



## Public-Private Partnerships in India's maritime sector: Legal structures and strategic impact on terminal supply chain efficiency

Anoop R Nambiar, Dr. Madhu Rani

Department of Law, Shri Venkateshwara University, Gajraula, Amroha, Uttar Pradesh, India

### Abstract

Public-Private Partnerships (PPPs) have emerged as a crucial strategy for enhancing port infrastructure and operational efficiency in India's maritime sector. This paper critically examines the legal structures underpinning these partnerships and assesses their strategic impact on terminal supply chain performance. The research employs a doctrinal legal methodology, combining statutory analysis, case studies, and comparative policy review. Findings reveal that while PPPs have contributed to infrastructure expansion and private sector participation, the legal frameworks governing them remain fragmented, inconsistent, and insufficiently responsive to operational complexity. Concession agreements often lack clarity in risk allocation, performance obligations, and dispute resolution, leading to variability in legal interpretation, enforcement delays, and reduced contractual predictability. These legal shortcomings directly impact terminal efficiency metrics such as vessel turnaround time, cargo throughput, and logistics coordination. Comparative insights from global best practices affirm the importance of specialized legal codes, transparent regulatory regimes, and integrated governance mechanisms in ensuring the success of port PPPs. The paper concludes by recommending a sector-specific PPP law, standardized concession agreements, a specialized maritime tribunal, strengthened institutional capacity for legal oversight, regulatory convergence, and the incorporation of dispute avoidance and adaptive legal clauses. These reforms can transform India's maritime PPP framework from a generalist, compliance-oriented model to a strategic, sector-responsive legal architecture that drives long-term terminal efficiency and global competitiveness.

**Keywords:** Public-Private Partnerships, maritime sector, terminal supply chain efficiency, legal structures, concession agreements, maritime trade, Sagarmala Project, port infrastructure, PPP models, Build-Operate-Transfer (BOT), design-Build-Finance-Operate-Transfer (DBFOT)

### Introduction

Public-Private Partnerships (PPPs) in India's maritime sector have emerged as a crucial strategy for enhancing port infrastructure and operational efficiency. These partnerships leverage private sector expertise and capital while maintaining government oversight (Tahir, 2017) <sup>[33]</sup>. The legal framework governing PPPs in India's ports is primarily outlined in the Major Port Authorities Act, 2021, which provides flexibility in structuring agreements and allocating risks (Vojković, 2006) <sup>[35]</sup>. Common PPP models include Build-Operate-Transfer (BOT) and Design-Build-Finance-Operate-Transfer (DBFOT) arrangements (Orzes et al., 2017) <sup>[24]</sup>. These structures have significantly improved terminal supply chain efficiency by introducing modern technologies, streamlining processes, and reducing turnaround times for vessels. Private operators, driven by profit motives, have implemented advanced cargo handling systems and IT solutions, leading to increased throughput and reduced logistics costs (Ock et al., 2005) <sup>[22]</sup>. However, challenges remain in balancing public interest with private profitability, ensuring fair competition, and adapting to evolving global maritime trade patterns. The strategic impact of PPPs extends beyond individual terminals, contributing to India's broader goal of enhancing its position in global trade and maritime logistics.

### Importance of maritime trade in India's economy

Maritime trade plays a crucial role in India's economic growth and development. As a peninsula with a vast coastline of over 7,500 kilometers, India has a strategic advantage in international trade through its ports (Osadume

& Blessing, 2020) <sup>[25]</sup>. The maritime sector contributes significantly to the country's GDP, facilitates the import of essential commodities like crude oil and exports of manufactured goods, and generates employment opportunities. India's major and minor ports handle a substantial portion of the country's external trade by volume, making them vital for both domestic and international commerce (Stakhov, 2023) <sup>[32]</sup>. The government's initiatives, such as the Sagarmala Project, aim to modernize port infrastructure, enhance connectivity, and promote coastal economic development, further underscoring the importance of maritime trade in India's economic landscape (Malangmei, 2020) <sup>[19]</sup>. By leveraging its maritime potential, India can strengthen its position in global supply chains and boost its overall economic competitiveness (Das, 2024) <sup>[8]</sup>.

### Background on the emergence of PPPs in port development

In response to the capital-intensive nature of port infrastructure and the historical inefficiencies of state-run ports, the Government of India embraced Public-Private Partnerships (PPPs) in the 1990s as part of broader liberalization reforms (Roy, 2005) <sup>[28]</sup>. The shift was institutionalized through policy measures such as the Maritime Agenda 2010-2020 and the subsequent Sagarmala Programme. PPP models like Build-Operate-Transfer (BOT) and Design-Build-Finance-Operate-Transfer (DBFOT) have since been employed to attract private investment, introduce operational expertise, and expand port capacity. However, the legal and contractual frameworks

governing these partnerships have evolved unevenly, often struggling to keep pace with commercial complexities and sectoral demands (Bailey, 2017) <sup>[4]</sup>.

