

Review Manuscript Layout on Assessing the Impact of Maritime Legislation on Enhancing Governance and Operational Efficiency in Indian Ports

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Abstract— This section will provide a brief introduction to the study. The section will briefly outline the lines of thought on which the study will be directed. This section will provide a brief overview of the study and the rationale behind conducting the same. The section will highlight the appropriate basis for conducting the current study as well as the ultimate goal of the study. This section will elaborate in detail on the manner in which the purpose of the study was planned to be accomplished. Further, some pertinent results of the study will also be highlighted here, along with the limitations faced by the study while deriving them. Lastly, any important recommendations to resolve an issue that is being investigated by the current study or any future research direction will also be laid out. The section will also outline the research gap identified. This section will highlight the originality of the research.

Index Terms— Maritime law, India, Indian Ports, Legal provisions, Efficiency, Indian Ports Bills

I. INTRODUCTION

Maritime trade holds a strategic position in Indian economy which utilizes the 7,500 kilometers long coastline of India and creates India as an important point in terms of global shipping and supply-chains. The work of the major and non-major ports of the country is critical towards facilitating imports of raw materials, export of finished goods and coastal-shipping services that alleviate land-logistics congestion. Nevertheless, in spite of the expansion of seaborne traffic and infrastructure investment, the Indian ports continue to experience long-term governance and operational problems: inadequate timeliness, disorganized regulation, ineffective hinterland accessibility, environmental concerns, and poor coordination among the state centres. Against

this backdrop, the current research explores the effects of the maritime laws on the governance and the efficiency of the performance of Indian ports. It seeks to determine how the recent law reforms, including the Indian Ports Bill, 2025 (that attempts to replace the century-old Indian Ports Act, 1908) and the Major Port Authorities Act, 2021, will enhance regulatory oversight and transparency, as well as facilitate integrated development and adhere to the international maritime standards. In this way the study provides the understanding of how legal frameworks may be used to make Indian ports and the Indian maritime system in general more competitive, and assist in India to achieve its overall maritime and trade interests.

II. STATEMENT OF PROBLEM

Although the ports are the key to the Indian trade infrastructure, the regulatory framework has been partially embedded in colonial-era laws and has not kept up with the emerging scale and complexity of port operations. As an illustration, the Indian ports Act of 1908 regulated major and non-major ports in more than a hundred years and its provisions are becoming obsolete in the age of containerisation, digitalisation and global environmental standards. Consequently, such problems as vague governance frameworks, ineffective federal-state coordination, insufficient transparency in tariffs, underdeveloped dispute-resolution systems, and the lack of environmental and safety aspects integration remain. Such inefficiencies spell out the operational efficiency of ports, deter the private outlay, increase the turnaround time of vessels, increase the logistic expenses and derail the Indian dream to be a global maritime center. This issue hence focuses on the need to reform or enhance maritime law

to enhance governance (structures, coordination, transparency) and efficiency (turnaround time, cost, connectivity, sustainability) in Indian ports. The importance of the study is that it can be used to chart the legislative reform in accordance with the improvement of port-performance, determine the most essential legal and operational associations, and suggest the directions of the policy and regulatory improvement. In the absence of such analysis, port governance will be in the form of incrementalism and transformation, and maritime infrastructure will not achieve its potential in India to contribute to trade competitiveness and economic growth.

III. METHODS

The current research has a qualitative and desktop-review approach that utilizes secondary resources. The following timeline served as a criterion in the reference selection process: it was found that the main legislative reforms to be reviewed (Major Port Authorities Act 2021, Indian Ports Bill 2025) came into the limelight in the 2021-2025 period, and that is why sources published around 2018-2025 were considered to be the most contemporary. Keywords to be searched on the database and on the internet were maritime law India, Indian ports governance, Indian Ports Bill 2025, major port authorities act 2021 India, port efficiency India turnaround time, port-led development India, port tariff transparency India, state maritime boards India, digitalisation Indian ports. Peer-reviewed transportation and logistics journals (e.g., Maritime Policy and Management, Transport Reviews), regulatory law journals (e.g., Journal of Maritime Law and Commerce) and Indian industry-government reports published by the Ministry of Ports, Shipping and Waterways (MoPSW) and the Ports Association of India were all consulted. Along with it, legislative documents and press releases (e.g. by the Press Information Bureau) were examined in order to receive primary data on law changes. All references were evaluated in relation to one or more of the research questions identified below. Weaknesses of the approach are that it depends on published information (may have time-lags), there is a lack of empirical research of rigor on very new laws (e.g. Bill 2025), and it is not feasible to carry out primary field interviews or port-level performance audits. However, the approach can be used to map systematically the

interventions between legislation and government and the efficiency performance of Indian port sector.

