Analysis on Port Performance Indicator of Syama Prasad Mookerjee Port

DISSERTATION REPORT

Submitted to the **School of Maritime Management, Indian Maritime University** in partial fulfilment of the requirements for theaward of degree,

Master of Business Administration in

International Transportation and Logistics Management

By

Gaurav Kumar
(Reg.No:2101305006)
Under the supervision of
Dr M.K. Dasgupta
H.O.D (MBA-ITLM)
Indian Maritime University, Kolkata

SCHOOL OF MARITIME MANAGEMENT

INDIAN MARITIME UNIVERSITY

(A Central University, Government of India)

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Thank You,
Gaurav Kumar
2101305006
MBA-2nd year

DECLARATION

I hereby declare that the dissertation entitled "**Analysis on Port Performance Indicator of Syama Prasad Mookerjee Port**" submitted by me, for the award of the degree of Masters of Business Administration (International Transportation and Logistics Management) to Indian Maritime University is a record of bonafide work carried out by me under the supervision of, **Dr.M.K. Dasgupta** (H.O.D- Indian Maritime University – Kolkata Campus), MBA (ITLM).

I further declare that the work reported in this thesis has not been submitted and will not be submitted, either in part or in full, for the award of any other degree or diploma in this institute or any other institute or university.

CERTIFICATE

SCHOOL OF MARITIME MANAGEMENT
INDIAN MARITIME UNIVERSITY
(A Central University, Government of India)
KOLKATA CAMPUS

This is to certify that the dissertation entitled "**Analysis on Port Performance Indicator of Syama Prasad Mookerjee Port**" submitted by Mr. Gaurav Kumar IMU (Kolkata campus), for the award of the degree of MBA (International Transportation and Logistics Management), is a record of bonafide work carried out by him under my supervision. The contents of this report have not been submitted and will not be submitted either in part or in full, for the award of any other degree or diploma in this institute or any other institute or university.

Place: Kolkata

Date:

Signature of supervisor

(DR. M.K. DAS GUPTA)
HOD MBA-ITLM IMU, KOLKATA

ABSTRACT

The performance of ports plays a crucial role in facilitating global trade and economic growth. In this study, an analysis is conducted on the port performance indicators of Syama Prasad Mookerjee Port, one of the major ports in India. The aim of the analysis is to assess the efficiency and effectiveness of the port operations, identify areas of improvement, and suggest measures for enhancing the overall performance of the port.

The study employs a quantitative approach, utilizing relevant data on port performance indicators, such as cargo throughput, vessel turnaround time, berth occupancy rate, container handling, and productivity, among others. The data is collected over a period of time, and statistical analysis, trend analysis, and benchmarking techniques are applied to assess the performance of the port.

The findings of the analysis reveal the current status of the port's performance, identifying strengths and weaknesses in different areas. The study highlights the need for improving the port's operational efficiency, optimizing resource utilization, enhancing container handling capacity, and reducing vessel turnaround time. Additionally, the study identifies the need for technological advancements, infrastructural upgrades, and operational streamlining to improve the overall performance of the port.

The results of this study are expected to provide valuable insights and recommendations for port authorities, policymakers, and stakeholders to implement strategic measures for enhancing the performance of Syama Prasad Mookerjee Port, and thereby contribute to the growth and development of the maritime trade sector in the region. Further research and analysis in this area are warranted to continuously monitor and evaluate the performance of the port and implement effective strategies for sustainable port operations.

TABLE OF CONTENT

1. INTRODUCTION

Syama Prasad Mookerjee Port, formerly known as Kolkata Port, is a major seaport located in Kolkata, West Bengal, India. It is one of the oldest ports in India and serves as a gateway for international trade of the country.

Analysis of port performance indicators involves evaluating various metrics and factors that reflect the operational efficiency, effectiveness, and productivity of a port. These indicators are used to assess the overall performance of a port and provide its strengths, weaknesses, opportunities, and challenges.

The analysis of port performance indicators for Syama Prasad Mookerjee Port include:

1. **Cargo handling:** This includes the volume of cargo handled, such as containers, bulk cargo, and general cargo, as well as the efficiency of cargo handling operations, such as turnaround time, berth occupancy, and waiting time.

2. **Vessel productivity:** This involves measuring the productivity of vessels calling at the port, such as the average number of moves per hour, vessel turnaround time, and berth productivity.

3. **Infrastructure and facilities:** This include evaluating the adequacy and condition of port infrastructure and facilities, such as berths, warehouses, container yards, and handling equipment, to determine their impact on port performance.

4. **Connectivity and hinterland access:** This involves assessing the connectivity of the port with the hinterland, including road, rail, and inland waterways connectivity, to determine the efficiency of cargo movement to and from the port.

5. **Financial performance:** This includes evaluating the financial health of the port, such as revenue, expenses, profit margins, and return on investment, to assess its financial sustainability and viability.

6. **Environmental sustainability**: This involves evaluating the port's environmental performance, including measures taken for pollution

control, waste management, and sustainable practices, to determine its compliance with environmental regulations and sustainability standards.

7. **Safety and security:** This include assessing the safety and security measures implemented at the port, such as navigation safety, port security, and emergency response, to ensure the smooth and secure operation of port activities.

8. **Customer Service:** Customer service is an important performance indicator for ports, as it measures the satisfaction of port users, including shipping lines, cargo owners, and other stakeholders. Metrics such as response time to customer inquiries, availability of information, and overall customer satisfaction surveys can be used to evaluate the port's customer service performance

9. **Container Handling Efficiency**: If the port handles containerized cargo, container handling efficiency becomes a crucial performance indicator. This includes metrics such as container dwell time. Lower container dwell times indicate efficient container handling processes and can lead to improved vessel turnaround times, reduced demurrage costs, and increased customer satisfaction.

10. **Utilization of Port Infrastructure**: The effective utilization of port infrastructure, including berths, terminals, storage yards, and other facilities, is a key performance indicator. Metrics such as berth occupancy rate, storage yard utilization rate, and equipment utilization rate can be used to evaluate how efficiently the port is utilizing its infrastructure. Higher utilization rates indicate optimal use of available resources, which can result in improved operational efficiency and reduced costs.

11. **Innovation and Technology Adoption:** The adoption of innovative technologies and processes can significantly impact the performance of a port. Metrics such as investments in technology, implementation of digital systems, automation levels, and innovation initiatives can be used to evaluate the port's efforts in adopting new technologies and driving innovation.