### Research problem and rationale

Despite the increased participation of private entities in India's port sector, legal ambiguities and regulatory fragmentation continue to affect the efficiency and performance of terminal operations. Several PPP projects have faced delays, contractual disputes, and performance issues due to unclear risk allocation, inadequate enforcement mechanisms, and inconsistent interpretations of concession agreements. These challenges raise fundamental questions about the adequacy of India's legal structures in safeguarding the interests of both public and private stakeholders while ensuring operational efficiency. This paper addresses the critical gap between legal design and strategic outcomes in India's maritime PPP framework, focusing specifically on terminal supply chain efficiency.

### Objectives and research questions

#### Objectives:

- To examine the legal frameworks and contractual models governing PPPs in India's maritime sector.
- To evaluate the strategic impact of these legal structures on the efficiency of terminal operations and supply chain performance.
- To identify challenges and gaps in current legal arrangements and propose policy recommendations.

#### Research Questions

- What are the key legal and institutional mechanisms that shape PPP projects in India's port terminals?
- How do these legal frameworks influence the efficiency, performance, and risk distribution in terminal operations?
- What are the existing gaps or inconsistencies in PPP regulation, and how can they be addressed through legal reform?

### 1.5 Methodology overview

This research employs a doctrinal legal research methodology, combined with case study analysis and comparative policy review. Primary sources include statutory instruments (e.g., Indian Ports Act, Major Port Authorities Act), PPP concession agreements, policy guidelines issued by the Ministry of Ports, Shipping and Waterways (MoPSW), and judicial decisions. Secondary sources include academic articles, government reports, and multilateral assessments on PPP best practices. Comparative references from global maritime PPP experiences are used to benchmark India's legal frameworks against international norms.

### 1.6 Structure of the paper

The paper is structured as follows: Section 3 presents a review of legal and academic literature on PPPs in the maritime sector. Section 4 outlines the statutory and institutional frameworks governing port-based PPPs in India. Section 5 analyzes the strategic impact of these legal arrangements on terminal performance. Section 6 explores the implementation challenges and legal disputes arising from PPP models. Section 7 compares India's legal structure with global practices. Section 8 provides a critical

discussion of findings, followed by Section 9, which concludes the study and offers legal-policy recommendations.

### Review of Literature

#### 1. Scholarly Approaches to PPPs in Infrastructure Law

The theoretical foundation of public-private partnerships (PPPs) in infrastructure law revolves around the need to balance private sector efficiency with public accountability (Forrer et al., 2010) <sup>[11]</sup>. Legal scholars have examined PPPs as hybrid arrangements that transcend traditional procurement models, embedding complex contractual obligations within administrative and constitutional frameworks. These models typically involve long-term concession agreements, risk-sharing arrangements, and performance-based incentives, raising significant legal concerns around regulatory oversight, enforceability, and renegotiation (Kyohairwe, 2014) <sup>[16]</sup>.

Key debates in the literature address the legal autonomy of contracting authorities, the enforceability of concession agreements, and the judicial review of PPP-related decisions. Critics have highlighted the vagueness of dispute resolution mechanisms, limitations in state capacity to manage large contracts, and the lack of transparency in award processes. The evolving jurisprudence on PPPs in India and other common law jurisdictions reflects an ongoing tension between commercial certainty and public interest safeguards, particularly when public assets like ports are involved (Cameron, 2004) <sup>[5]</sup>.

#### 2. Legal Developments in Indian Maritime PPPs

Scholarly engagement with India's port sector reforms has generally emphasized the policy shift from state-owned port management to corporatized, market-oriented models, especially since the launch of the Maritime Agenda 2010–2020 and Sagarmala Programme (George & Rengamani, 2019) <sup>[12]</sup>. Legal analyses of this transition point to the increasing reliance on PPP structures for container terminals, bulk cargo handling, and dredging operations. Several studies have examined the role of the Major Port Authorities Act, 2021, which grants ports greater financial and operational autonomy, yet leaves room for ambiguity in the allocation of contractual risk and regulatory supervision (Neves & Scare, 2010) <sup>[21]</sup>.

