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The necessity and implementation strategies for establishing Gyeongnam and Changwon as key logistics hubs in port operations

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Abstract

The development of Jinhae New Port is expected to have positive effects on the local economy and foster the regional port logistics industry. However, since most of the port-related industry companies are located in the old downtown areas of Busan, such as Yeongdo and Jungang-dong, the main focus of the port will still remain in the old downtown of Busan even after the opening of Jinhae New Port. This study conducted basic research to maximize the benefits of the Jinhae New Port opening by exploring ways to establish Gyeongnam and Changwon as port logistics hubs. The specific research objectives included identifying target port-related industries and companies for attraction, as well as presenting the justification and rationale for establishing Gyeongnam and Changwon as port logistics hubs. The results indicated that the supply industry, ship management industry, ship repair industry, and shipbuilding equipment industry are sectors that Gyeongnam and Changwon should focus on attracting. The necessity of establishing Gyeongnam and Changwon as port logistics hubs is presented based on: 1) local tax revenue from the operation of Busan New Port, and 2) regional balanced development and the construction of a megacity. Specific implementation measures suggested include: 1) renaming the port, 2) attracting port-related industries, 3) seizing key agendas for port advancement, 4) establishing a smart port task force for the coexistence of ports, universities, and cities, and 5) enhancing the attractiveness of port cities to prevent population outflow.

Keywords: Busan Port, Port Logistics, Jinhae New Port. Balanced Regional Development

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1. Introduction

The Busan New Port is established across the Gangseo District of Busan and the Jinhae District of Changwon in Gyeongnam. The inception of the Busan New Port can be traced back to January 1995. Following the Great Hanshin Earthquake in January 1995, which caused severe congestion and delays at Busan North Port, discussions began regarding the construction of a new port. The North Port, located in the city center, faced significant challenges for expansion. Consequently, in July 1996, the government announced a comprehensive port development plan that outlined the construction of the new port in Busan.

As of 2024, the Busan New Port operates a total of 26 berths. An examination of the berths by administrative district reveals that there are 16 located in Busan and 10 in Changwon. The share of the hinterland area dedicated to port-related activities is greater in Gyeongnam and Changwon than in Busan. Within the hinterland of the Busan New Port, a total of 69 manufacturing and logistics companies are established, with 60 located in Changwon and only 9 in Busan.

The development of Jinhae New Port is anticipated to yield significant economic benefits for the region and foster the local port logistics industry. Beyond the direct effects of increased cargo handling and revenue growth for port operators, the development may stimulate job creation and other indirect economic impacts by promoting the growth of related industries. Following the opening of Jinhae New Port, the total number of berths in Busan Port will comprise 36 in Changwon and 23 in Busan, indicating a shift in the concentration of port logistics towards Gyeongnam and Changwon over Busan.

However, the opening of Jinhae New Port alone may not suffice for Gyeongnam and Changwon to become a logistics hub to rival Busan. Most of the businesses related to port industries—such as ship management, supply of ship provisions, container repair, shipbuilding, tugboat services, pilot services, inspection and measurement services, and fuel supply—are primarily located in the old downtown areas of Busan, including Yeongdo and Jungang-dong. According to the research by Lee and Kim (2019), despite Gyeongnam possessing the highest number of trading ports in the country, a high level of concentration in port-related industries was not evident. If this situation persists, the central axis of port activities will continue to reside in the old downtown area of Busan, even after the opening of Jinhae New Port.

To maximize the effects of the Jinhae New Port opening and ensure balanced regional development, this study aims to conduct foundational research to establish Gyeongnam and Changwon as a logistics hub.

The structure of this study will be organized as follows: Chapter 2 will review prior research. Chapter 3 will examine the current state of related industries within Busan Port and present a list of companies that Gyeongnam and Changwon should attract. Chapter 4 will discuss the necessity and implementation strategies for establishing Gyeongnam and Changwon as a logistics hub. Chapter 5 will provide the conclusion.