12. **Turnaround Time for Vessels:** The time taken for vessels to complete their port call, including time spent at berth, can be a critical performance indicator. Lower vessel turnaround times indicate efficient port operations, faster cargo handling, and reduced waiting time for vessels, which can result in increased throughput, improved customer satisfaction, and reduced costs for shipping lines.

13. **Cargo Dwell Time:** Cargo dwell time refers to the time taken by cargo to move through the port, including time spent at various stages such as unloading, storage, and loading. Longer dwell times can result in increased costs, delays, and congestion, while shorter dwell times indicate efficient cargo handling operations. Monitoring cargo dwell time can help identify bottlenecks and areas for improvement in cargo handling processes.

14. **Human Resource Management:** Effective human resource management is crucial for the performance of a port. Metrics such as employee turnover rate, training programs, and employee satisfaction can be used to assess the port's human resource management practices. High employee satisfaction, low turnover rates, and effective training programs can lead to a motivated workforce, better performance, and reduced operational disruptions.

15. **Port Charges and Fees:** Port charges and fees can have a significant impact on the competitiveness of the port. Metrics such as tariff rates, handling charges, and other fees can be used to assess the port's pricing competitiveness. Lower port charges and fees may attract more shipping lines and cargo, leading to increased throughput and revenue.

16. **Compliance with Regulatory Requirements**: Compliance with regulatory requirements is essential for ports to operate legally and sustainably. Metrics such as regulatory audits, violations, and penalties can be used to assess the port's compliance with relevant regulations, laws, and standards. Good compliance practices indicate responsible operations and adherence to legal and regulatory requirements.

17. **Stakeholder Engagement:** Stakeholder engagement measures the port's efforts in engaging with various stakeholders, including port users, local communities, government agencies, and other relevant entities. Metrics such as stakeholder communication, community engagement programs, and public relations efforts can be used to assess the port's stakeholder engagement. Positive stakeholder engagement indicates the port's commitment to building strong relationships with its stakeholders and addressing their concerns.

18. **Intermodal Connectivity**: Intermodal connectivity measures the ability of the port to seamlessly connect with other modes of transportation, such as rail and road. Metrics such as intermodal connectivity index, rail-road ratio, and transit times can be used to assess the effectiveness of the port's connectivity with hinterland and its ability to facilitate smooth cargo movement to and from the port.

Analysis of these performance indicators can provide valuable insights into the operational efficiency, competitiveness, and sustainability of Syama Prasad Mookerjee Port. It can help identify areas of improvement, optimize operations, and drive strategic decision-making for the port's management, stakeholders, and policymakers.

2. LITERATURE REVIEW

A study **by Lu** et al. (2021) analysed the impact of port hinterland accessibility on port performance indicators. The study found that better hinterland connectivity, such as improved road and rail infrastructure, can significantly improve port efficiency and reduce logistics costs. The study recommended that port operators work closely with logistics providers and government agencies to improve hinterland connectivity and optimize logistics flows.

Another study by **Zhen** et al. (2021) analysed the impact of digitalization on port performance indicators. The study found that the adoption of digital technologies, such as blockchain and artificial intelligence, can improve port efficiency and reduce costs by optimizing logistics flows, enhancing transparency, and reducing paperwork. The study recommended that port operators invest in digital technologies and collaborate with technology providers to optimize port operations.

A study by **Notteboom** et al. (2015) found that the physical layout of ports, such as the number of berth and their configuration, can have a significant impact on the efficiency of port operations. The study also found that the level of automation in port operations can significantly improve efficiency and reduce costs.

Another study by **Wang** et al. (2017) analysed the impact of port governance on port performance indicators. The study found that port governance structures, such as public or private ownership, can have a significant impact on port performance. The study also found that the level of competition in the port market can influence the efficiency of port operations.

Several studies have also examined the impact of environmental factors on port performance indicators. For example, a study by **Yang** et al. (2019) found that climate change can have a significant impact on port operations, particularly in areas prone to extreme weather events. The study recommended that port operators implement measures to adapt to climate change and reduce the risk of disruption to port operations.

3. PURPOSE OF THIS RESEARCH

The purpose of conducting research on port performance indicators of Syama Prasad Mookerjee Port could be multi-fold, including:

1. **Performance evaluation:** The research may aim to evaluate the current performance of Syama Prasad Mookerjee Port in terms of various indicators, such as cargo handling efficiency, vessel productivity, infrastructure and facilities, connectivity, financial performance, environmental sustainability, safety and security. This can provide a comprehensive understanding of the strengths and weaknesses of the port's operations, helping identify areas of improvement and optimization.

2. **Benchmarking**: The research may aim to benchmark Syama Prasad Mookerjee Port's performance against other ports regionally or globally, to assess its competitiveness and identify best practices that can be adopted for enhancing performance.

3. **Policy-making:** The research may serve as a basis for informing policy-making decisions related to the development and management of Syama Prasad Mookerjee Port. It can provide evidence-based insights that can aid in formulating strategies, plans, and policies for improving port performance, promoting sustainable practices, and addressing challenges.

4. **Stakeholder communication:** The research findings can be used to communicate the performance of Syama Prasad Mookerjee Port to various stakeholders, such as port authorities, government agencies, investors, shipping lines, and the local community. It can facilitate transparent communication, foster collaboration, and build trust among stakeholders.

4. METHODOLOGY OF STUDY

1. **Define the Research Objective**: Clearly state the purpose of the study and the specific research questions or objectives to be addressed. For example, the objective could be to analyse the performance of Syama Prasad Mookerjee Port based on key performance indicators (KPIs) and identify areas for improvement.

2. **Literature Review:** Conduct a comprehensive review of relevant literature, research articles, reports, and publications related to port performance indicators, port management, and relevant industry trends. This will help establish the existing knowledge and understanding of the subject and identify any gaps in the literature.

3. **Selection of Performance Indicators:** Based on the research objective, review the available performance indicators used in the port industry and select the most relevant ones for the study. Consider factors such as data availability, relevance to the research objective, and alignment with the port's strategic goals.

4. **Data Collection:** Collect relevant data for the selected performance indicators. Data sources may include port records, official reports, industry databases, surveys, and other relevant sources. Ensure data quality and reliability by validating and verifying the data from multiple sources, as well as considering any limitations or potential biases.

5. **Data Analysis:** Analyse the collected data using appropriate statistical or analytical methods, such as descriptive statistics, trend analysis, benchmarking, or regression analysis. Interpret the findings and derive meaningful insights to evaluate the port's performance based on the selected indicators.