Legal commentaries on Model Concession Agreements (MCAs) in port projects reveal a lack of uniformity in risk distribution, weak termination clauses, and insufficient clarity on force majeure and performance guarantees (Meysam Mousavi et al., 2014) <sup>[20]</sup>. Academic work also notes the limited role of independent regulatory bodies, such as the Tariff Authority for Major Ports (TAMP), in ensuring post-contract compliance and tariff rationalization. While India has seen increased private participation in ports like JNPT, Kamarajar, and Vizag, the absence of a specialized legal regime governing maritime PPPs continues to be viewed as a constraint on operational and contractual predictability (Liyanage & Villalba-Romero, 2020) <sup>[18]</sup>.

#### 3. International Perspectives

Global best practices in port PPPs demonstrate how robust legal frameworks can directly impact terminal efficiency and investor confidence (Siregar & Putra, 2024) <sup>[30]</sup>. Jurisdictions such as Singapore, the Netherlands

(Rotterdam), and the UAE offer models where legislative clarity, transparent regulatory regimes, and effective dispute resolution mechanisms contribute to successful private sector participation. These systems typically feature sector-specific PPP laws, clear delineation of public and private responsibilities, and performance-linked incentives (Sokol, 2019) <sup>[31]</sup>.

Reports by multilateral institutions like the World Bank, UNCTAD, and WTO underscore the importance of legal standardization, concession oversight, and adaptive regulation in ensuring the operational success of port PPPs (Idowu, 2019) <sup>[13]</sup>. Their case studies emphasize the role of detailed contractual design and independent regulatory authorities in minimizing delays, improving turnaround time, and promoting long-term port sustainability. These international experiences offer comparative insights that are valuable for critically assessing India's evolving legal structure in the maritime PPP domain (Ogundipe et al., 2024) <sup>[23]</sup>.

#### 4. Identified Gaps

Despite the growing body of research on PPPs and port sector liberalization, there is limited academic analysis focusing specifically on the legal architecture of PPPs in India's maritime sector. Most existing studies either highlight policy outcomes or examine commercial performance without systematically connecting these to the legal underpinnings of concession design, enforcement, and dispute resolution.

Furthermore, there is a notable absence of literature that evaluates how legal structures directly affect operational outcomes such as cargo throughput, turnaround times, and supply chain resilience. The interaction between contractual enforceability and terminal efficiency remains underexplored, especially in the context of Indian port terminals operating under PPP arrangements. This research seeks to fill that gap by offering a critical, legally grounded assessment of how PPP law and governance shape the efficiency of terminal operations in India's port infrastructure.

#### Legal Framework Governing PPPs in the Maritime Sector

The legal framework for maritime Public-Private Partnerships (PPPs) is complex, involving national and international regulations. National laws govern PPP formation, implementation, and oversight, addressing risk allocation, contract terms, dispute resolution, and environmental compliance (Joković, 2018) <sup>[14]</sup>. Internationally, maritime PPPs must adhere to conventions set by the International Maritime Organization and the UN Convention on the Law of the Sea, as well as regional and bilateral agreements (Chircop, 2015) <sup>[6]</sup>. This framework balances public interests, private sector participation, environmental protection, and economic development in the maritime sector (Kerr, 2022) <sup>[15]</sup>.

#### 1. Constitutional and Legislative Basis

The constitutional foundation for India's port infrastructure governance stems primarily from the Union List under the Seventh Schedule of the Constitution, where Entry 27 and Entry 31 provide the Union government exclusive legislative competence over major ports and shipping. Additionally, Article 297 vests ownership of the territorial

sea and seabed with the Union, establishing its jurisdiction over maritime assets and trade.

The Indian Ports Act, 1908, as one of the earliest legislative enactments, classifies ports into major and non-major categories and grants powers to the central and state governments respectively. Over time, port governance for major ports has been modernized through the Major Port Authorities Act, 2021, which seeks to provide operational autonomy, encourage corporate governance, and promote private investment through transparent leasing and concessionary models. This Act supersedes the Major Port Trusts Act, 1963 and introduces Board of Major Port Authorities with powers to enter into contracts and grant PPP concessions.

#### 2. Institutional and Contractual Mechanisms

The operationalization of PPPs in the maritime sector is guided by policies and institutional guidelines issued by the Ministry of Ports, Shipping and Waterways (MoPSW). Under its aegis, several model frameworks such as Design-Build-Finance-Operate-Transfer (DBFOT) and Build-Operate-Transfer (BOT) are deployed for terminal development, container handling, and berth modernization (Zhen et al., 2019) <sup>[36]</sup>.

At the heart of these arrangements lie Model Concession Agreements (MCAs), which serve as the contractual template defining the scope of the project, obligations of the concessionaire, revenue-sharing mechanisms, and performance-linked penalties (*International, Supranational and National Shipping Policies*, 2022). These agreements are governed by general principles of contract law under the Indian Contract Act, 1872, and public procurement norms. The involvement of financial institutions and lenders also brings project finance law and security interest provisions into play, adding another layer of legal complexity.