IV. RESEARCH QUESTIONS

The research questions are as follows:

1. What impact has the historical development of maritime law in India had on its current legal and regulatory framework?
2. How effectively do current regulations, including The Indian Ports Act, 1908 and The Major Port Authorities Act, 2021, oversee India's maritime and port sector?
3. What are the challenges encountered by India's ports in facilitating maritime trade?
4. What are the objectives of the Indian Ports Bill, 2025 in terms of enhancing India's maritime governance and ensuring alignment with global standards?

V. LITERATURE REVIEW

5.1 Historical Evolution and Concepts of Maritime Law

The development of the maritime law in India depicts a slow transition between the localised customary laws to the multi-layered structured statutory framework that has been influenced by global trade, technological changes, and environmental demands. Before British rule, the coastal kingdoms like that of Gujarat, Kerala and Eastern India depended upon the region-specific port practices, mercantile guild and fisheries laws. These standards enabled the trade along the coast but did not have a single national legal framework. Sea trade had become lively, but safety, navigation, tariff control or environmental conservation were by and large informal.

Formalization of the maritime laws started during the period of the British rule with the British being motivated by strategic and commercial interests. The Indian ports Act of 1908 offered a legal foundation to the conservancy of the harbour, regulation of the passage of vessels and collection of port duties. Although innovative in its period, the Act echoed a colonial agenda, namely, the necessity to guarantee smooth navigation of the British commercial vessels, the central governance of the strategic ports, and the revenue-driven system of governance. It did not foresee the future developments like the

containerization, multimodal logistics, operation of the private terminals, digitalization of the navigation system or the environmental regulatory governance.

The development of India maritime industry after independence was tremendous because of the growing volume of cargo, containerization, integration of global supply-chain and coastal-shipping operations. With the increasing complexity of the modern port work however, the historical legal framework was unable to keep pace. Scholars have pointed out that there were loopholes in the governance, arisen by the 1908 Act that include division of power between central and state governments, scanty measures on investment using the Public-Private Partnerships (PPP) and no infrastructure on digital logistics, pollution management, or safety provisions. This disproportion of old regulations and new operating requirements helped in creating inefficiencies, delays, and uncertainty on regulations.

Theoretically speaking, modern maritime law in India has developed into a multi-level system of governance which includes:

- Port systems that distinguish between major (central) and non-major ports;
- Ship navigation regulation, ship traffic, tariffs, port dues and user requirements;
- Sustainability and environmental needs, such as adherence to MARPOL, Ballast Water Management and IMO rules and conventions.
- Digital and logistical integration, including Vessel Traffic Services (VTS), Port Community Systems (PCS), e-customs and single window clearances;
- Mechanisms of Centre -State coordination, which would be necessary to synchronize non-major port policies with national maritime objectives;
- International harmonization, the connection of Indian port regulations with the world of trade, climate and maritime agreements.

This transformation would change the existence of a limited form of conservancy driven colonial regime to comprehensive governance regime that would consider the efficiency, sustainability, environmental standards and competitiveness. The new concept of digital-based monitoring systems, combined with an integrated logistics planning, and environmental risk mitigation, clear tariff regimes, and systematic regulatory control now become obligatory in the

modern concept of maritime governance, which was not present in the older legislative frameworks.

Therefore, it can be seen that the decades-long history of the Indian maritime law both reflects the continuity of the colonialist framework and the necessity of new, progressive regulation tools. This background provides an explanation why the latest changes such as the Major Port Authorities Act, 2021 and the Indian Ports Bill, 2025 are aimed at updating the governance, boosting the efficiency of the ports, and aligning the Indian system of maritime governance with the international best practices and sustainability principles.

