



Maritime Technology and Research

<https://so04.tci-thaijo.org/index.php/MTR>



Research Article

The role of Chittagong Port to support MSR in providing maritime transport facilities through intermodal freight transportation system in Asia

Razon Chandra Saha*

Center for Higher Studies and Research, Bangladesh University of Professionals, Dhaka 1216, Bangladesh

Article information

Received: August 14, 2020

Revised: September 3, 2020

Accepted: September 10, 2020

Keywords

Hinterland potentiality,

Port regionalization,

Maritime Silk Road,

Intermodal transportation system,

Maritime transport

Abstract

Among the seaports in the Bay of Bengal, Chittagong Port is in a lucrative position to cover the maximum spatial transportation in Asia. The China-proposed Maritime Silk Road (MSR), under the banner of the Belt and Road Initiative (BRI), has probably overlooked Chittagong Port as a maritime load centre in the South Asian region due to geopolitical issues. The recent performance of Chittagong Port in terms of container throughput and consideration of the hinterland potentiality by the MSR means that Chittagong Port is visualized attractively as a load centre or connector in the region. An intermodal freight transportation system brought a new dimension to the port regionalization. In particular, Chittagong Port's geographical position and performance are 2 important indicators in serving the intermodal system to the region in timely and economical fashion. The main objective of port development in Bangladesh is to act as a maritime load centre of the MSR and to offer port services, not only to Bangladesh, but also to provide maritime transport facilities, as well as seaport access, to the landlocked countries of Nepal and Bhutan, the naturally landlocked part of India, the southwest part of China, and the neighboring country of Myanmar for regional development. In addition to the literature review, this research uses a qualitative research method with the combination of primary and secondary data collected from the field. Moreover, one network model is designed considering how Chittagong Port will provide hinterland services to the region and implement the dictums of the MSR and the BRI. Overall, this paper aims to investigate the potentiality of Chittagong Port to serve as a regional maritime load centre of the MSR to develop an integrated intermodal freight transportation system in Asia.

All rights reserved

1. Introduction

Among the seaports in the Bay of Bengal, Chittagong Port is in a lucrative position to cover the maximum spatial transportation in Asia. Chittagong Port has great and comprehensive hinterland potentiality to serve neighboring countries of South Asia, Myanmar, and the south-west part of China. Probably, the China-proposed Maritime Silk Road (MSR), under the banner of the Belt and Road Initiative (BRI) had overlooked Chittagong Port as a maritime load centre in the South Asian region due to geopolitical issues.

*Corresponding author: Center for Higher Studies and Research, Bangladesh University of Professionals, Bangladesh
E-mail address: razon864@yahoo.com

The recent performance of Chittagong Port in terms of container throughput and consideration of the hinterland potentiality by the MSR has meant that Chittagong Port is visualized attractively as a load centre or connector in the region. An intermodal freight transportation system brought a new dimension to the port regionalization. Intermodal systems are supportive of long-distance last-mile services or maritime transport facilities, irrespective of any country. In particular, Chittagong Port's geographical position and performance are 2 important indicators in serving the intermodal system to the region in timely and economical fashion. Lee et al. (2018) explored the BRI as the focal point for socio-economic-political interests because of its likely impact on land and sea transport and maritime logistics. Lam et al. (2018) expected that the BRI and related strategic developments will cater to the further growth of maritime trade, which is an important and inevitable future for international shipping. The MSR has to develop a port community system in Asia for threading the whole maritime network and connecting to the whole of the Asia and outer world shipping network through intermodal networks.

The scope of the work is to identify the gaps for developing Chittagong Port as a regional intermodal hub for Asia, especially in terms of infrastructural development and capital management for port and inland transport network development. The main objective of port development in Bangladesh is to act as a maritime load centre of the MSR and to offer port services, not only to Bangladesh, but also to provide maritime transport facilities, as well as seaport access, to the landlocked countries of Nepal and Bhutan, the naturally landlocked 7 sisters of India, the south-west part of China, and the neighboring country of Myanmar for regional development. In addition to the literature review, this research used a qualitative research method with the combination of primary and secondary data collected from the field. Moreover, one network model was designed considering how Chittagong Port will provide hinterland services to the region and implement the dictums of the MSR and the BRI.

The structure of the paper continues with a research methodology for asserting how the paper was developed and how the ethical issues were managed, along with a statement of the limitations of the study. After this, a scenario analysis is conducted to determine the potentiality of Chittagong Port in Section 3. Then, a brief description is given concerning the BRI and the MSR and their impact on the Bay of Bengal, especially for South Asia and Southeast Asia, in Section 4. Next, Section 5 briefly reviews available literature related to the subject. Section 6 describes the role of India and China in developing the Chittagong Port. Furthermore, Section 7 states how the Chittagong Port will provide maritime logistic support in this region. Subsequently, Section 8 articulates the role of the intermodal freight transportation system in developing regional connectivity. Major findings are discussed in Section 9. Before the conclusion, Section 10 develops a freight transport network model, and Section 11 provided future directions for Chittagong Port to support the MSR. Overall, this paper aims to investigate the potentiality of Chittagong Port to serve as a regional maritime load centre of the MSR to develop an integrated intermodal freight transportation system in Asia.

2. Materials and methods

Research is a social phenomenon, and method is a way to complete research in a systematic manner by following all steps of the research and maintain all ethical issues with limitations in data collection and report writing. As a part of the qualitative research method, field research (Neuman, 2011) observes real events in the field and identifies the difficulties, current situation, and future aspirations of the people that are explored by the researcher. This paper employs the qualitative research method to extract qualitative data from primary and secondary sources. In addition, knowledge was gained from extensive field visits to important transport nodes of India (seaport, inland container depot (ICD), and land port), Bangladesh (seaport, land port, ICD, and riverine inland container terminal (RICT)), Nepal (dry port), and Bhutan (dry port) from June 2018 to May 2019. On behalf of these transport nodes, key managers were interviewed to ascertain the strengths,

obstacles, prospects, and potentiality in the aspect of seaport connectivity, hinterland services, and intermodal connectivity. Major findings of the field visits are highlighted in Section 9 in the light of regional connectivity in South Asia, China, and Myanmar.

Ruan et al. (2019) brought a scenario analysis in their port development research that was applied in this study to identify one maritime load centre of the MSR under the BRI to cover maximum hinterland in South Asia (Bangladesh, Seven Sister States (SSS) of India, Nepal, and Bhutan) and Southeast Asia (China and Myanmar). The scenario method is useful when research falls into data scarcity and non-quantifiable decision variables to enable forecasting of future business environments, as well as searching for key drivers in the research arena. Scenario analysis is conducted in the next Section 3 to justify a maritime load centre and identify a seaport to act as a prime node of the MSR. This paper has some limitations in collecting numerical data of container throughput for Nepal and Bhutan that is managed by major Indian seaports, and also how many containers are moved to the basically landlocked SSS of India.

Neuman (2011) advised managing ethics, as research has an ethical-moral dimension and researchers must be prepared to consider ethical issues in designing the research structure properly. This research maintained ethical concerns actively and did not disclose anything concerning the names of the persons who helped to obtain data or provide information or suggestions to develop this paper or future recommendations. For maintaining ethical issues, it was not possible to disclose the organization name/person name, and this was a limitations of the research. Additionally, the MSR and the BRI has created unofficial conflict between India and China. Finally, India (Borah, 2017) opted out from BRI activities as per India's own strategy and governmental decision. Therefore, the statements in this research are solely the personal opinion of the author and does not provide any support or favor to India or China.

