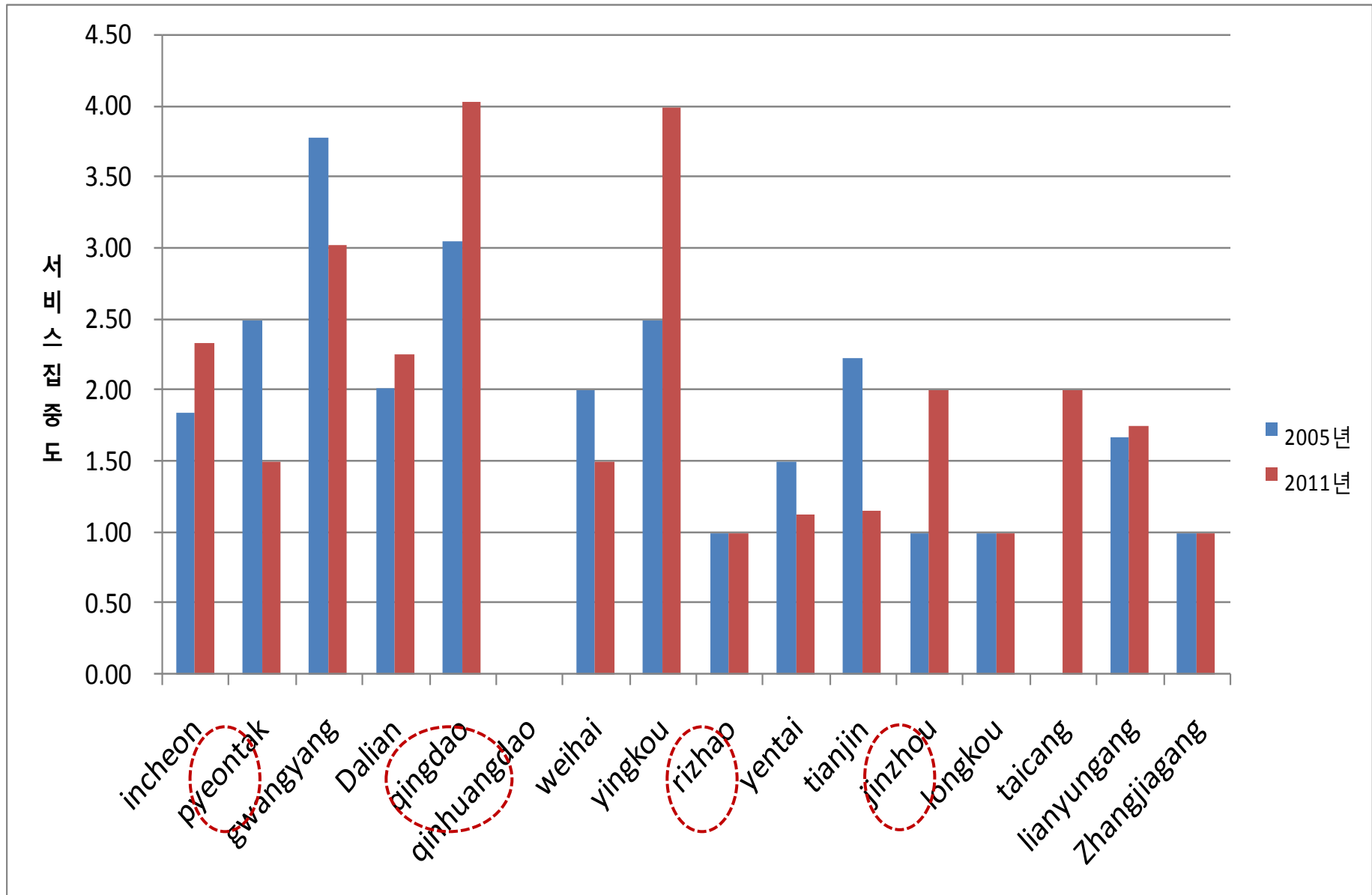
Number of Liners



Number of Services



Service Concentration



Port connectivity analysis

- **Number of Partner Ports**

- **Number of Linkage**

- **Ex) ABC Service :**

Shingapore → HK → Kaoshiung → Busan →

Tokyo → LA → Busan → HK → Shingapore

⇒ number of linkages of Busan : 4

⇒ number of partner ports of Tokyo : 2

- **Port Connectivity**

Number of Partner Ports

• Incheon	20 → 23	(15.0%)
• Pyeongtaek	7 → 6	(-14.3%)
• Gwangyang	34 → 23	(-32.4%)
• Total	61 → 52	(-14.8%)

• Dalian	29 → 29	(0.0%)
• Qingdao	34 → 40	(17.6%)
• Qinhuangdao	0 → 4	(-%)
• Weihai	6 → 5	(-16.7%)
• Yingkou	8 → 7	(-12.5%)
• Rizhao	4 → 2	(-50.0%)
• Yantai	8 → 5	(-37.5%)
• Tianjin	25 → 16	(-36.0%)
• Jinzhou	2 → 4	(100.0%)
• Longkou	3 → 2	(-33.3%)
• Total	119 → 114	(-4.2%)

• Taicang	0 → 4	(0%)
• Lianyungang	9 → 11	(22.2%)
• Zhangjiagang	4 → 2	(-50.0%)
• Total	13 → 17	(30.8%)

Ranking

2004

1. Gwangyang
2. Qingdao
3. Dalian
4. Tianjin
5. Incheon
6. Lianyungang
7. Yingkou
8. Yantai
9. Pyeongtaek
10. Weihai
11. Rizhao
12. Zhangjiagang
13. Longkou
14. Jinzhou
15. qinhuangdao
16. taicang

