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WORKING PAPER

STRATEGIC IMPORTANCE AND DEVELOPMENT OF PORT OF KOLKATA: A SUGGESTION FOR A DEEP SEAPORT

Dr. Deepankar Sinha

WPS No. LD-22-58

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Strategic Importance and Development of Port of Kolkata: A Suggestion for a Deep Seaport

Dr. Deepankar Sinha

ABSTRACT

The need for alternate sea routes is growing following the Suez Canal blockade, Chinese hegemony, and geopolitical transformation among nations. China's influence in the Indian ocean is observed from its presence in Sri Lanka and Pakistan ports. Port of Kolkata finds its mention among global analysts and the BRI - as it provides an alternative route to join the Indian Ocean avoiding the Malacca Strait. The economy of India and the Southeast Asian countries, especially Bangladesh, are growing; despite the region's growth, there are no large ports, and the performance of the present ports lags behind the standards in the rest of the world. India needs to realize this and strengthen the port system, especially given its BBIN, BIMSTECH, and Act-East policies. In this article, the current state of the Kolkata port is analysed. A deep seaport is proposed to enable India to strengthen its geopolitical strength, improve the balance of payments, reduce cost and emissions, and provide a sustainable option to the global maritime community.

Keywords: Kolkata Port, Deep Seaport, Kolkata Port System, Geopolitical, BRI, Act-East Policy

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Introduction

Kolkata Port, the oldest port in India, was set up in the year 1870 on the country's east coast in the state of West Bengal. This port, located along the Hooghly river at around 230 kilometres from the sea, was first set up under the Calcutta Port Commissioners (CPC) by the British government ruling India. It was then the only maritime gateway of the country trading goods with the world. Kolkata, then known as Calcutta, was the capital of the British Empire until 1911 and, as such, was of strategic interest to the British regime.

The port started with four jetties for discharge of cargo with no loading facilities. It expanded to include the Kidderpore Dock (KPD) in 1892 with lock gates and King George's Dock (KGD), named after King George V, in 1935. KGD was renamed Netaji Subhas Dock (NSD) in 1973. KPD and NSD are combinedly referred to as the Kolkata dock system (KDS). Calcutta port came under the Major Port Trust Act of 1963 and was christened Calcutta Port Trust (CPT) in 1975. In 2001 Calcutta was renamed Kolkata; since then, Calcutta Port Trust has become Kolkata port trust (KoPT). In 2021, KoPT was renamed Shyama Prasad Mukherjee Port Trust (SMPT)[i].

These docks have locks, making it an impounded dock system, sheltering the dock basin water from getting affected by high and low river tides. At the low tide, the water depth was 4.2 meters preventing any ship from calling at the port. The ships must wait for high tide, raising the navigable draft to around 6.5 metres. This tidal phenomenon and low mean draft made the shipping window 12 hours a day and continued.

In the initial days, the port handled jute, tea, coal, wheat, and seeds as export cargo; kerosene oil, rice, and sugar as import cargo. The cargo composition significantly changed over time as break-bulk or packaged shipments were replaced by container cargo. Besides, the increase in the Indian economy led to an exponential rise in crude oil imports, and the environmental concerns led to the withdrawal of coal and iron ore exports. In around 1959, cargo such as carrying food grains unloading from bigger vessels during fair seasons was started at Haldia anchorage - 104 kilometres south of Kolkata and 130 Km nearer to the sea.

The increasing oil import, from 2,00,000 gallons in 1875 to 12,00,000 gallons in 1982-83, led the authorities to build oil jetties in 1886, at a point called Budge-Budge located at a distance of 30

kilometres from Kolkata. The port witnessed a growing trend of petroleum oil imports and an increasing size of vessels resulting in the development of an oil jetty in 1968 at Haldia. The Haldia Dock Complex (HDC) was commissioned in 1977, comprising 17 berths and three oil jetties to handle dry and liquid bulk cargo. The infrastructure in HDC served to export coal and iron ore; the oil jetties primarily cater to the import of crude oil and chemicals. This dock initially provided a navigable draft of 8 to 9 metres. It was reduced to around 7 to 7.5 metres due to siltation.

Meanwhile, the very-large and ultra-large crude carriers were introduced in the shipping world, but HDC failed to accommodate fully-laden Panamax vessels. Many of these vessels unloaded cargo partially at Visakhapatnam or Paradeep port and then called Haldia dock for discharging the residual cargo. In the wake of this deteriorating draft Indian Oil, the most prominent Indian oil company, planned to set up a pipeline from Paradeep to Haldia, making the oil jetties redundant.

Kolkata port provisioned for cargo loading and unloading operations at Diamond Harbour and Sagar anchorages in search of deep draft locations. Port river pilots guide the ships up to these points and anchor for overside discharge of cargo on barges or smaller vessels for final unloading at Kolkata and Haldia docks.

The parcel load of vessels handled in these anchorages was higher than those visiting HDC, reducing the opportunity cost for the shipping lines. In 2021, an LPG tanker carrying around 50,000 carried out a ship-to-ship discharge at the anchoring point in Sand Heads[ii], providing approximately 10 metres draft. The present configuration of the port is illustrated in figure 1.

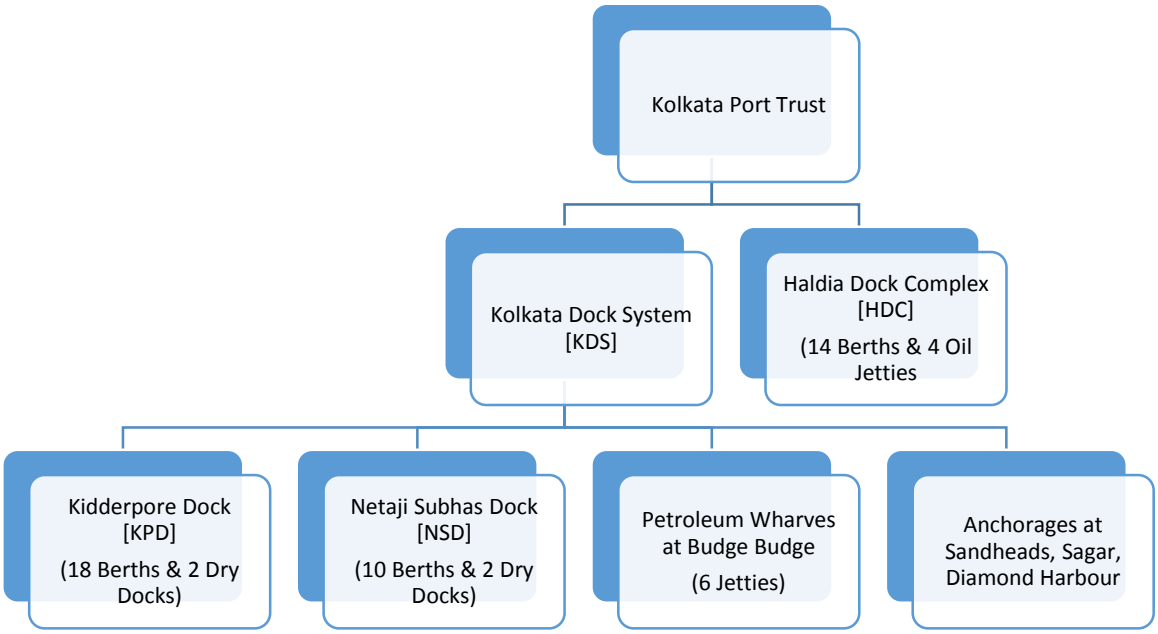

Figure 1: Kolkata Port Administrative Units

Thus, Kolkata port is a multi-locational port along the river Hooghly, as illustrated in figure 2.