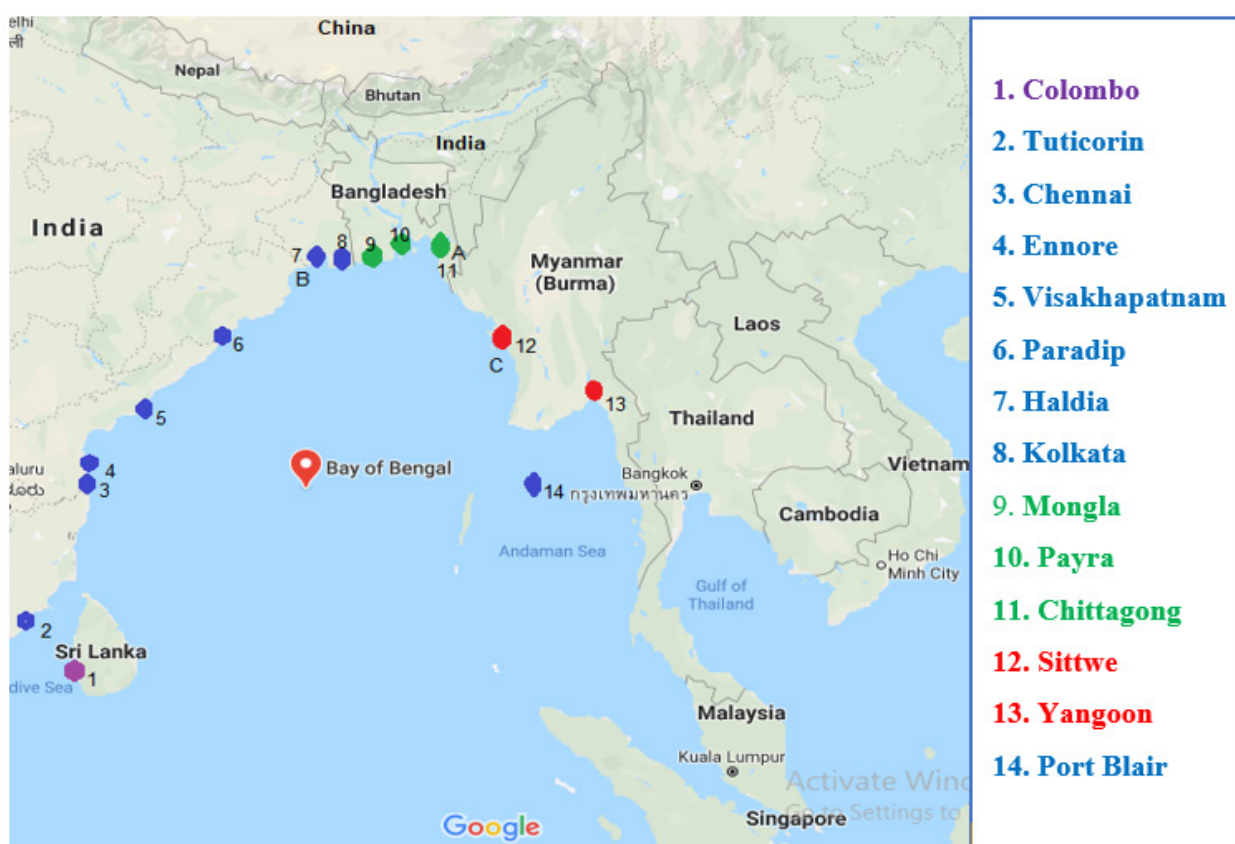


Figure 1 Major seaports in the Bay of Bengal.

Source: Map from Google (2020a).

3. Seaport facilities in the Bay of Bengal

The Bay of Bengal in the Indian Ocean is strategically positioned from China and the middle position of South Asia/Southeast Asia, which is a key factor in reaching an overland spatial road. In this situation, the overland Silk Road provides a graphical link to the BRI for connection with the proposed MSR, which is the subject of a major dispute with India. Before going to the next Section for details of the MSR, this Section sketches the seaport facilities in the Bay of Bengal. In the territory of the Bay, 4 countries have coastlines and seaports, which are presented in the below **Figure 1**.

Table 1 Target seaports for MSR in the Bay of Bengal.

SL#	Country	Seaports	Selected for MSR	Justification	Remarks
1	India	Tuticorin Chennai Ennore Visakhapatnam Paradip Haldia Kolkata and Port Blair	Haldia	Haldia is comparatively good in distance, draft, and hinterland accessibility. Marked as B in Figure 1 .	Paradip and Visakhapatnam are also important but not good for Bhutan or the SSS of India.
2	Bangladesh	Chittagong Mongla and Payra	Chittagong	Chittagong has vast experience in managing cargos and containers. Marked as A in Figure 1 .	Mongla is feasible but not good for big volume handling due to draft constraint.
3	Myanmar	Yangoon and Sittwe	Sittwe	In the right position to support nationally and internationally. Marked as C in Figure 1 .	Yangoon is not suitable for other countries' shipments.
4	Sri Lanka	Colombo.	None	Not considered.	It is suitable for deep seaports only.

It is clear in **Figure 1** that Chittagong is the closest to the upper land areas of India, Nepal, Bhutan, China, and Myanmar, compared to Haldia and Sittwe. As stated earlier, scenario analysis helps to obtain a suitable port to serve the maximum hinterland irrespective of countries, and Chittagong Port has high potential in terms of place, distance, capacity, and performance among the seaports in the Bay of Bengal. **Table 1**, on the next page, demonstrates the justification of Chittagong Port as the prime maritime load center to cater to international maritime transport.

As per the scenario analysis and justifications in **Table 1**, the details of 3 major seaports are stated below, because they are strategically important in the Bay of Bengal.

3.1 Chittagong port: Principal seaport of Bangladesh

Chittagong port is the principal seaport of Bangladesh, and above 90 % of international trade, both import and export, are performed by this port. The port is well connected via rail, road, and river modes to the capital city, Dhaka, and the rest of the country. The port has intermodal connections via rail and river and has an improving intermodal system day by day. The great advantages of this port are river transportation connectivity to the major cities of the country and a good connection to the SSS of India. The Lloyd's List (2020) ranked Chittagong Port as the 64th busiest container port of the world, as per their container port throughput in 2018. The historical record handling of 2.9 million Twenty-foot Equivalent Units (TEUs) was performed by Chittagong

Port. The main dimension of this throughput is to manage domestic containers only, with a limited intermodal opportunity to the hinterland.

3.2 Haldia port: Soul of the eastern part of India

Due to draft constraint of Kolkata port, Haldia became a popular port on the eastern coast of India, which has huge hinterland up to the SSS of India, Nepal, and Bhutan. This port has coastal shipping with Chittagong Port and performs lucrative maritime coastal trade in between Bangladesh and India. Nepal and Bhutan also depend on the performance of Haldia port, as they have to take the maximum maritime facilities from Haldia just after Kolkata port. Anwar (2016) identified 8 major ports on the east coast of India, and Haldia is a potential seaport among the ports for supporting the maximum hinterland of India. The port of Haldia (Worldportsource, 2020) is a major seaport of India, and was preliminary developed as an industrial port. The port of Haldia is the fourth biggest port in India, and it is a part of the port of Kolkata.

