KEY POINTS

- To improve efficiency, enhance ease of doing business, and reduce logistics cost, the Asian Development Bank is supporting the Government of India with the simplification and improvement of processes at ports and airports.
- A study of Jawaharlal Nehru Port and Visakhapatnam Port recommended the development, implementation, and full integration of digital platforms (e.g., Port Community System) to reduce physical touch points and rationalize manual processes.
- Building reliable digital systems with better user interface for bill of entry, shipping bill, filing cargo, etc., for timely clearances by minimizing delays due to frequent breakdowns was the centerpiece of proposed enhancements.
- Streamlining of processes across ports to eliminate procedural and documentation redundancies was also assessed.
- Authorities could develop a self-audit and improvement toolkit to audit transactional processes, identify concern areas, and plan for continuous improvement of logistics handling at the port.

Reforming Port Processes in India
for Logistics Efficiency

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BACKGROUND

Logistics services in India are relatively costly, ranging between 13% and 14% of gross domestic product (GDP) as compared to 8% in the United States and 9.5% in Germany.¹ The Government of India is keen to reduce inefficiencies in the sector and bring down logistics costs to improve competitiveness and increase India's participation in global and regional value chains.

The Asian Development Bank is supporting the Logistics Division, Ministry of Commerce and Industry, Government of India, in improving and simplifying logistics processes to bring in efficiency, enhance ease of doing business, and reduce the overall logistics cost at export–import gateways (ports and airports). For this purpose, detailed port–process mapping was undertaken at two key gateways—Jawaharlal Nehru Port (JNPT) and Visakhapatnam Port (VPT)—to:²

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¹ NITI Aayog, Government of India and Rocky Mountain Institute. 2018. *Goods on the Move: Efficiency and Sustainability in Indian Logistics*. Global Mobility Summit. New Delhi.

² The JNPT is on the western coastline along the Arabian Sea and is the largest container port in India whereas VPT is located on the east coast of India, almost midway between Kolkata city in the north and Chennai city in the south. The port contributes significantly to maritime trade with economies in the Asia and Pacific regions. The two ports handle various cargoes and have different facilities, leading to possible variations in business processes and documentation requirements.

- understand transactions and documents being exchanged between different stakeholders;
- identify variations in on-ground processes across ports, terminals, cargo categories, and movement type; and
- identify areas of intervention to achieve simplification of business procedures and bring in process efficiencies.

This policy brief presents the methodology of the study (carried out in JNPT and VPT), highlights major findings, offers solutions to reform port systems, and suggests the institution of a self-audit and improvement toolkit for port processes.

METHODOLOGY

The study, which was consultative in nature, identified key actors and stakeholders involved in goods clearance at ports, had in-depth interactions with them to understand key issues, and developed suitable interventions to streamline the processes.

Over 100 primary interactions were conducted across a spectrum of stakeholders that included customs and participating government agencies (PGAs) responsible for clearances, port and terminal operators, and logistics services providers like freight forwarders and shipping agents (Figure 1).³

Based on the interactions with the stakeholders, 70 detailed process maps for both VPT and JNPT were prepared highlighting the processes, documents, and systems involved in the port value chain. The process maps were analyzed and the key issues and possible solutions identified on the following themes:

- multiple instances of submission of hard copy documents despite efforts toward digitalization;
- multiple submissions of the same document to different stakeholders;
- redundancy in document submission requirements;
- prevalence of manual processes requiring physical touch points that need deployment of personnel better used elsewhere;
- nonstandard business processes followed across different terminals of the same port or airport; and
- variation in processes of PGAs.

The port value chain was categorized into 8 major processes, which were further divided into 28 subprocesses or transactions. The major processes are discussed below.