5.2 Legal and Regulatory Framework of Maritime Law in India

The Indian maritime regulatory system has become a multi-layered system, which is influenced by the colonial-era laws, the post-independence administrative reform and modern demands of the modern governance. One of the statutes that are regarded as the root of statutes on port conservancy, navigation regulations, safety control and harbour dues is the Indian Ports Act, 1908. Nevertheless, its concentration is indicative of the environment in which it operated at the beginning of the twentieth century, small general-cargo ships, low requirements in governance, and centralized administrative authority. The Act does not have explicit commercial decision-making mechanisms, combined planning of port hinterlands, regulatory control of private terminals and formal environmental requirements. These holes were growing larger as ports diversified, traffic increased, and investment requirements increased.

Comparing the old and the new - Major Port Trusts Act, 1963 and the Major Port Authorities Act, 2021

The biggest change came with the Major Port Trusts Act, 1963 and the establishment of semi-autonomous port trusts to run major ports. Despite being progressive in giving boards limited powers, the Act retained a very centralized decision-making body in which the Union Government was in control of the tariffs, land use, and significant financial decisions. This limited the strategic responsiveness of major ports especially in a competitive world shipping environment.

Understanding that these limitations existed, the Major Port Authorities Act, 2021 brought a new governance

overhaul. The 2021 Act takes the form of authority-based governance, as opposed to the trust-based model of the 1963, which was acute to government-nominated boards and rigorous procedures. It gives more independence to port boards in setting tariffs, financial planning, management and commercial contracts of assets. Notably, the Act requires the representation of independent members and representatives of state governments making the governance more balanced and accountable. It also proposes an Adjudicatory Board to resolve disputes, which will lessen reliance on central ministries and do better to separate regulatory oversight between policy-making and operational operations.

Nevertheless, even though the 2021 Act is a modernization of governance of major ports, non-major (state) ports are governed under various state regulations, resulting in inconsistency in standards, safety standards, compliance with the environment and tariff practices. Such regulatory fragmentation has led to the formulation of the Indian Ports Bill, 2025, that aims at consolidating the port legislation in the country. The Bill also provides equal oversight with uniformity in Maritime State Development Councils, standard tariff-publication rules, standard positions of State Maritime Boards, and harmonized environmental and safety frameworks, unlike the 1908 and 1963 Acts.

5.3 Obstacles in India's Maritime Trade and Ports

Although India has a very long coastline and strategic geographical location of this country, the port and maritime trade ecosystem is still experiencing various perplexing problems, which severely affect efficiency in operations, regulatory consistency and competitiveness. The greatest impediment is the disjointed regulatory environment, which is due to the fact that they are applying both outdated regulatory systems such as the Indian Ports Act, 1908 and the newly developed systems such as the Major Port Authorities Act, 2021 and state maritime regulations. This co-existence has created overlaps in jurisdiction particularly in jurisdictions touching on safety control, tariff policies and environmental clearances. Parallel orders are frequently issued by Central and State authorities, so the enforcement of the same is inconsistent and the investors and port operators are not certain anymore.

A second impediment relates to the issue of tariff regulation and procedural overheads. Despite the introduction of tariff reforms, a number of the ports continue to use the multi-layered clearance procedures that include central ministries, customs, shipping regulators, pollution control boards and other state agencies. These long approval chains drive up the transaction costs, diminish predictability to shipping lines and discourage international shipping alliances that require stability and fast turnaround decision making.

The third significant hurdle is caused by infrastructure and operational shortages, yet rather than throwing previous arguments, it is necessary to point into some deeper systemic problems. The problem with Indian ports is infrastructural asymmetry, with some of the privately operated terminals having modern equipment and deep drafts, many of the publicly owned berths are still using old crane and have a small yard capacity as well as lacking an adequate container-handling technology. The capacity mismatch between the port infrastructure and the vessel development is also equally important. Shipment in the world has shifted to ultra-large container vessels (ULCVs) at a very fast rate; however, most ports in India do not have the depth, crane reach and advanced navigation systems to handle them effectively and safely. This mismatch in the structure limits the capability of India to attract transshipment cargo and Indian exporters are forced to use international hubs in Colombo and Singapore.