2010

1. Qingdao
2. Dalian
3. Gwangyang
4. Incheon
5. Tianjin
6. Lianyungang
7. Yingkou
8. Pyeongtaek
9. Yantai
10. Weihai
11. Jinzhou
12. Qinhuangdao
13. Taicang
14. Rizhao
15. Zhangjiagang
16. Longkou

Ranking

2004

1. Qingdao
2. Gwangyang
3. Dalian
4. Tianjin
5. Incheon
6. Lianyungang
7. Yantai
8. Yingkou
9. Pyeongtaek
10. Weihai
11. Rizhao
12. Longkou
13. Zhangjiagang
14. Jinzhou
15. Qinhuangdao
16. Taicang

2010

1. Qingdao
2. Gwangyang
3. Dalian
4. Incheon
5. Lianyungang
6. Tianjin
7. Yantai
8. Weihai
9. Pyeongtaek
10. Yingkou
11. Qinhuangdao
12. Longkou
13. Jinzhou
14. Taicang
15. Rizhao
16. Zhangjiagang

Number of Linkages

• Incheon	69 → 122	(76.8%)
• Pyeongtaek	8 → 11	(37.5%)
• Gwangyang	269 → 249	(-7.4%)
• Total	346 → 382	(10.4%)

• Dalian	170 → 203	(19.4%)
• Qingdao	367 → 483	(31.6%)
• Qinhuangdao	0 → 5	(0%)
• Weihai	8 → 12	(50.0%)
• Yingkou	10 → 8	(-20.0%)
• Rizhao	6 → 2	(-66.7%)
• Yantai	17 → 18	(5.9%)
• Tianjin	71 → 49	(-31.0%)
• Jinzhou	2 → 4	(100.0%)
• Longkou	5 → 4	(-20.0%)
• Total	656 → 788	(20.1%)

• Taicang	0 → 4	(0%)
• Lianyungang	22 → 61	(177.3%)
• Zhangjiagang	4 → 2	(-50.0%)
• Total	26 → 67	(157.7%)

Port Connectivity

• Incheon	3.45 → 5.3	(53.7%)
• Pyeongtaek	1.14 → 1.83	(60.4%)
• Gwangyang	7.9 → 10.8	(36.8%)
• Total	5.7 → 7.3	(29.5)

• Dalian	5.86 → 7.00	(19.4%)
• Qingdao	10.79 → 12.08	(11.9%)
• Qinhuangdao	0 → 1.25	(-%)
• Weihai	1.33 → 2.40	(80.0%)
• Yingkou	1.25 → 1.14	(-8.6%)
• Rizhao	1.50 → 1.00	(-33.3%)
• Yantai	2.13 → 3.60	(69.4%)
• Tianjin	2.84 → 3.06	(7.8%)
• Jinzhou	1.00 → 1.00	(-%)
• Longkou	1.67 → 2.00	(20.0%)
• Total	5.5 → 6.9	(25.4%)

• Taicang	0 → 1.00	(-%)
• Lianyungang	2.44 → 5.55	(126.9%)
• Zhangjiagang	1.00 → 1.00	(-%)
• Total	2 → 3.9	(97.1%)