1. **Pre-vessel clearance.** This starts with the ship seeking entry into the port and ends with the vessel being assigned a berth. The shipping agent submits the vessel certificates and vessel-related documents to the port traffic or marine department

Figure 1: Stakeholders Interacted with during the Study

CFS = container freight station, CHA = customs house agent, DPD = direct port delivery, DPE = direct port entry, FSSAI = Food Safety and Standards Authority of India, ICD = inland container depot, IT = information technology.
Source: Study team.

³ A participating government agency (PGA) is an agency other than customs that has a role in clearance of goods, such as a food safety regulator or a textile committee.

in the port community system. The traffic or marine department checks the documents and gives clearance for berthing the vessel.

2. **Vessel berthing and clearance.** The berthing and clearance process begins with the vessel arriving at the port anchorage point and being assigned a pilot for berthing. The process ends with various vessel-related clearances being provided by the customs officer, immigration officer, and public health officer on verification of vessel-related documents.
3. **Vessel sail-out clearance.** The vessel sail-out clearance is issued by the port where the vessel is berthed and the customs house that supervises the port.
4. **Cargo clearance process for import.** The import clearance process begins with the customs house agent/consignee submitting the bill of entry on the Indian Customs Electronic Data Interchange Gateway (ICEGATE) portal.⁴ It lasts till the exit stage of the final out-of-charge (i.e., final clearance and handover) by customs and payment of import duty by consignee. In between, the process might entail goods clearance from a PGA.
5. **Cargo clearance for export.** The exporter of cargo completes the formalities with customs. This includes customs assessment for any duty drawback or duty payment

on exported goods. The process might also entail PGA clearance on the particular exported item.

6. **Cargo handling in terminal.** This includes the different activities related to loading and unloading of cargo to and from the vessel, and its movement from and to the yard.
7. **Cargo delivery for import.** The final stage in the port import process involves final cargo delivery from the terminal to the importer and transport of the container from the terminal to the container freight station (CFS).
8. **Cargo gate-in to the terminal for exports.** This includes the stuffing and de-stuffing process in CFS and movement from CFS to terminals.

The 8 processes and the associated 28 subprocesses are detailed in Figure 2.

All possible movement types were analyzed to ensure that every kind of transaction was comprehensively studied and accounted for. These included export and import of containers (both full and partially full container load), empty containers, dry bulk, break bulk, and liquid bulk. Regulatory innovations leading to differential treatment of cargo in the Indian context, such as direct port delivery and direct port entry, were also analyzed.

Figure 2: Stages in Port Process

CFS = container freight station, DGLL = Directorate General of Lighthouses and Lightships, IGM = import general manifest, PGA = participating government agency, PHO = port health office, VCN = voyage call number.
Source: Study team.

⁴ ICEGATE is the national portal of the Indian Customs of Central Board of Indirect Taxes and Customs (CBIC) that provides e-filing services to the trade, cargo carriers, and other trading partners electronically.

KEY FINDINGS

While the findings below are specific to JNPT and VPT, they provide good insight into the key port system challenges in India.