The other challenge that has not been discussed extensively is the complexity of maritime environmental compliance. India is the signatory of conventions like MARPOL and Ballast Water Management, but there are differences in the local enforcement mechanisms among the states and type of ports. There are very small ports that do not have accredited labs, waste reception sites that are compliant, and monitoring technologies. This means that ship operators are faced with uncertain results of inspection which translates into delays and possible arrests. It is this discrepancy, which undermines the credibility of India as a desirable maritime destination. More so, the institutional capacity constraints are a major challenge. A number of State Maritime Boards especially in smaller coastal States have been experiencing chronic understaffing, lack of technical skills and financial independence. This limits their

control over other ports other than the major ports, the monitoring of concessions and the adoption of safety and environmental standards. Even large ports have been subject to administrative inertia, particularly in those areas where technical supervision is needed, including hydrographic surveys, electronic navigation systems, and real-time port performance analytics.

Two other barriers:

(a) Security vulnerabilities and geopolitical vulnerabilities:

The Indian ports are more susceptible to cybersecurity threats at sea, smuggling, routine transshipments, and threats due to geopolitical strains in the Indian Ocean. Absence of a common maritime security protocol in all ports leads to unequal preparedness with some ports having state of the art surveillance and others being left with having minimum manual checks.

(b) Gaps in climate resilience and disaster preparedness:

The Indian ports are mostly situated in cyclone prone areas, but resilience planning (flood resistant berth, emergency recovery measures, storm surge modelling and climate resistant break waters) is ineffective. This creates increased downtime, loss and disruption of national supply chains.

The combination of these barriers explains why wholesale changes are necessary, which go beyond mere modernisation of the legislation and instead includes the institutional, technological, environmental and security aspects that characterise the modern port ecosystem.

5.4 Transformative Prospects of the Indian Ports Bill, 2025

Indian Ports Bill, 2025 is a critical chance to transform the model of maritime governance in India to an integrated, future-proof, and global-oriented system. The Bill is a significant step in the reduction of systemic regulatory fragmentation by attempting to create a single legal framework under which major and non-major ports are bound together under consistent principles whilst also adhering to federal structures in contrast to previous piecemeal reforms. Its most valuable contribution is that it has improved the ability of centre-state to coordinate their policies by bringing together the Maritime State Development Council (MSDC) where they are able to share decision-making

on policy, safety, environmental standards and strategic investments which before was marred by institutional disconnection.

The first and most innovative aspect of the Bill is that it focuses on intelligent regulatory governance. The Bill instead of adopting prescriptive colonial-style rules encourages outcome-based regulation in the form of digital monitoring, online publication of tariffs, electronic licensing and automated compliance tracking. This practice brings Indian port regulation closer to international models whereby regulation by data enhances transparency and good competitiveness among ports.

The other change factor is the formalization of State Maritime Boards into statutory bodies tasked to license, supervise the activity of concessionaires, promote environmental adherence to rules and regulations as well as to deal with safety in non-major ports. This transparency eliminates role and gives the powers to the states to build robust port clusters, in addition to the old major-port network.

The Bill also brings on board extensive environmental and safety governance systems. Nevertheless, rather than restating the points, it is also critical to note that the Bill requires risk-based environmental assessments, regular safety audits, harmonized waste-management procedures, and the consistent use of IMO-compliant standards used in ports. This does not only facilitate compliance but also makes India a better place globally because the Indian ports become eco-friendly and safe to operate.

Moreover, the Bill covers an under-developed field, which was lacking previously, that is, the dispute resolution in both major and non-major ports. Although in the previous versions the non-major port committees were in the centre of interest, the Bill considers a layered model such that the contractual dispute, tariff dispute and conflict associated with concessions can be brought to be resolved by higher adjudicated bodies to decrease litigation loads and improve investment decisions.

The Bill has already been called one of the most progressive at the time of its consideration on the fact that it has included digital maturity standards of ports. These are requirements on Port Community Systems (PCS), electronic tracking of cargoes, real-time surveillance of vessels, and the single data-sharing standards between customs, immigration, shipping lines and port authorities. This type of digital

integration will eradicate delays in procedures, minimize human touch to create an interoperable logistics ecosystem, which is what India requires to match with automated global hubs.

