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A Study on Competitiveness Improvement of Chittagong Container Port*

Haque Md Jubair[a], Woo-Chul Ahn[b]

[a] Department of International Commerce and Area Studies, Gangneung-Wonju National University, South Korea
[b] Department of International Commerce and Area Studies, Gangneung-Wonju National University, South Korea

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Abstract

Purpose - Market structure is crucial to identify as it defines the market states for new and existing container ports to perform within a given region. the study aims to compare the major ports in the Bay of Bengal in the context of Chittagong Port.
Design/methodology/approach - For this study, the past 9 years of container volume data have been collected and analyzed through the HHI index, BCG matrix and shift effect analysis. Based on the analysis, this study has found that the Chittagong Port is in an oligopoly competitive market structure.
Findings - The findings have shown that port in low market share and low growth in very recent years with the moderately concentrated ports HHI index. The shift effect analysis shows that the container volumes shifted from one port to another in the 2019 and 2020 periods. This study is the pioneer study in the Bay of Bengal region to identify the market structure, analyze market share and growth, and analyze the market concentration.
Research implications or Originality - Future recommendations for the port authority is to take advantage of geolocation; attract international; tax exemption, faster clearance process, reduced waiting charges; increasing storage and technological machinery; promoting maritime logistics education; promoting Chittagong tourism; collaboration with other countries. Also, this study can be used as basic data for the establishment of a new supply chain between Korea and Southwest Asia for the Korean government and companies.

Keywords: Market Structure, Market Concentration, HHI index, Shift Effect, Chittagong port
JEL Classifications: D40, L10, L11, L90, Y4

Ⅰ. Introduction

The Bay of Bengal is vital to the countries that border it since it is the world's biggest bay. More broadly, the region's demographic, economic, and security changes have significant ramifications for Asia and the global order. The bay's scope among Sri Lanka, Bangladesh, and Malaysia is often characterised as a "triangular basin" running west to east. The Bay of Bengal, which connects the Indian and Chittagong Port, maintains a pivotal place in global economic

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[a] First Author, E-mail: jhaque@g.kmou.ac.kr
[b] Corresponding Author, E-mail: logistics_gwnu@gwnu.ac.kr

movements in a manner that few other locations do (Hamid et al., 2021). Every year, one-fourth of the world's commercial products pass across the Bay of Bengal from Chittagong Port. The bay is essential for China in retaining its access route to the Chittagong Port (Hamid and Hosna, 2021; Hossain et al., 2019).

However, recently Chittagong Port Authority faces operational inefficiency due to a lack of cargo handling machinery, a shortage of required human resources, political issues, theft, no advancement of technology (Hosna et al., 2021), etc. The authority of Chittagong Port raised the rent on storage in December 2016, which is charged after the expiry of the four-day free storage service. But the temporary measure has not been able to yield a good result (Ferdous and Das, 2020; Harun, 2022).

After the COVID-19 lockdown was lifted, imports have increased significantly. China is one of the major countries for importing goods like; bags, smart techs, shoes, clothes, machinery, fashion accessories and more. At present Bangladesh has witnessed a significant upward shift in goods imported. The country's single-month import payments reached nearly US$6.50 billion in January 2022. Bangladesh's import expenses may increase further if the ongoing war between Russia and Ukraine continues (Express, 2022). It is a challenge for Bangladesh to handle this situation. Whereas many researchers have already identified caution and remedies to control this situation (Munim et al., 2022), the Bangladeshi port relationship among countries, competitive relations among major ports, container waiting and for time and ports' effectiveness and efficiencies (Harun, 2022; Ferdous and Das, 2020).

However, an analysis of the market structure and shift effects of Chittagong Port of Bangladesh and competition is not yet developed by many researchers and practitioners (Li et al., 2017). The study by Liu, Kang, and Ahn (2016), shows the market structure and shift effect of major China ports. The major problem for Chittagong Port as well as ports of the Bay of Bengal market structures is, it is still unidentified whether the container ports' market structures are a monopoly or oligopoly or any other that mentioned above (Nyunt and Kim, 2020).