2. Literature review

Since the mid-1990s, research on the economic effects of port construction and operation has been actively conducted. Kim and Choi (2008) reported that the production induced effect from final demand in the Ulsan port industry amounted to 6.823 trillion KRW, while the value-added creation effect was 1.723 trillion KRW. The employment induced effect was reported to be 21,514 jobs. Additionally, the production induced effect from port industry activities was estimated at 2.51 trillion KRW, with a value-added creation effect of 674 billion KRW and an employment induced effect of 8,895 jobs.

BPA (2005) indicated that the port logistics industry contributes 20.64% of Busan's total economic output (9.88% directly and 10.76% indirectly). Furthermore, it accounts for 21.5% of the value-added contribution in the Busan area. According to Lim (2008), the contribution of Busan Port and related industries exceeds 1/5 of regional production and 1/7 of regional employment.

According to IPA (2009), the regional production induced effect of the port logistics industry and related sectors constitutes 33.29% of total regional production.

Lee and Kim (2019) studied the clustering phenomena of port cities in Korea using location quotients (LQ). The results indicated that Seoul was the most specialized city for international freight transportation, while Busan

exhibited specialization in inland freight transport, port and other maritime terminal operations, and handling of waterborne cargo. Additionally, Busan was recognized as a cluster for foreign freight transportation, cargo packing, and inspection and weighing services. Incheon specialized in operations of ports and other maritime terminals, while Gyeonggi Province showed specialization in general warehousing, refrigerated storage, and other storage services. Jeonnam was specialized in inland passenger transportation, and Ulsan was noted for the storage of hazardous materials. Gyeongnam, having the highest number of trading ports (nine) and two coastal ports, did not demonstrate significant specialization in related industries.

Lee (2024) proposed development strategies for Dangjin Port. The study suggested enhancing Dangjin's brand name, including bulk goods in regional development taxes to increase local revenue, establishing a task force for the port's development, collecting port-related statistics, analyzing Dangjin Port's contributions to the growth and development of Pyeongtaek-Dangjin Port, and selecting long-term tasks for its development, including independent operations.

Ha and Han (2006) outlined development strategies for regional container ports. The research emphasized the following: (1) establishing transport networks that differentiate from hub ports, (2) continuously understanding local shipper needs and building collaboration systems, (3) pursuing routes based on the production and trade characteristics of hinterland areas, (4) creating networks between core and hub ports, (5) developing hinterland areas specialized for regional enterprises, (6) securing cost competitiveness, and (7) establishing co-opetition relationships between regional ports.

Choi and Kim (2023) provided concrete methods for local governments with ports to secure financial resources for port-related needs based on cases from Donghae and Mukho ports. The research proposed: (1) establishing a fund using a portion of tariffs on imported goods, (2) instituting fees on facilities that generate externalities, and (3) imposing local resource facility fees on goods transported to ports.

Jeong and Lee (2024) analyzed the efficiency, growth potential, and stability of five port-related companies. The findings revealed that port service companies exhibit the highest efficiency and growth potential, while ship repair companies demonstrated the greatest stability.

Seong and Kin (2022) conducted a survey on the status of port-related industries in Busan and proposed improvements. According to the study, port-related industries in Busan fall under the Busan City Ship Management and Related Industries Promotion and Support Ordinance, including (1) port service companies, (2) ship fuel supply companies, (3) ship repair companies, (4) container repair companies, and (5) supply companies for ship provisions. The survey revealed that the closure or cessation rates for port service firms, ship fuel supply companies, container repair firms, and supply companies for ship provisions were 12%, 5%, 4%, 13%, and 13%, respectively. Notable improvement measures.

Li et al. (2024a) presented a model of resilience in port clusters through integrated hypergraph-based modeling and agent-based simulation. The study focused on the port cluster in Hong Kong and Macau. The results indicated how cargo handling capacity improves when ships do not dock during severe operational disruptions caused by typhoons.

Gupta and Prakash (2024) measured the competitiveness of maritime port clusters in Southeast Asia, employing a multi-attribute utility theory approach in their methodology. The evaluation considered factors such as (1) the pre-existing macroeconomic environment encompassing firms, resources, and culture, (2) governance, (3) infrastructure, and (4) connectivity, which includes synergies and diversity among cluster participants. The findings revealed that Mumbai (near Jawaharlal Nehru Port) exhibited the highest competitiveness, followed by Colombo and Male.