#### 3. Judicial and Regulatory Oversight

Legal and regulatory oversight in the port PPP space operates through multiple avenues. The Tariff Authority for Major Ports (TAMP) is tasked with determining and regulating tariffs for major port trusts and their PPP operators (Rajasekar & Deo, 2014) <sup>[26]</sup>. Although recent reforms under the 2021 Act allow for more market-based pricing, TAMP retains oversight in legacy agreements, raising questions around regulatory dualism (Akbik & Migliorati, 2024) <sup>[1]</sup>.

Judicial review has played an increasingly important role in resolving disputes related to termination of concessions, revenue claims, delay penalties, and allocation of risk (Choi, 2011) <sup>[7]</sup>. Courts have generally upheld the sanctity of concession agreements while emphasizing the need for procedural fairness, legitimate expectation, and public interest safeguards. However, the lack of a specialized maritime PPP tribunal has led to prolonged litigation and delays in project delivery.

The Comptroller and Auditor General (CAG) also audits port PPPs, offering critical insights into compliance with concession norms, deviations in performance metrics, and inconsistencies in land use or financial structuring. Together, these institutional mechanisms underscore the fragmented yet evolving legal ecosystem that governs PPPs in India's maritime sector (Taylor, 2025) <sup>[34]</sup>.

## PPP Models and Their Strategic Influence on Terminal Efficiency

### 1. Comparative Review of PPP Structures at Indian Ports

India's major ports have adopted various PPP models to attract private investment, enhance terminal efficiency, and expand capacity. The predominant models include Build-Operate-Transfer (BOT), Design-Build-Finance-Operate-Transfer (DBFOT), and Lease-Develop-Operate (LDO) frameworks. These models vary in terms of asset ownership, risk allocation, and duration of concession (De & Ghosh, 2002) <sup>[10]</sup>.

A comparative review of PPP structures at ports such as Jawaharlal Nehru Port Trust (JNPT), Visakhapatnam Port, Kamarajar Port, and Mundra Port reveals differentiated impacts based on contractual design (Sinha & Bagodi, 2018) <sup>[29]</sup>. For instance, BOT concessions at JNPT terminals include strict performance-linked obligations for turnaround time, cargo handling targets, and berth occupancy. In contrast, private ports like Mundra operate under broader lease-based models with greater autonomy, offering flexibility in pricing and service delivery (De, 2006) <sup>[9]</sup>.

The variance in PPP structuring—both in legal terms and institutional enforcement—directly correlates with differences in operational outcomes, indicating that legal clarity and enforceability are central to supply chain efficiency in port terminals.

### 2. Operational Outcomes: Turnaround Time, Cargo Handling, Infrastructure Expansion

Empirical studies and port performance reviews have consistently linked PPP engagement with improved operational efficiency, particularly in terms of reduced vessel turnaround time, increased cargo throughput, and expanded infrastructure capacity (De, 2006) <sup>[9]</sup>. Terminals developed under structured concession frameworks, with clear Key Performance Indicators (KPIs), have shown faster adoption of mechanized handling systems and digitized logistics interfaces (Rohrlick, 1997) <sup>[27]</sup>.

However, in ports where legal contracts lacked specificity on performance obligations or where enforcement mechanisms were weak, private players have reportedly underperformed or sought renegotiation. This reinforces the argument that the legal structure of PPP agreements—especially the clarity of obligations, penalties, and monitoring clauses—plays a critical role in operational success.

### 3. Risk Allocation and Performance Accountability in Concession Agreements

Risk allocation is a defining feature of PPP legal contracts, and its misalignment has often led to project failure or litigation. In Indian port PPPs, risks related to traffic volume, environmental clearances, and land acquisition are often ambiguously defined, leading to contested interpretations between port authorities and concessionaires (Lei & Jingnan, 2010) <sup>[17]</sup>.

Concession agreements typically include clauses for financial closure timelines, revenue sharing models, exit and substitution rights, and force majeure events (Alijani & Joneydi, 2020) <sup>[3]</sup>. However, the enforceability of these clauses often depends on the institutional capacity of the port authority and the responsiveness of the regulatory system. Ports with robust contract management units and

standardized dispute resolution procedures tend to show better performance metrics.

Thus, the strategic impact of PPPs on terminal efficiency is not just a function of private participation but a direct outcome of how legally the contract is drafted, monitored, and enforced.

### Challenges in Legal Implementation and Governance

Despite the increasing reliance on Public-Private Partnerships (PPPs) in India's maritime infrastructure, several structural, procedural, and contractual limitations continue to hamper the legal effectiveness of these partnerships. While model concession agreements provide a broad legal framework, their practical application often encounters systemic inconsistencies and operational uncertainties.

