

# THE COMPETITIVENESS OF PORTS ON THE PERIPHERY: WHAT COULD BE DONE?

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**Abstract:** *There is abundant research into the competitiveness of maritime transportation and the port industry in general. In addition, previous and current researches apparently prone to investigate the competitiveness and performance of large size of ports that hold international and regional hub status. Of these studies, it is interesting to note that there is scarce study in the smaller size of ports, in particular the ones that have disadvantage in term of location. In the literature, the study of the small size of ports is more focusing on its development only. However, there is little research into how to make small size of port or ‘ports on the periphery’ more competitive although they face particularly strong threats in a highly competitive environment. Thus, gap is identified. More importantly, in enhancing the competitiveness and subsequently the performance of this category of ports, this study also proposing spatial characteristics, port supply chain integration and sustainability advantages are seen as the promising strategies that able to assist the ports to compete with other adjacent small or large ports.*

**Keywords:** *Ports on the periphery, Intermediacy, Centrality, Port supply chain integration, Sustainability*

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## Introduction

Ports are desperately searching for new ways to increase performance and gain a sustainable edge in today’s dynamic and competitive business environment (Almotairi and Lumsden, 2009). Since competition between ports is intense, many studies have investigated factors contributing to the competitiveness of ports and strategies to increase competitiveness. These studies have been centered on the major, established ports such as Singapore, Hong Kong and Busan located on the main maritime networks/routes, for example (Chou et al, 2003; Yeo and Song, 2005; Tongzon and Heng, 2005; Yeo et al, 2008; Acosta et al, 2007; Yeo et al, 2007; Choi et al, 2007; Tongzon and Sawant, 2007; Yeo, 2010; Yeo et al, 2011; Yuen et al, 2012). In contrast, ports facing geographical disadvantage, hereafter called ‘ports on the periphery’ have been overlooked.

This indicates that past researches have failed to balance the attention given to the size of ports when investigating their performance. The imbalance in attention is simply because the importance of these category of ports is quite often unnoticed and they are not as interesting as the larger ports to many researchers (Margarino, 2014). However, being remoteness, peripheral or lack of intermediacy does not mean the ports will perpetually be disadvantage. Hence, with innovative thinking, such as port supply chain integration, and changing market conditions, such as the need to reduce carbon emissions, there are opportunities for ports on the periphery to become competitive. With the global challenge of climate change and customers' increasing interest in environmental sustainability, greater opportunities may be seen for smaller and medium-sized ports that have been peripheral, which can add environmental benefits to the customers' supply chains.

### **Ports on the Periphery**

In the maritime transportation literature, it has been recognized that there are two important factors determining the fundamental competitiveness of a port. These are site and situation (Brooks et al., 2010). These two factors are the initial determinants of where strategically important ports have grown, particularly large transshipment hubs. Site refers to features of a port's infrastructure such as depth of water, number of berths, cargo handling equipment, intermodal connections, and efficiency and effectiveness of the port operator. Situation refers to the spatial relationships of intermediacy and centrality, i.e. proximity to major shipping lanes and proximity to hinterland markets respectively. Of the two factors, situation has been identified as the most significant contributor to ports flourishing (McCalla, 2008). For example, Hong Kong is one of the busiest and most efficient ports in the world as it benefits from a strategic commercial location, due to its intermediacy on the main corridor to Europe and the East Coast of the USA, and centrality as its hinterland generates millions of tons of container loads (Fleming, 1997).

Ports on the periphery are defined as ports that are off the main international maritime shipping networks/routes (no intermediacy) or not located close to a large domestic market (no centrality), as illustrated in Figure 1 (Brooks et al, 2010). These peripheral ports are also known as assisting ports, secondary ports, and SMPs that have small to medium size of cargo throughput compared to gateway ports (Feng, 2013). It is said that this category of ports is having disadvantages in many ways. This is in line with the claim made by Darren, Theo, & César (2016) in which the peripherality location also viewed (on account of their distance/remoteness) as being disadvantaged in terms of the high transport and production costs they (foreland and hinterland port users) typically attract. Take Scotland for example, it suffers from poor direct maritime access to continental Europe due to being far from the main maritime routes. Intermediacy is not the only barrier to Scotland, lagging infrastructure development and lack of enough government initiatives to promote direct links have also been identified (Monios & Wilmsmeier, 2012). These barriers hinder Scottish ports in becoming more competitive.