Port Connectivity

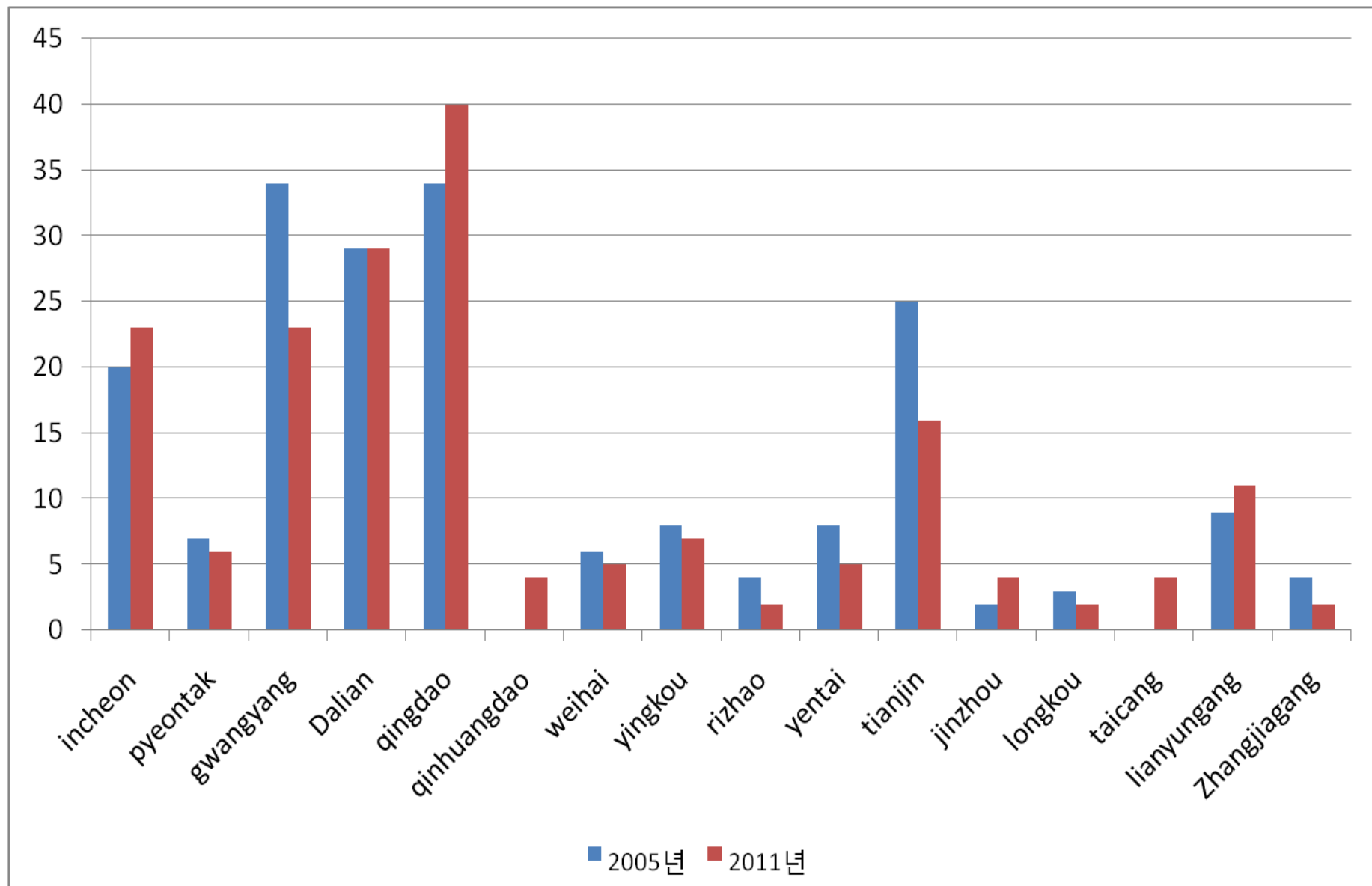
2004

1. Qingdao
2. Gwangyang
3. Dalian
4. Incheon
5. Tianjin
6. Lianyungang
7. Yantai
8. Longkou
9. Rizhao
10. Weihai
11. Yingkou
12. Pyeongtaek
13. Jinzhou
14. Zhangjiagang
15. Qinhuangdao
16. Taicang

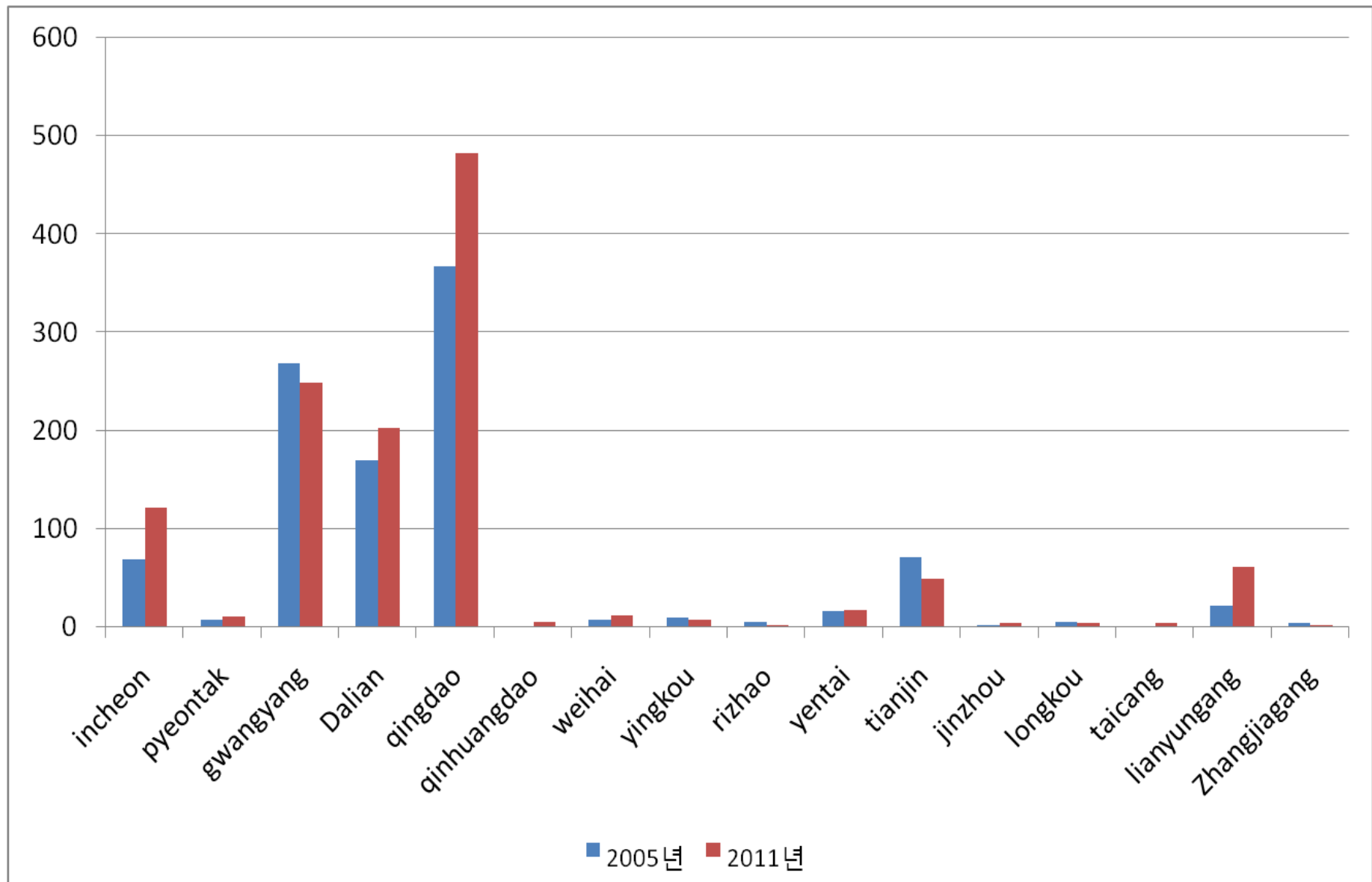
2004

1. Qingdao
2. Gwangyang
3. Dalian
4. Lianyungang
5. Incheon
6. Yantai
7. Tianjin
8. Weihai
9. Longkou
10. Pyeongtaek
11. Qinhuangdao
12. Yingkou
13. Rizhao
14. Jinzhou
15. Zhangjiagang
16. Taicang