1. **Several manual processes and physical touch points.** The number of unique documents that stakeholders need to submit is as high as 115 at JNPT and 145 at VPT. More than half of these are mandated to be in hard copy, owing to poor online application management systems and the absence of protocols related to digital signature authenticity verification where required by law. The following examples illustrate this:
 - a. When a ship docks, officers from customs boarding, port health, and immigration physically go aboard the vessel to verify its documents (prepared by the vessel master) in hard copy.
 - b. Since the online module for berth allocation in the VPT Port Community System (PCS)⁵ is still being designed, berth allocation for a vessel at VPT still involves an in-person meeting between the traffic department officer and the shipping agent.
2. **Multiple submissions of the same document to different portals.** Since digital systems (at both JNPT and VPT) such as the ICEGATE,⁶ the PGA import clearance system, and the port operating system (POS) are siloed rather than integrated, for a single transaction, stakeholders need to upload the same set of documents separately to each such portal, leading to systemic inefficiency, duplication of effort, and increase in time and resources costs. About 50% of the additional document copies required at JNPT and about 33% at VPT are attributable to the said lack of integration.
 - a. For instance, say, a customs house agent (CHA) uploads cargo-related supporting documents such as invoice, packing list, and contract copy/purchase order to the e-Sanchit portal for customs verification.⁷ Since e-Sanchit is yet to be integrated with the PGA import clearance system, if the cargo needs clearances from PGAs such as the Food Safety and Standards Authority of India and Plant Quarantine, the CHA will have to upload the documents again on the PGA import clearance system.
 - b. Similarly, documents such as bills of entry, import general manifests (IGMs), and duty paid receipts submitted by CHA to ICEGATE have to be re-uploaded for the traffic department at VPT on their POS because the systems are not integrated.
3. **Redundancy of documentation requirements.** Many documents submitted for a particular process are irrelevant or unnecessary. Some instances are as follows:
 - a. **Irrelevant but mandatory submissions.** For instance, at VPT, vessel-related documents compulsorily submitted by the shipping agent to the customs import section are merely for reference and are not required for any process under its purview. Also at VPT, cargo-related documents such as the crew list, bill of entry, bill of lading and customs duty paid receipt, compulsorily submitted by the shipping agent to the traffic department, are actually supposed to be verified by the customs officer before cargo delivery to the importer. However, currently, the VPT traffic department verifies the documents on behalf of customs owing to lack of clarity in regulations and the authority to check the documents.
 - b. **Erroneous submissions owing to lack of clarity on policies and regulations.** To cite an example, the Indian Ports Association mandates that vessel certificates be submitted by the shipping agent on the PCS in order to receive clearance for vessel berthing. However, the variations in documentation requirements across ports—for example, 14 documents mandated by JNPT vis-à-vis 7 by VPT—are not properly communicated to shipping agents, leading to confusion and erroneous uploads. Furthermore, though vessel-related document uploads remain valid for six months, for subsequent calls by the same vessel at Indian ports, shipping agents are known to re-upload these for every voyage irrespective of time elapsed.
 - c. **Document verification mandated beyond the regulatory purview of agencies.** Lack of clarity regarding the regulatory purview of stakeholders leads to additional documents being submitted for approvals. For example, in VPT, a shipping agent submits as many as 103 documents for the traffic department to approve its iron-ore cargo. Many of these 103 documents do not come under the regulatory purview of the VPT and are not required for cargo clearance but are still verified.
4. **Redundancy of processes.** Certain processes have continued in practice despite being rendered redundant by digitization.
 - a. For instance, though the details of a transshipment application (TSA) for a container are available in the terminal operating system (TOS), VPT customs (unlike

⁵ A PCS is an electronic platform that connects the multiple systems operated by a variety of organizations that make up a seaport or airport community. In India, the PCS (maintained by Indian Ports Association) is intended to integrate the electronic flow of trade-related documents/information and function as a centralized hub for the ports of India and other stakeholders like shipping lines/agents, surveyors, stevedores, banks, container freight stations, inland container depots, customs brokers, importers, exporters, railways/CONCOR, and government regulatory agencies for exchanging electronic messages in a secure manner.

⁶ ICEGATE is the national portal of the Indian Customs of Central Board of Indirect Taxes and Customs (CBIC) that provides e-filing services to the trade, cargo carriers and other trading partners electronically.

⁷ The e-Sanchit (e-Storage and Computerized Handling of Indirect Tax Documents) portal of ICEGATE facilitates paperless processing and uploading of supporting documents for trading across borders.

JNPT) mandates that the terminal operator collect a signed copy of the TSA before releasing the container to the container freight station (CFS).

- b. Customs at VPT (but not JNPT) also mandates that a hard copy of the electronically issued “Let Export Order” be signed by the customs officer after the verification of container entry into the terminal; the container is allowed for shipment only after the document is physically signed.

