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Transshipment Hub Port Competitiveness of the Port of Colombo against the Major Southeast Asian Hub Ports*

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ABSTRACT

The hub port competition has intensified beyond regional boundaries, resulting in the port of Colombo competing with the Southeast Asian hub ports of Singapore, Klang, and Tanjung Pelepas in the transshipment market. This study analyzes the competitiveness of Colombo as a transshipment hub in “hub and spoke” and “relay” networks. Shipping lines evaluate the selection criteria for transshipment hub ports and the performance of competitive hub ports. The generalized cost approach together with a discrete choice model is used to assess port choice behavior by estimating the transshipment market share of hub ports and analyzing several scenarios. The results reveal Colombo’s lack of competitiveness in relay networks and most of the feeder ports in hub and spoke networks, mainly due to its high deviation from trunk sea routes and lower performance in some non-quantitative criteria. Singapore has dominant market share in relay networks and for most feeder ports in hub and spoke networks, mainly due to its high performance in non-quantitative criteria, except Pipavav and Nhava Sheva, dominated by Colombo.

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1. Introduction

As an economical transportation mode for international freight distribution, liner shipping is extensively used, despite its high complexity

with multiple players and network structures (i.e., hub and spoke and relay). Moreover, hub hopping behavior because of the availability of

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multiple hub ports in adjacent regions creates many alternative choices for shipping lines. Transshipment refers to the shipment of goods or containers to an intermediate destination before being taken to their final destination (Soamiely et al., 2004), enabling shipping lines to maintain minimum ports of call without restraining market coverage. The cascade effect resulting from increasing vessel sizes, together with infrastructure limitations in minor seaports, emphasizes the vital role of transshipment operations.

The significant role of transshipment operations and the competitive nature of the liner shipping industry synergistically create many complications in the hub port selection process, while making it necessary to consider a range of decision-making criteria. The situation becomes more complex when competition rises among cross-regional hub ports for serving overlapping origin/destination markets. The port of Colombo is strategically located on the East-West main sea route as a major transshipment hub in South Asia. Despite the location advantages, currently Colombo competes with hub ports in Southeast Asia, such as Singapore, Klang, and Tanjung Pelepas, as they develop their transshipment market share beyond their regional boundaries (Szakonyi, 2015). Furthermore, Colombo is highly vulnerable, with serious dependency on the Indian sub-continent feeder market, while not having a significant role as a transshipment hub for relay networks (Szakonyi, 2015). Therefore, analysis of this competitive scenario creates an effective contribution for Colombo to remain as a major transshipment hub port in the region.

Since the study focuses on analyzing hub port competitiveness, previous related studies were extensively reviewed. To identify competitive dynamics, Yap et al. (2007) analyzed the market share, growth of handling, shipping services, vessel sizes, and slot capacities among East Asian ports. The results indicated that Chinese ports are increasingly becoming attractive as direct calling ports, bypassing Japanese and Taiwanese ports. According to the slot capacity analysis carried out by Lam and Yap (2007), competition for Singapore port from Port Klang and Tanjung Pelepas was highlighted, although Singapore was consistently the premier transshipment hub in the region. These studies indicate that, regardless of the dominant position of major hub ports, new hub ports emerging with strong competitive advantages can have a huge influence on shipping lines' hub port selection decisions.

Moreover, structural changes in maritime markets can be influenced by hub port competition. Ducruet et al.'s (2011) study on port competition and network polarization in East Asia confirmed the progress of secondary ports over their major competitors, while the overall network structure tends to remain polarized by a few major hub ports that resist internal and external threats. The effect of Chinese ports on Singapore port was analyzed by Tongzon (2011), who indicated that, although the Shanghai port has overtaken Singapore as the world's busiest port, the performance of the Singapore port has not been adversely affected, and this complementary relationship might become competitive if the factors of port choice change. This emphasizes the significance of analyzing hub port selection factors as they change over time due to various market influences. Yap and Lam (2006) studied the competitive dynamics among East Asian container ports using port throughput data, while examining the long-run relationships with co-integration tests. The competition/cooperation between Shanghai and Ningbo-Zhoushan ports was studied by Li and Oh (2010), while highlighting the impossibility of cooperation, since each port has its own competitive advantages. Hence, an endowment of competitive advantages is significant for hub ports to withstand external market forces.

The competition between Busan and Kobe ports was analyzed by Ishii et al. (2013) with game theory, considering the effect of port charges and capacity. The significance of low port charges when there is high demand elasticity was revealed, together with simultaneous port expansions of competing ports. Hoshino (2010) studied the competition/collaboration among Japanese ports for surviving major competition from Chinese and Korean ports, and the significance of collaboration among Japanese minor ports was highlighted. Hence, advance identification of competitive forces is significant when determining strategies to maintain hub port competitiveness.

These studies highlight the significance of analyzing hub port competitiveness, as even major hub ports face strong competition in the market. However, the competitiveness of hub ports may vary based on different liner networks (i.e., hub and spoke and relay) although no previous studies have focused on liner network types. In addition, although previous studies confined their scope to analyzing competition among hub ports from the same region, competition can be developed as cross-regional matters, similar to the situation between Colombo and the Southeast Asian hub ports. Therefore, the objectives of this study are to identify the significant sources of competitiveness of the port of Colombo for both hub and spoke and relay networks, compared to Singapore, Klang, and Tanjung Pelepas, by estimating transshipment market shares, and to analyze several practical scenarios to understand the potential implications for the transshipment hub status of the port of Colombo.

As previous studies used different methodologies appropriate for achieving their intended objectives, considering the objectives of this study, the generalized cost approach is used, because both quantitative and non-quantitative hub port performance measures can be incorporated with generalized cost. The possibility of converting non-monetary performance into monetary values with generalized cost enables identification of the significant sources of competitiveness measured by high monetary values. Since this study analyzes competitiveness via estimating market shares of hub ports, generalized cost can be represented as the disutility of selecting individual hub ports for transshipment operations.

2. Study Area

2.1. Study Area Selection

This study primarily focuses on the port of Colombo (CMB), while the ports of Singapore (SIG), Klang (PKG), and Tanjung Pelepas (TPP) are considered as competitive hub ports. The study area of the paper is illustrated in Fig.1. The South Asia region is categorized into three different feeder markets: the Indian East coast, South coast, and West coast. The major feeder ports located in each feeder market and competitive hub ports are introduced with relevant port codes in Fig. 1, and are used throughout the study. Initially, to understand the competitive situation, preliminary data analysis is carried out using container shipping network data from 2013 provided by MDS Transmodal. Two different indicators, annual service frequency and annual slot capacity of common services, calling on both hub ports and feeder ports, respectively, are considered, as shown in Table 1.

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