#### 1. Contract Enforcement and Renegotiation Issues

A recurring challenge in port PPPs is the inconsistent enforcement of concession terms, particularly when projects face delays, cost overruns, or underperformance. Several concessions have required renegotiation of revenue-sharing terms, financial restructuring, or extended project timelines—often without a transparent legal framework to guide such revisions. The absence of clear legal standards for renegotiation results in ad hoc settlements, undermining investor confidence and reducing accountability. Moreover, many port authorities lack dedicated legal or contract management cells, which exacerbates the risk of misinterpretation or unilateral amendment of contractual clauses.

#### 2. Dispute Resolution Delays and Lack of Uniform Standards

Although concession agreements typically contain arbitration clauses, dispute resolution in practice is marred by delays, procedural inconsistencies, and jurisdictional confusion. The absence of a specialized dispute resolution forum for maritime PPPs forces many cases into general commercial courts or ad hoc arbitration, where maritime and port-specific legal nuances are often overlooked. This leads to protracted litigation, escalated project costs, and stalling of terminal operations. There is also no uniform legal standard on critical issues like delay attribution, force majeure events, or termination compensation, resulting in conflicting outcomes in different PPP projects.

#### 3. Regulatory Overlaps and Jurisdictional Conflicts

India's maritime governance involves multiple stakeholders—central ministries, port authorities, state governments, and regulatory bodies—each with overlapping jurisdictions. This leads to regulatory fragmentation, especially in areas like tariff determination, environmental clearance, and land-use approvals. For example, older port projects governed by TAMP (Tariff Authority for Major Ports) continue to follow price caps, while newer ones operate under market-linked tariff regimes, creating legal inconsistency. Similarly, coordination between central PPP guidelines and port trust regulations remains weak, resulting in disjointed legal compliance and unclear project oversight.

#### 4. Transparency and Stakeholder Participation Gaps

Legal challenges also arise from inadequate transparency in project structuring, bidding, and performance monitoring.

Although procurement rules mandate competitive bidding, the absence of public disclosures on bid evaluations, concession terms, and compliance audits raises concerns about legal fairness and due process. In many cases, local stakeholders—including labor unions, state governments, and port users—are insufficiently consulted, leading to legal disputes post-award. This lack of participatory governance reduces the legitimacy of PPP arrangements and affects long-term project sustainability.

### Comparative Legal Insights from Global Maritime PPPs

Countries with advanced port infrastructure have demonstrated that the success of public-private partnerships in the maritime sector is deeply tied to the robustness of legal and regulatory frameworks. Legal clarity, specialized dispute resolution systems, and efficient regulatory institutions contribute significantly to improving project execution, investor confidence, and terminal performance. This section draws on experiences from Singapore, the Netherlands (Rotterdam), and the UAE to offer insights relevant to India's legal landscape.

#### 1. Legal Frameworks in Singapore, Rotterdam, and UAE

Singapore operates under a centralized and codified legal regime governed by the Maritime and Port Authority of Singapore (MPA), which provides end-to-end legal and regulatory support for PPP projects. Its concession agreements emphasize strict service-level obligations, independent audit mechanisms, and streamlined land acquisition processes, all embedded within clear legislative mandates.

In Rotterdam, port development is handled by the Port of Rotterdam Authority under Dutch civil law, where public-private joint ventures operate within transparent corporate frameworks. The legal regime prioritizes stakeholder engagement, environmental due diligence, and enforceable long-term contracts that adapt to technological evolution and market volatility.

The UAE uses a hybrid model based on civil law and international commercial norms. Ports like Jebel Ali operate under special economic zone laws and international arbitration systems. Contracts are comprehensive, performance-linked, and supported by port-specific investment laws that protect investor rights and streamline operational approvals.

#### 2. Best Practices in Drafting, Monitoring, and Enforcement

These international examples illustrate that effective PPP implementation requires more than financial structuring—it demands sector-specific legal codification and monitoring frameworks. Key best practices include:

- **Detailed concession drafting:** International projects often feature highly structured concession agreements that specify performance metrics, timelines, risk-sharing models, and legal remedies with precision.
- **Independent regulatory oversight:** Institutions like MPA (Singapore) and public-private boards (Rotterdam) operate with statutory autonomy, reducing bureaucratic interference and ensuring contract enforcement.

- **Integrated dispute resolution mechanisms:** Use of pre-defined arbitration panels, sectoral tribunals, or administrative boards expedites conflict resolution, protecting both public interest and investor rights.
- **Stakeholder accountability:** Regular legal compliance audits and mandatory public disclosure mechanisms help in maintaining transparency and minimizing legal disputes.