5. Lack of standardization. Government agencies such as customs tend to follow different processes for the same activities in different ports, leading to confusion, delays, and inefficiencies.

- a. At JNPT, customs issues entry inwards for a vessel before berthing based on the IGM details submitted by the shipping agent. At VPT, the entry inwards is given only after the customs boarding officer has made all verifications, leading to a delay in the commencement of cargo operations.
- b. When an export container gates-in at a terminal at JNPT, the gate operator scans a print copy of its Form 13 to retrieve its details from the TOS. At VPT, however, the transporter links the truck number to the Form 13. The gate operator simply uses the truck number to retrieve the Form 13 from the TOS, eliminating the need for a hard copy.

exchange.⁹ However, barring six to eight PCS messages, the rest are not in use due to lack of integration with existing systems. In order to achieve a higher level of integration across stakeholders, it is important to not only implement the existing PCS messages but also develop new ones. For example, if light dues receipts¹⁰ from the portal of the Directorate General of Lighthouses and Lightships could be ported to PCS through a new PCS message, all stakeholders could access and verify it, avoiding the need for multiple hard copy submissions.

3. Set up reliable systems with better user interface. The smooth functioning of the PCS and its competence in ensuring timely clearances hinge strongly on the reliability of individual systems and their user interface. For example, stakeholders complain that ICEGATE is slow, it frequently breaks down, and consumes maintenance downtime. This leads to delays in filing the bill of entry, shipping bill, IGM, export general manifest (EGM), etc., and in uploading supporting documents. Upgrading the ICEGATE system to ensure higher speed and ensuring better maintenance to reduce breakdowns will make it easier for the CHA to access the system and lessen delays in filing cargo-related documents. Similarly, better user interface will enable PGAs to access all the documents uploaded by the CHA on e-Sanchit (through Single Window Interface for Facilitating Trade or SWIFT), thus avoiding multiple submissions of the same document.

4. Streamline and simplify processes. Last but not least, it is important to focus on simplifying and streamlining processes across ports to do away with redundancies. This may involve policy and regulatory changes and defining standard operating procedures (SOPs) for greater efficiency. For example, at present, the CFS collects hard copy cargo-related documents from the CHA or importer or exporter and stores these for up to 5 years on behalf of customs, which requires them for clearance audit. This leads to multiple submissions and physical touch points for cargo clearance. Instead, customs should complete the audit of documents through the Indian Customs Electronic Data Interchange System.¹¹

KEY SOLUTIONS

The findings from JNPT and VPT provide valuable insights into the key challenges for reforming port systems to maximize operational efficiency and improve ease of doing business. The key policy solution relates to having a methodology for audit and implementing regular audits of the detailed processes at ports. Besides regular audits, a range of digital and process reforms are required for improving operational logistics efficiency.

- 1. Develop digital platforms for reducing physical touch points.** Undertake detailed audits to track the incidence of manual activities and physical touch points, such as those related to berth allocation, customs approval for domestic coastal cargo, and the transshipment process, and develop digital platforms to gradually phase out these processes.
- 2. Implement the existing PCS messages and develop new ones.** All major ports (13) and key minor ports (5) in India are present in the PCS.⁸ The current version of the PCS has 7 modules and 114 messages designed for information

Besides these general recommendations, specific action points unique to each port may be arrived at through a **thorough transaction-level audit of processes** by the port administration along with **an associated scoring mechanism** to serve as a comparative benchmark and encourage them to take a path toward self-improvement.

⁸ The major ports refer to ports that are controlled and managed by the Ministry of Shipping, Government of India, whereas the minor ports are controlled and managed by respective state governments.

⁹ Messages here refer to activities associated with information and online document exchange for the completion of different procedures.

¹⁰ Light dues are the charges levied on ships for the maintenance of lighthouses and other aids to navigation. In India, light dues are charged by the Director General of Lighthouses and Lightships for management and maintenance of lighthouses in the country.