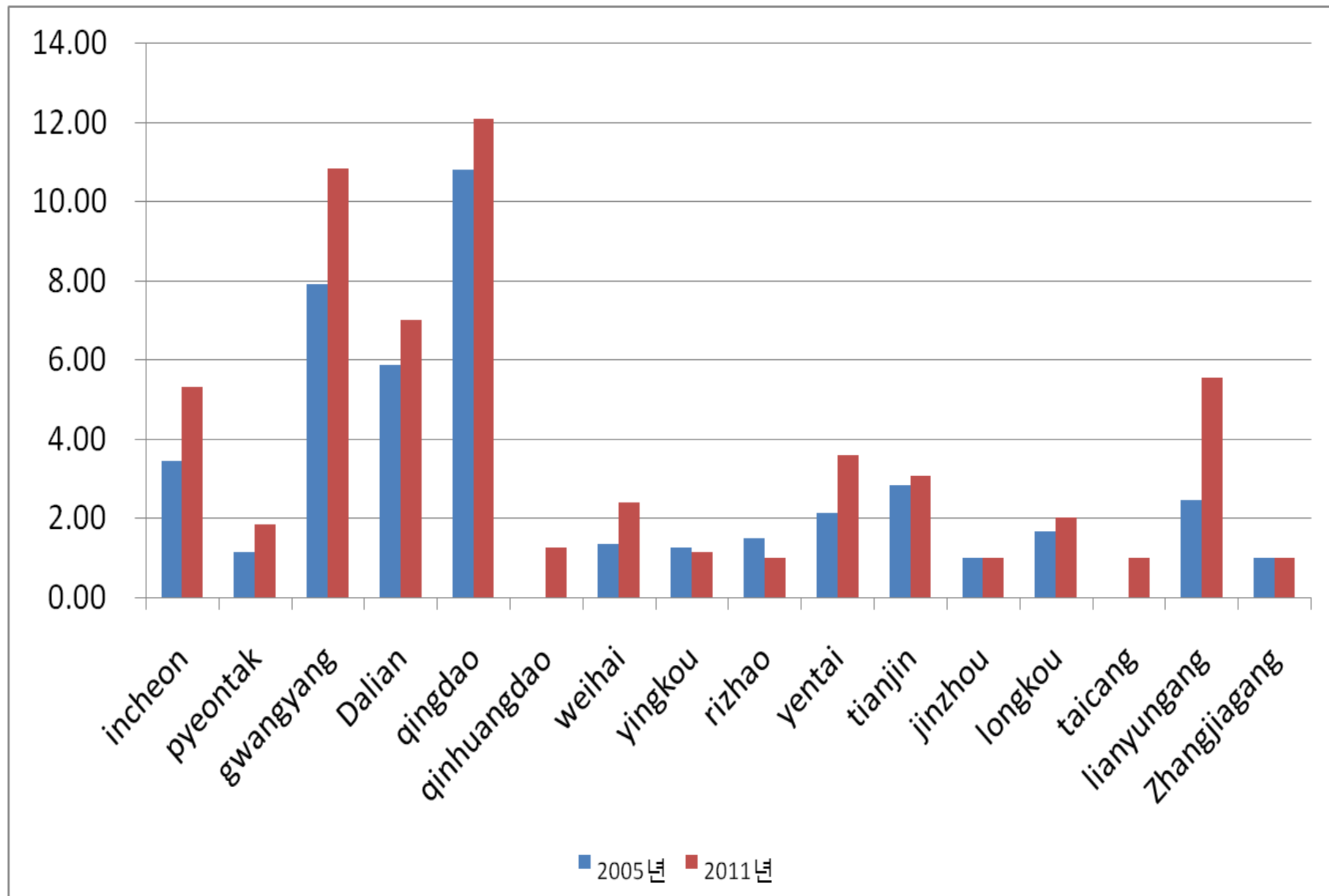
Partner Ports



Linkage



Port Connectivity



Average service capacity analysis

- Average Vessel Size
- Average Service Frequency (per month)
- Average Service Capacity
 - = Average Vessel Size x Average Service Frequency

Average Vessel Size

- Incheon 1,114 → 1,211 (8.7%)
- Pyeongtaek 420 → 677 (61.1%)
- Gwangyang 3,073 → 3,540 (15.2%)
- **Total (avg.) 1,536 → 1,809 (17.8%)**

- **Dalian** 2,612 → 3,425 (31.1%)
- **Qingdao** 2,722 → 3,747 (37.7%)
- Yingkou 1,171 → 1,835 (56.7%)
- Rizhao 860 → 2,739 (218.6%)
- Yantai 869 → 888 (2.2%)
- Tianjin 2,034 → 3,163 (55.5%)
- **Total (avg.) 1,711.3 → 2,632.8 (53.8%)**

- Lianyungang 1,673 → 1,514 (-9.5%)
- Zhangjiagang 227 → 827 (264.1%)
- **Total 950 → 1,170.5 (23.2%)**

Ranking

2004

1. **Gwangyang**
2. Qingdao
3. Dalian
4. Tianjin
5. Lianyungang
6. Yingkou
7. **Incheon**
8. Yantai
9. Rizhao
10. **Pyeongtaek**
11. Zhangjiagang

2010

1. Qingdao
2. **Gwangyang**
3. Dalian
4. Tianjin
5. Rizhao
6. Yingkou
7. Lianyungang
8. **Incheon**
9. Yantai
10. Zhangjiagang
11. **Pyeongtaek**

Ranking

2004

1. Yingkou
2. Pyeongtaek
3. Tianjin
4. Gwangyang
5. Rizhao
6. Dalian
7. Yantai
8. Incheon
9. Qingdao
10. Lianyungang
11. Zhangjiagang