#### 3. Lessons Applicable to Indian Maritime Law Reforms

India can draw several actionable lessons from these jurisdictions:

- First, there is a need for a sector-specific PPP law or legal guidelines tailored for maritime infrastructure, rather than relying solely on generic public procurement norms or contractual templates.
- Second, specialized dispute resolution forums or port tribunals should be established to expedite legal redressal in high-value PPP projects.
- Third, India's PPP governance could benefit from enhanced legal provisions for performance-linked incentives, termination safeguards, and renegotiation protocols, reducing the reliance on discretionary interpretation.
- Finally, legal reforms must emphasize regulatory convergence across central and state levels, ensuring consistent application of PPP policies in both major and non-major ports.

#### Discussion

India's embrace of Public-Private Partnerships (PPPs) in the maritime sector represents a significant shift toward market-driven infrastructure development. However, this evolution has outpaced the legal and institutional frameworks required to support it. The findings of this research demonstrate that while PPPs have contributed to capacity augmentation and technological modernization of port terminals, their long-term efficiency and sustainability are fundamentally shaped by the quality of the underlying legal structures.

A major concern is the variability in the legal drafting, interpretation, and enforcement of concession agreements across ports. Terminals operating under well-structured and clearly enforceable contracts—particularly those with strong performance-linked clauses and risk allocation mechanisms—have generally outperformed others. In contrast, poorly drafted agreements lacking clarity in dispute resolution, revenue sharing, or force majeure provisions have frequently led to operational disruptions, renegotiations, and even litigation. These outcomes highlight that legal precision is not merely administrative—it directly impacts supply chain continuity, investor confidence, and overall terminal performance.

Furthermore, India's maritime PPP governance suffers from institutional fragmentation and regulatory overlap, with agencies such as the Ministry of Ports, TAMP, and CAG operating in parallel without cohesive frameworks. This weakens oversight and contributes to delays in both project execution and resolution of legal conflicts. The absence of a specialized legal forum for maritime disputes exacerbates these delays, forcing projects into prolonged arbitration or general litigation channels ill-equipped for sector-specific complexities.

Comparative insights from countries like Singapore and the Netherlands underscore the importance of dedicated maritime PPP legislation, specialized tribunals, and integrated regulatory oversight. These jurisdictions demonstrate that when legal frameworks are streamlined and aligned with operational imperatives, PPP projects are more likely to achieve performance benchmarks and ensure long-term viability.

Therefore, to maximize the strategic impact of PPPs in port infrastructure, India must reimagine legal reform not as a corrective tool, but as a foundational enabler of terminal efficiency. A sector-specific PPP legal code, uniform concession standards, proactive risk management clauses, and institutional legal capacity-building are essential to make the Indian maritime sector legally coherent and operationally resilient.

## Conclusion and Policy recommendations

### Conclusion

This research critically examined the legal structures underpinning Public–Private Partnerships (PPPs) in India’s maritime sector and assessed their strategic impact on terminal supply chain efficiency. The analysis reveals that while PPPs have substantially contributed to infrastructure expansion and private sector participation in port operations, the legal frameworks governing these partnerships remain fragmented, inconsistent, and insufficiently responsive to operational complexity.

Concession agreements—central to PPPs—often lack clarity in defining risk-sharing models, performance obligations, and dispute resolution pathways. The absence of uniformity across ports, coupled with a lack of sector-specific legislation, has led to variability in legal interpretation, enforcement delays, and reduced contractual predictability. These legal shortcomings directly impact terminal performance metrics such as vessel turnaround time, cargo throughput, and logistics coordination.

Furthermore, institutional challenges—including regulatory overlap, limited transparency, and inadequate legal oversight—undermine the transformative potential of PPPs. Comparative insights from global best practices affirm the importance of specialized legal codes, transparent regulatory regimes, and integrated governance mechanisms in ensuring the success of port PPPs. India’s current legal approach to maritime partnerships must therefore evolve from a generalist, compliance-oriented model to a strategic, sector-responsive legal framework that supports operational excellence.

### Policy Recommendations

#### a. Enact a Sector-Specific PPP Law for Ports

Introduce a dedicated legal framework tailored to maritime PPPs, harmonizing contractual templates, risk allocation standards, and dispute resolution mechanisms. This law should provide statutory clarity to model concession agreements and integrate flexibility for evolving commercial needs.

#### b. Standardize Concession Agreements Across Major and Non-Major Ports

Develop legally vetted, performance-linked model concession agreements with mandatory provisions for monitoring, penalties, and arbitration. This would reduce renegotiation risks and promote legal predictability for investors and operators alike.