This study is significant as it is a pioneer study in market structure analysis for the Bay of Bengal container ports research field to identify the market structure scenario. Previously the market structure has been identified for China ports, South Korean ports, and other developed countries. Thus, the study aims to compare the major ports in the Bay of Bengal in the context of Chittagong Port. In this way, the changes in the market structure are analysed by the HHI index, BCG matrix and shift effects to get more in-depth information regarding Chittagong ports.

The study will be structured as follows. The 1st chapter will discuss the background of the Bay of Bengal and the background of the Bay of Bengal. The problem statement, research questions and objectives will be discussed. In chapter 2, previous studies regarding the Bay of Bengal, and Chittagong ports will be discuseed. In the 3rd chapter, the methodology, formula for doing HHI, BCG matrix and Shift effect analysis will discuss with the analysis data. In the 4th chapter, the discussion is provided, and findings discussed by aligning with the objectives, limitations, and future directions for authority and researchers provided.

II. Literature Review

1. Review of previous domestic/foreign studies on the port structure

First, to assess research that has explored port market concentration ratios, Hayuth (1981) used concentration ratio indexes to examine changes in the market structures of U.S. container ports. Following that, several academics examined changes in market structures by taking into account the features of specific areas, based on Hayuth's (1981) approach. Notteboom (1997) for example, used concentration ratios to study changes in port structures in Europe, whereas Wang (1998) analysed changes in the competitive structure of Hong Kong ports.

Ji (2013), used HHIs to examine the concentration ratios of container throughputs in Yangtze River Delta ports from 2000 to 2010. Several ports exhibited scattered and slightly concentrated market concentration ratios. Li et al., (2015), used concentration ratio (CR) indices to examine the concentration ratios of containers at Chinese coastal ports from 1982 to 2012. Their findings revealed that concentration ratios have been decreasing steadily since 1982, indicating that competition in these container marketplaces has increased.

The research listed above used concentration ratios to examine the architecture of port markets. However, it is difficult for them to determine which ports have gotten more competitive and which have been less competitive. As a result, other researchers used concentration ratio studies, and share-shift analyses to examine changes in port traffic quantities and market competitive structures.

Park (2001), used three approaches to examine the South Korean ports market concentration structure based on total cargo throughputs per port from 1966 to 2000. HHI index was one of the models. All ports were separated into distinct areas, such as the west area, south area and east area of the sea. However, the ports were grouped into geographical groupings rather than competitive groups, which would include being based on their size or the peculiarities of their rivers.

Using data from 2003 to 2011, Jeong (2013), examined the changes in the traffic volume structures of Incheon Port and North China ports. The results demonstrate that the ports' HHI scores declined, indicating a decrease in the market's oligopoly structure. Although the yearly average traffic volume of Incheon Port has improved since 2009, the port's market share has declined to roughly 4.8 percent. As a result, the pace of expansion was lower than at competitive ports. Furthermore, their shift-share research revealed that the absolute yearly average growth in traffic attracted by Incheon Port from 2009 to 2011 was roughly 200,000 TEU. Lee and Kwon (2014) used a DEA and shift-share analysis to evaluate and examine the competitiveness of North East Asian ports from 2003 to 2012. Their findings demonstrate that while all North East Asian ports developed, Shanghai Port, Shenzhen Port, and Hong Kong Port saw a slowdown in port growth. Furthermore, growth in all South Korean ports slowed.

Cao et al., (2004) used an HHI and share-shift analysis to examine changes in concentration ratios and port architecture at 18 ports in the Pearl River Delta, Yangtze River Delta, and Pan Bo Hai Delta. According to the findings, the concentration ratios of Chinese coastal ports grew between 1999 and 2001. Competition between ports was fierce, and rivalry within each of the three groups was fiercer than competition between port groups.

Liang et al., (2008) used a share-shift analysis to analyze the market structures, discovering

that rivalry among ports in the area was severe and market structures exhibited dispersion patterns. Furthermore, they discovered that Shanghai Port's competitiveness had dropped while Ningbo Port's had grown. Kevin et al.(2004) investigated the consequences of gradually increasing the competitiveness of Chinese container ports, focusing on the marine logistics of the Hong Kong port. The study found that competition among ports was severe since they were geographically and physically similar.

The most recent research by Nyunt and Kim, (2020) has identified the efficiency levels of key port facilities in the Bay of Bengal region and studied how specific factors impact container port and terminal efficiency. The study focuses on the Colombo Port, Chennai, Chittagong Port, and Yangon Port. To assess the port's efficiency, Data Envelopment Analysis was used. HHI and Shift effect is still lacking in the Bay of Bengal area.