6. **Interpretation and Discussion of Results**: Interpret and discuss the results of the data analysis in the context of the research objective and relevant literature. Identify strengths, weaknesses, opportunities, and threats (SWOT) of the port's performance and discuss the implications of the findings.

7. **Conclusion and Recommendations**: Summarize the key findings of the study and provide recommendations for improving the port's performance based on the results and insights obtained. Discuss potential strategies, actions, and initiatives that could be implemented to address the identified areas for improvement.

8. **Report Writing**: Prepare a comprehensive report documenting the research methodology, findings, and recommendations in a clear and structured manner. Include appropriate references to the literature and data sources used in the study.

Syama Prasad Mookerjee Port, Kolkata

Kolkata Port renamed as Syama Prasad Mookerjee 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.

Kolkata Port comprises of two dock systems one at Kolkata and other at Haldia.

The port has two distinct dock systems — **Kolkata dock system** and a deep-water dock at **Haldia dock complex.**

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 breakbulk 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.

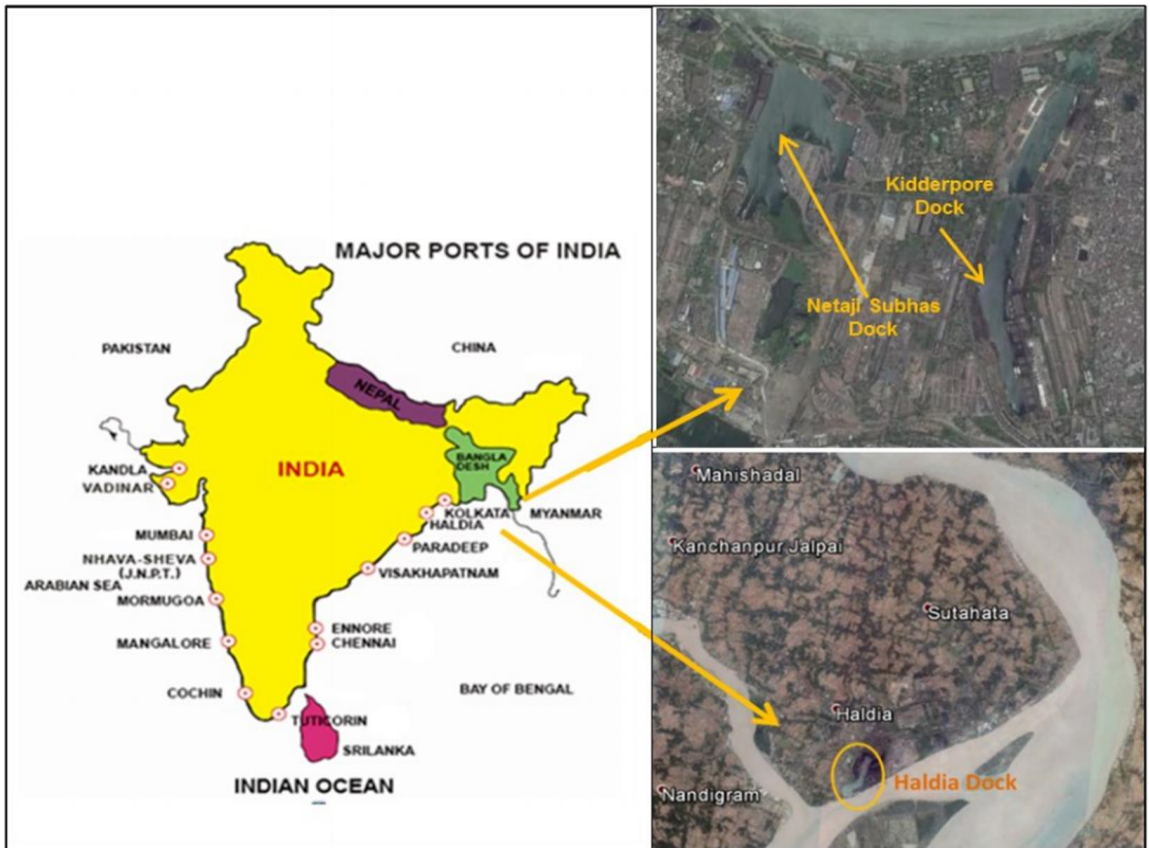
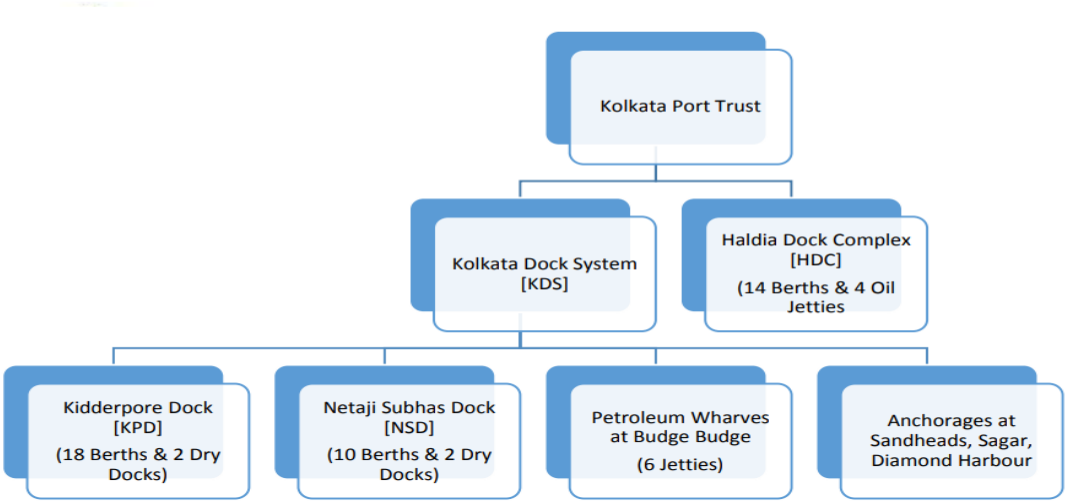