Li et al. (2024b) analyzed the impact of China's Belt and Road Initiative on the development and expansion of port city clusters. The research demonstrated that from 2000 to 2020, port cities along the Maritime Silk Road experienced significant urbanization effects. Spatial change analysis indicated that the Belt and Road Initiative led to temporary urban spatial reconfigurations, with new smaller cities emerging as a result.

Yang et al. (2020) studied the connectivity of components within maritime clusters, focusing on regions in Western Europe, Hong Kong-Macau, and the Yangtze River area. The results showed that Western

Europe displayed the highest connectivity in shipping and ship management, while Hong Kong-Macau specialized in maritime finance and ship brokerage, with lower specialization levels observed in other sectors, indicating polarization. The Yangtze River area was identified as specialized in shipbuilding and ship repair.

Shi et al. (2020) proposed development strategies for port-led shipping clusters through the case study of the Shanghai shipping cluster. The research emphasized that shipping clusters should evolve into (1) eco-friendly ports, (2) global supply chain hubs, and centers for the distribution of maritime resources. It underscored the necessity for government-led initiatives and the implementation of differentiated cluster-building strategies and effective policy tools.

Shi et al. (2021) examined the phenomenon of international hierarchy within shipping clusters. The results indicated that the international hierarchy of shipping clusters remains stable, with governance restructuring and innovation influencing the stability of this international hierarchy.

3. Port-Related Industries and Selection of Attracting Industries

The operational activities of ports give rise to various related industries, significantly contributing to regional economic development. An examination of maritime law, the Port Transportation Business Act, and the Port Act reveals the types of industries encompassed within the scope of port-related industries.

According to the Maritime Law, the following sectors can be included as part of port industries: maritime passenger transportation, maritime cargo transport, maritime brokerage, shipping agency services, vessel chartering, and ship management. The Port Transportation Business Act encompasses various port transportation activities such as stevedoring, inspection, appraisal, and weighing, along with related industries such as port services, supply of goods, bunkering services, and container repair services. The Port Act includes pilotage as a component of the port industry, while the Pilotage Business Act also categorizes pilotage under the umbrella of port-related industries.

Yang (2021) outlined the port industry sectors, including: 1) port transportation businesses encompassing stevedoring, inspection, appraisal, and weighing activities; and 2) port-related industries such as port services (including services like pilotage, berthing, vessel guarding, vessel cleaning, and fresh water supply), supply of goods, bunkering services, container repair, pilotage and tugboat services, ship repair and shipbuilding equipment, and value-added activities in the hinterland.

Following a vessel's arrival at the port and completion of cargo handling, various relevant sectors emerge prior to its departure. Notable port-related industries include container unpacking and securing, inspection, appraisal, quarantine, bonded storage, container inspection and cleaning, customs clearance, vessel repairs, supply of provisions, classing services, pilotage, and tug services.

These industries not only enhance the functionality of the port but also create comprehensive interdependencies, forming an intricate network that supports efficient port operations.

According to the 2022 Busan Port Maritime Industry Survey, the sectors associated with Busan Port and related industries include: 1) warehousing, 2) stevedoring, 3) ancillary port industries (including pilotage, tugboat services, packaging, inspection and appraisal, waterborne transportation support services, and bunkering services), 4) supply of provisions, 5) repair services (including container repair and ship repair), 6) port construction, 7) passenger transportation, 8) cargo transportation, 9) agency and brokerage services (including shipping agency services, brokerage and transport arrangement services, vessel chartering, and ship management), 10) land transportation, and 11) public administration.

Out of a total of 13,129 companies, 9,094 are located in Busan and Changwon, with 8,052 companies in Busan and 1,042 in Changwon. In terms of revenue, companies in the Busan area reported an average revenue of 9,001 million KRW, while those in Changwon reported an average of 8,575 million KRW.