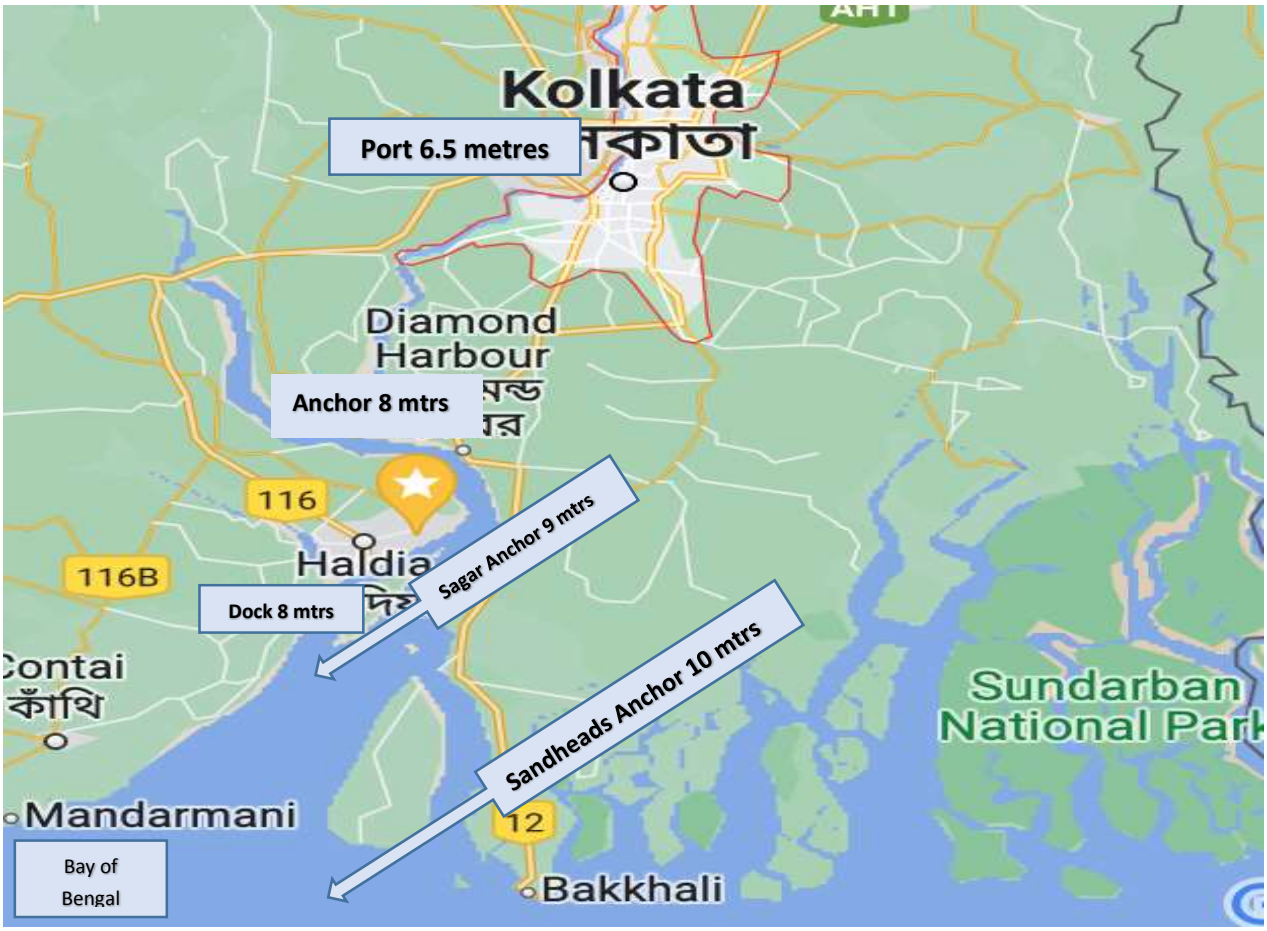

Figure 2: Operational points of Kolkata Port

Source:https://www.kolkataporttrust.gov.in/index1.php?layout=1&lang=1&level=1&sublinkid=145&lid=178

Port's Performance: In 1950-51 Kolkata port's share was around 40% of all Indian ports, handling about 7.5 MT and 69.2 million INR[iii], i.e., less than a million USD. At this time, Kolkata port comprised Kolkata Dock System (KDS) alone. The port's cargo handling stood at around 64 MT in 2019-2020, which marginally dipped in the following year due to the pandemic. The gross revenue in 2020 21 stood at about 27964 Million INR[iv] – approximately 3.7 million USD. Figure 3 illustrates the cargo throughput trend of Kolkata port in the last few years