Notably, the modern risks are considered in the Bill, which incorporates the climate resilience and integration of maritime security. The ports will have to prepare disaster management plans, carry out vulnerability assessment and discuss with Coast Guard and Navy on maritime domain awareness. These are responses to the weaknesses identified in Section 5.3. Lastly, the Bill is transformative in nature; however, the literature also points to the fact that legal reform itself cannot achieve operational transformation. The influence of the Bill is based on the long run investments in the infrastructure of ports, digital systems, institutional capacity-building, human resources, and political will towards coordinated implementation at the federal layers. In the absence of these complementary reforms, legislative change may turn out to be symbolic and not transformative.

In general, the Indian Ports Bill, 2025 will provide a contemporary, theoretical, technology-focused and ecologically appropriate regulatory base, which might greatly improve the quality of governance, business performance, and maritime competitiveness in India, assuming the implementation process of the act is organized, investment-intensive, and institutionally coordinated.

VI. RESEARCH GAP

Despite the extensive amount of available literature about the maritime sector in India, there are various gaps to discuss that have not been covered adequately, with regard to legal, institutional, and governance aspects of port performance. The majority of the research work done deals with classic problems, including infrastructure capacity, cargo volume, turnaround time, and logistics optimisation. Nonetheless, little scholarly interest exists in the application of the maritime legislation to the functioning efficacy, institutional responsibility, coordination frameworks, and the strategic purpose of ports in the long term.

The former research gap has to do with the legal aspects of the changing maritime system in India. Although the Major Port Authorities Act, 2021 and the Indian Ports Bill, 2025 have already been a subject of debate within the policy community, there is little

scholarly literature that attempts to empirically determine the impact of the two bills on the policy outcomes, which include the independence of decision-making, market-driven tariff determination, and investor trustworthiness. Literature covering the effectiveness of legislative reforms in curbing legislative change into port operations, sustaining contractual stability, efficiency in dispute resolution or port-state accountability has not been exhaustively analysed. This absence of legal-operational connection does not allow one to have a complete picture as to whether governance reforms are actually raising performance or merely symbolic.

The second gap is that there is no literature on federal-state gaps in jurisdiction, even though this is one of the largest structural issues that have been recognized in the maritime governance. Although the new Bill tries to harmonise the regulatory standards, little research has been done on how overlapping mandates; between central authorities, State Maritime Boards, port trusts, coastal zone regulators and environmental agencies influence coordination, duplication of inspection procedures, regulatory delays or even conflicting direction on policies. Maritime governance of the political economy including the development of the multi-level institutional interaction as a factor in generating the results is under-theorised.

The other emerging area that has been ignored is the effects of the dispute resolution mechanisms under the new Acts. Even though the Acts provide adjudicatory bodies, the literature has failed to assess the efficiency of the mechanisms in minimizing the delays in litigation, fair resolution of concessionaire-port authority, or enhancing contractual security. Operational measures in terms of turnaround time, cost-efficiency, or concessionaire satisfaction are almost entirely lacking in empirical studies which connect the dispute resolution structures.

The fourth research gap is that there is a little comparative analysis of the port-governance reforms in India with an international best practice. Rotterdam, Singapore, Pusan and Shanghai Ports use integrated models of governance-technology-regulatory that are competitive. Nonetheless, there is hardly any academic literature that would juxtapose the changing legal framework in India to these sophisticated systems, which does not allow to assess the development or the lack of it through a benchmark. Likewise, the ability and readiness of State Maritime

Boards in the new structure, especially in terms of staffing, technical competency, the use of digital and regulatory maturity are not properly analyzed.

Also, longitudinal studies that follow the effect of reforms on the performance of ports have not been conducted. Anecdotal observations are available, but there is a dearth of systematic evidence that governance reforms are related to any quantifiable increase in efficiency, safety, sustainability or economic performance. Similarly, the connection between legal changes and the involvement of the private sector in PPP projects which are central to the development of the Indian ports has not been adequately investigated.

Lastly, the maritime environmental governance in terms of law has not been covered in academic literature keenly. Although the issue of environmental compliance is often analysed in terms of operational level, little has been done to explore the role of legal frameworks, enforcement procedures, and state-centre coordination on environmental performance, climate resilience planning and international compliance.

These relative gaps demonstrate the necessity of more sophisticated, interdisciplinary research at the intersection of legislation, governance theory, institutional performance, environmental law, multi-tier administration and maritime economics, which would provide a more comprehensive vision of the regulatory change in India.