3.3 Sittwe port: Exclusive gateway of Myanmar

Sittwe port is a new name in the Bay of Bengal and has generated much interested in India and China. Both countries are keen to obtain maritime facilities and have argued to invest to develop an industrial zone nearby the Indian border, thus getting exclusive maritime facilities for the SSS of India. India is highly interested in the Sittwe port of Myanmar to support the SSS and increase exposure in the Bay of Bengal.

Significantly, Ruan et al. (2019) found that India, Pakistan, Bangladesh, Nepal, and Bhutan offer competitive advantages, due to their locations in South Asia, for having a historic maritime trade link with China. In terms of the strategic position in the Bay of Bengal, Bangladesh has a high degree of centrality to cover spatial and river connectivity to cover South Asia and Southeast Asia. Likewise, Islam (2016) observed that the Chittagong Port has high potential in South Asia, and has wider economic hinterland located in South Asia and Southeast Asia. Overall, Chittagong Port is highly feasible to act as the prime maritime load center of the MSR to present the BRI in Asia effectively. The port of Colombo is treated as a regional transshipment hub for South Asia. The BRI has a plan to keep forward to the east coast of India and the landside of the Bay of Bengal to make shipping activities easy and avoid multiple handling of cargos and containers. In this connection, the MSR line moved towards the coast of the Bay, and one seaport is essential to serve the landlocked parts efficiently. Henceforth, Chittagong Port has potential to play an active role.

4. The Maritime Silk Road of the Belt and Road Initiative

The BRI has 2 core components, which are 21st Century MSR and Silk Road Economic Belt (SREB), that are designed to cover maximum sea areas of the world and do maritime business peacefully with all. Driven by the MSR, a strong shipping service network is aimed for to allow sustainable development in international shipping. In detail, the BRI is a strategic plan of the Asian giant, China that pushes to expand its global influence, or attempt to take a lead in world trade. South Asia, Bangladesh, Nepal, and Pakistan are involved with the BRI for developing their ports and railways and industrial and power sectors. Interestingly, India opted out from this great initiative, as it is seen differently by them, and the country may have other political or business issues regarding the BRI. In the sense of port development, Bangladesh could see this as an opportunity to identify Chittagong Port as an alternative to Kolkata port as a maritime load center that is marked on the MSR map. The BRI (Lee, 2018) is driven by the Asian Infrastructure Investment Bank (AIIB), which started its operation in 2016, and reached many countries, seaports, and other places of the world. However, Chhetri et al. (2020) feel the trade war between the USA and China, that has threatened to derail the global economy, also has led to precautions taken by India, when they opted out from the BRI, as stated by Borah (2017).



Figure 2 Maritime Silk Road map.
Source: Xinhua Finance Agency (2017).

In contrast, Borah (2017) stated that the BRI has taken the world by storm and forced everyone to sit up and take notice, where most of the Asian countries have jumped to tag, but India opted to sit out from this uncertainty. India has long term projects related with the Asian Development Bank (ADB) and is developing its infrastructure through the South Asian Sub-Regional Economic Cooperation (SASEC) road connectivity investment program with the neighboring countries of Nepal, Bhutan, and Bangladesh. Moreover, Bhatta (2018) stated that the BRI may change the whole dynamic and enhance trade among the countries of Asia, except for India, because India does not see its brightness for the world, but rather sees deep long- term political and security implications. In the context of the BRI, Dwarakish and Salim (2015) suggested that competitive battle among ports will increasingly lead to fights ashore.

However, the BRI (Chen et al., 2019) is a national strategy of China to strengthen globalization and regional economic integration. The main objective of the 21st Century Maritime Silk Road (MSR) is to connect China to the world by land and sea. Against the background of the BRI, Chinese ports continue to evolve toward ‘going global’ and internationalization and to reach out to countries along the BRI through cooperation with ports in those countries. Similarly, Chen et al. (2019) expected that the BRI will further promote China’s port connectivity under the ‘going global strategy’ and will take part in global port construction and operation.

5. Literature review

There has been limited research conducted on the freight transport management of South Asia regarding the MSR in the Bay of Bengal. In research, Islam (2016) stated that bilateral agreement between Bangladesh and Nepal/Bhutan/China is not possible in transport management, as they do not share a common border. It is an essential multilateral issue, as India holds the key to any agreement on freight transport or spatial transportation in the overland of Indian areas. The symbolic role (Cahoon et al., 2013) between healthy trade movement through a port and regional growth is self-evident, but the economic activities of the region will prosper speedily. Kavirathna et al. (2018) describes the hub and spoke network, which has the advantages of mainline and feeder

services for operating by an integrated manner of network configuration and ensuring proper transportation of cargos and containers between the origin and destination ports. Ruan et al. (2019) stated that ports are a capital-intensive multimodal facility that require substantial investment on infrastructural development to connect them with rail, road, and even pipeline links to improve the efficient handling of all types of cargo as an integrated part of the global supply chain and port logistic network.

Additionally, Kavirathna et al. (2019) mentioned the ideas of port competition and cooperation, which are the most common types of interaction among market players at both the inter and intra port levels. In terms of port competition, high competitiveness of the entire port is significant for all terminal operators located in that port under the port authority or port management. On the other hand, port cooperation is appreciated in attracting more shipping lines and terminal operators to increase port competitiveness in a strategic location. Wang et al. (2020) noted that ports are playing an important role in the MSR as nodes of global trade circulation for the economic development of a country or region. Notteboom and Rodrigue (2009) observed the presence of physical hinterland in the transport supply chain, in the form of modal and intermodal, to consider a network of transport infrastructure, modes, and terminals between ports and hinterland in achieving accessibility in freight distribution.

Chen et al. (2019) suggested that port governance is always influenced by a central government. However, the management of a port is always driven by a company or authority. In Bangladesh, port management is an authority, but is highly influenced by the Ministry of Shipping, as well as the government of Bangladesh. Therefore, port governances or strategic decisions are highly recommended by the government. Bhattacharya et al. (2014) explained the logistics supply chain in a well-organized transportation system network that is associated with the intermodal system. Notteboom and Rodrigue (2005) explored 3 important areas in the transport system-containerization, intermodality, and information and communication technology (ICT) - that had enhanced the spatial and functional reconfiguration among logistics nodes. To accelerate trade and improve intermodalism (Jeevan et al., 2019), the dry port concept is excellent in increasing seaport competitiveness in terms of port performance, capacity, hinterland distance, services, and managing trade volume that also assists in boosting the regional economy. It should be mentioned that a dry port is an extended part of a seaport. Saka and Cetin (2019) argued that dry ports are playing an import role within the transport network exclusively to the hinterland of a seaport in the age of containerization and the quick development of the intermodal freight transportation system.

Inclusively, port cooperation facilities always exaggerate the trade links to enhance the port's hinterland region and increase the port's throughput (Huo et al., 2018). Bhattacharya et al. (2014) found that rail and river transport services are largely unutilized, or highly disorganized, but have potential to operate intermodal services and assist seaports to reduce the load of container stacking at port yards, which could lead to congestion. Cahoon et al. (2013) suggested the port authority act as a coordinator for facilitating the port services in a regional network, because a potential regional development platform will allow interaction with its community and stakeholders in the hinterland to upgrade port functions and mutually solve critical problems. Notteboom and Rodrigue (2005) expected that port regionalization provides a strategic answer to the imperatives of the inland distribution segment of the supply chain in terms of improving its efficiency, enhancing logistic integration, and reducing distribution costs. Therefore, the port system has an influence on inland transport networks, where intermodal plays a vital role in seamless transportation from country to country and aids regional connectivity.