2010

1. Rizhao
2. Yingkou
3. Yantai
4. Incheon
5. Lianyungang
6. Pyeongtaek
7. Gwangyang
8. Qingdao
9. Tianjin
10. Dalian
11. Zhangjiagang

Average Service Frequencies

- Incheon 4.39 → 6.18 (40.7%)
- Pyeongtaek 6.40 → 5.33 (-16.7%)
- Gwangyang 4.73 → 4.97 (5.0%)
- Total 5.2 → 5.5 (6.2%)

- Dalian 4.66 → 3.98 (-14.6%)
- Qingdao 4.32 → 4.28 (-0.9%)
- Yingkou 11.33 → 22.25 (96.3%)
- Rizhao 4.67 → 48.00 (928.6%)
- Yantai 4.44 → 6.67 (50.0%)
- Tianjin 5.23 → 4.00 (-23.6%)
- Total 4.33 → 11.15 (157.4%)

- Lianyungang 4.20 → 6.00 (42.9%)
- Zhangjiagang 4.00 → 0.03 (-99.2%)
- Total 4.10 → 3.02 (-26.4%)

Average Service Capacity

- Incheon 4,889 → 7,476 (52.9%)
- Pyeongtaek 2,688 → 3,609 (34.3%)
- Gwangyang 14,525 → 17,579 (21.0%)
- Total 7,376 → 9,554 (29.7%)

- Dalian 12,173 → 13,630 (12.0%)
- Qingdao 11,759 → 16,036 (36.4%)
- Yingkou 13,275 → 40,829 (207.6%)
- Rizhao 4,012 → 131,448 (3176.6%)
- Yantai 3,860 → 5,917 (53.3%)
- Tianjin 10,644 → 12,653 (18.9%)
- Total 7,412 → 29,350 (296.0%)

- Lianyungang 7,027 → 9,083 (29.2%)
- Zhangjiagang 908 → 28 (-97.0%)
- Total 3895 → 3529 (-9.4%)

Ranking

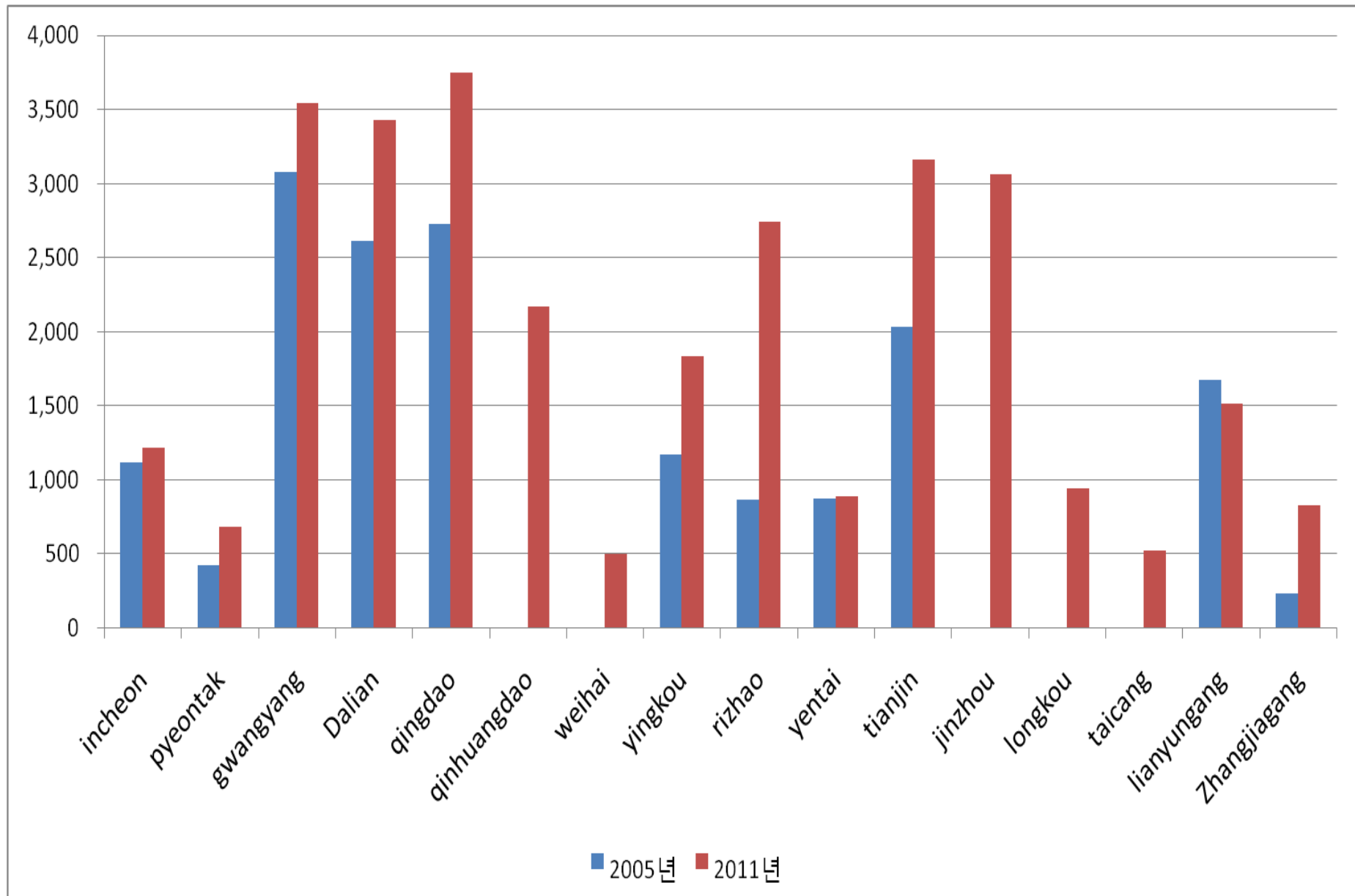
2004

1. Gwangyang
2. Yingkou
3. Dalian
4. Qingdao
5. Tianjin
6. Lianyungang
7. Incheon
8. Rizhao
9. Yantai
10. Pyeongtaek
11. Zhangjiagang