#### c. Establish a Specialized Maritime PPP Tribunal or Fast-Track Arbitration System

Create a dedicated adjudicatory body with maritime and infrastructure law expertise to ensure efficient resolution of PPP disputes. This would mitigate prolonged litigation and improve contractual compliance and accountability.

#### d. Strengthen Institutional Capacity for Legal Oversight

Build dedicated legal and contract management cells within port authorities and the Ministry of Ports to enhance enforcement, monitoring, and renegotiation capabilities. Capacity-building programs for regulators and port officials on contract law, risk management, and regulatory compliance should be institutionalized.

#### e. Ensure Regulatory Convergence and Transparency

Align central and state-level regulations governing tariffs, environmental compliance, and land use to avoid jurisdictional conflicts. Implement mandatory public disclosures of concession terms, bid evaluations, and project performance to enhance stakeholder trust and legal transparency.

#### f. Incorporate Dispute Avoidance and Adaptive Legal Clauses

Include pre-agreed mediation processes, renegotiation protocols, and force majeure flexibility clauses in concession contracts to manage unforeseen risks without escalating to formal litigation.

By embedding these recommendations into its legal reform agenda, India can unlock the full potential of PPPs in its maritime sector—not just as financing tools, but as legally robust, operationally strategic partnerships that drive long-term terminal efficiency and global competitiveness.

### References

1. International supranational and national shipping policies. Edward Elgar, 2022, 46–73. <https://doi.org/10.4337/9781803920245.00012>
2. Akbik A, Migliorati M. Understanding oversight through parliamentary questions The European Parliament in the Economic and Monetary Union. *European Union Politics*,2024;25(4):675–697. <https://doi.org/10.1177/14651165241268274>
3. Alijani M, Joneydi L. Risk Allocation in Contracts of Public Private Partnership,2020;3(8):93–118. <https://doi.org/10.22034/law.2021.521769.1023>
4. Bailey M. Supporting the wartime economy imperial maritime trade and the globalised maritime trade system 1914–1916. *Journal for Maritime Research*,2017;19(1):23–45. <https://doi.org/10.1080/21533369.2017.1331617>
5. Cameron W. Public accountability Effectiveness equity ethics. *Australian Journal of Public Administration*,2004;63(4):59–67. <https://doi.org/10.1111/j.1467-8500.2004.00402.x>
6. Chircop A. The International Maritime Organization. Oxford University, 2015, 416–438. <https://doi.org/10.1093/law/9780198715481.003.0019>
7. Choi Y. The efficiency of major ports under logistics risk in Northeast Asia. *Asia-Pacific Journal of Operational Research*,2011;28(01):111–123. <https://doi.org/10.1142/s0217595911003089>