To compare the total revenues of notable port-related industries (ancillary port industries, supply of provisions, and repair services) by region, the total revenue for port-related industries in Busan was found to be 23,126 million KRW, whereas the total revenue for port-related industries in Changwon was 15,338 million KRW.

Among the companies located in the Busan Jung-gu and Yeongdo-gu areas, many engage in port operations, which leads to significant time and cost inefficiencies. The regional concentration of port-related industries contributes to social costs, particularly affecting specific sectors such as supply of provisions, pilotage, weighing services, inspection services, and appraisal services. These industries would benefit from relocation to Jinhae New Port to mitigate these issues.

Most ship repair and shipbuilding equipment companies are located in Yeongdo, Busan. The shipbuilding equipment industry encompasses the production of all machinery and materials used in the construction and repair of ships, including metallic and non-metallic processed goods, electrical and electronic equipment, and machinery components. Shipbuilding materials account for 55% to 65% of the construction cost of a vessel, making it a high-value-added industry with significant variation depending on the type and size of the ship.

In Europe, the shipbuilding equipment industry also covers materials, engineering, design, and consulting. As of 2019, there were 1,239 shipbuilding equipment companies in South Korea, including 79 in hull fabrication, 101 in machinery, 894 in outfitting, and 165 in electrical and electronic sectors. Among these, the electrical and electronic equipment sector provides technologies for maritime connectivity for autonomous ships (including data exchange systems, navigational equipment technology, Ethernet-based onboard communication technology, and cyber security for vessel navigation systems and equipment) as well as remote monitoring technologies and intelligent maritime traffic information services. Out of the total 165 companies in this sector, 83 are located in Busan (Park Gye-gak et al., 2021). Therefore, it is essential to attract key ship repair yards and related industries such as shipbuilding equipment to Gyeongnam and Changwon.

4. The Necessity of Hub Formation and Implementation Strategies

The operation of Busan New Port significantly impacts Gyeongnam and Changwon, contributing to substantial revenue generation for the Busan Port Authority (hereafter referred to as BPA). As of 2023, BPA's rental income amounts to 1.475 trillion KRW, while income from port facility usage fees totals 1.976 trillion KRW. These revenue streams represent the primary sources of income for BPA.

As of 2023, Busan Port has a total of 38 berths distributed across different regions: 10 berths are located in Gyeongnam and Changwon, 16 are situated in Busan's new port area, and 12 are in the North Port. Considering this distribution, BPA's revenue contribution from Gyeongnam and Changwon can be estimated at approximately 90.8 billion KRW.

Despite this economic contribution, the local taxes paid by BPA predominantly benefit the city of Busan's municipal and district revenue. The taxes that BPA pays include acquisition tax, property tax, registration and license tax, and local income tax. In 2016, BPA's total local tax payment amounted to 12.88 billion KRW, with 11.12 billion KRW going to Busan Metropolitan City and its autonomous districts. From 2011 to 2016, BPA paid a total of 57 billion KRW in local taxes, of which 50.2 billion KRW was paid to Busan City and Jung-gu. During this period, BPA was eligible for local tax relief on municipal and district taxes in Busan, but the relevant ordinance was repealed on December 27, 2017.

According to Lee (2017), it is estimated that BPA's acquisition tax payment to Busan City from 2018 to 2020 will total 10.7 billion KRW.

Additionally, it is important to note the local tax revenue generated by businesses related to port operations at Busan New Port. Employees engaged in port-related industries (such as pilotage, inspection, weighing, and land transportation) who reside in Busan are required to pay local taxes to the city and its districts. An estimation of this revenue has been omitted.

To ensure that Gyeongnam and Changwon become a logistics hub following the opening of Jinhae New Port, the relocation of BPA's headquarters to Changwon should be prioritized. This move has the potential to generate significant economic effects and would greatly aid in increasing population influx and local tax revenue.

To mitigate the decline of local populations, the establishment of regional megacities is essential. According to urban planning experts, there are currently two candidate regions for local megacity development: "Busan-Ulsan-Gyeongnam" (Buul-gyeong) and "Daejeon-Sejong-Cheongju" (Daese-cheong). In order to

establish a regional megacity in our area, it is imperative to locate the Busan Port Authority (BPA) and port-related industries in Gyeongnam and Changwon. The relocation of BPA and port-related industries to Changwon would serve as a catalyst for the formation of a regional megacity.