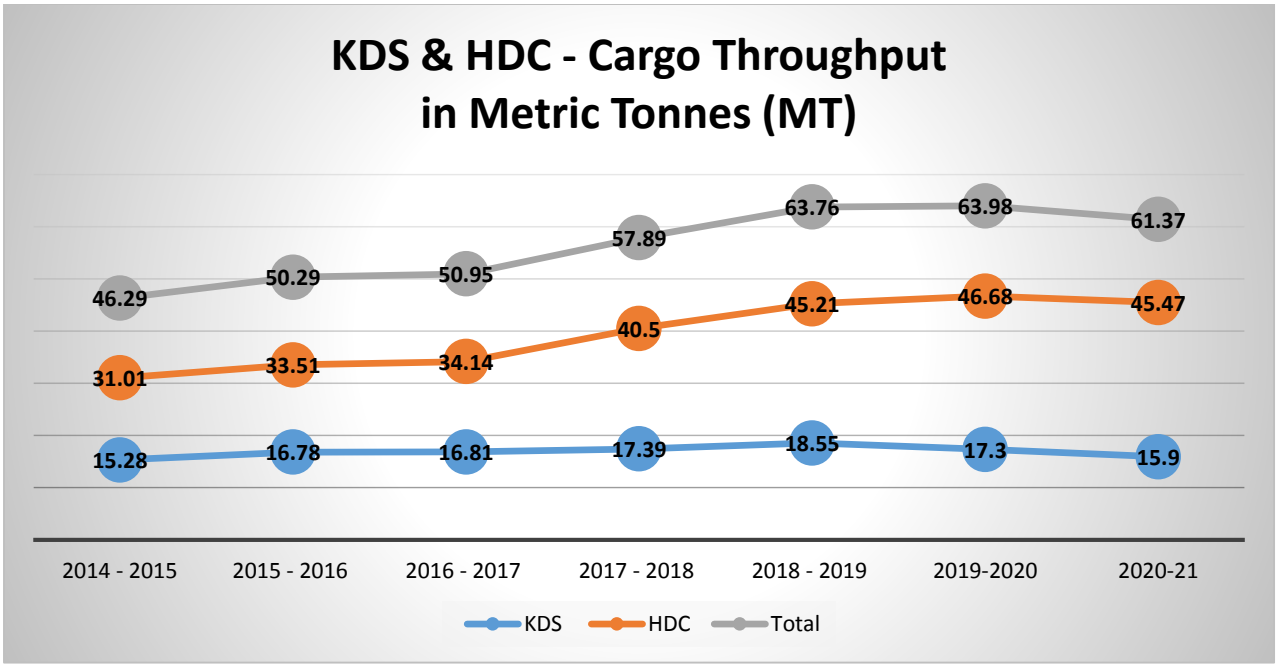

Figure 3: Cargo handled by Kolkata Port in the Last Five Years

Data Source: https://www.kolkataporttrust.gov.in/showfile.php?layout=2&lang=1&level=2&sublinkid=1500&lid=1283

Chart: Author's creation

Importance of Kolkata Port: Kolkata port serves as the maritime gateway for northern and north-eastern India and landlocked countries, namely, Nepal and Bhutan – figure 4.

Figure 4: Map illustrating Kolkata connected to Nepal and Bhutan

It is further connected to the national waterways on river Ganges – NW1, connecting up to 1620 Km upstream (figure 5).

Figure 5: The National Waterways – 1(NW1)

Source: http://www.walkthroughindia.com/walkthroughs/the-6-inland-national-waterways-of-india/

The port enables the transit of goods inland to India's eastern region to 230 Km from the sea; further, its upstream connectivity to NW1 and national waterways 2 makes it a crucial node from the sustainability perspective. The inland water movement of cargo eases road congestion, reduces railway movements, optimizes cost per ton-mile, and lowers emissions (from land carriers) compared to rail-road transport.

Kolkata Port is India's link node to Kaladan multimodal transit transport corridor connecting India with ASEAN. This port has been suggested as the nodal hub in the proposed blue quadrilateral linking the Bangladesh-Bhutan-India-Nepal (BBIN) nations (Sharda & Sinha, 2021). It is connected with direct shipping services to Bangladesh, Myanmar, Colombo, and Singapore ports.

The containers from the port move by feeder shipping lines feeding to the main sea lines plying between the hub ports (figure 6). The port finds a strategic place in the Chinese Belt and Road Initiative (BRI), formerly the One-Belt-One-Road (OBOR) project. It is the only port in India to be part of the revived silk route.

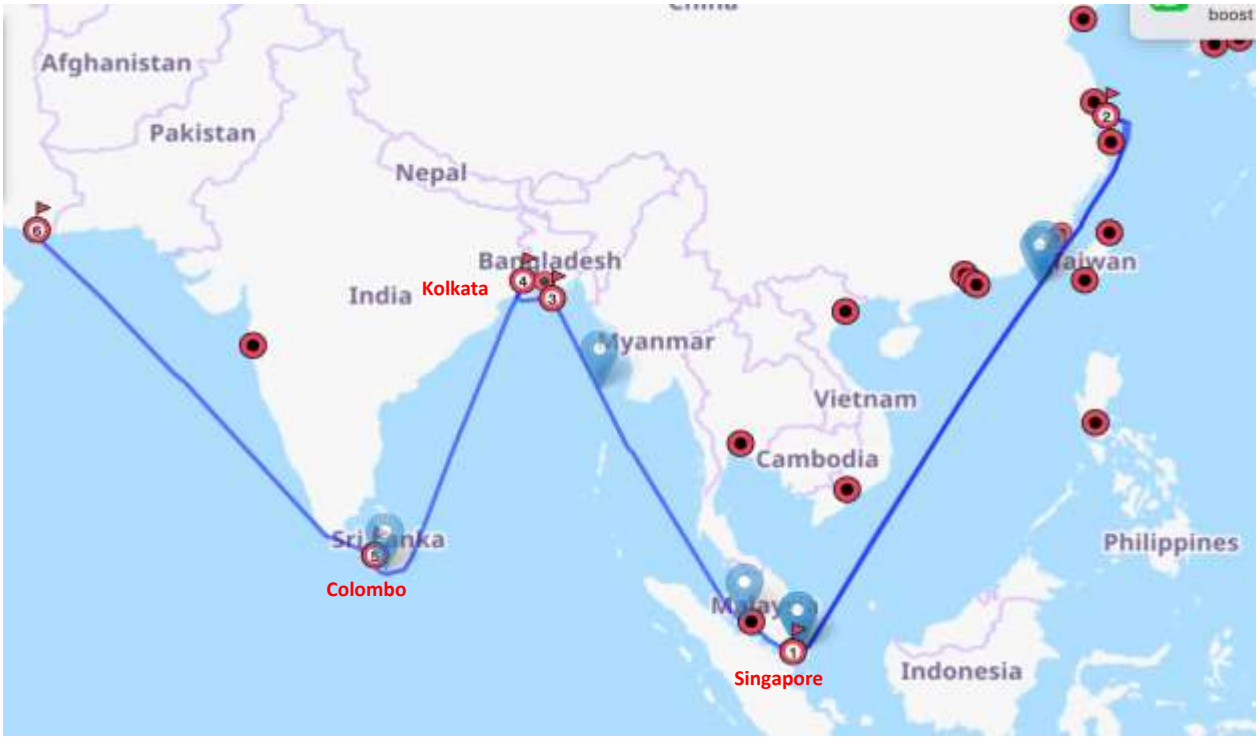

Figure 6: Kolkata port's sea connectivity

Despite the economic growth and increasing trade in this region, there are no hub ports to cater to the trade of India and its southeast partner countries. The performance of major ports in this region, such as Kolkata or Chittagong, lags behind any world-class sport such as Singapore, Shanghai, Rotterdam, and similar.

This article aims to suggest ways to make the port of Kolkata enhance its strategic importance in the Indian Ocean region. It analyzes the current state of the port of Kolkata and plausible ways to set up a port system instead of viewing individual docks and operational points in silos. It proposes an approach with a deep seaport as the hub connecting with all other existing units. The paper suggests complementarity and coopetition amongst units in lieu of competition and cannibalization. Thus, a holistic approach based on systems thinking forms the basis of this article.

There are six sections in this article. The next session section discusses the Port's features, issues, and challenges, followed by two sections on the need for Kolkata Port's augmentation and future plans proposed by the port authorities. Section 5 presents the way ahead for the port's development to enhance its strategic importance in the region. The last section concludes the study.

