論文の内容の要旨

# Evolution Dynamics of Container Port Systems with a Geo-Economic Concentration Index: A Comparison of Japan, China and Korea

（地理的・経済的特性を考慮した港湾群の空間的集中特性の変遷に関する研究：日本・韓国・中国の比較分析）

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The advent of containerization technology has resulted in inter-port competition due to the expansion of hinterlands. In the process of the container port evolution, two tendencies, namely, concentration and de-concentration of container traffic have been observed in many literatures. Since 1990s, the concept of hub-and-spoke shipping network brought by the increasing vessel size and strategic alliances of shipping liners have intensified the competition of the container ports into the regional level. Concentrated investment was injected to major ports by port authorities or terminal operators for the expansion of the capacity and upgrading of the facilities to accommodate the latest generation vessels, in an attempt to become the regional hub ports.

In the context of northeastern Asia, three neighboring countries, namely Japan, China and Korea, have been proactively making development plans to vie for the hub status in the region, such as the “Shanghai international shipping center police” launched by China in 1995, “Northeastern Asia logistics hub strategy” launched by Korea in 2001 and “Super-Hub port policy” launched by Japan in 2003. However, in the battle for regional hub, it seems that Japanese ports are inferior in its competitiveness compared with China which boasts the ports of Shanghai and Shenzhen ranked as 2nd and 4th in the world respectively in terms of the container handling amount, and Korea, which boasts Busan port that ranked 5th in 2007. Considering the fact that Japan has five major ports and a large number of small sized container ports scattered along the coast, while both China and Korea have dominant ports, it seems that Japan’s container port system is too de-concentrated. Is Japan’s container port system really more de-concentrated than other countries? How can we compare the degree of concentration of container port systems among the different countries? How did the degree of concentration change over time? What are the reasons underlying the concentration dynamics? What is the government’s strategy? What kind of value judgment is reflected in the different strategy adopted by each country?

To address the above questions, the research set the following objectives:

- To develop a comparable index to measure the degree of concentration of container port systems in different country;
- To apply the developed index to examine the concentration dynamics of container port systems in Japan, China and Korea;
- To explain the reasons underlying the observed results from the perspective of government strategies and institutional changes;
- To draw some constructive lessons from the past.

The first stage of this research develops a comparable index to measure the degree of concentration of container port systems on a country level. Based on the Herfindahl-Hirschman Index (HHI), a new index named Geo-Economic Concentration Index (GECI), which considers the competitive interactions among ports by incorporating geographical and economic characteristics of countries, is developed.

In addition to considering the market share of the cargo handling amount of ports which is commonly adopted by traditional methodologies, the new index includes some other factors such as the length of coastline, international trade volume and the inland transport performance to measure the concentration rate so that the influence of geographical and economic differences can be eliminated from the result and make the index comparable among countries in different graphical and economic scales. Numerical analysis of the effect of (a) port number, (b) market shares, (c) port distribution, (d) trade volume and (e) transport performance are conducted to understand how the GECI behaves.

The second stage applies the developed index into the container port systems in Japan, China and Korea to examine the concentration dynamics from the period of 1975 to 2007. Cases progressively representing the market shares, length of coastline and spatial location of port, trade volume and transport performance are specified to show the contribution of each factor to the final concentration result.

The application results show that Japan has a relatively de-concentrated port system and has remained stable for a long period with a slight concentration tendency after 2000, while Korea has a high degree of concentration which declined to a certain extent from 1995 to 2000 and rebounded after 2000. China's concentration degree lies between Japan and Korea, with a de-concentration tendency from 1980 to 1990 and a strong concentration tendency from 1995 to 2005.

The third stage explores the reasons underlying the observed concentration dynamics with special emphasis on the influences of government's policies on container port development and the institutional framework of

port governance. A profile-based and time series-based discussion has been carried out on factors causing the long-term degree of concentration and short-term concentration/de-concentration tendency. Following findings are concluded from the research:

As for Japan, the nation's adoption of a balanced development policy as the basic principle for national development is identified as an essential reason for the low concentration level of Japan's container port system. The social structure wherein the national policy-making is decided through adjustment in accordance with the intentions of the various stakeholders, particularly the involvement of the local autonomous bodies in the process of policy-making, determines that the concentration of the investment and resource is not likely to be realized in Japan.

In contrast, the concentrated development strategy for container port development adopted by Korea accounts for the high level of concentration in its container port system. The essential reason lies in the centralized port governance system in which national government controls the development of port in a way that the national interests can be best fulfilled. As a consequence, intensive investment tends to be made to ports with competitive advantage in order to achieve the strategic development at the national level.

As for China, under the background of the economic reform from the planned economy to market economy, continuous institutional reform has been carried out in the port governance system. The decentralization of administrative rights to the local port authority and the participation of the private sector in container development lead to the strong concentration driven by the market power. Moreover, the national government's policy incentives for the development of a few specific ports for the purpose of achieving the hub status in the region have further contributed to the concentration tendency after 2000.

Furthermore, a classification of the concentration dynamics patterns according to the driven factor of concentration practices in different time periods has been presented. This characterizes the observed concentration dynamics in Japan, China and Korea as either constraint-limited concentration, market-driven concentration or strategic concentration, or alternatively, as resulted de-concentration, development-driven de-concentration or balanced development oriented de-concentration.

Keywords: Container Port System, Evolution Dynamics, Concentration Index