In 2030, it is anticipated that the containerized cargo processed at Jinhae New Port will be recorded as part of the throughput at Busan Port. While BPA generates approximately 90.8 billion KRW through Gyeongnam and Changwon, most of the local taxes are paid to Busan Metropolitan City and its districts. This situation suggests that Gyeongnam and Changwon provide the land, while revenue and tax income primarily benefit Busan. Therefore, it is reasonable to propose changing the name of Busan Port to Busan-Gyeongnam Port.

It is crucial to attract port-related industries to Gyeongnam and Changwon. The concentration of port-related industries in Busan necessitates long-distance travel from the old downtown area to Busan New Port, resulting in social costs that diminish the competitiveness of the port. Consequently, it is vital to attract industries such as supply of provisions, pilotage, weighing services, inspection services, and appraisal services to Gyeongnam and Changwon, enhancing port competitiveness while reducing social costs.

Gyeongnam and Changwon must prioritize key agendas for the advancement of Busan Port. These agendas should include: 1) strategies for the development of Busan Port as a starting point and hub for the Arctic Sea Route, 2) development strategies for Busan Port in the era of declining population, and 3) the establishment of a tri-port system in conjunction with the construction of the Gadeokdo New Airport.

Thus far, Gyeongnam and Changwon have not played a prominent role as key actors in the policy network concerning Busan Port and, consequently, have not represented their interests. With the proposal of the Busan-Gyeongnam Port Authority Act, it is anticipated that Gyeongnam will be able to recommend an equal number of port commissioners to BPA, similar to Busan.

Both Busan and Gyeongnam are experiencing high levels of population aging and accelerating youth outmigration. The competitiveness of local universities is also declining. The outmigration of young people contributes to the weakening of regional industrial competitiveness, and the port sector is no exception. There is a need for policies that foster a positive cycle among the port, region, and universities.

Investment in smart port R&D funding at local universities is essential so that these institutions can conduct research and train personnel for port development and the establishment of smart ports. The products of this R&D and the trained personnel must be utilized within the regional port development efforts.

5. Conclusions

While the development of Jinhae New Port is expected to bring economic benefits to the region and foster local port logistics industries, the majority of port-related businesses remain concentrated in the old downtown areas of Busan, specifically Yeongdo and Jungang-dong. As a result, even after the opening of Jinhae New Port, the focal point of port activities will still be located in Busan's old downtown. This study conducted foundational research aimed at maximizing the effects of the Jinhae New Port opening by establishing Gyeongnam and Changwon as a logistics hub.

The specific objectives of this research include exploring target industries and companies for attracting port-related businesses, as well as presenting the necessity and rationale for transforming Gyeongnam and Changwon into a port logistics hub. The findings indicate that the industries that Gyeongnam and Changwon should actively pursue include the supply of provisions, ship management, ship repair, and shipbuilding equipment manufacturing industries.

The necessity for establishing a port logistics hub in Gyeongnam and Changwon is underscored by two key points: 1) despite the operation of Busan’s new port, there is a leakage of local tax revenue; and 2) the need for balanced regional development and the establishment of a megacity.

Specific implementation strategies are proposed as follows: 1) change the name of the port, 2) attract port-related industries, 3) prioritize key agendas for port development, and 4) create a Busan-Gyeongnam alliance for building a sustainable port city.

This study presents the necessity and implementation strategies for establishing Gyeongnam and Changwon as a port logistics hub from a practical perspective.

Although it does not apply scientific research methodology due to its nature as a practical study rather than an academic investigation, it emphasizes that Gyeongnam and Changwon should grow as the two main pillars of port logistics alongside Busan from the perspective of regional balance. Future research should include quantitative studies, such as measuring Gyeongnam and Changwon's contributions to the growth of Busan Port and calculating the social costs associated with the concentration of Busan-related industries.

This paper has several limitations because it does not apply scientific research methodology. These points should be supplemented in future research.

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