The BRI was initiated by China in 2013, and academic and commercial literature is growing; there is a keen interest found in investors, especially in port development, as found in the research of Lee et al. (2018), Gekara and Nguyen (2020). Lam et al. (2018) viewed the prospects of the MSR as the global shipping network and the connectivity for new and existing shipping links and port connections, which will grow new commercial opportunities for the shipping and port

industries. Chen et al. (2019) developed a research paper for guiding policymakers and stakeholders of China in alleviating overseas investment risks and developing foreign port chain management through the MSR. Kanrak et al. (2019) emphasized the maritime transport network, including air networks, as a whole transportation network that will help to increase production, consumption, and international trade. Gekara and Nguyen (2020) added that the BRI has reshaped the international trade and transportation landscape and developed huge attention in both academic and policy debates. Chhetri et al. (2020) argued for technological innovation and structural reforms in business that will help to manage the complex supply chain in a sustainable way in the age of the fourth industrial revolution. They watched the convergence of the world economic system induced the BRI, which will shape and reconfigure the key global transport nodes and trade corridors. China's ports are working hard to develop and make ties with foreign ports in the line of the MSR to act as a global port developer for managing their ongoing global strategy in port management.

In a parallel study of the port of Mombasa with the Chittagong Port, by Gekara and Nguyen (2020), Mombasa port acts as a key gateway of the region and coordinates a wide variety of customers and stakeholders across the different countries and destinations in the hinterland. Therefore, Chittagong Port also needs to take such preparations to promote the MSR and serve outside of the country as a part of expanded hinterland port services. Similarly, Shibasaki et al. (2019) brought the example of Gwadar port in Pakistan as a new gateway of the MSR, which will act as a regional hub port in Asia and Europe subject to the handling of a sustainable volume of containers, if rail links are well connected as an integrated intermodal service to the hinterland.

The above literature has not investigated the potentiality of Chittagong Port to serve as a regional maritime load center of the MSR to develop an integrated intermodal freight transportation system in Asia. Therefore, this paper attempts to fill the research gap and investigate the potentiality of Chittagong Port.

6. Role of India and China in developing Chittagong port

Lee (2018) said that China has paved a solid way for the BRI to be implemented in for coming years, and this may have an impact on maritime transportation, trade, global logistic patterns, and railway services in achieving the goal of the BRI through the MSR and the SREB. Bhatta (2018) reported that, as new emerging powers of the world, India and China are both trying to enhance their global activities in South Asia. China is not a member of South Asia, but its boundary to Nepal, Bhutan, and India, its business activities with Nepal and Bangladesh, its involvement in Bangladesh-China-India-Myanmar (BCIM) and other forums, and its influence with the BRI makes a strong position in South Asia. Port regionalization (Notteboom & Rodrigue, 2009) permits improvement of a distribution network in a region that corresponds more closely to fragmented production and consumption systems. This initiative is a process to increase industrial zones for production and to change lifestyles by the consumption of international commodities, as per purchasing power that is derived by production and its export worldwide.

Besides MSR activities, Wang et al. (2020) explored port cooperation as being an important communication strategy by Chinese ports and terminal operators, as it will bring economic benefits to provide sea access for global trade in other countries. Regmi (2015) recommended improving intermodal transport corridors in South Asia and harmonizing the rules and procedures to develop a transport and logistics industry by engaging the private sector. India is the biggest power in South Asia in terms of geographical area, population, and economy. The utmost care should be taken towards Bangladesh, Nepal, and Bhutan. On the other hand, Huo et al. (2018) investigated China's interests in assisting in port construction, which is conducted by Chinese port construction companies worldwide.

South Asian countries are experiencing high trade costs due to inadequacy in trade and transport facilitation. Particularly, these are severe in border crossing and free freight movement. A potential freight transportation system in the name of transit and transshipment through Bangladeshi

seaports could emerge as an integrated freight movement in South Asia. Transport connectivity between South Asia and Southeast Asia is receiving growing attention by policymakers due to huge investment of China in Nepal, Pakistan, and Bangladesh. Industrial development of Nepal and Bhutan depends highly on the geopolitical decisions of India to enable international trade among South Asian countries, especially free seaport access. For long term sustainability, Cahoon et al. (2013) argued for regional port authorities in the global supply chain to develop the hinterland region. The efficient movement of cargo always helps the economic growth of a country, but this has bottlenecks in developing countries due to the poor infrastructure of port terminals, inland transport networks, and transport nodes, such as inland terminals, dry port, ICD, etc. Overall, both India's and China's cooperation is required to develop Chittagong Port.

7. Maritime logistic support by Chittagong port

Port development (Saha, 2015) is essential in Bangladesh to meet the global demand of port modernization and increase port efficiency and productivity, as well as port governance. Port regionalization is a key issue, in which Chittagong Port has high potential to act as a regional hub, just after the port of Colombo. Another key issue of port development in Bangladesh is infrastructural development of port terminals, inland transport network development, and inland intermodal infrastructure development to support the container transport system. Infrastructural development depends on capital investment, and foreign donations or loans are required to develop major ports or inland transport infrastructure. The Liner Shipping Connectivity Index (LSCI) has some recommendations to improve port facilities; similarly, the Logistics Performance Index (LPI) needs to be improved and supported by the government, as major stakeholders are government offices.

The LPI (Wang et al., 2020) consists of both qualitative and quantitative measures, such as customs performance, infrastructure quality, and timeliness of shipments, and is denoted as a tool to help countries identify the challenges and opportunities they face in their performance in trade logistics. Another area is dry port development to facilitate intermodal systems and expedite transit and transshipment facilities to neighboring countries for doing maritime transport business. Port regionalization is a step to attract the international shipping community to invest in the port sector of Bangladesh. Kavirathna et al. (2018) reported that rapid development of international trade and globalization are causing ports to handle a considerably increased volume of freight in the maritime transport sector.

The LSCI is referred to by the United Nation's Conference on Trade and Development (UNCTAD) (Fugazza & Hoffmann, 2017) and is aimed to capture the level of integration into the existing liner shipping networks, calculated at the country and port level to assess the current position and potentiality in accessing to global trade. As per the report of UNCTADStat (2019), China is in the highest rank (151.91 points), and India scored 55.54 points at the 24th position, but Bangladesh has only 13.24 points (90th Position). The LSCI indicates the development of merchant fleets and container carrying capacity and the introduction of new liner services to compete with others and attract international shipping lines and terminal operators to work in Bangladesh. Another important indicator is the LPI, which is also lower for Bangladesh, where it is in 100th position, with 2.58 points, and in which Germany is ranked 1st, with 4.20 points. Here, India has 3.18 points, in 44th position in the world, as per rankings in 2019. Bangladesh needs to improve in all components of the LPI, including infrastructure, logistic service quality, ease of international shipments in a timely fashion, cargo tracking and tracing, and custom facilities. To create port competitiveness, Chittagong Port has to play a role and work with the government to improve both indices of the LSCI and LPI in order to obtain positive points from the BRI management.