Fig. MAP Of Kolkata Port

Operational Zone



Port Performance Indicators

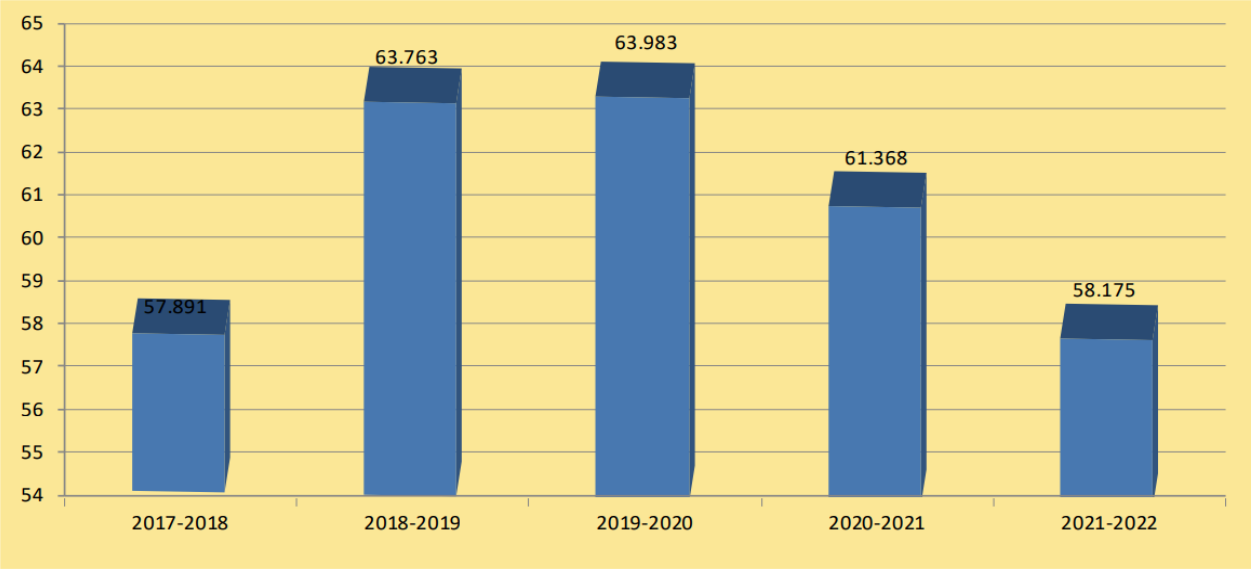
1. Cargo Traffic

In 1950-51 Kolkata port's share was around 40% of all Indian ports, handling about 7.5 MT and 69.2 million INR. 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.

In recent years, Kolkata Port has been undergoing modernization and expansion efforts to improve its efficiency and capacity. The port has also implemented various measures to reduce turnaround time, enhance customer satisfaction, and increase productivity.

Kolkata Port handled a total of 61.368 million tonnes of cargo in the fiscal year 2020-21. This represents a decline of 16.8% compared to the previous year 2019-2020, which was mainly attributed to the COVID-19 pandemic.

According to the latest available data from the Ministry of Shipping, Government of India, Kolkata Port handled 58.175 MT of cargo traffic during 2021-22



TOTAL TRAFFIC AT SMP, KOLKATA FOR THE LAST FIVE YEARS (In million tonnes)

2. Comparative Performance

Comparative performance of Kolkata Port in respect of the following commodities vis-a-vis other Indian Major Ports deserves special mention:

1) **Year 2018-2019**

Container	**Ranked 3rd** in Container Traffic handling
Cooking Coal/Other Coal	**Ranked 1st** in coal handling among major port
Other Liquid Cargo	**Ranked 2nd** in liquid cargo handling among major port

2) Year 2019-2020

Container	**Ranked 3rd** in Container Traffic handling
Cooking Coal/Other Coal	**Ranked 1st** in coal handling among major port
Other Liquid Cargo	**Ranked 2nd** in liquid cargo handling among major port

3) Year 2020-2021

Container	**Ranked 4th** in Container Traffic handling
Cooking Coal/Other Coal	**Ranked 1st** in coal handling among major port
Other Liquid Cargo	**Ranked 2nd** in liquid cargo handling among major port

4) Year 2021-2022

Container	**Ranked 4th** in Container Traffic handling
Cooking Coal/Other Coal	**Ranked 1st** in coal handling among major port
Other Liquid Cargo	**Ranked 2nd** in liquid cargo handling among major port
Fertilizer	**Ranked 3rd** in finished fertilizer

Comparative performance of Kolkata Port with respect to other major ports

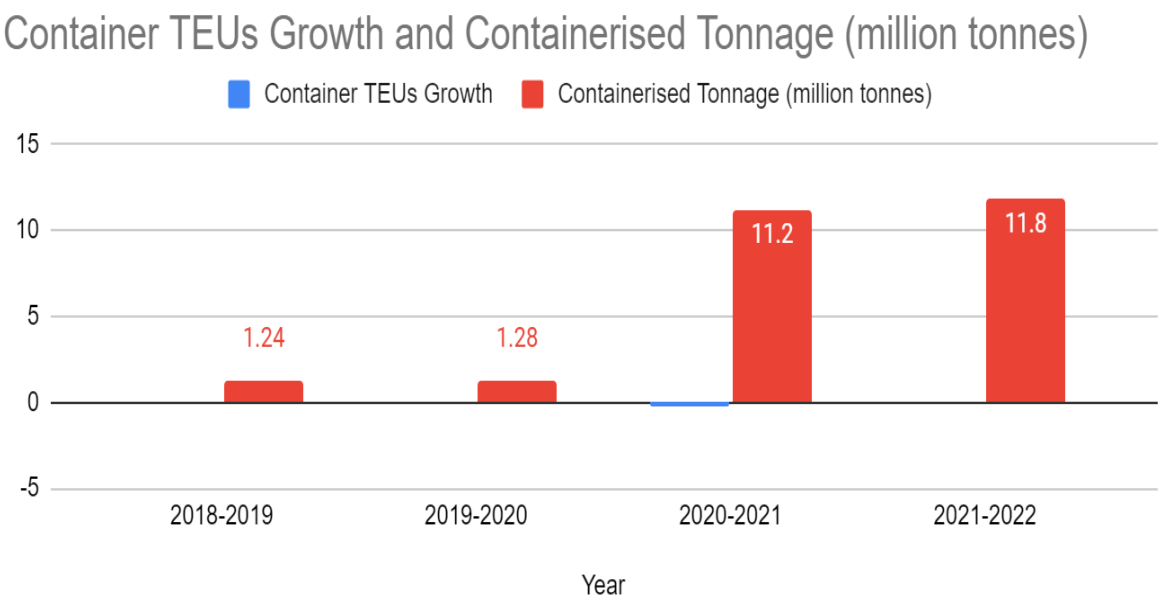
Location	Type of Port	Annual Capacity (million tonnes)	Cargo Handled (million tonnes, 2020-21)	Rank Based on Cargo Handled	Container Traffic (TEUs, 2020-21)	Turnaround Time (days)	Berth Occupancy Rate (%)
Kolkata, West Bengal	Multipurpose	76	58.1	4	0.69 million	2.62	67.71
JNPA, Maharashtra	Container	7.4	4.85	9	4.9 million	1.45	65.27
Kandla, Gujarat	Multipurpose	100	72.03	3	NA	1.37	60.24
Visakhapatnam, Andhra Pradesh	Multipurpose	131	72.61	2	0.68 million	1.66	57.46
Chennai, Tamil Nadu	Multipurpose	68	53.03	5	1.53 million	1.98	64.34
Mangalore, Karnataka	Multipurpose	43	31.5	7	0.30 million	2.5	61.77
Kochi, Kerala	Multipurpose	30	20.02	8	0.49 million	2.41	48.95
Paradip, Odisha	Multipurpose	277	144.56	1	0.21 million	2.19	66.15