		Centrality	
		<i>Yes</i>	<i>No</i>
Intermediary	<i>Yes</i>	Successful Ports	Ports on Periphery
	<i>No</i>	Ports on Periphery	Struggling Ports

**Figure 1: Situation of port (Brooks et al, 2010)**

Studies of ports on the periphery can be found in the literature albeit not many, for example (Slack and Wang, 2002; Brooks et al, 2010; Monios and Wilmsmeier, 2012; Wilmsmeier and Monios, 2013). Recently, In 2018, Rahman, Ismail, Othman, Roslin, & Lun published an article that investigate the performance of secondary ports in East Coast Economic Region (ECER) of Malaysia by considering operational performance, physical performance, shipping demand performance, financial performance and manpower performance. In addition, given that the secondary ports do not hold a conclusive definition and classification, Othman, Rahman, Ismail, & Saharuddin (2019) proposed a sustainable port classification framework in Malaysian by distinguishing three main categories of ports – major port, minor port and tertiary port. Similarly, Wiradanti, Pettit, Potter, & Abouarghoub (2018) has provided an interesting literature on the factors that influence the concentration and deconcentration of peripheral ports. However, these studies are focused on the development of ports and how to measure their performance rather than on what and how to make them more competitive, which is particularly a concern for ports that lack intermediacy but have good centrality, i.e. a hinterland or natural market that they can serve. In enhancing the performance of this category of port, it is paramount to identify its competitive advantages.

There are several reasons that contributed to the under-reviewed studies of these peripheral ports. Feng (2013) and Feng and Notteboom (2013) have put forwarded several reasons to support the lack of study on the peripheral ports. Firstly, it is said that the ports on the periphery are having disadvantages in term of competition as they are receiving the limited calls from shipping lines compared to larger size of ports, simply because of their location and lack of management efficiency. In addition, the upscaling of ship size has also contributed to the limited calls of shipping lines to peripheral ports and it has changed the way maritime business is being conducted. This resulted in the decreasing number of ports of call and shipping lines are only concentrating on the specific ports (gateway and hub) for which the deviation distance is minimal. This is demonstrated by data on trade between the Far East and North Europe, which show the average number of ports of call falling from 4.9 in 1989 to 3.4 in 2009 (Ducruet and Notteboom, 2012) with the increasing size of ships, despite overall grow in cargo volumes.

As described by Rodrigue et al (1998), “maritime deviation” is the additional distance taken away from the main shipping routes to visit a port. The greater this deviation the more reluctant shipping companies are to use a port along their major pendulum routes, unless the port has significant hinterland demands as abundant cargoes can offset the deviation costs, particularly the operating cost. The operating cost can be divided into three broad categories: fixed daily cost (e.g. cost of crews, supplies, insurance, maintenance and fuel for auxiliary engines); cost of bunker fuel for the main engines which is dependent upon the cruising speed of the ship; port charges which are constant for a specific voyage. The bunker fuel price is volatile due to imbalances between oil supply and demand in the market (Ronen, 1982). Its volatility was seen clearly as it increased sharply from \$28 to \$147 per barrel between 2003 and 2008, before falling back to \$40 in January 2009 and rising again to \$100 in 2011.

Many shipping lines have been introducing speed controls to offset higher bunker fuel prices. For example, reducing ship cruising speed by 20% can reduce fuel consumption by about 50%. However, the trade-off is longer voyage times. The shipping line Hapag-Lloyd, for instance, took action to reduce fuel costs by reducing ships’ speeds from 23.5 to 20 knots on the round trip between Hamburg and ports in the Far East, but at the cost of increasing voyage times from 56 to 64 days. This longer voyage time meant higher operating costs, charter costs, interest costs and other monetary losses (Kirschbaum, 2008). Shippers are unhappy with these longer journey times, as they have had to build up their inventory levels and adjust their supply chains resulting in higher costs (Faber et al., 2012). This situation makes shipping lines even more reluctant to go to ports on the periphery as the long distances deviated from the main shipping routes would make journey times even longer.