Another recent research by Munim et al., (2022) assesses the attractiveness of Bangladesh's Chittagong Port by examining port connections, infrastructure, pricing, quality of service, management and governance, and green procurement management practices. Confirmatory Composite Analysis is used to validate the port attraction measurement model (CCA). Methodologically, this study is still unable to show the market competitiveness, market concentration, market growth, market share and shift effect of Chittagong ports compare with the other major ports of the Bay Bengal area.

This study is adapting the HHI index and Shift effect analysis to describe the market concentration, effectiveness; container shifting, market share, and market growth of Chittagong Port along with major the ports of the Bay of Bengal. The significance of the study is relying on the importance of identifying the market concentration, shift effect of container ports, market growth, market share, and market competitiveness as there is no research done before with HHI and shift effect analysis method in this particular Bay of Bengal container ports.

2. Situation of Chittagong Port

Bangladesh continues to lag behind other container ports in terms of international standards. Bangladeshi ports are yet to be compared to global standards as the nation has a low level of technological advancements. One of the primary problems with existing ports is draught, which means that most large ships cannot reach the jetty, and ploughshares that can access the jetty must wait for high tide (Tareq et al., 2020).

Chittagong Port is Bangladesh's main seaport and a vital gateway to the rest of the globe (Sen et al., 2020). The Bangladesh port business is highly reliant on the two main operational ports, Chittagong Port and Mongla Port. The Payra Port and the Matarbari Deep-sea Port are two additional ports in the works. The port system also comprises 23 inland ports and 22 river ports. All ports in the nation are managed by the government of Bangladesh's Ministry of Shipping. The bulk of Bangladesh's ports is governed by public authorities, while Public-Private Partnerships (PPPs) are gaining traction in recent years (Munim, 2022).

After first appearing in China, the coronavirus disease 2019 (COVID-19) outbreak spread across Europe and the rest of the world by March 2020. Aside from the public health catastrophe, the global economy and port operations were halted. Chittagong Port is regarded as Bangladesh's economic nerve centre. Chittagong Port handled a sizable portion of export-import traffic (Mannan, Shaheen, and Saha, 2021).

According to Munim et al., (2022), much of the existing container port literature focuses on large ports in Europe, East Asia, and North America, while many subsidiary ports of the network, which play an important role in their nations, are disregarded. The ports of the Bay of Bengal, which have a huge influence on the economy of Bangladesh, have also been disregarded by experts.

Chittagong Port, among the seaports in the Bay of Bengal, is in a lucrative position to cover the most spatial transit in Asia. Due to geopolitical concerns, the projected Marine Silk Road (MSR) by China under the name of the Belt and Road Initiative (BRI) has most likely disregarded Chittagong Port as a maritime load centre in the South Asian area. The current success of Chittagong Port in terms of container throughput, as well as the MSR's analysis of the hinterland potentiality, indicate that Chittagong Port is favourably envisioned as a container load centre or connector in the area (Saha, 2020).

Sukanta Sen et al., (2020) show that the Chittagong port is Bangladesh's main seaport and a significant gateway to the rest of the globe. According to the research, the cost of conducting business is rising as a result of inefficiencies at the country's primary harbour. Inefficiency at Chittagong Port has major effects on exporters and importers, resulting in trade loss and interruption, as well as additional expenses and time to process containers in Chittagong Port.

The below table illustrates the current facilities and development of the container port of the Bay of Bengal. This table indicates the total number of terminals, berths, and TEU storage capacity that each port has, as well as the number of days needed to clear the shipment from customs take each port. This information helps to understand the capacity, advancements and performance of each port.