In the eyes of Kavirathna et al. (2018), Chittagong Port is denoted as a feeder port in the Bay of Bengal. To perform as a hub port, Chittagong has to compete with Colombo, Sri Lanka, and Singapore, as well as to attract shipping lines, forwarders, and shippers accordingly. In research,

Notteboom and Rodrigue (2009) noted that conventional spatial representation of hinterlands is being challenged by new functional realities, notably with the emergence of global commodity chains. Here, port performance is not limited in managing port activities also expanded to develop hinterland by providing logistic facilities and setting inland terminals and dry ports, and, importantly, sitting with the stakeholders for continuous development of port products and services. Overall, Chittagong Port needs to develop a multipurpose facility, capitalizing on natural deep water and increasing its proximity by creating new shipping routes internationally for improving LSCI and LPI scores.

8. Intermodal connectivity

Shipping connectivity is an important determinant in calculating trade cost. Hamilton (2015) noted that intermodal is an attractive alternative of carrying cargo by long-haul truck, as it has 2 important factors in freight transport management. The first one is related to cost, as it is less expensive compared with trucking, and the second is it being an environmentally-friendly freight transportation system worldwide. Notteboom and Rodrigue (2009) found that port regionalization encompasses creating integrated hinterland, making substantial commitments for secure access to ports and investing in inland distribution centers or terminals, and working closely with inland freight forwarders in all modes of transport. Notteboom and Rodrigue (2005) expressed that port authorities should promote the intermodal freight transportation system in order to secure cargo in its hinterland in a highly competitive market.

Regmi (2015) suggested promoting intermodal freight transportation system and integrating the whole transportation system and different transport modes as a part of sustainable freight transport to save the environment from pollution, also removing road congestion by using rail-based intermodal transport. A dry port is a transport node in the intermodal system and acts as an intermodal terminal to facilitate services to the seaport and is a great connector of the hinterland and foreland of a seaport. Moreover, a dry port is a secure inland location for the temporary storage of import-export cargo, and a place for customs inspection and other formalities onwards to international freight movement. Dwarakish and Salim (2015) mentioned that ports have become more dependent on the intermodal system in passing containers quickly to the hinterland and foreland. Notteboom (2008) advised port authorities to promote intermodal systems and coordinate with logistic networks to secure cargo and make relations with port users under conditions of high competition from port rivalry. A dry port (Wei et al., 2018) is a connecting node of a seaport; in the aspects of the BRI, it will integrate inland regions with seaports and cross-border inland ports. Dry ports are found to be potential nodes of a container transportation network in hinterland that will help to expedite the activities of the MSR meaningfully. In a synchronized maritime transport network, Kanrak et al. (2019) argued for a dry port in connection to seaports and coordination with other transportation networks for international trade. In addition, Wang and Chen (2019) stated that waterway transfer is the innovation of intermodal containers from port to river port, as a part of the port logistic cooperation, to the hinterland.

Bhattacharya et al. (2014) discovered that the intermodal system will assist in developing effective transport networks and reduce negative impacts on the environment and energy consumption. They expected that the intermodal system will reduce transport costs and improve the freight transportation system drastically, as it has higher levels of efficiency. Earlier, intermodal transport was based on rail transport, but it has a higher degree of work efficiency in rivers and on roads. Furthermore, concerns about the environment are increasingly popular in using intermodal systems and are treated as strong influences in measuring port competitiveness. The physical inland freight distribution system (Notteboom & Rodrigue, 2005) became a cornerstone in port competitiveness and in promoting ports in acting as a regional port in hinterland. Rodrigue (2006) emphasized last mile delivery and fulfilling the criteria of logistics where intermodal systems are convenient in terms of cost, time, and the efficient delivery of cargo from origin. However,

intermodal nodes are important in the hinterland, to connect with seaports easily and timely, because nodal space is a set of locations promoting the efficiency of different transport networks for offering integrated freight transportation such as intermodal systems and features of the dry port system. Nowadays, dry ports (Saka & Cetin, 2019) are helping to expand the hinterland of the seaport and decreasing the capacity problem at the port yard. In this context, Chittagong Port has to set a dry port, an ICD, and a RICT for ensuring integrated intermodal connectivity as a step to qualify as a regional hub port in Asia.

9. Results and discussion

This Section will discuss the major findings of the research from the literature review, scenario analysis, and field visits to the transport nodes and hinterlands of Chittagong Port. The geography of port choice is a matter of the port's position to serve hinterlands. In connection with this, Mueller et al. (2020) suggested 4 important issues in port choice, as below:

- Terminal selections within a port.
- Port hinterland strategies.
- Hinterland corridor efficiency.
- Inland port operation.

To discuss the first issue of terminal selection, Chittagong Port has diversified port terminal management to both private and own management. The port has a plan to open to neighboring countries and increase its hinterland as much as possible. Hinterland corridor efficiency is poor; inland port operations are developing, and inland connections to ICD and RICT are in progress. Moreover, shipping lines (Kavirathna et al., 2018), forwarders, and shippers are playing a vital role in selecting hub ports, and they have practical viewpoints on the “monetary”, “time”, “location”, and “operation” factors, in which Chittagong Port is accordingly suitable.

Nepal and Bangladesh are involved in the BRI of China and took loans for developing their infrastructure. India is still monitoring the activities of the BRI. To ensure maritime logistic support and easy port access, Bhutan wants to get the help of Bangladesh. As Bhutan needs to take permission from India for road use and positive consent for using Bangladeshi seaports, the role of India is highly appreciated for regional connectivity. Nepal also needs the same permission and consent from India. Overall, the role of India is important in identifying Chittagong Port as an integrated port transportation system in South Asia. In addition, to provide port transport facilities from Bangladesh, the consent of India and Nepal are highly important. Two important forums, Bangladesh-Bhutan-India-Nepal (BBIN) and BCIM, had been suggested to solve all geopolitical issues in freight transport management, but were found to be very inactive in developing the transport system in this region.

Indian's “Chicken-Neck” in the Siliguri corridor made transport movement among the South Asian countries ineffectual and dysfunctional, as stated by Islam (2016). Investment in the Sittwe port of Myanmar is also an important issue and is increasing India-China maritime rivalry in the Bay of Bengal. India has the opportunity to develop Chittagong Port and provide maritime logistic support to SSS of India, but they are making it a backup option by developing Sittwe port. The poor infrastructure of Bangladeshi seaports and inland transportation are also big issues in developing road and river transportation systems to serve maritime logistic services. The intermodal system is under development in Bangladesh and is serving a small scale intermodal by rail and river. In the context of LSCI and LPI, Bangladesh is not up to the mark, and lots of work is needed to improve the rankings and set a global standard.

Jeevan et al. (2019) found that the dry port concept is still a new and emerging area in maritime logistics, where a limited amount of research had been conducted and had addressed its dimension in depth. A railway connection (Saka & Cetin, 2019) is a strong part of a seaport that allows a more rapid flow of cargos and containers with minimum cost, always preferred by carriers.

Dry port establishment with rail connections is a major concern where Bangladesh's land ports are feasible, and the present infrastructure of land ports have the potential to perform as a dry port.