2. Features, Issues, and Challenges of the Port (Kolkata & Haldia)

Kolkata

Navigable Challenges: The navigable challenges include 3 Bs – the bars, bends, and bores. The bars refer to sand bars on the riverbed, that is, the ridges created by deposits of silt carried into the river during high tides and that settle down during the ebb tide. The soil deposition is not uniform across the channel, and the region with the most increased silt deposit limits the size of the vessels that can call the port. The Hooghly River is meandering and has sharp bends that restrict the size of the ship to the extent of 172 metres up to Kolkata and 189 metres for Budge Budge [6]. Bores are exceptionally high tides that disrupt the movement of ships. Besides, the fluctuating navigable draft is a major issue.

Draft issues: Kolkata Port, the first Indian port, suffers from the limitations of the fluctuating navigable draft and the sizes of the locks limiting the dimensions of the ships that can enter the port. The draft varies with time along the day; it peaks every six hours, and the vessel's speed determines how much load it can carry to cross the channel along with the high tides. The draft forecast of the port, illustrated in Figures 7 and 8, shows a draft difference of two metres between high and low-speed vessels. As a thumb rule, port officials say that one metre draft accounts for 2000 metric tons (MT) of container cargo; it can be even more for bulk freight. Besides, vessels plying with 12 knots speed face a draft difference of one metre or more, that is, on certain days, it could avail 8 metres of the draft while during the same month it can be seven metres or below. So a vessel that generally calls the port availing 6 metres draft may have to visit with a lower parcel load due to a fall in the draft during the same period. In addition, the navigable draft fluctuates over months, as during the winter, the average draft is lower than during the monsoon seasons. Thus the influence of nature, an externality, impact the port operations.