Table 1. Current Facilities in the Port of Bay of Bengal

	Yangon	Colombo	Chittagong	Kolkata	Paradip	Vishakapatnam	Chennai	V.O. Chidambaram
Terminals	4	3	3	4	2	3	4	2
Jetties	14	4	19	34	16	24	3	17
Capacity in TEUs	1,500	18,000	50,000	41,279	1,000	500,000	8,500,000	54,000
customs clearance time	14 days	24 hours to 7 days	10 days 8 hours	2 to 3 days	2 to 3 days	1 to 3 days	8 days 16 hours	3 days

The above data has been collected from; Chittagong Port (Journal of Commerce Online, 2019; Uni Logistics, 2022); Yangon Port (DLCA, 2018; Maritime Gateway, 2022); Colombo (SLPA, 2020); Kolkata Port (Gupta and Chakrabarti, 2021); Paradip (V-Ocean, 2022); Vishakhapatnam Port (Basu, 2019); Chennai (Chennai Port Authority, 2019); V.O. Chidambaram (VOC Port Authority, 2022).

Ⅲ. Empirical Results

To analyze the data, the study will adopt HHI, BCG matrix, and shift effects. This study focuses on the cargo over the last 9 years from the ports of Bangladesh and the Bay of Bengal to analyze the relevant concentration ratios and shift effects.

1. Data Collection

For this study, the researcher uses a secondary data collection method. The latest TEU data has been collected for the respective container ports from a different available data source.

Table 2. Shipping Volumes of Container Ports of the Bay of Bengal from 2012 to 2020

Ports	2012	2013	2014	2015	2016	2017	2018	2019	2020
Yangon	474,300	478,341	613,571	744,789	893,201	1,057,888	1,043,469	1,121,750	1,020,793
Colombo	4,180,000	4,310,000	4,910,000	5,185,000	5,550,000	6,200,000	7,000,000	7,230,000	6,850,000
Chittagong	1,410,000	1,540,000	1,620,000	2,025,000	2,189,000	2,419,000	2,706,000	3,038,000	2,840,000
Kolkata	463,212	449,300	528,166	577,749	635,848	640,183	651,549	844,762	687,357
Paradip	13,072	8,675	4,270	4,973	1,913	6,837	12,509	11,504	15,819
Vishakhapatnam	183,020	201,845	237,053	214,189	333,938	388,624	437,013	396,870	475,477
Chennai	1,539,275	1,467,855	1,551,548	1,571,000	1,624,000	1,760,000	1,620,000	1,683,000	1,311,000
V.O.CHIDAMBANAR	475,599	507,735	559,727	611,714	639,677	697,631	715,120	701,268	734,137

〈Table 2〉 shows the total container volume data from 2012 to 2020 for all the ports of the Bay of Bengal. The container ports TEU data of Yangon Port has been collected from (CeicData, 2022a), Colombo (CeicData, 2022b), Chittagong Port (Chittagong Port Authority, 2020), Kolkata Port (Sun, 2022), Paradip Port (Paradip Port Authority, 2022), Vishakhapatnam Port (Vishakhapatnam Port Authority, 2022), Chennai Port (Port of Chennai, 2022), and V.O. Chidambaranar (V.O. Chidambaranar Port Authority, 2022).

2. Method Result

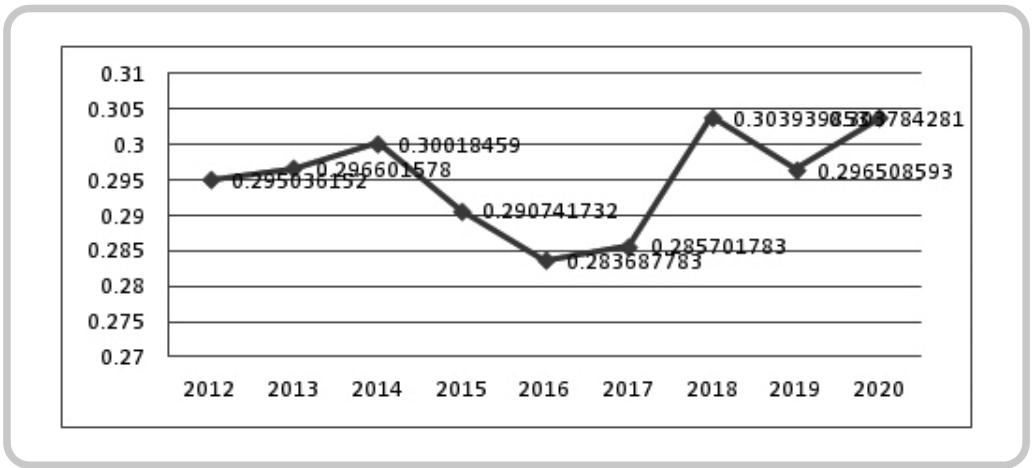
2.1 Herfindahl–Hirschman ndex:

The HHI has been employed as a concentration ratio index in several prior port concentration ratio assessments. The HHI can explain the share held by various big firms, as well as the proportion held by small and medium-sized businesses. As there is more than one entity operating in that given market (Brezina et al., 2014). The 'n' is market share with 'si = 1/n, i = 1, 2… n' and below is the formula for the HHI index;

$$HHI = \sum_{i=1}^{n} \left(\frac{1}{n} \right)^2, n = 1,2,\cdots,n. \quad (1)$$

A sector with an HHI index of less than 0.15 is regarded as un-concentrated, 0.15 to 0.25 is considered moderately concentrated, and 0.25 or above is considered extremely concentrated. At first, the study analyzed the HHI index based on the above data;

Fig. 1. HHI Index for Container Ports Market Concentration.



From 〈Fig. 1〉, the HHI result comes from traffic volume from all ports respectively from the year 2012 to 2020 period. The analysis finds that the total market concentration of the Bay of Bengal is highly concentrated as the result is above 0.25 and also there are low concentrations noticed during the 9-year analysis period. The HHI index is analyzed to measure market competitiveness. The higher the concentration is, the lower the market is competitive. In 2015, 2016 and 2017, there was a lower trend in HHI results, which was still highly concentrated as it was more than 0.25. In 2018 and 2020, the HHI index is the highest with more than 0.30 results. An in-depth discussion will be provided in the next chapter along with the findings.

2.2 BCG Matrix

This strategy takes into account the existing position of ports as well as changes in their competitive posture over time (Lodha and Damle, 2022). The Boston Consulting Group established the BCG matrix approach, commonly known as the growth-share matrix method, in the United States (Elbayoumi et al., 2022). The horizontal and vertical matrices, which indicate relative market shares and yearly average growth rates. As Zhong (2022) explains, labelling a port as a 'question mark' represents high market growth but low market share. Second, the term 'star' represents a high market growth rate and high market share. Third is the term 'cash cow' that represents low market growth, but maintains high market share. Finally, there is the term is 'dog' which indicates both low market growth rates and low market shares (Zhong, 2022).

The BCG analysis for the current study was conducted on import/export volume from 2012 to 2014, 2015 to 2017 and from 2018 to 2020. First, the dynamic matrix of traffic volumes from 2012 to 2014 were analyzed. Chittagong, Yangon, V.O.Chidambanar, Kolkata and Vishakapatnamare fell in the question mark category. Colombo is in the cash cow category. Chennai and Paradipare in the dog category. No ports qualified for the star category in the 2012 to 2014 period.

Table 3. BCG Analysis on Total Volume for Individual Ports from 2012 to 2020

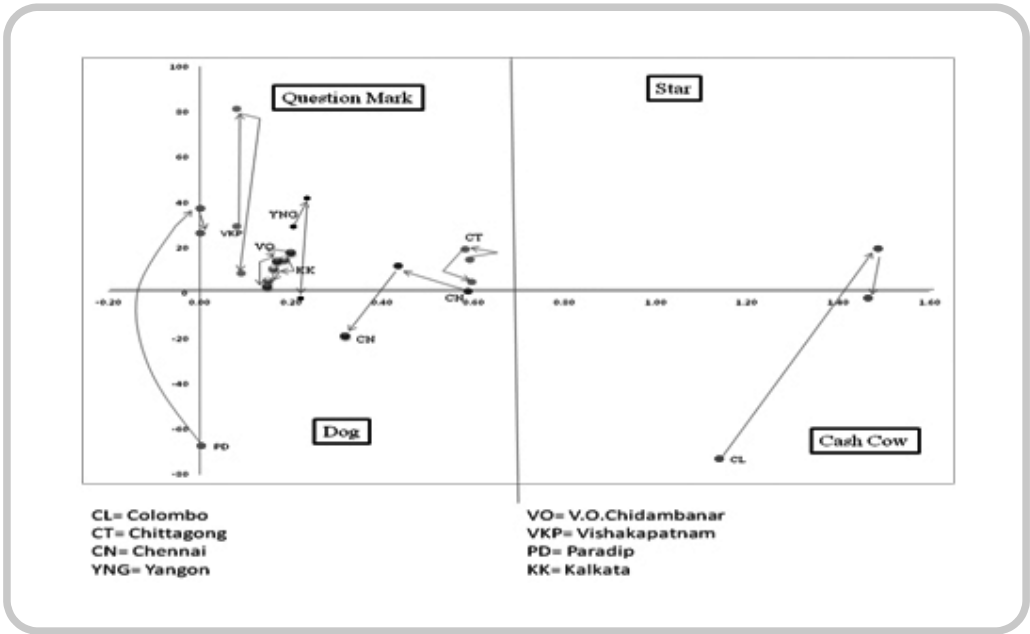
Port	2012-2014	2015-2017	2018-2020
Yangon	Question mark	Question mark	Dog
Colombo	Cash Cow	Star	Cash Cow
Chittagong	Question mark	Question mark	Question mark
Kolkata	Question mark	Question mark	Question mark
Paradip	Dog	Question mark	Question mark
Vishakhapatnam	Question mark	Question mark	Question mark
Chennai	Dog	Question mark	Dog
V.O.CHIDAMBANAR	Question mark	Question mark	Question mark