8. Das S. Ports of Progress Analysis of the Port Infrastructure Development Program and Sagarmala Project. *International Journal of Science and Research*,2024;13(11):704–713. <https://doi.org/10.21275/sr241111113153>
9. De P. Total Factor Productivity Growth Indian Ports in the Era of Globalisation. *Maritime Economics & Logistics*,2006;8(4):366–386. <https://doi.org/10.1057/palgrave.mel.9100164>
10. De P, Ghosh B. Productivity Efficiency and Technological Change in Indian Ports. *International Journal of Maritime Economics*,2002;4(4):348–368. <https://doi.org/10.1057/palgrave.ijme.9100051>
11. Forrer J, Boyer E, Kee JE, Newcomer KE. Public–Private Partnerships and the Public Accountability Question. *Public Administration Review*,2010;70(3):475–484. <https://doi.org/10.1111/j.1540-6210.2010.02161.x>
12. George CC, Rengamani DJ. Sagarmala A Beacon of Development in the Maritime Horizon of India. *International Journal of Recent Technology and Engineering*,2019;8(2):1183–1187. <https://doi.org/10.35940/ijrte.b1831.078219>
13. Idowu HA. Benchmarking Global Best Practices for Improving Higher Education Quality in Africa. *IGI Global*, 2019, 72–90. <https://doi.org/10.4018/978-1-5225-9829-9.ch004>
14. Joković S. Characteristics of the Legal Framework for Serbian PPPs. *European Procurement & Public Private Partnership Law Review*,2018;13(2):113–118. <https://doi.org/10.21552/eppl/2018/2/6>
15. Kerr BP. Binding the International Maritime Organization to the United Nations Convention on the Law of the Sea. *International Organizations Law Review*,2022;19(2):391–422. <https://doi.org/10.1163/15723747-19020006>
16. Kyohairwe S. Local democracy and public accountability in Uganda The need for organisational learning. *Commonwealth Journal of Local Governance*,2014;15:86–103. <https://doi.org/10.5130/cjlg.v0i0.4064>
17. Lei S, Jingnan J. The Model Research of Risk Allocation on PPP Project Financing,2010;23:372–375. <https://doi.org/10.1109/iciiii.2010.96>
18. Liyanage C, Villalba-Romero F. Disaster risk reduction compliance framework for public private partnership port projects. *International Journal of Disaster Resilience in the Built Environment*,2020;12(5):484–499. <https://doi.org/10.1108/ijdrbe-05-2020-0053>
19. Malangmei P. The Sagarmala Project and the One Belt One Road Project. *Routledge India*,2020:100–115. <https://doi.org/10.4324/9780429320538-7>
20. Mousavi SM, Hashemi H, Mojtahedi SMH. An integrated approach for risk assessment in port projects. *Advanced Computational Techniques in Electromagnetics*,2014;2014:1–11. <https://doi.org/10.5899/2014/acte-00171>
21. Neves M, Scare R. Defining an Agribusiness Strategic Agenda for 2010–2020,2010;13(1):1–8. <https://doi.org/10.22004/ag.econ.93342>
22. Ock JH, Diekmann JE, Han SH, Park HK. Improving decision quality a risk-based go/no-go decision for build–operate–transfer projects. *Canadian Journal of Civil Engineering*,2005;32(3):517–532. <https://doi.org/10.1139/105-002>
23. Ogundipe T, Ewim S, Sam-Bulya N. Building a theoretical framework for financial risk management in emerging markets Applying global best practices to the oil and gas industry in developing economies. *GSC Advanced Research and Reviews*,2024;21(1):082–114. <https://doi.org/10.30574/gscarr.2024.21.1.0377>
24. Orzes G, Sartor M, Nassimbeni G, Fratocchi L. Build–operate–transfer an emerging entry mode for service offshoring. *Production Planning Control*,2017;28(4):295–309. <https://doi.org/10.1080/09537287.2017.1282055>
25. Osadume R, Blessing UC. Maritime Trade and Economic Development A Granger Causality and Bound Test Approach. *LOGI Scientific Journal on Transport and Logistics*,2020;11(2):23–32. <https://doi.org/10.2478/logi-2020-0012>
26. Rajasekar T, Deo M. Determinants of Port Performance Evidence from Major Ports in India A Panel Approach. *International Journal of Research in Computer Application Management*,2014;2(5):206–213. <https://doi.org/10.12691/ijefm-2-5-5>
27. Rohrlick MA. Load-by-Wire Advanced Cargo Handling System, 1997, 106(1). <https://doi.org/10.4271/975506>
28. Roy KC. Historical pattern of India’s economic growth salient features. *International Journal of Social Economics*,2005;32(11):951–967. <https://doi.org/10.1108/03068290510623799>
29. Sinha D, Bagodi V. A Causal Review of Dynamics in Indian Ports. *IIM Kozhikode Society & Management Review*,2018;8(1):60–73. <https://doi.org/10.1177/2277975218798186>
30. Siregar KE, Putra AMS. Enhancing governance in Indonesian legal entity state universities Insights from global best practices. *Journal of Educational Management and Instruction*,2024;4(1):101–112. <https://doi.org/10.22515/jemin.v4i1.9158>
31. Sokol DD. The Case for Global Best Practices in Antitrust Due Process and Procedural Fairness. *Oxford University*, 2019, 4–30. <https://doi.org/10.1093/law-ocl/9780198815426.003.0002>
32. Stakhov A. Integration strategies and challenges in maritime trade. *Market Economy Modern Management Theory and Practice*,2023;21(1(50)):136–148. [https://doi.org/10.18524/2413-9998.2022.1\(50\).270415](https://doi.org/10.18524/2413-9998.2022.1(50).270415)
33. Tahir MS. Public Private Partnerships. *The Professional Medical Journal*,2017;24(01):1–9. <https://doi.org/10.29309/tpmj/2017.24.01.491>
34. Taylor M. Role for Parliament in Independent Judicial Appointments Insights from the Comptroller and Auditor General. *The Denning Law Journal*,2025;33(1):79–114. <https://doi.org/10.5750/dlj.v33i1.2230>
35. Vojković G. Administrative Supervision of Work of Port Authorities in the Republic of Croatia. *Promet-Traffic Transportation*,2006;18(2):73–76. <https://doi.org/10.7307/ptt.v18i2.668>
36. Zhen L, Zhuge D, Wang S, Murong L, Yan R. Operation management of green ports and shipping networks overview and research opportunities. *Frontiers of Engineering Management*,2019;6(2):152–162. <https://doi.org/10.1007/s42524-019-0027-2>