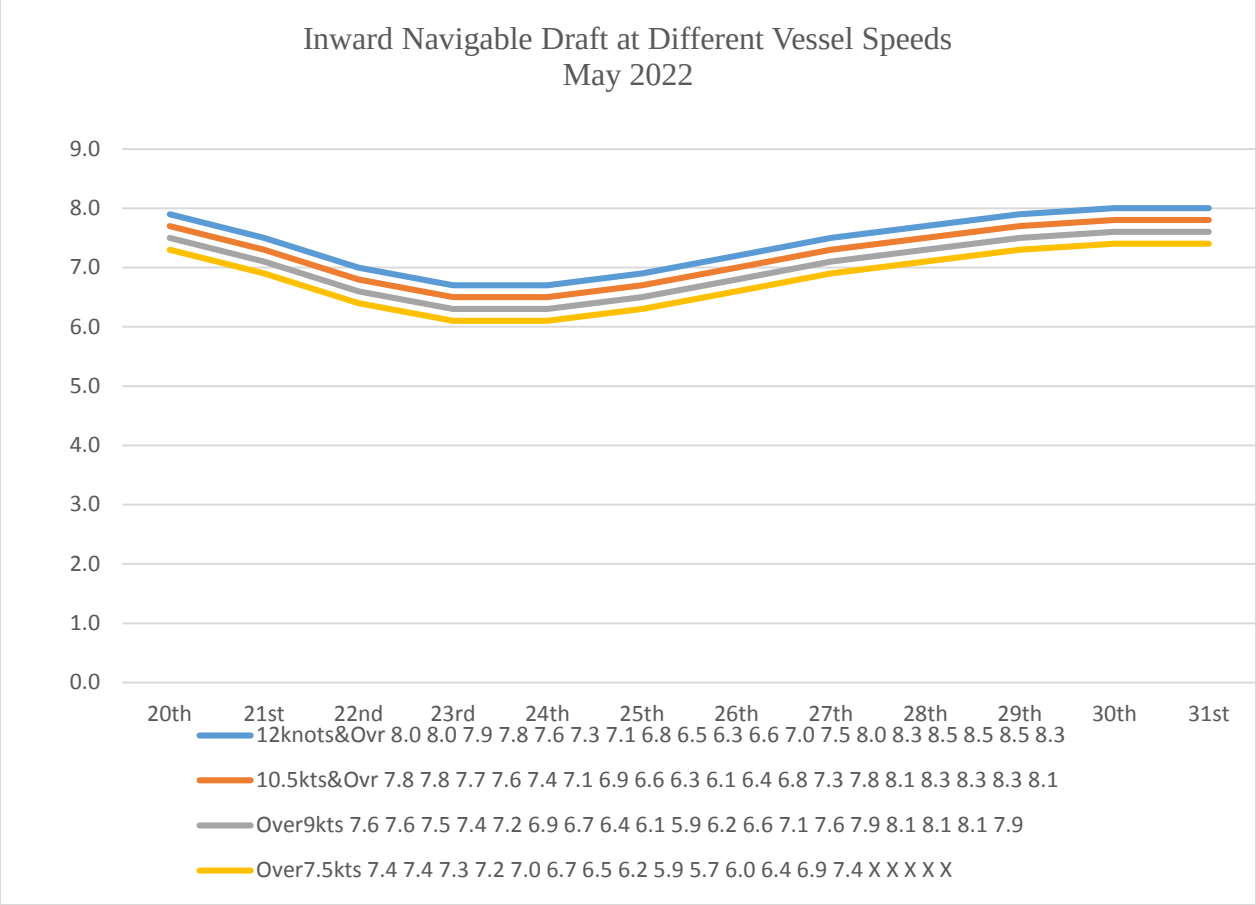

Figure 7: Inward draft

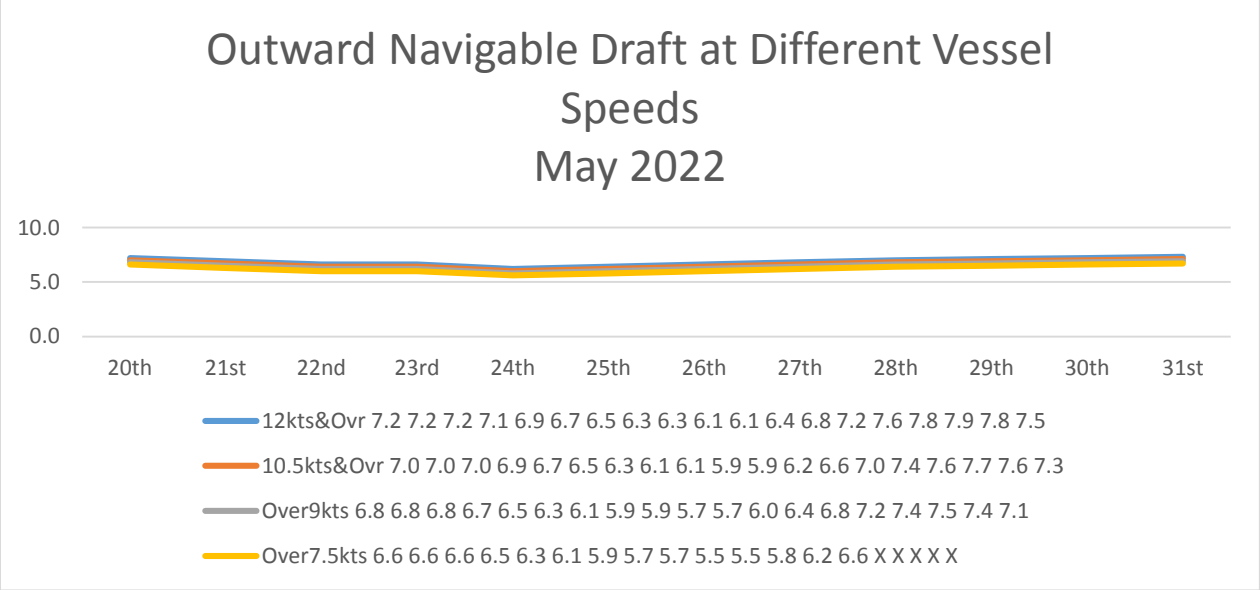

Figure 8: Outward draft

Pilotage Challenges: The Kolkata Dock System (KDS) piloting distance is around 223 kilometers. It includes 148 kilometre of the river and 75 kilometres of sea movement. There are four stages of piloting - the ships come with the assistance of a vessel traffic management system (VTMS) from Sandhead anchorage to Sagar. At this point, the port pilot, referred to as the river pilot, boards the ship and guides it up to a point called Garden Reach. Here, the river pilot deboards, and the harbour pilot embarks on board the vessel, maneuvering it up to the lock gates. At the lock gates, the berthing master, also referred to as the dock-pilot, takes over the charge of the vessel - maneuvering and placing the ship alongside the berth.

Lock Gates: The dimensions of the locks, shown in Figure 9, restrict the size of the vessel that can enter the port. The NSD lock width of around 90 feet allows ships up to 172 metres in length and 24 0.3 metres in width (beam). KPD has a lock width of about 70 feet, enabling vessels with a 157 metre length and 21.3 meters beam[v].

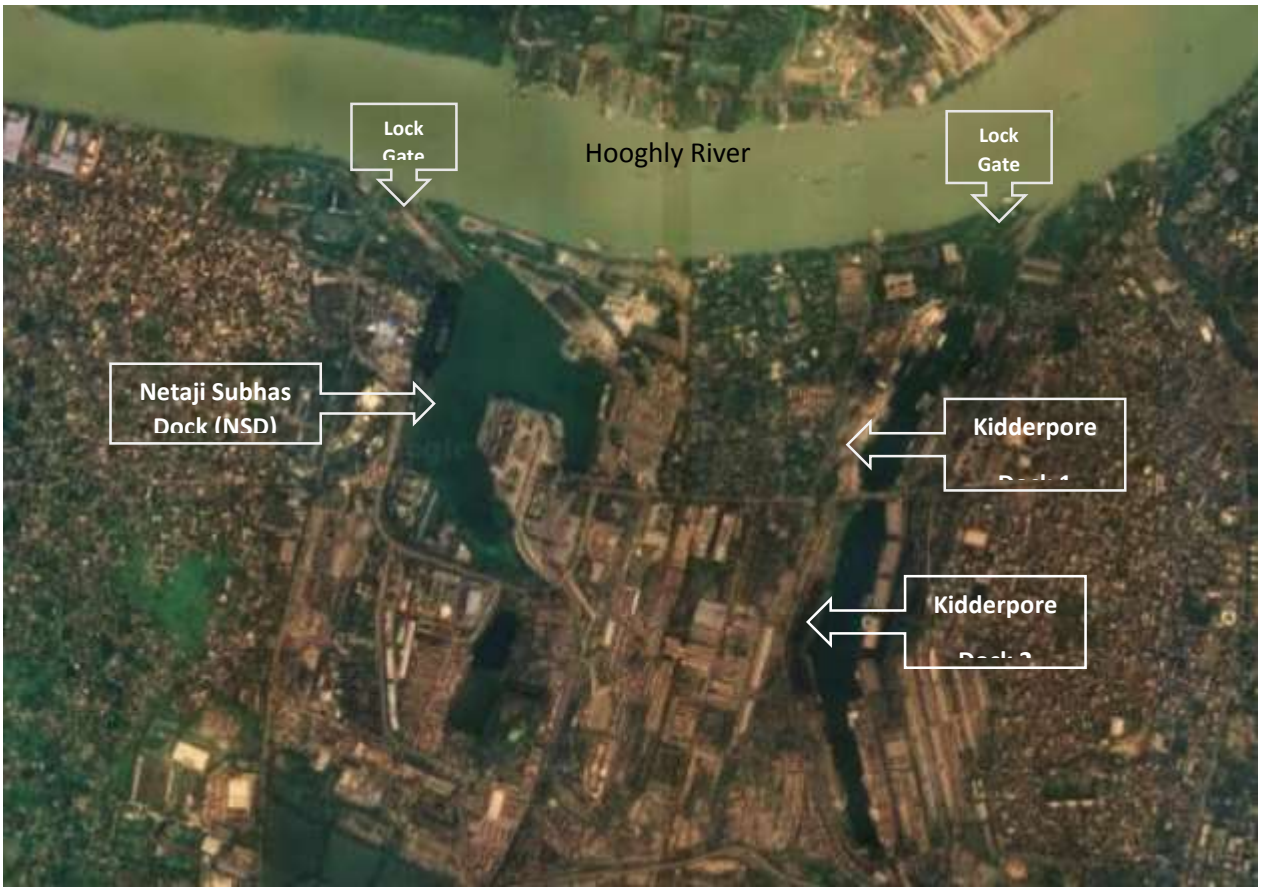

Figure 9: Kolkata Dock System – NSD & KPD

Source: http://www.worldportsource.com/ports/maps/IND_Port_of_Kolkata_236.php

Berths: The layout of NSD (figure 10) suggests that the quay is not continuous, somewhat broken restricting ships of different lengths accommodated alongside the berths in the dock.

Figure 10: NSD Layout

Table one shows that the lengths of most of the berths are higher than 172 metres, the maximum permissible length of a vessel that can visit the dock system. Berth number 12 has a length of 152 metres, i.e., less than the optimal limit. The draft across these berths varies from 7.1 to 9 metres.

Table 1: NSD Berth description

Sl. No.	Berth No.	Length (m)	Water Depth (m)	Commodity Handled
1	1	200	7.1	Heavy Lifts &General Cargo
2	2	187	7.8	General Cargo
3	3	183	9.0	General Cargo
4	4	181	8.6	Container
5	5	182	8.2	Container
6	7	192	8.5	Container
7	8	225	8.0	Container
8	12	152	8.1	Liquid cargo/POL
9	13	174	8.2	General Cargo
10	14	174	7.4	General Cargo

Thus, available berth length and the draft at each of these points restrict the size of the ship.