Bhatta (2018) viewed that Nepal, Maldives, Sri Lanka, Pakistan, and Bangladesh are working with China and see it as a major partner for their infrastructure development, because of Chinese investments that have increased significantly. Moreover, Bhutan has distance and road congestion problem with Indian seaports. Therefore, BBIN and BCIM forums need to bring in an active position in managing regional transport and open to all to develop industrial zones accordingly.

The study has faced several limitations to give support to BRI management. Firstly, the Chittagong Port's position in the Bay of Bengal is natural, value-driven through the port's performance and connection to South Asia and Southeast Asia but is not preferred as a prime maritime load centre. Secondly, LSCI and LPI are not up to the mark in Bangladesh due to poor port and inland transport infrastructure, minimum port and custom facilities, inland transport connectivity, and multimodal transport facilities in shaping a standard freight transportation system for a maritime nation. Lastly, the role of India is as a powerful neighboring country to develop Chittagong Port and provide free access to so-called Chicken-Necks in Siliguri corridor to increase hinterland up to Nepal, Bhutan, and China and act as a regional hub port in Asia.

The nature of relations between port authority and hinterland shippers/consignees is changing or is impacting on port development. The role of seaport authority is not limited to within port protected areas, but also extends to manage the inland freight distribution networks within the hinterland and to manage or create an environment for the smooth running of cargos and containers in a transport or distribution channel efficiently and timely. The performance of seaports (Notteboom & Rodrigue, 2009) is strongly connected to the development and performance of inland transport networks that give good access to cargo bases in the hinterland. Thus, Chittagong Port needs to develop its port facilities and inland transport connectivity to increase port competitiveness.

10. Freight transport network model

To follow the MSR under the BRI, a freight transport network model is sketched in **Figure 3**, and also stated in **Table 2**. The center of the model is Chittagong Port, connected by 5 routes by road/rail intermodal, and one route for river intermodal. Among the 23 land ports of Bangladesh, the freight transport model has selected 5 land ports, and it is proposed to convert them into dry ports to add them as transport nodes to connect to Chittagong Port via a rail or road intermodal network. Importantly, land ports will perform as intermodal nodes, exit points at the cross-border, and dry ports to support Chittagong Port and attract shippers/consignees to obtain all kinds of international shipping facilities cheaply.

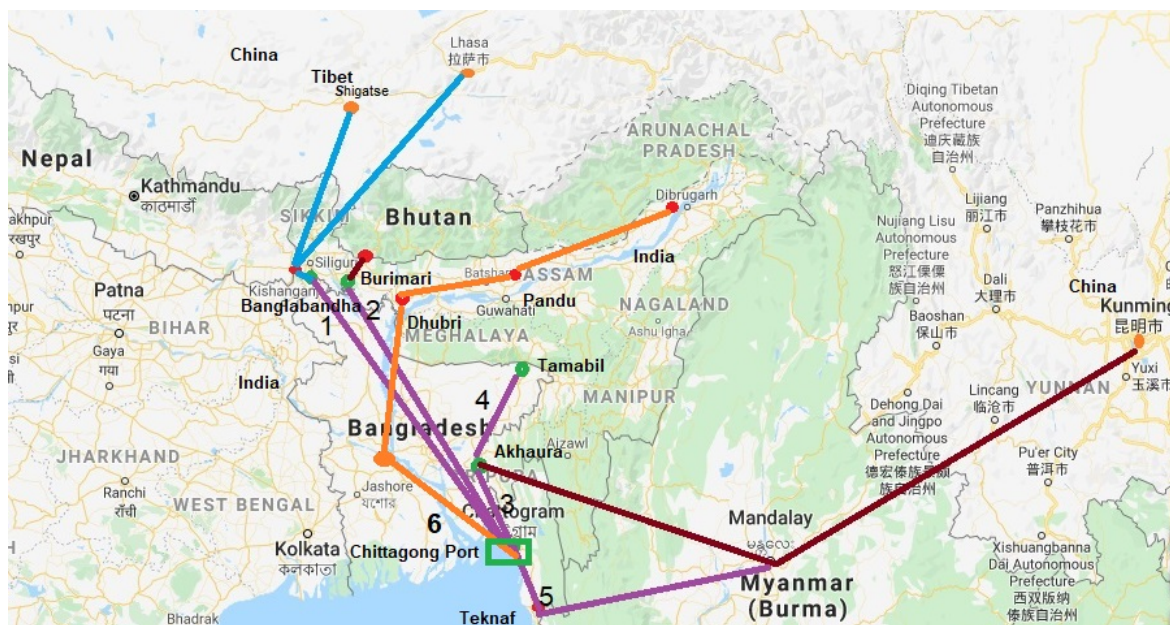


Figure 3 Freight transport network model for Chittagong Port.
Source: Map from Google (2020b).

Table 2 Freight transport routes as per the network model.

Route #	Mode	Origin	Exit port	Hinterland	Remarks
1	Road/Rail	Chittagong	Banglabandha	Kakarvita, Nepal Siliguri, India Shigatse, China Lhasa, China	SASEC and Asian Highway will assist to develop this network.
2	Road/Rail	Chittagong	Burimari	Phunentsholing, Bhutan Assam, India Meghalaya, India	SASEC will help as per Route #1.
3	Road/Rail	Chittagong	Tamabil	Meghalaya, India Arunachal Pradesh, India Assam, India Nagaland, India Manipur, India	SASEC Road will help as per Route #1.
4	Road/Rail	Chittagong	Akhaura	Tripura, India Mizoram, India Mandalay, Myanmar Kunming, China	Need to construct a rail network.
5	Road/Rail	Chittagong	Teknaf	Rakhine, Myanmar Kunming, China Mandalay, Myanmar Mizoram, India	A river bridge is required in the Naaf river between Bangladesh and Myanmar.
6	River	Chittagong	Chilmari	Assam, India Meghalaya, India Arunachal Pradesh, India	River intermodal will be the best option but dredging is required.

As per **Figure 3** and **Table 2**, route #1 is developed for Nepal and China to cover the underlying areas of Kathmandu, Nepal, and Tibet, China, to make a link between Bangladesh, India, Nepal, and China. In this connection, the most important link route #1 is developed to serve landlocked Nepal and the Southwest part (Tibet Autonomous Region) of China. Adjacent, route #2 is for Bhutan and SSS of India. Bhutan faces sea access problems to connect with Kolkata and Haldia due to distance and road congestion problems, as stated earlier. Route#3 is exclusively for SSS of India, and the exit port is Tamabil land port. Prominently, route #4 is designed for many countries and promotes the motto of BCIM, also connecting Kolkata to Kunming, China. Next, route #5 is also designed as like route #4 for India, China, and Myanmar.

The designed river mode will originate from Chittagong to Dibrugarh via Dhubri and Pandu, and Chilmari port will be the exit point of this river network. River transportation is safe, cheap, and environmentally friendly. In this connection, the proposed river route will promote the river intermodal system from Chittagong Port to SSS of India with the provision of serving Bhutan and others by the combination of road and river intermodal. This research also suggests that road intermodal from Chittagong Port to Myanmar via Teknaf is also feasible, which may be extended up to Kunming and promote the motto of BCIM. Nepal and Bhutan will be greatly benefitted by obtaining this service from Chittagong Port and develop their logistic and supply chain to cater to industrial zones and economic development.