3. Number of vessels handled

Year	Port Name	Total vessel Handled	Percentage Total Vessels at Indian Major Ports
2018-2019	SMP, Kolkata	3649	17%
2019-2020	SMP, Kolkata	3513	17%
2020-2021	SMP, Kolkata	3189	16%
2021-2022	SMP, Kolkata	2957	15%

4. Container Traffic

Year	Port Name	Container TEUs Handled	Container TEUs Growth	Containerised Tonnage (million tonnes)
2018-2019	SMP, Kolkata	8,29,482	4.18%	1.24
2019-2020	SMP, Kolkata	8,44,762	1.84%	1.28
2020-2021	SMP, Kolkata	6,87,357	-18.63%	11.2
2021-2022	SMP, Kolkata	7,35,195	6.95%	11.8

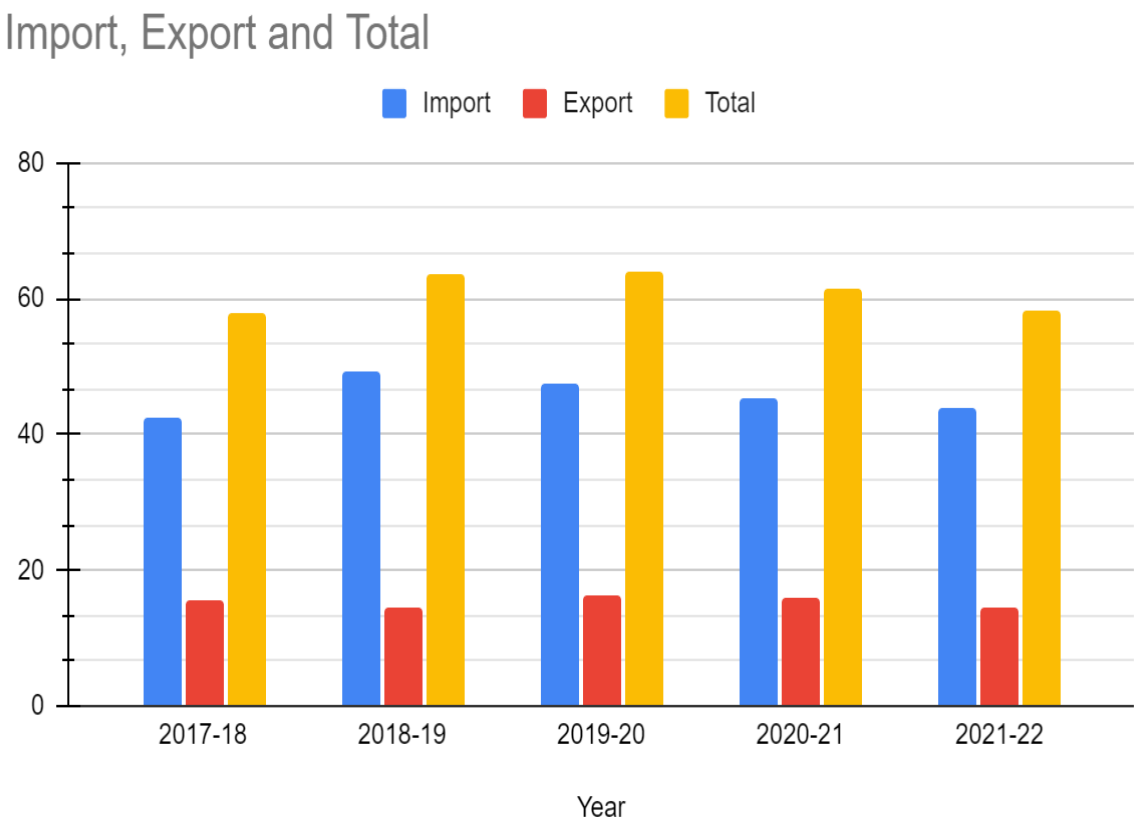


SMP, Kolkata total number of Containers handled during 2021-22 was 7,35,195 TEUs vis-à-vis 6,87,357 TEUs in 2020-21. In spite of raging COVID Pandemic for better part of the year that ravaged shipping and trade activities globally, Container traffic at SMP, Kolkata improved by 7% in comparison to previous year. Total containerised tonnage at the Port was 1,17,94,299 tonnes in 2021-22 vis-à-vis 1,11,64,117 tonnes in 2020-21, an increase of 5.64%.