The dynamic matrix of traffic volumes from 2015 to 2017 were analysed, and it was found that Chittagong, Yangon, V.O.Chidambanar, Kolkata, Vishakapatnam Chennai and Paradipis fell into the question mark category. Finally, Colombo is in the star category. There is no cash cow and dog category in the 2015 to 2017 time period.

The dynamic matrix of traffic volumes from 2018 to 2020 were analysed, and it has been found that Chittagong, V.O.Chidambanar, Kolkata, Vishakapatnam and Paradipare fell into the question mark category. Chennai and Yangon are in the dog category and in the cash cow category is Colombo. There is no star category in the 2020 time period.

Based on the BCG matrix analysis data from the total volume, it has been clear that Chittagong Port has continuously fell into the question mark category ⟨Fig. 2⟩. The question mark category entails that the port has high market growth but a low market share. The numbers may be large for the Chittagong Port, however, the market growth and market share are very steady for Chittagong Port.

Fig. 2. BCG Matrix line Direction from 2012 to 2020



2.3 Shift-Effect Analysis

Finally, the shift-effect analysis is performed to examine changes in the traffic quantities of various ports within the region (Allate, 2018). Shift effects indicate the traffic volume collected by a port from rival ports in the same region; this scenario is only achievable with the total competition (Zhang et al., 2020).

$$SHIFT_i = TEU_1 - \left(\frac{\sum_{i=1}^{n} TEU_1}{\sum_{i=1}^{n} TEU_0} \right) * TEU_0 \quad (2)$$

Table 4. Shift Effect Analysis on Bay of Bengal Container Ports from 2012 to 2020

Port	2012-2014	2015-2017	2018-2020
Yangon	69,478	160,813	-4,207
Colombo	114,918	-45,172	-26,105
Chittagong	2,520	-20,050	181,894
Kolkata	-3,207	-55,698	47,340
Paradip	-10,726	847	3,531
Vishakapatnam	27,102	130,640	46,199
Chennai	- 214,230	-132,221	- 280,327
V.O.CHIDAMBANAR	14,144	- 39,160	31,674

The shift effect analysis shows the traffic volume over time that has shifted to other ports. Based on the analysis it has been found that Yangon Port had lost around 4,207 traffic from the 2018 to 2020 period. Colombo Port's traffic volumes shifted around 45K+ and 26K+ from the 2015 to 2020 period. Chittagong Port's traffic shifted from 2015 to 2017 period around 20K+ volumes. However, in 2018, it performed better. Chennai faced a major shift in the traffic volumes from the 2012 to 2020 period, around 214,230; 132,221 and 280,327 volumes. Kolkata gained traffic volumes from 2018 to 2020. Prior to that period, the port's volumes shifted every period to other ports. On the other hand, Vishakapatnam performed well from 2012 to 2020 with no shift in traffic volumes from the port.