Some ports have found it difficult to respond competitively to these changes due to their site and situation, so that some that were once leaders have lost much of their attractiveness and importance to shipping lines; whilst others that were previously minor have grown into major ports and container hubs. It is ports on the periphery that have suffered most either because they are too far from the main shipping lines or their hinterland cannot sustain the capacity of larger vessels. This is compounded by fierce competition in the market that drives on competitors with better sites and situations.

Secondly, given that the smaller size ports are perceived as having disadvantageous locations in the maritime transportation industry; therefore, their presence has received far less attention from researchers because their resource availability is seen to be inadequate to support their development. Moreover, Margarino (2014) mentioned that the economic function of peripheral and their roles in the logistics chains are not completely recognised. The author added that the peripheral ports (if not all) are also suffer from lack of visibility and their voices are often too weak to be heard. Furthermore, with a limited size, peripheral ports have difficulty in attracting the necessary traffic flows (Hynes, Mateo-Mantecón, O’Connor, & Tsakiridis, 2019) and subsequently the profits that these ports are generating are too small for them to leverage capital for investments development (Myszka, 2011). This is due to the lack of diversity in cargo-handling activities as some (if not all) peripheral ports are commonly associated with a niche market or specialised cargo which also means that they are relying on commodity prices. Thus, it

is viewed that these disadvantages are what often place the peripheral ports in a difficult situation. What is more, these disadvantages not only make the development of such ports continuously stagnant, but they also affect a port's competitiveness and performance in many ways.

### **Research Questions**

The fundamental research question is, "How can ports on the periphery be made more competitive?" If the current weakness is a lack on intermediary, then there is nothing the port can do to reposition itself closer to the major shipping routes. However, another solution would be to find an opportunity to exploit that would offset the cost of deviation, i.e. "How can a port on the periphery offer more value to merit the cost of deviation?" Whilst answers to this question are still to be explored exhaustively, one major opportunity that looms large is sustainability. This can be divided into three types: environmental, economic, and social.

From the environmental perspective, maritime is seen as a greener form of transport compared to road or rail, so it follows that it should be used to get products as close to market as possible rather than using more distant ports and subsequent land transport. This can be achieved by deviation from major shipping routes to ports on the periphery or the use of a hub and spoke model. In such a model one of the existing major ports would act as the hub, whilst smaller vessels would feed the periphery ports, eliminating long land journeys. From the economic perspective, the use of a periphery port will cause the development of industries to support the port and it will act as a catalyst to industries that naturally locate themselves near to ports, such as food, chemicals, and power stations. This will also have the social benefit of creating good quality jobs in the region of the port.

Apart from sustainability, being integrated with supply chains is identified as one of the best solutions to be considered by ports in order to remain competitive. Contemporary supply chain management is increasingly requiring the integration and coordination of activities both internally and externally, with suppliers and customers, upstream and downstream, to reduce waste, to increase delivery speeds, to reduce unit costs and to increase flexibility and responsiveness to meet market demands (Hosseini, et al., 2012). Moreover, Slack (2001) suggested that in combating the current challenges in maritime transportation, seaports should expand their scope to work closely with other actors in the logistics chain, treating them as stakeholders and working together to develop the competitiveness and attractiveness of the entire port-based logistics package. Ports should be proactive in developing partnerships with these other actors to create an integrated port-based service looking more like a 'one-stop shop'. This strategy will enhance the hinterland and peripheral ports connectivity and the market for this ports may expand and subsequently the profile of the peripheral ports may significantly change (Feng & Hao, 2014). Such integrated development can be driven by wider regional development as seen in the Liverpool Superport project.

## Conclusion

The competitive environment of maritime transport with features such as increasing vessel sizes and volatile, but generally increasing bunker fuel prices, has led to a decline in use of ports on the periphery as shipping lines focus on large ports with intermediacy and centrality. If the ports on the periphery are to survive then we must find ways to make them more competitive. This can be viewed as offering more value to offset higher costs. Sustainability and port supply chain integration could be the basis of this added value and the basis upon which ports on the periphery may compete. The positive relationships between the spatial characteristics (site and situation elements), the port supply chain integration strategy and sustainability advantages in enhancing the competitiveness of peripheral ports are perceived as the gradual process of deconcentration of the gateway and hub ports.

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