Traffic Handled at SMP, Kolkata During Last Five Years

(In million tonnes)

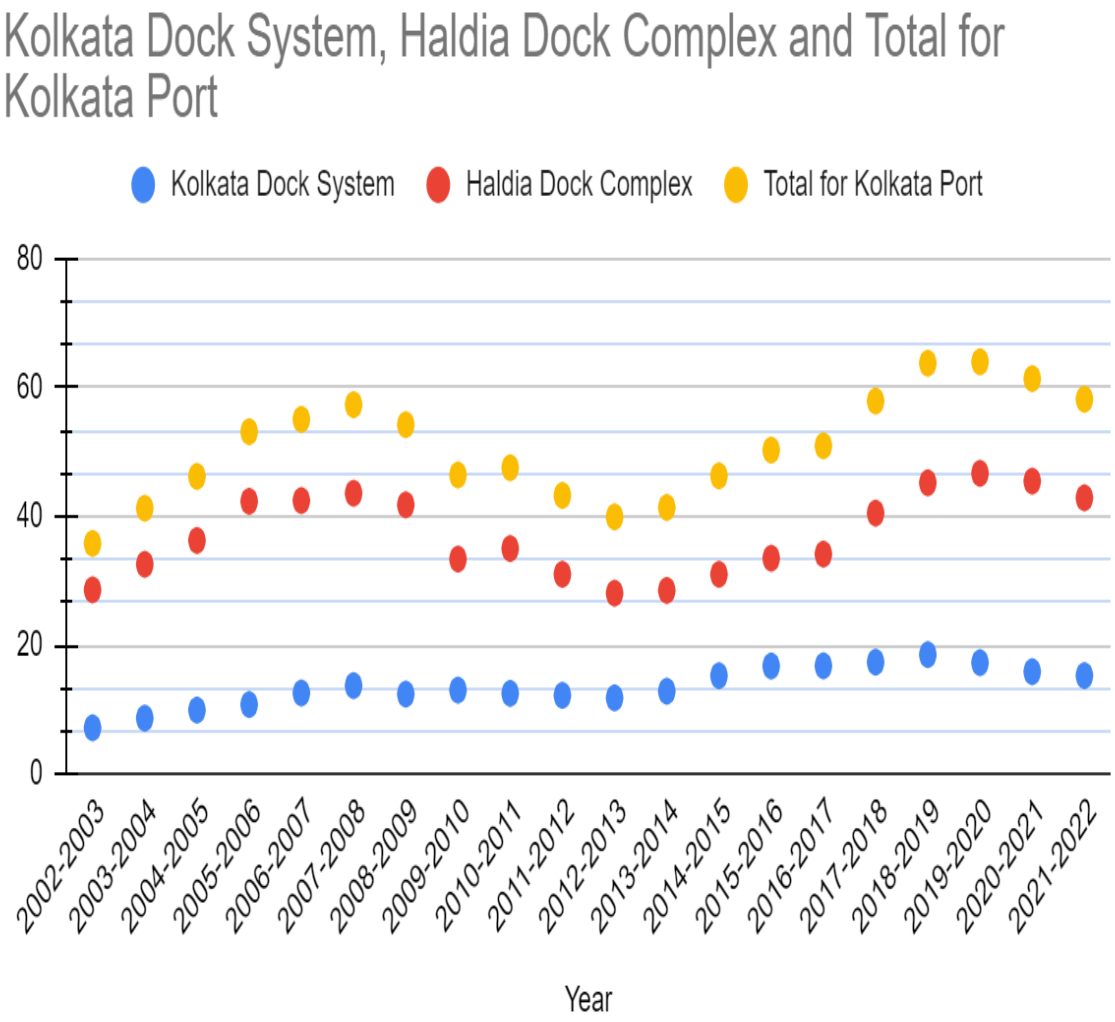
Year	Import	Export	Total
2017-18	42.342	15.549	57.891
2018-19	49.224	14.539	63.763
2019-20	47.543	16.44	63.983
2020-21	45.275	16.093	61.368
2021-22	43.793	14.382	58.175



Traffic handled by SMP, Kolkata during 2021-22 was 58.175 Million Tonnes, vis-a-vis 61.368 Million Tonnes (MMT) in 2020-21, implying a modest decline of 3.193 MMT (5.20%). Trade suffered a setback due to ongoing COVID 19 global Pandemic throughout 2021-22 and super cyclone 'Yaas' rampaging West Bengal in May'21. Growth of traffic slowed down since the first quarter of 2021-22 due to pandemic, disrupting economic activity worldwide. The export traffic decreased by 1.647 MMT (10.63%) w.r.t previous year.

CARGO HANDLED IN LAST TWENTY YEARS

Year	Kolkata Dock System	Haldia Dock Complex	Total for Kolkata Port
2002-2003	7.201	28.603	35.804
2003-2004	8.693	32.567	41.26
2004-2005	9.945	36.262	46.207
2005-2006	10.806	42.337	53.143
2006-2007	12.596	42.454	55.05
2007-2008	13.741	43.588	57.329
2008-2009	12.428	41.792	54.22
2009-2010	13.045	33.378	46.423
2010-2011	12.54	35.005	47.545
2011-2012	12.233	31.015	43.248
2012-2013	11.844	28.084	39.928
2013-2014	12.875	28.511	41.386
2014-2015	15.283	31.01	46.293
2015-2016	16.782	33.507	50.289
2016-2017	16.81	34.141	50.951
2017-2018	17.39	40.501	57.891
2018-2019	18.551	45.212	63.763
2019-2020	17.303	46.68	63.983
2020-2021	15.9	45.468	61.368
2021-2022	15.298	42.877	58.175


Kolkata Dock System, Haldia Dock Complex and Total for Kolkata Port
Kolkata Dock System
Haldia Dock Complex
Total for Kolkata Port
80
60
40
20
0
2002-2003
2003-2004
2004-2005
2005-2006
2006-2007
2007-2008
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2011-2012
2012-2013
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2015-2016
2016-2017
2017-2018
2018-2019
2019-2020
2020-2021
2021-2022
Year

Factors that could contribute to the decline in import-export traffic at SMP Kolkata:

i. Infrastructure limitations: SMP Kolkata has limitations in its infrastructure, such as inadequate container-handling capacity, insufficient road or rail connectivity, or outdated equipment, this could make it less attractive to shipping lines, resulting in a decline in import-export traffic.

ii. Environmental factors: Environmental factors such as severe weather conditions, port congestion due to high volumes, or waterway disruptions can impact shipping schedules and routes, resulting in a decline in import-export traffic.

iii. Political instability: Political instability or unrest in the region or country can impact trade volumes, and consequently, the amount of cargo that is imported or exported through a port.

iv. Shifts in supply chains: Changes in supply chain strategies by importers or exporters, such as sourcing from different countries or using different transportation modes, can impact trade volumes and result in a decline in import-export traffic at SMP Kolkata.

5. Ship Traffic

Comparative position of ship calls at the port for the last five years is shown in table.