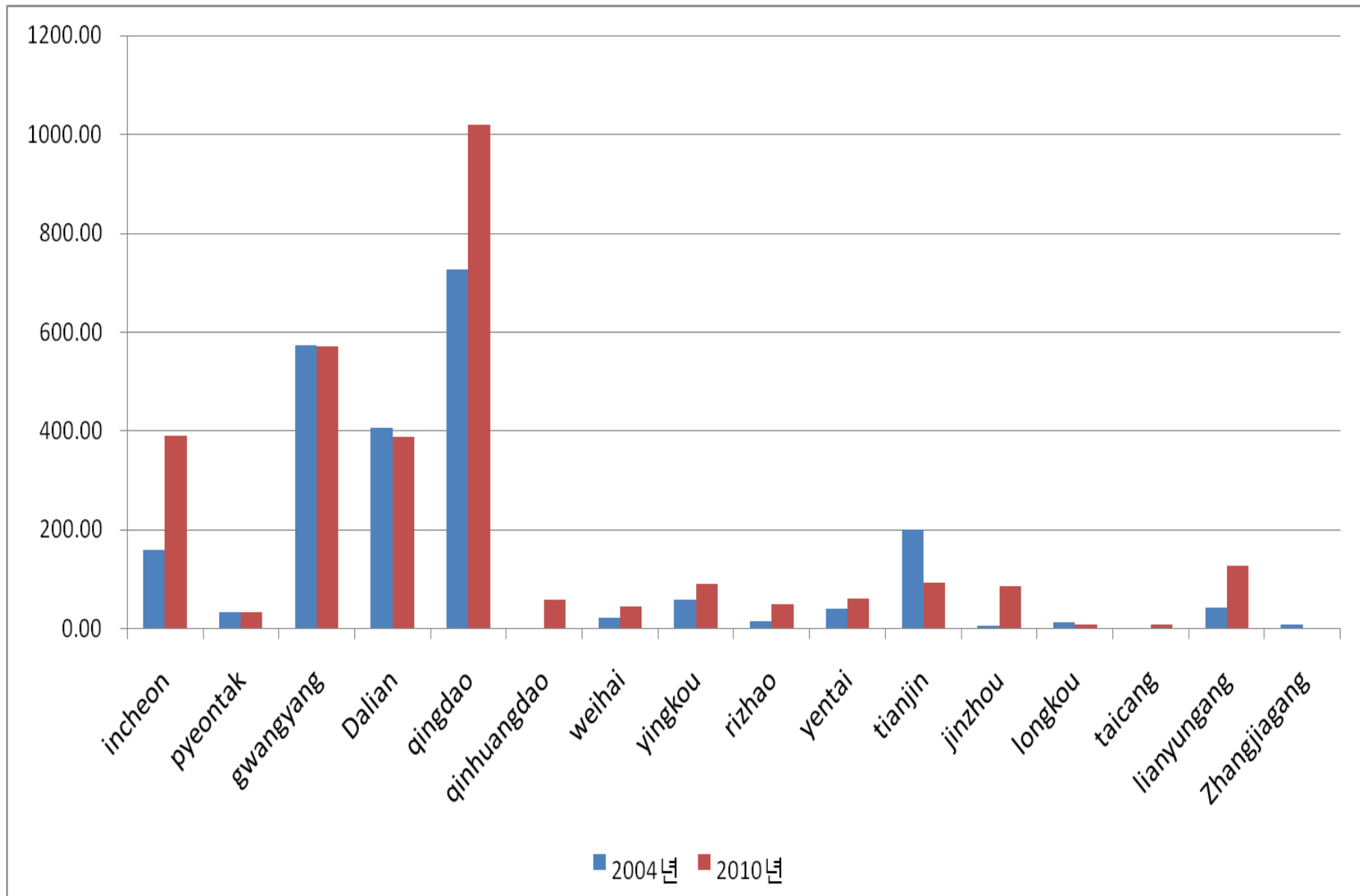
2010

1. Rizhao
2. Yingkou
3. Gwangyang
4. Qingdao
5. Dalian
6. Tianjin
7. Lianyungang
8. Incheon
9. Yantai
10. Pyeongtaek
11. Zhangjiagang