Finally, Lee (2018) referred to the development of BCIM Economic Corridor for connecting Kunming (Yunnan province, China), Mandalay (Myanmar), Dhaka (Bangladesh), and Kolkata (India) to improve the transport system. In addition, Notteboom and Rodrigue (2005) noted the port regionalization concept that is associated with hinterland concept in the age of globalization, as customers are always thinking about maritime logistic costs, including inland transport costs and total logistics cost. This innovative model will help to integrate the freight transport system under the banner of the BRI.

11. Future directions for Chittagong port

After obtaining the major findings, the research explored some future directions for fruitful results from the MSR and develop easy maritime access and do international trade. It is expected that a good transport network is a way to develop an industrial area in a landlocked part of a region and will remove trade barriers. This research covers Chittagong Port, which will support the MSR for upgrading and designing a model to cover the maximum area of South Asia and Southeast Asia. The below future directions are stated to set the MSR in South Asia and connect it to the outer world:

- The Bangladesh government and Chittagong Port Authority should jointly develop a long-term freight transport plan and arrange transit and transshipment for all. Undoubtedly, cooperation from India and China is appreciated to obtain technical and financial support in developing port and inland transport infrastructure.

- The port regionalization concept needs to be adopted where intermodal freight transportation systems are a must. Chittagong Port has to develop intermodal terminals and create dry port connectivity, along with more ICD and RICT facilities, all over the country.

- Two important indexes are the United Nation's Conference on Trade and Development (UNCTAD)'s LSCI and the World Bank's LPI. Both need to be improved in Bangladesh to show strong support and attract the world shipping community, terminal operators, and logistic companies to come and do business. The government of Bangladesh needs to make a long-term plan to improve LSCI and LPI for creating an integrated freight transportation system in Asia.

- Saka and Cetin (2019) expected that the establishment of a dry port and its connection with a seaport terminal will support the growth of the economy and it is requested to keep dry port development as an important component of the country's maritime strategies. Proposed and potential land ports need to be converted into dry ports.

➤ Kavirathna et al. (2018) recommended to increase port competitiveness to act as a hub port in the Bay of Bengal. In this context, port competition and port cooperation are important; competition will benchmark the facilities and service quality of the port, and port cooperation will assist to increase freight volume, as well as port efficiency and productivity. Chittagong Port Authority has to develop port marketing teams and influence port users to utilize Chittagong Port.

➤ Wang et al. (2020) suggested that the BRI is a great opportunity for Chinese terminal operators to invest, manage, and operate overseas terminals. The Bangladesh government has to accept the offer of Chinese terminal operators' long-term experience and their technology to upgrade Chittagong Port.

➤ Regmi (2015) recommended improving the operations and facilitation measures by reviewing the conditions of infrastructures, processes, and procedures and analyzing operation costs, time, and durability of the services. Chittagong Port has to improve its facilities and increase port productivity, as per the demands of the region.

12. Conclusions

This study examined the potentiality of Chittagong Port to support the MSR, which is higher than the proposed maritime load centre of Kolkata port. The sense of the physical presence of Chittagong Port in the Bay of Bengal is argued to set a fixed port to enter South Asia, East Asia, and Southeast Asia. In line with such motivations, Chittagong Port is best, in all aspects, to connect to the overland Silk Road under the BRI of China. Geopolitics is an issue in Asia that is also motivating other powerful nations of the world, especially in covering the Bay of Bengal to enter the maximum hinterland and to get connected to the upper or northern parts of the world. To avoid any conflict in promoting global trade and developing dark or landlocked parts, it is essential to create an opportunity for maritime access that will be convenient for all, as well as cost-effectively and timely.

Freight transport is a key issue for a country to manage import and export trade in the age of globalization. In addition, international trade through maritime transport, territories of maritime shipping, regional forums, and environmental concerns are updated issues, as well as challenges, in doing global trade easily and economically. Transport is a social matter that extends out of national boundaries and falls into regional and international boundaries for increasing mobility and supplying freight on-demand, as well as for doing international trade to improve the social status of human beings. A maritime supply chain is essential between South Asia and Southeast Asia, as is regional development of landlocked areas of Asia, Nepal and Bhutan and unofficially landlocked areas of India (SSS), China (Southwest), and Myanmar (Rakhine state and others).

Transport economics and maritime logistics are constructive components for an emerging economy or a country. Bangladesh is a well-known maritime nation which has focused its maritime logistics activities through Chittagong Port. In addition, the transport economics of Bangladesh have indicated to go one step ahead to increase maritime logistics and provide uninterrupted support to neighboring countries to do maritime transport business as per Singapore and Sri Lanka. With the voice of Lam et al. (2018), MSR will bring extra multi-dimensional impacts on transport management and practice in the long-term. The BRI is a great opportunity for Bangladesh to add to the MSR and make a connection to the overland Silk Road through the intermodal freight transportation system. This study tried to show the natural presence of Chittagong Port, which has potential in terms of capacity and performance to act as a prime maritime load centre of the MSR. Lastly, the innovative freight transport network model that is designed in this research will help BRI management to review the map of the MSR and highly consider Chittagong Port.

Acknowledgement

I am greatly indebted to my PhD Supervisor Dr Shamsul Hoque, Professor of Bangladesh University of Engineering and Technology (BUET), for his kind guidance to develop this paper. This paper was accepted for oral presentation in the IAME (International Association of Maritime Economist) 2020 conference in Hong Kong in June 2020 and presented accordingly.

References

- Anwar, S. (2016). *List of major ports on East Coast of India*. Retrieved from <https://www.jagranjosh.com/general-knowledge/list-of-major-ports-on-east-coast-of-india-1482755412-1>
- Bhatta, C. D. (2019). Emerging powers, soft power, and future of regional cooperation in South Asia. *Asian Journal of Political Science*, 27(1), 1-16. doi:10.1080/02185377.2018.1557062
- Bhattacharya, A., Kumar, S. A., Tiwari, M. K., & Talluri, S. (2014). An intermodal freight transport system for optimal supply chain logistics. *Transportation Research Part C: Emerging Technologies*, 38, 73-84. doi:10.1016/j.trc.2013.10.012
- Borah, R. (2017). *India-Myanmar-Thailand trilateral highway: A promise to transform the region's economic landscape*. Retrieved from <https://japan-forward.com/india-myanmar-thailand-trilateral-highway-a-promise-to-transform-the-regions-economic-landscape>
- Cahoon, S., Pateman, H., & Chen, S. L. (2013). Regional port authorities: Leading players in innovation networks. *Journal of Transport Geography*, 27, 66-75. doi:10.1016/j.jtrangeo.2012.06.015
- Chen, J., Fei, Y., Lee, P. T. W., & Tao, X. (2019). Overseas port investment policy for China's central and local governments in the belt and road initiative. *Journal of Contemporary China*, 28(116), 196-215. doi:10.1080/10670564.2018.1511392
- Chhetri, P., Gekara, V., Li, S., & Lee, J. Y. (2020). Changing global production network and its implication on Belt and Road Initiative. *Journal of International Logistics and Trade*, 18(1), 13-14. doi:10.24006/jilt.2020.18.1.013
- Dwarakisha, G. S., & Salim, A. M. (2015). Review on the role of ports in the development of a nation. *Aquatic Procedia*, 4, 295-301. doi:10.1016/j.aqpro.2015.02.040
- Fugazza, M., & Hoffmann, J. (2017). Liner shipping connectivity as determinant of trade. *Journal of Shipping and Trade*, 2(1), 1-18. doi:10.1186/s41072-017-0019-5
- Gekara, V. O., & Nguyen, X. T. (2020). Challenges of implementing container terminal operating system: The case of the port of Mombasa from the Belt and Road Initiative (BRI) perspective. *Journal of International Logistics and Trade*, 18(1), 49-60. doi:10.24006/jilt.2020.18.1.049
- Google. (2020a). Seaports in the Bay of Bengal. Retrieved from <https://www.google.com/maps/@15.4538263,84.8962593,5z>
- Google. (2020b). Map of South Asia and Southeast Asia. Retrieved from <https://www.google.com/maps/@27.6787402,86.3586959,6z>
- Hamilton, S. (2015). 3 reasons why intermodal transportation is an attractive alternative to Long-Haul trucking. Retrieved from <https://logisticsviewpoints.com/2015/07/07/3-reasons-why-intermodal-transportation-is-an-attractive-alternative-to-long-haul-trucking>
- Huo, W. W., Zhang, W., & Chen, P. S. L. (2018). Recent development of Chinese port cooperation strategies. *Research in Transportation Business & Management*, 26, 67-75. doi:10.1016/j.rtbm.2018.01.002
- Islam, M. (2016). *Regional connectivity: Current challenges for Bangladesh*. In Proceedings of the Seminar of Bangladesh Economic Society-Chittagong Chapter, 2016.
- Jeevan, J., Bandara, Y. M., Salleh, N. H. M., Ngah, A., & Hanafiah, R. (2019). A procedure for implementing exploratory mixed methods research into dry port management. *Transactions on Maritime Science*, 8(2), 157-170. doi:10.7225/toms.v08.n02.001