Year	KDS	HDC	Total
2017-18	1356	2315	3671
2018-19	1384	2265	3649
2019-20	1292	2221	3513
2020-21	1049	2140	3189
2021-22	1006	1951	2957

However, there could be several reasons for a decrease in ship calls at a port. Some possible reasons could include:

i. **Changes in global trade patterns:** If there has been a shift in global trade patterns, the demand for certain types of cargo or routes may have decreased, resulting in fewer ships calling at the port.

ii. **Economic factors:** Economic factors such as recessions or changes in exchange rates can affect trade volumes, and consequently, the number of ship calls at a port.

iii. **Competition from other ports:** If other ports in the region or country are offering better facilities, infrastructure, or incentives, shipping lines may choose to call at those ports instead of the original port, resulting in a decrease in ship calls.

iv. **Changes in regulations or policies:** Changes in regulations or policies related to trade, customs, or immigration can affect the attractiveness of a port to shipping lines, which may result in a decrease in ship calls.

6. Turn-Round Time

Turnaround Time for Vessels: The time taken for vessels to complete their port call, including time spent at berth, can be a critical performance indicator. Lower vessel turnaround times indicate efficient port operations, faster cargo handling, and reduced waiting time for vessels, which can result in increased throughput, improved customer satisfaction, and reduced costs for shipping lines.

Average Turn-Round Time (TRT) of different categories of vessels for Kolkata Dock System (KDS) and Haldia Dock Complex (HDC) for 2021-22 along with those for 2020-21 is shown in table.

Type of Vessel	Average Turn-Round Time per Vessel (In days)	
	2020-21	2021-22
A. **Kolkata Dock System:**		
Tankers (POL Product)	3.06	2.04
Other Tankers	1.60	2.03
Container	2.32	2.48
Dry Bulk Cargo	3.14	10.24
Other Cargo	4.39	4.81
Overall	**2.62**	**2.76**
B. **Haldia Dock Complex:**		
Tankers (POL Crude)	2.52	1.66
Tankers (POL Product)	2.02	1.61
Coking Coal	3.74	2.44
Thermal Coal	3.59	1.75
Iron Ore	4.29	2.14
Fertiliser	3.70	2.54
Raw Materials for Fertiliser	4.89	2.55
Container	1.77	1.77
Overall	**3.09**	**2.14**

At KDS, overall average TRT increased during 2021-22 vis-à-vis.2020-21 primarily due to 6.24% higher Average Parcel Load during the year under review vis-à-vis previous year. However, TRT improved only for Tankers carrying POL (Product). TRT increased primarily due to higher Average Parcel

Load for Other Tankers, Containers, Dry Bulk, Break Bulk by 18.35%, 3.73%, 7.52% and 10.24% respectively in 2021-22 w.r.t 2020-21.

At HDC, overall average TRT improved in 2021-22 vis-à-vis 2020-21. TRT improved in the current year for Tankers carrying POL Crude & Product, Coking & Thermal Coal, Iron Ore, Fertilizer & its Raw Materials compared to previous year. TRT for Containers remained at par in 2021-22 w.r.t. 2020-21.

7. Berth Occupancy

Berth Occupancy refers to the utilization of a berth or docking space in a port or harbour. It is the percentage of time that a berth or dock is occupied by a vessel. A high berth occupancy rate indicates that there is a high demand for port services, which can lead to congestion and delays for vessels trying to access the port.

(In Percentage)

Port Area (Berths)	2019-2020	2020-2021	2021-2022
Netaji Subhas Dock (NSD)	72.46	47.67	47.67
Container Berths (2,3,4,5,7 & 8)	84.77	76.04	76.04
12 NSD (Liquid Cargo Berth)	58.91	61.22	55.14
Budge Budge Jetties	28.63	11.55	11.32

Based on the data provided, it appears that the Netaji Subhas Dock (NSD) and Container Berths have seen a decrease in the amount of port area used from 2019-2020 to 2020-2021, but remained the same in 2021-2022. On the other hand, the Liquid Cargo Berth at NSD has seen a decrease in port area used from 2019-2020 to 2021-2022.

Meanwhile, the Budge Budge Jetties have experienced a significant decrease in the amount of port area used from 2019-2020 to 2020-2021 and a slight decrease in 2021-2022.

There could be various reasons for changes in port area usage, such as shifts in global trade patterns, changes in the demand for certain types of cargo, fluctuations in the economy, changes in regulations or policies, and disruptions caused by natural disasters or pandemics.

8. Connectivity and hinterland access to the SMP, Kolkata

Kolkata Port is located on the east coast of India and has good connectivity and hinterland access.

1. Road Connectivity: Kolkata Port is well-connected to the National Highways network through NH-12, NH-16, and NH-19. The port is also connected to the Golden Quadrilateral and the North-South Corridor, which links Kolkata to other major cities in India.

2. Rail Connectivity: The port has a rail connectivity network with two rail systems, one managed by Kolkata Port Trust and the other by the Eastern Railways. The port has direct rail connections with important cities such as Delhi, Mumbai, Chennai, Bangalore, and Hyderabad.

3. Waterways Connectivity: Kolkata Port is situated on the Hooghly River and has navigable waterways up to Haldia. The port is connected to the National Waterway 1 (NW-1) that extends from Haldia to Allahabad, covering a distance of 1620 km.

4. Air Connectivity: Kolkata Port is connected to the Netaji Subhash Chandra Bose International Airport, which is about 17 km away from the port. The airport has good international connectivity and is connected to several major cities in India.

5. Hinterland Access: Kolkata Port serves the hinterland regions of West Bengal, Bihar, Jharkhand, and eastern parts of Uttar Pradesh. The port has a good road and rail connectivity network with these hinterland regions, making it an important gateway for cargo movement.

9. Infrastructure and Facilities

Here are some infrastructure and facility development projects undertaken by the Kolkata Port Trust:

1. Mechanization of Cargo Handling: Kolkata Port has undertaken mechanization of cargo handling to improve the speed and efficiency of operations. The port has installed modern cargo handling equipment such as cranes, conveyor belts, and other specialized equipment for handling different types of cargo.

2. Development of Ro-Ro Terminals: Kolkata Port has developed Roll-On/Roll-Off (Ro-Ro) terminals for the movement of vehicles between different locations. The Ro-Ro terminals have reduced the transportation time and cost for vehicle manufacturers and dealers.

3. Upgradation of Passenger Terminals: Kolkata Port has upgraded its passenger terminals to provide better facilities and services to passengers. The terminals have been modernized with facilities such as air-conditioning, escalators, and baggage handling systems.

4. Development of Cold Storage Facilities: Kolkata Port has developed cold storage facilities to handle perishable goods such as fruits, vegetables, and seafood. The cold storage facilities have been equipped with modern refrigeration and handling equipment to maintain the quality of the cargo.