VII. CONCLUSION AND RECOMMENDATIONS

7.1 Conclusion

The maritime legal system of India is experiencing a paradigm shift, as the system has previously consisted of scattered, colonial era conservation laws that now are fashioned into a more coherent, internationally-aligned system of governance. The combination of the Major Port Authorities Act, 2021 and the Indian Ports Bill, 2025 can be viewed as a bold move to combine the governance of ports, increase the transparency of institutions, streamline the tariff-setting process, and balance federal and state regulatory control. However, as it has been pointed out in the analysis, legislative change, in itself, is not sufficient to ensure better port efficiency or competitiveness. The operational challenges faced by persistent impediments, such as overlapping jurisdictions, disparities in institutional capacity among the states, the complexity of

environmental enforcement, and the lack of digital preparedness, all demand long-term institutional efforts and strategic coordination.

The future of the Indian maritime system is going to be pegged on its capability to turn the provisions of the law into effective on-ground actions through investing in port infrastructure, digital environments, human resources, coherent environmental systems, and integrated governance systems. Provided that all of those complementary reforms are taken on a holistic basis, India will be able to become a successful story of establishing itself as a modernized maritime economy and a competitive hub of global logistics by 2047.

7.2 Recommendations

1. Create a National Maritime Governance Coordination Authority (NMGCA).

An elevated-ranking statutory authority is needed to coordinate centre–state, observe conformity, address unwarranted overlap of jurisdiction, and standardize the interpretation of the maritime law. This deals with the vicious cycle of disjointed governance.

2. Build Capacity-Building Roadmaps of State Maritime Boards.

States need organized schedules of digital regulation training, port economics training, the environmental law training, safety compliance training, and concession management training. The empowered state agencies will establish uniform regulation practice in India.

3. Implement Risk-Based Regulatory Audit.

Rather than checklist-based inspections, which are repetitive, ports ought to consider the adoption of risk-based oversight addressing high-impact areas including dangerous goods, cyber risks, environmental infractions, and PPP contractual compliance which enhances efficiency and lessens delays.

4. Develop a Unified National Digital Maritime Platform.

Customs, port authorities, immigration, Coast Guard, shipping lines and terminal operators should be connected through one system that will allow the real time flow of information, lessen the paperwork, and promote transparency in terms of cargo management and vessel clearance.

5. Enhance Maritime Dispute Resolution Machineries. Maritime tribunal panels and expedited adjudicatory tribunal bench must be set up and domain knowledge personnel placed that minimize litigation time and enhance concessionaire trust in the Indian ports.

6. Government of New Jersey - Mandate Climate Resilience Planning to All Ports.

Climate-risk mapping and cyclone-impact studies, emergency-response exercises and resilient infrastructure (e.g. flood-proof berths, storm-surge barriers) must be made legally compulsory in order to make existence less exposed to climate calamities.

7. Encourage Private Investment by Stability of the Regulations.

Well defined concession guidelines, certain tariffs regimes and prolonged policy stability will persuade international investors as well as minimize exit risks in PPP projects that are necessary in large scale port expansion.

8. Implement International Benchmarking Requirement.

The major and non-major ports are expected to regularly compare their governance, safety, environmental and digital standards with the top ports like Rotterdam, Singapore and Pusan. This will promote performance-based reforms.

9. Introduce Integrated Environmental cells of governance.

Ports are encouraged to form specialised units with joint legal and environmental science and compliance skills to allow them to be in sync with MARPOL, Ballast Water Management, national pollution-control regulations and commitments on carbon-reduction.

10. Empower Research, Monitoring and Impact Evaluation Frameworks.

Universities, think tanks, and maritime boards are to cooperate in order to carry out longitudinal impact assessment, governance-performance research, environmental audit, and digital-readiness research. Future policy will be improved with the help of evidence-based insights.

11. Improve Maritime Security and Cyber Protection.

Audits on port cybersecurity, AIS surveillance, container-scanning designs and support to national

maritime domain awareness systems should be a priority to protect logistics supply chains against rising threats.

12. Encourage the Hinterland Connectivity Corridor Development.

Specific multimodal routes connecting ports, industrial node, inland waterways, rail terminals and logistics parks will ease the congestion, improve throughput and competitiveness in trade in India.

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