- Kanrak, M., Nguyen, H. O., & Du, Y. (2019). Maritime transport network analysis: A critical review of analytical methods and applications. *Journal of International Logistics and Trade*, 17(4), 113-122. doi:10.24006/jilt.2019.17.4.003
- Kavirathna, C. A., Kawasaki, T., & Hanaoka, S. (2019). Intra-port coopetition under different combinations of terminal ownership. *Transportation Research Part E: Logistics and Transportation Review*, 128, 132-148, doi:10.1016/j.tre.2019.06.001
- Kavirathna, C. A., Kawasaki, T., Hanaoka, S., & Matsuda, T. (2018). Transshipment hub port selection criteria by shipping lines: The case of hub ports around the Bay of Bengal. *Journal of Shipping and Trade*, 3(4), 1-25, doi:10.1186/s41072-018-0030-5
- Lam, J. S. L., Cullinane, K., & Lee, P. T. W. (2018). The 21st century Maritime Silk Road: Challenges and opportunities for transport management and practice. *Transport Reviews*, 38(4), 413-415. doi:10.1080/01441647.2018.1453562
- Lee, P. T. W. (2018). Connecting Korea to Europe in the context of the Belt and Road Initiative. *KMI International Journal of Maritime Affairs and Fisheries*, 10(2), 043-054.
- Lee, P. T. W., Hu, Z. H., Lee, S. J., Choi, K. S., & Shin, S. H. (2018). Research trends and agenda on the Belt and Road (B&R) initiative with a focus on maritime transport. *Maritime Policy & Management*, 45(3), 282-300. doi:10.1080/03088839.2017.1400189
- Lloyd's List. (2020). *Chittagong-Bangladesh*. Retrieved from <https://lloydslist.maritimeintelligence.informa.com/LL1128249/64-Chittagong-Bangladesh>
- Mueller, M. A., Wiegman, B., & Van Duin, J. H. R. (2020). The geography of container port choice: modelling the impact of hinterland changes on port choice. *Maritime Economics & Logistics*, 22, 26-52. doi:10.1057/s41278-019-00142-6
- Neuman, W. L. (2011). *Social research methods: Qualitative and quantitative approaches*. Essex, UK: Pearson Education.
- Notteboom, T. E. (2008). *The relationship between Sea Ports and Intermodal Hinterland in Light of Global Supply Chains: European challenges*. Discussion Paper 2008-10, University of Antwerp, Belgium.
- Notteboom, T. E., & Rodrigue, J. P. (2005). Port regionalization: Towards a new phase in port development. *Maritime Policy & Management*, 32(3), 297-313. doi:10.1080/03088830500139885
- Notteboom, T. E., & Rodrigue, J. P. (2009). The future of containerization: Perspectives from maritime and inland freight distribution. *Geo Journal*, 74(1), 7-22. doi:10.1007/s10708-008-9211-3
- Regmi, M. B. (2015). *International freight transport, logistics systems and transport facilitation*. In Proceedings of the National Stakeholders Consultation and Capacity Building Workshop on Sustainable and Inclusive Transport. Thimphu, Bhutan.
- Rodrigue, J. P. (2006). *Intermodal transportation and integrated transport systems: Spaces, networks and flows*. In Proceedings of the Flowpolis: The Form of Nodal Space Conference, Las Palmas de Gran Canaria, Spain.
- Ruan, X., Bandara, Y. M., Lee, J. Y., Lee, P. T. W., & Chhetri, P. (2019). Impacts of the Belt and Road Initiative in the Indian subcontinent under future port development scenarios. *Maritime Policy & Management*, 46(8), 905-919. doi:10.1080/03088839.2019.1594425
- Saha, R. C. (2015). Port development in Bangladesh. *European Journal of Business and Management*, 7(7), 392-399.
- Saka, M., & Cetin, O. (2019). Research of a dry port which can support container transportation from Kocaeli Ports in terms of possibilities and capabilities. *International Journal of Engineering and Innovative Research*, 1(1), 35-48.
- Shibasaki, R., Tanabe, S., Kato, H., & Lee, P. T. W. (2019). Could Gwadar Port in Pakistan be a new gateway? A network simulation approach in the context of the Belt and Road Initiative context. *Sustainability*, 11(20), 5757. doi:10.3390/su11205757

- UNCTADstat. (2019). *Liner shipping connectivity index, annual Table summary*. Retrieved from <https://unctadstat.unctad.org/wds/TableViewer/tableView.aspx?ReportId=92>
- Wang, P., & Chen, J. (2019). Innovative waterway-waterway transfer service models and experience for container logistics in China (Shanghai) pilot free trade zone: A case study of Taicang express line. *Journal of International Logistics and Trade*, 17(4), 103-112.
doi:10.24006/jilt.2019.17.4.103
- Wang, T., Kang, J. W., & Valentine, V. F. (2020). A holistic analysis of national e-commerce and logistics development. *Maritime Economics & Logistics*, 22, 500-513.
doi:10.1057/s41278-020-00151-w
- Wei, H., Sheng, Z., & Lee, P. T. W. (2018). The role of dry port in hub-and-spoke network under Belt and Road Initiative. *Maritime Policy & Management*, 45(3), 370-387.
doi:10.1080/03088839.2017.1396505
- Worldportsource. (2020). *Port of Haldia*. Retrieved from http://www.worldportsource.com/ports/review/IND_Port_of_Haldia_3509.php
- Xinhua Finance Agency. (2017). *China proposes visions on maritime cooperation under OBOR*. Retrieved from <http://en.xfafinance.com/html/BR/Policy/2017/341967.shtml>