IV. Conclusion

The discussion of the analyzed data will be shown here and the achievement of objectives will be discussed here as well. To identify the major issues that the market structure data is missing for the Bay of Bengal, the current study has developed a few objectives to get the appropriate data to fill the research gap. The discussion of collected and analyzed data will be discussed by aligning with the objectives and the discussion can be categorized as; 1. discussion on the findings of market concentration through the HHI index; 2. Discussion on the findings of BCG Matrix analysis; 3. discussion on market structure characteristics of the container ports of the Bay of Bengal in comparison with Chittagong port; 4. discussion on the findings of traffic volume shifts among the ports through shift effect analysis in comparison with Chittagong port.

At first, the HHI index analysis, the study finds that the Bay of Bengal is highly concentrated. The HHI index data for 2012 was 0.295, 2013 was 0.296, 2014 was 0.300, 2015 was 0.290, 2016 was 0.283, 2017 was 0.285, 2018 was 0.303, 2019 was 0.296 and 2020 was 0.303. Important to note that, the result is higher than 0.25, which is considered highly concentrated.

Secondly, the discussion on the findings of market share and market growth through BCG matrix analysis shows three life cycle periods; from 2012 to 2014, from 2015 to 2017 and from 2018 to 2020. The analysis data shows that, for the 2012 to 2014 life cycle period, Colombo is in the cash cow and Paradip is in the dog category, while, the rest of the ports hold the question mark category. From 2015 to 2017; Colombo holds the star category with high market growth and share. Paradip holds a strong performance in market growth as it holds the question mark category. Whereas the rest of the ports remain constant in the question mark category. For the year 2018 to 2020, Colombo holds the cash cow category with low growth. Chennai and Yangon container ports hold the dog category. For rest of the ports remain constant in the question mark category. The important point is, Chittagong is going downward in the 2020 period, very close to becoming a dog with the port losing market share and market growth compared with other years. This can be said that the COVID-19 impact negatively impacted the performance of the port in the year of 2019 to 2020 (Hamid et al., 2020).

Thirdly, the shift effect analysis measures the loss of container volumes among the ports of the Bay of Bengal region from 2012 to 2014, from 2015 to 2017 and from 2018 to 2020 categories. Based on the analyzed data, from table 4, at the latest time period from 2018 to 2020, Chittagong has gained 181,894 container volumes compared with any other port and Chennai has loses 280,327 volume which is higher than any other ports. Chittagong ports is gaining volumes, which depends on the future performance, from 2021 year.

At fourth, the discussion about the characteristics of the market structure of the container ports of the Bay of Bengal region. As has been discussed in the HHI index and BCG matrix, the market is highly concentrated and very low competitive for the container ports in the region of the Bay of Bengal, which pointing towards the oligopoly competition as the oligopoly phenomenon is not decreasing for the region of the Bay of Bengal. Based on the shift effect analysis data shows that every container port in the Bay of Bengal is performing competitively low in the region. Therefore, the Bay of Bengal container ports market is lowly competitive, highly costly, and hard to survive as the market is highly concentrated, has low market growth and market share and the shifting in the container volumes are significantly high.

Based on the findings and discussion, current study has developed limitations and recommendation for authority and future researchers both. The authority and government of container ports of the bay of Bengal, specifically Chittagong port of Bangladesh, can adopt several implications to promote container ports around the world, as well as internally that, can impact the container ports' performance positively. Based on the data from HHI, shift effect and BCG matrix analysis from the previous section, future recommendations for the port authority is to take advantage of geolocation; attract international; tax exemption, faster clearance process, reduced waiting charges; increasing storage and technological machinery; promoting maritime logistics education; promoting Chittagong tourism; collaboration with other countries;

At the conclusion, the significance of the study is its nature as it is the pioneer study to contribute to the market structure of the Bay of Bengal region in the context of Chittagong port. Previous studies had focused on the performance and efficiencies in this area, however,

the market structure was still a missing point for this region. The current study has implemented the HHI index, BCG matrix and shift effect analysis methods to identify the market structure of the Bay of Bengal region in the context of Chittagong port. The study has successfully developed the study in container ports of the Bay of Bengal. And decoupling and tax evasion of existing global supply chains are in full swing as nationalism has recently spread due to Brexit in the UK, the Corona pandemic, and the US-China trade dispute. In particular, global production bases, which were concentrated in China in the past, are changing through Southeast Asia and only in the hemisphere such as Southwest Asia and India. Therefore, this study can be used as basic data for the establishment of a new supply chain between Korea and Southwest Asia for the Korean government and companies.

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