City Congestion: NSD and KPD are city-based ports that impose restrictions on the flow of goods by roads resulting in trucks waiting outside the city and congestion of streets during to and fro movement from the docks. This factor increases the dwell time of cargo and the turnaround time of the ships.

Haldia: Figure 11 shows the dock layout. Haldia dock complex is an impounded dock system with lock gates primarily handling dry and liquid bulk cargo. The oil jetties for liquid cargo handling are outside the dock basin.

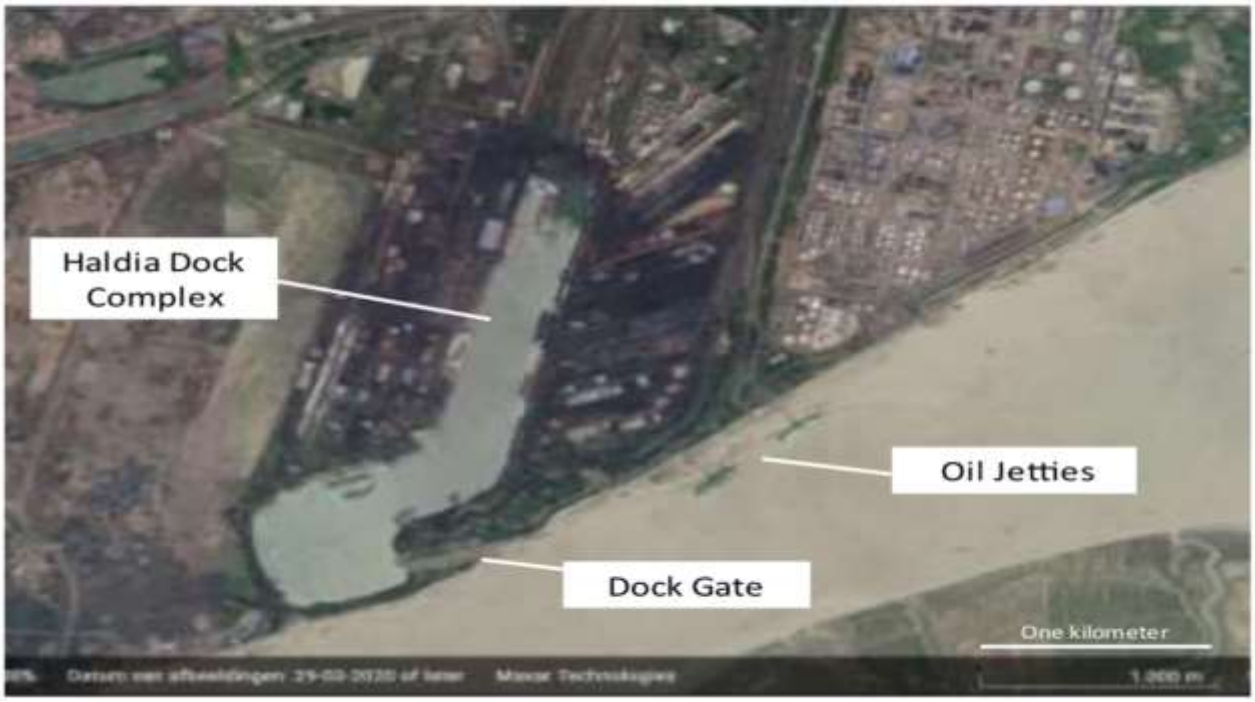

Figure 11: Haldia Dock Complex Layout

Vessel Size and Parcel Load Imbalance: Panamax vessels call at Haldia Dock but visit with around 40 to 50 percent load on board due to draft restrictions. The dock can accommodate a ship of about 100,000 DWT (deadweight tonnage) yet carry half the capacity (Figure 12). A snapshot of vessels called at Haldia in April 2020 shows a wide gap between DWT and parcel load.

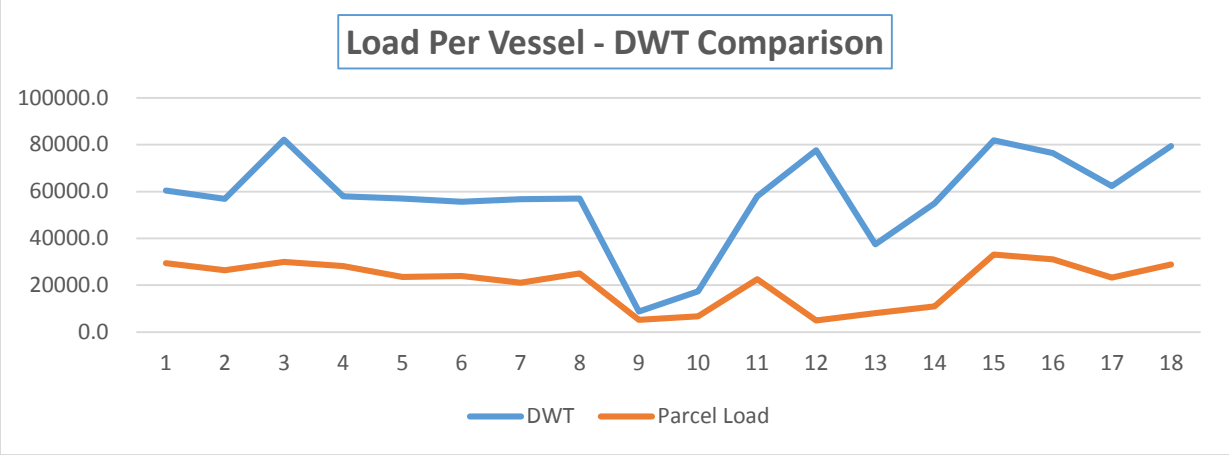

Figure 12: DWT - Parcel load comparison

Data source: Haldia Dock Complex, SMPT

The parcel load to DWT ratio is 50 percent or less, as illustrated in figure 13.