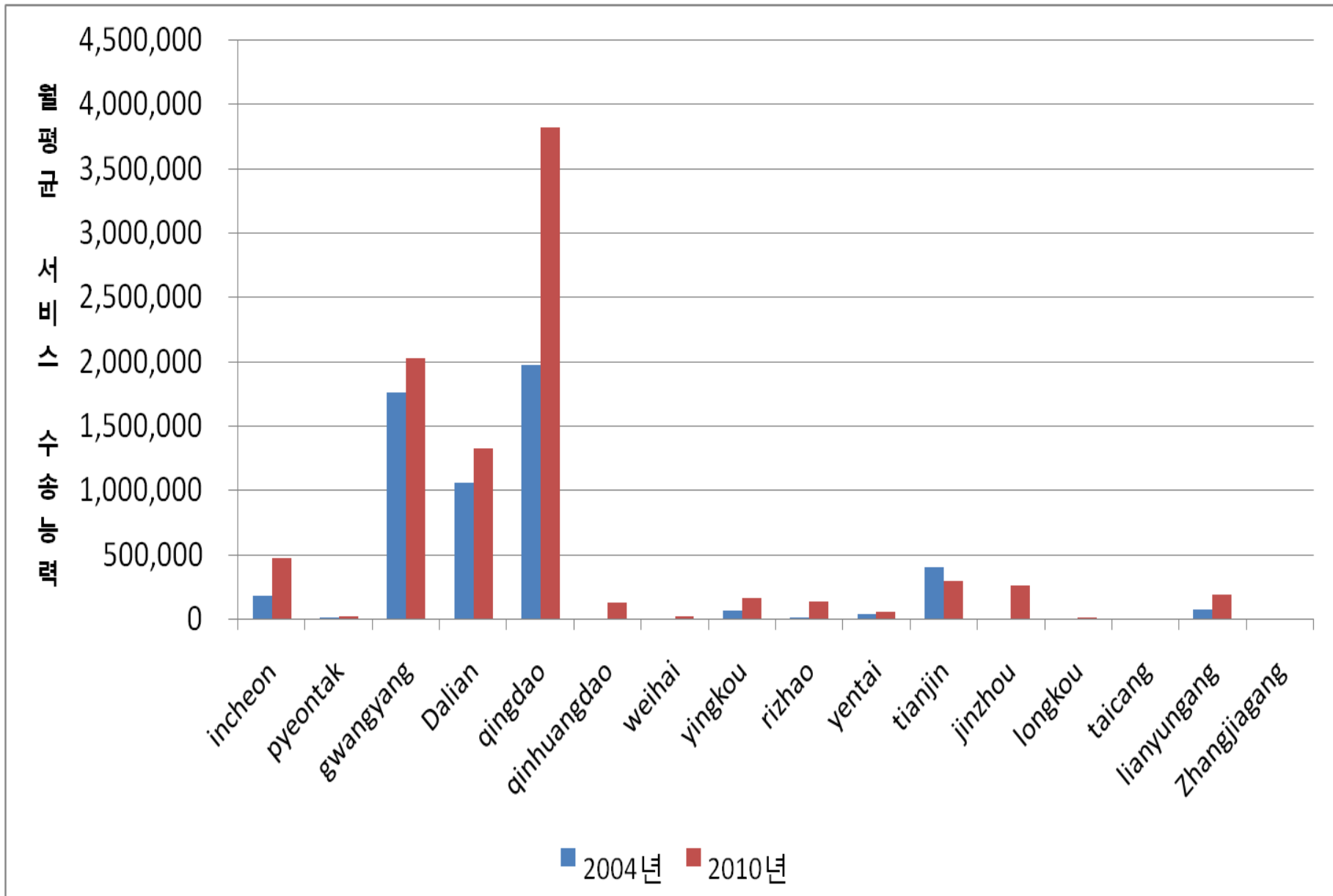
average Vessel Size



Average Service Frequency

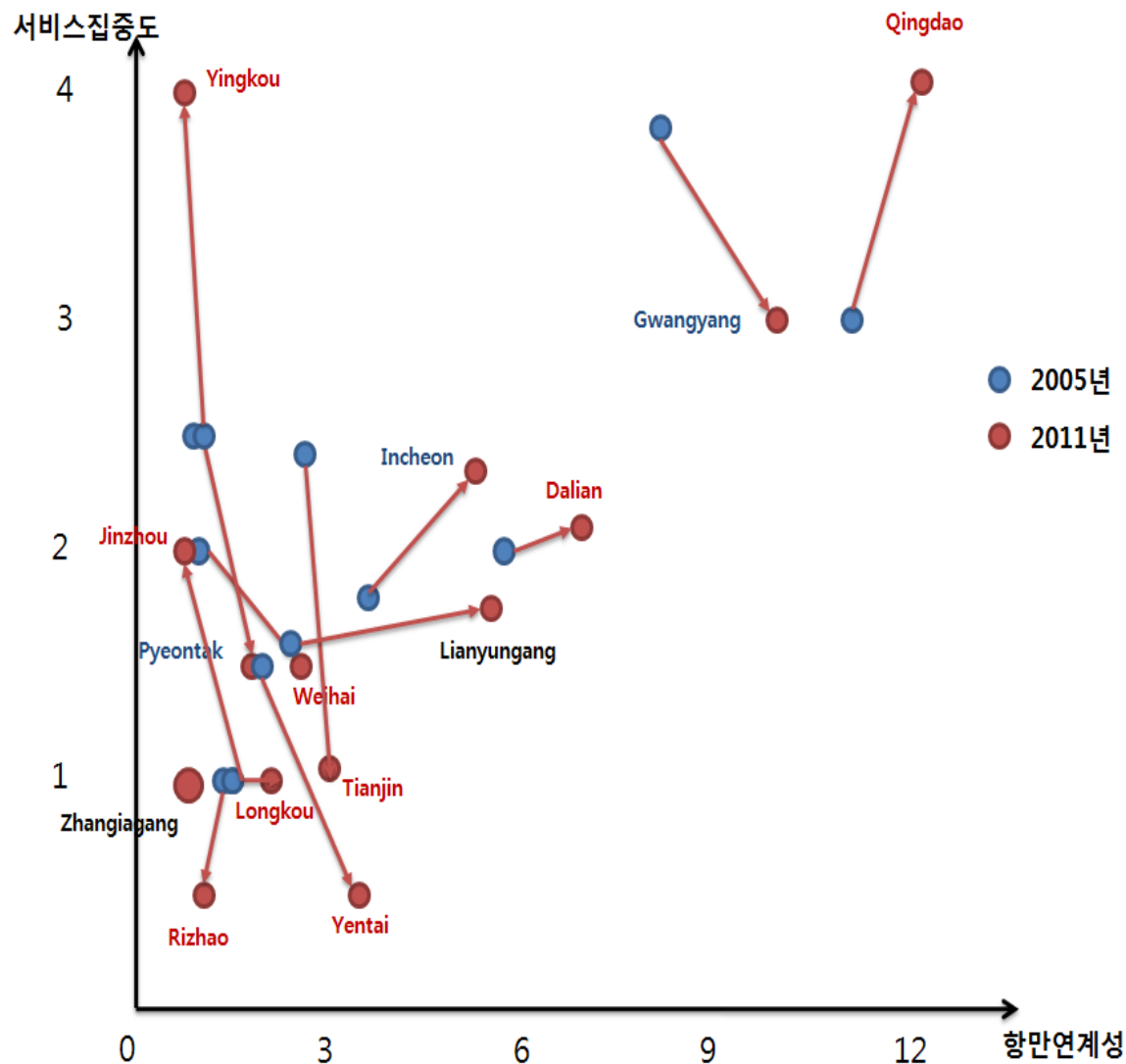


Average Service Capacity



Matrix analysis

Service concentration vs. Port Connectivity



Service concentration ↑
Port connectivity ↑

**Dalian, Qingdao, Incheon,
Lianyungang**

Service concentration ↑
Port connectivity ↓

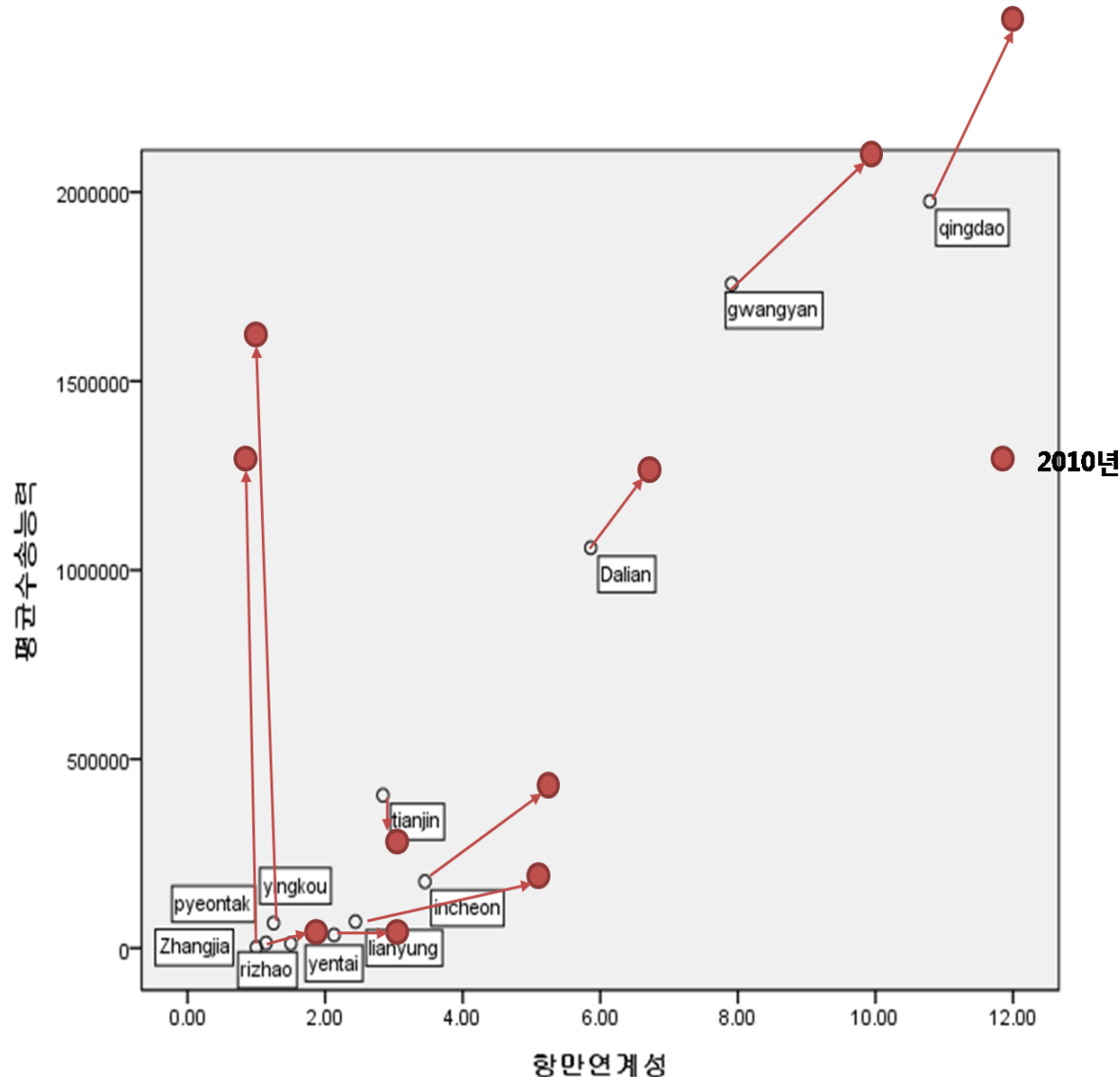
Yingkou, Rizhao

Service concentration ↓
Port connectivity ↑

**Gwangyang, Yentai,
Pyeontaek, Wei hai, Tianjin**

Matrix analysis

Average service capacity vs. Port connectivity



Average Service Capacity ↑
Port connectivity ↑

**Dalian, Qingdao, Incheon,
Lianyungang, Yentai,
Pyeongtaek, Weihai,
Gwangyang**

Average service capacity ↑
Port connectivity ↓

Yingkou, Rizhao

Average service capacity ↓
Port connectivity ---

Tianjin, Zhangjiagang

Implication for Korean Ports

- **Service Concentration Strategy**

Marketing for the Liners which can provide more services

- **Port Connectivity Strategy**

Marketing to increase the number of linkages of the shipping routes

- **Service Capacity Strategy**

Choice of vessel size and service frequency



Thanks