5. Development of Cruise Terminal: Kolkata Port has developed a modern cruise terminal to promote tourism and cruise industry in the region. The terminal is equipped with modern facilities such as immigration and customs clearance, baggage handling, and other amenities for passengers.

6. Upgradation of Road Connectivity: Kolkata Port has undertaken upgradation and expansion of road connectivity to the port to improve the movement of cargo by road. The upgradation includes construction of new roads, widening of existing roads, and installation of traffic management systems.

Infrastructure Projects Development for SMP

- Reefer Park for EXIM Seafood and Agri-Products at NSD
- Re-strengthening/resurfacing of Road infrastructure/ drainage system
- Rebuilding of 6 & 7 NSD Berths with backyard, for improved container handling capacity
- A cement plant of 0.5 MT tonnes capacity constructed on port land with direct pipeline.
- Installation of 1 Mega Watt solar plant in Haldia to produce renewable energy for port operations.

10. SWOT analysis of Kolkata Port

Strengths:

- Strategic location, being situated at the confluence of the Hooghly river and the Bay of Bengal
- One of the oldest and largest ports in India, with a rich history and heritage
- Excellent connectivity to major transportation networks, including road, rail, and air
- Capable of handling a diverse range of cargo, including dry bulk, liquid bulk, container, and project cargo
- Modern and efficient infrastructure, including berths, cranes, and handling equipment
- Strong relationships with key stakeholders, including shipping lines, cargo owners, and government agencies

Weaknesses:

- Congestion and capacity constraints, leading to delays and inefficiencies
- Limited depth at the docks, which restricts the size of vessels that can be accommodated
- Dependence on traditional cargo segments, with limited diversification into new areas such as cruise tourism or offshore oil and gas
- Bureaucratic procedures and inefficiencies, leading to delays and higher costs
- Competition from other ports in the region, including Haldia and Paradip

Opportunities:

- Expansion and modernization of infrastructure, including dredging of the river channel to accommodate larger vessels
- Diversification into new areas such as cruise tourism or offshore oil and gas, leveraging the port's strategic location and infrastructure
- Development of a dedicated logistics hub and Special Economic Zone (SEZ) in the vicinity of the port
- Increased collaboration with neighboring ports and transportation networks, including the proposed Eastern Dedicated Freight Corridor and the Kolkata Metro Rail project
- Adoption of digital technologies and automation to improve efficiency and reduce costs

Threats:

- Geopolitical risks and global economic downturns, affecting the demand for trade and cargo flows
- Environmental concerns, including pollution and climate change, leading to regulatory restrictions and increased costs
- Disruptions due to natural calamities, such as cyclones or floods
- Competition from other ports in the region, which are also investing in modernization and expansion
- Shifts in technology and customer preferences, leading to changes in the type and volume of cargo handled

Limitation of Syama Prasad Mookerjee Port, Kolkata

1. Limited depth: The port has a limited depth, which restricts the size of the vessels that can enter the port. This makes it difficult for the port to handle large volumes of cargo. The dredging of the Hooghly River is another major limitation of the port. The river has a high sediment load, which makes it difficult for larger vessels to navigate through the channel. The depth of the river also restricts the size of the vessels that can be accommodated at the port.

2. Congestion: The port is located in a densely populated area, which leads to congestion and traffic problems. This can cause delays and increase the turnaround time for ships.

3. Limited capacity: The port has a limited capacity, which restricts its ability to handle large volumes of cargo. This can be a problem during peak seasons when there is a surge in demand for the port's services.

4. Old infrastructure: Some of the port's infrastructure is old and outdated, which can lead to maintenance problems and reduce the efficiency of the port.

5. Environmental concerns: The port's operations can have a negative impact on the environment, including air and water pollution. The port authorities have taken steps to address these concerns, but they remain a challenge.

The limitation of SMP at NSD (Netaji Subhas Dock)

1. Limited draft: The draft of vessels that can be accommodated at NSD is limited to 7 meters, which restricts the size and capacity of vessels that can be handled.

2. Limited cargo storage: The storage capacity for cargo at NSD is limited, which can cause congestion and delay in cargo handling operations.

3. Congestion: The limited space and capacity at NSD can lead to congestion, especially during peak periods, which can result in delays and increased turnaround times.

4. Inadequate infrastructure: The infrastructure at NSD is not equipped to handle the growing demand and volume of cargo, leading to operational inefficiencies and delays.

5. Lack of modernization: The port has not kept pace with modernization and technological advancements in the industry, leading to operational inefficiencies and increased costs.

Suggestions to improve the performance of SMP, Kolkata

1. **Dredging**: Dredging is important to maintain a safe depth for vessels to navigate. SMP, Kolkata should regularly dredge the harbour and approach channels to maintain the required depth.
2. **Increase Berth Occupancy Rate:** SMP, Kolkata should focus on increasing berth occupancy rate by optimizing berth allocation and improving vessel scheduling.
3. **Modernize equipment and technology**
4. **Implement green initiatives:** The port can implement eco-friendly initiatives such as using renewable energy sources and reducing carbon emissions. This can help to reduce its environmental impact and enhance its reputation as a responsible and sustainable port
5. **Optimize berth utilization:** SMP Kolkata can optimize berth utilization by reducing idle time and improving turnaround time. It can improve coordination between ships and terminals, reduce waiting time for berths, and optimize cargo handling operations.
6. **Automation:** It can invest in advanced technologies like automation, Artificial Intelligence, and Internet of Things (IoT) to optimize processes, reduce turnaround time, and increase productivity.
7. **Bottlenecks could be removed**
8. **Introduce the night navigation system**
9. **Implementation to introduce barges**
10.

CONCLUSION

In conclusion, there are several key performance indicators that can be used to evaluate the performance of SMP Kolkata, such as vessel turnaround time, container dwell time, berth productivity, and yard utilization. By focusing on optimizing these indicators, SMP Kolkata can improve its overall port performance, reduce operational costs, and enhance customer satisfaction. To achieve this, SMP Kolkata may consider implementing several strategies such as streamlining maintenance processes, improving communication, investing in training and development, implementing a preventive maintenance program, optimizing spare parts inventory, using data analytics, and utilizing technology to automate yard planning processes. By continually monitoring and evaluating performance metrics, SMP Kolkata can ensure that it remains competitive and responsive to the needs of its customers in the rapidly evolving global trade landscape.