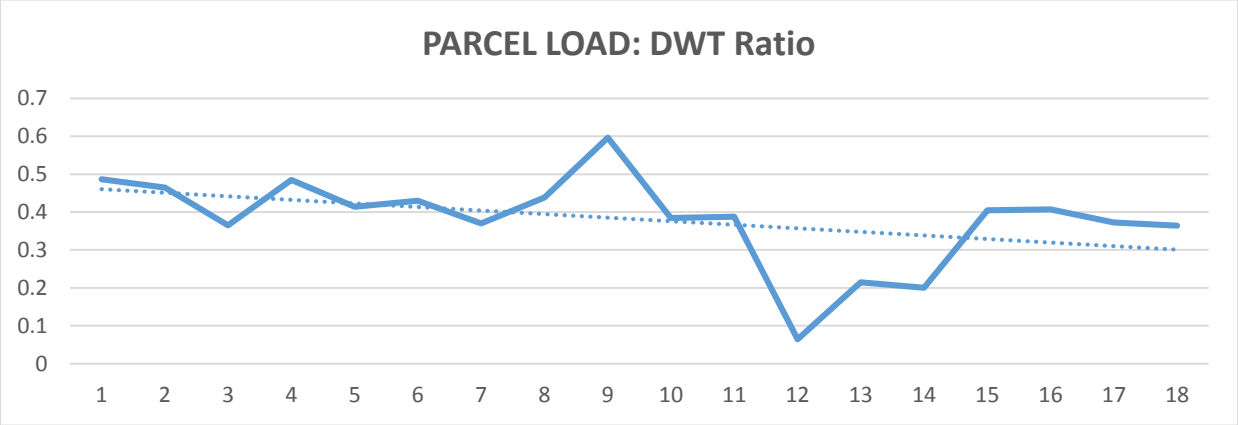

Figure 13: Parcel load to DWT Ratio

Data source: Haldia Dock Complex, SMPT

The low load factor per vessel increases the cost and raises the question of sustainable operations. The energy and resource consumption (tugs and pilots) per ton of cargo handled with a low parcel load remains unchanged. If vessels come fully laden, the cargo throughput remains intact, and resource utilization per ton of freight is low. In the year 2021, 2262 partially laden vessels visited HDC. Fully loaded ships will reduce the number of ship calls by almost half, reducing emission, energy consumption, and utilization of resources. Thus, a deep seaport will bring in additional 50% revenue and reduce costs, increasing profit margins.

Export-Import Imbalance: The gap between export and import is significant - meaning vessels have to leave the port with almost negligible cargo compared to its capacity. Thus shipping lines incur an opportunity cost - which may discourage them from future expansion on this route (figure 14).

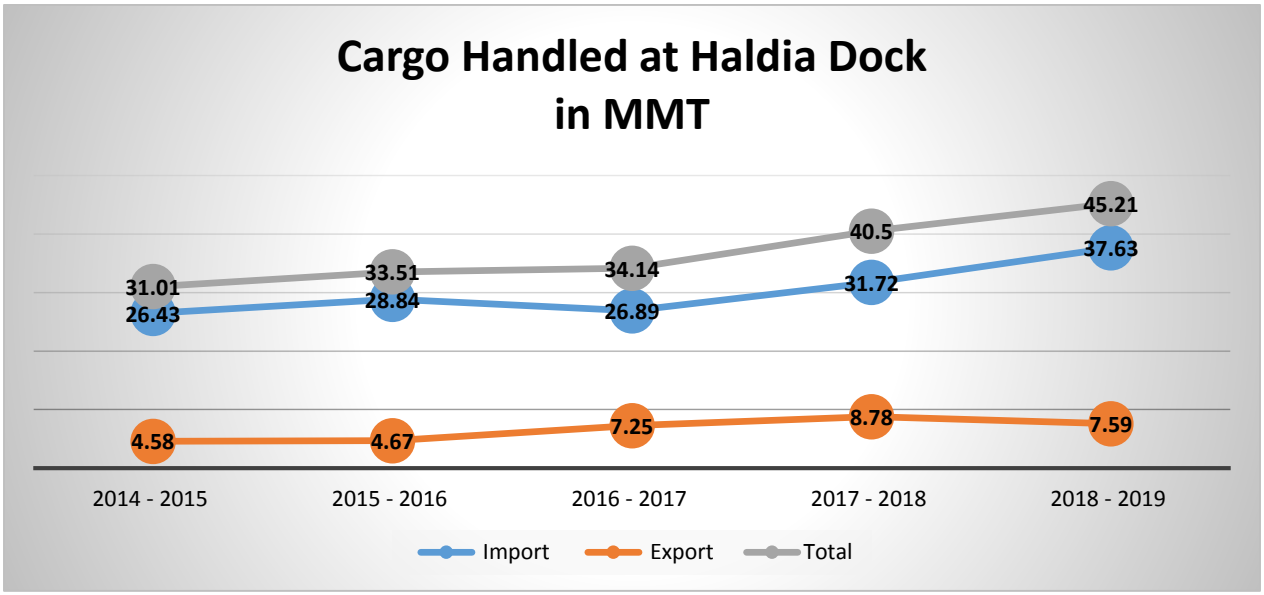

Figure 14: Cargo handled by Haldia Dock Complex of Kolkata Port in Last Five Years

Data Source: https://www.kolkataporttrust.gov.in/showfile.php?layout=2&lang=1&level=2&sublinkid=1500&lid=1283

Chart: Author's creation

India aims to strengthen its ties with Southeast Asian nations, and the trade between these countries has been increasing over time. The connectivity of Kolkata Port with Ashugunj, Mongla, and Chittagong ports in Bangladesh and Sittwe (Kaladan) port in Myanmar is an essential step toward strengthening regional ties and trade. This linkage will help increase the exports to these countries, and Kolkata can serve as the transshipment port to the Southeast Asian countries. However, the current constraints need to be alleviated to meet this target.

Lock Gate Efficiency: Haldia Dock Complex (HDC) has a single entry point to its dock through the lock system built-in 1977. This lock failed in August 2014, halting shipping[vi] for some time; the need for a second lock was felt. Besides, the lock was manually operated, causing a longer time for ships to berth.

PreBerthing Delays (PBD): The ships have to wait for two days on average, and in some cases, the waiting time exceeds five days[vii]. Thus with a lower parcel load and higher waiting time, the opportunity loss for the shipping lines is significant. This increases the shipping cost.

India aims to pursue multilateralism through its Act East Policy (AEP) and BIMSTEC (Bay-of-Bengal initiative for Multi-Sectoral Technical and Economic Cooperation) program to respond to China's inroads in this region[viii]. Augmentation of Kolkata port's capabilities can aid India in strengthening its objectives. This process will include multimodal projects that link Kolkata port to the national waterways NW1 and NW2, connecting the ports of Bangladesh and Myanmar and making inroads towards Nepal and Bhutan.

The need to strengthen Kolkata port capacity is further endorsed by the fact that China has already previously conceptualised the Kunming (Yunnan province) – Kolkata (K2K) corridor, i.e., the Bangladesh-China-India-Myanmar (BCIM) corridor. This conduit is one of the proposed six corridors under BRI. China already initiated its maritime connect – the 'string-of-pearls' comprising the Gwadar port in Pakistan, Hambantota in Sri Lanka, and Kyauk Pyu in Myanmar with an eye on Sonadia port in Bangladesh. This initiative also makes China develop an alternate route to the Malacca Strait[ix]. At the same time, it is also viewed as an infringement on the sovereignty of the recipient country [x,xi,xii].

The development of the Kolkata port into a mega-infrastructure can counter China's initiative as it will be the nodal point of India's AEP. The signing of the Indo-Bangladesh treaty is the first step in this direction. All plans should ensure that Kolkata port acts as a maritime hub in the Southeast Asian region with constraints such as draft, waiting time and operational inefficiency removed.

Shippers in Bangladesh face massive congestion in the Chittagong port during the month. April to October every year. The Dhaka Chamber of Commerce and Industry (DCCI) proposed to use the Haldia dock as an alternative to Chittagong port, moving cargo, especially containers, through inland waterways to the Indian port. It would cost additional around 200 U.S. Dollars but save time[xiii]. Thus, there is already a proposal for considering Haldia dock as a transhipment hub for Southeast Asian countries.

The above context was reiterated by the Associated Chambers of Commerce in India (ASSOCHAM), who called for a separate dock system to cater to the additional need for a transhipment hub in this part of the country [xiv].

3. Port's Future Plans

The Government of India has undertaken a mega plan referred to as 'Sagarmala' to enhance the capacity of the ports in India to 2500 MMTPA (million metric tons per annum) by 2025 from the existing capacity of 1500 MMTPA[xv]. Under this plan, Kolkata Port Authority aims to construct our new berths to handle edible oil, LPG, and chemicals and construct a second lock for the Haldia Dock Complex. These projects are expected to increase the capacity and throughput of the port but are incremental as they're not enough to cater to mainline shipping.

In March 2022, Adani Port Special Economic Zone (APSEZ) won the bid to develop a port in a location called Tajpur, supposedly a place with a deeper draft[xvi]. Figure 15 shows the proposed site of the deep seaport.

Figure 15: Proposed location of the deep seaport.

4. Way Forward:

Global policymakers looked location of ports from the perspectives of centrality, accessibility, and other economic and geographical dimensions[xvii]. Bhaumik[xviii] observed that Kolkata Port qualifies as the hub port given the Trans-Asian railway corridor, the AEP, the BBIN, and BIMSTECH initiatives.

This paper proposes a holistic approach for the augmentation of the Kolkata port, leading to the development of a Kolkata port system (KPS). It would comprise the deep seaport as the Hub for existing dock systems and anchorages of Kolkata ports connecting the port system of Bangladesh (Chittagong, Mongla, Ashugunj, Narayanganj, Payra, and other smaller ports) and Myanmar ports (Sittwe, Thilawa, and others). KPS is linked to the National Waterways 1 and 2 (NW1 & NW2), connecting north Bengal and Assam. These connectivities further extend to Nepal and Bhutan through roadways.

Feeder vessels and barges can operate between the deep seaport and the KDS, HDC, Buj Buj, Diamond Harbour (DH), and Sagar anchorages. Figure 16 illustrates the proposed Kolkata port system to meet the strategic requirement of the region.

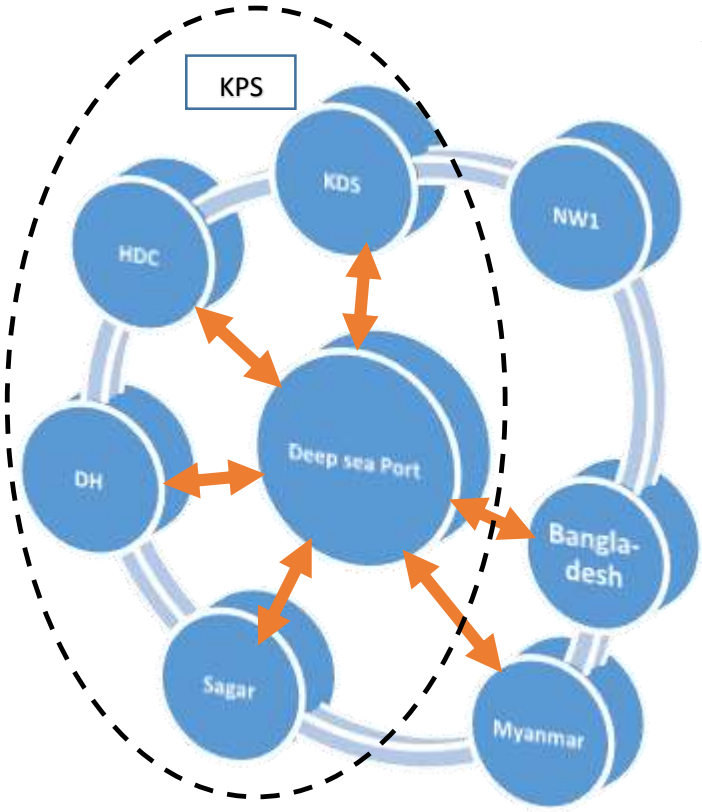

Figure 16: The Conceptual Framework of the Kolkata Port System (KPS)

Source: Author's creation

The Kolkata port system (KPS) can serve the BBIN region by integrating inland waterways terminals (IWT) of India, Bangladesh, and Myanmar[xix]. An illustration is in figure 17. Nepal and Bhutan can be linked through multimodal routes. The Kaladan project can be the connectivity to Myanmar and beyond.

Figure 17: The BBIN Trade Network: Kolkata Port System as the Nodal Point

Source: https://cuts-citee.org/pdf/discussion-paper-a-network-of-multi-modal-logistics-parks-in-the-bbin-sub-region.pdf

5. Conclusion

Over time, Kolkata port, celebrating its 125 years of existence, has a chequered history catering to the northern and eastern part of the Indian subcontinent and countries in Southeast Asia. Kolkata Dock System (KDS) is located in the heart of the city, once the country's capital, and serves as the kitchen port with minimal railroad movement of cargo to the destination and vice versa. Haldia dock complex, located 60 kilometres downstream of Kolkata, has a more significant navigable draft and can call Panamax vessels but suffers from the comparatively low draft for ships to come fully laden with cargo. The port authorities have also explored handling the shipments at anchorages such as Diamond Harbour, Sagar, and Sand Heads, where the draft availability are better but can only be availed during fair weather seasons.

India's stress in building a strong relationship with the Southeast Asian countries, coupled with the congestion problems in Chittagong port, the principal port of Bangladesh, has led to the focus of augmenting Kolkata port to cater to the neighbouring countries. Further, the signing of the Indo-Bangladesh water protocol treaty led to the growing importance of the port serving as the hub of inland transportation to the northern and northeastern states of India and Bangladesh.

India needs to strengthen the port to counter China's inset to the Asian countries through Sri Lanka and Pakistan. Kolkata port has the potential to become a hub port provided its deep-sea unit can accommodate Capesize vessels and offer efficiency to attract mainline vessels[xx].

The deep seaport will also ensure savings of Indian forex reserves as Indian cargo can get transshipped here instead of visiting Colombo. In addition, the country earns from the transshipped shipment of other foreign nations – Bangladesh and Myanmar.

This paper proposes a holistic approach that integrates the different dock systems with the deep seaport leading to synergization and not cannibalization of traffic amongst the dock systems.

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[i] https://pib.gov.in/PressReleasePage.aspx?PRID=1629041#:~:text=Cabinet%20approves%20renaming%20of%20Kolkata%20Port%20Trust%20as%20Syama%20Prasad%20Mookerjee%20Trust&text=The%20Union%20Cabinet%20chaired%20by,as%20Syama%20Prasad%20Mookerjee%20Port.

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[v] https://www.kolkataporttrust.gov.in/showfile.php?layout=1&lid=4136

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