¹¹ The Indian Customs EDI System (ICES) is the customs’ automation system. Currently, ICES is operational at 245 major customs locations and handles 98% of India’s international trade in terms of import and export consignments.

Figure 3: Self-Audit Toolkit Structure

Data collection through stakeholder surveys	Process mapping and validation	Identification of areas of improvement	Root-cause mapping	Development of an action plan	Dissemination of findings through a stakeholder workshop	
<ol style="list-style-type: none"> 1. Capturing transactions across processes 2. Listing the documentation involved 3. Ensuring digitalization, process mapping, and validation 	<ol style="list-style-type: none"> 1. Detailed mapping of processes 2. Capturing process variations across commodity, delivery type, participating government agencies, movement, etc. 3. Validation of process maps 	<ol style="list-style-type: none"> 1. Mapping a continuous improvement matrix with details of key issues of various process groups 2. Identifying key issues prevalent in the port 	<ol style="list-style-type: none"> 1. Mapping the key issues identified in the continuous improvement matrix 2. Identifying and mapping the root causes of issues 	<ol style="list-style-type: none"> 1. Identifying improvement areas based on root-cause mapping 2. Preparing a detailed action plan and roadmap for addressing the issues 	<ol style="list-style-type: none"> 1. Presenting roadmap and action plan to stakeholders 2. Deliberating on interventions and action plan 	<p><i>The exercise would be repeated at regular intervals (6 to 12 months) or after every significant intervention to assess the impact.</i></p>

Source: Study team.

SELF-AUDIT AND IMPROVEMENT TOOLKIT

The challenge in designing a self-audit and improvement toolkit is that it needs to be comprehensive in terms of mapping and must account for the transactional and procedural diversity across ports. It also has to be flexible and customizable to a specific port with its unique layout, operational plan, and hierarchy of activities. Figure 3 provides a summary of the steps involved in the implementation of the toolkit.

Implementation

The steps involved in the implementation of the toolkit (Figure 3) include the following:

- 1. Data collection.** The self-audit process starts with the collection of preliminary data related to each transaction (across the 28 subprocesses in Figure 2) through survey questionnaires that are specific to each type of entity. This exercise is intended to capture the nature of each transaction, the related exchange of documents and information, and the mode of this exchange.
- 2. Process mapping and validation.** The surveys provide preliminary data to support the initial mapping of the 28 subprocesses; the process maps thus created are validated by stakeholders to ensure the correct flow of transactions.
- 3. Identification of areas of improvement.** An analysis of the data and process maps helps identify the issues and

challenges across the subprocesses, including physical copy submissions, multiple submissions, physical touch points, and redundancy of documentation and processes.

- 4. Root-cause mapping.** Root-cause analysis for each issue also indicates the potential intervention that can resolve it. The typical root causes include lack of digitization, lack of integration between systems and stakeholders, poor regulations, lack of SOPs, and low awareness.
- 5. Development of an action plan.** Based on the root-cause mapping, a list of interventions is prepared, prioritized by ease of implementation, impact, and timelines. A detailed action plan for the implementation of interventions defines stakeholder responsibility and timelines.
- 6. Findings dissemination workshop with stakeholders.** The port authority shares the findings and the action plan with all stakeholders through a workshop. The authority then liaises with each of the stakeholders to ensure the implementation of the action plan.

Rating

The self-audit exercise is repeated periodically using a three-level rating system to monitor port-process improvement across:

- five key issues (Table 1),
- eight major processes (Figure 2), and
- overall port processes.

Table 1: Rating scale for monitoring improvement

		Measuring improvements across key issues				
		Number of hard copy submissions	Instances of multiple submissions	Number of physical touch points	Number of redundant processes	Number of redundant documents
Significant improvement	★	>=20%	>=30%	>=10%	>=10%	>=20%
Moderate improvement	★	>0% and <20%	>0% and <30%	>0% and <10%	>0% and <10%	>0% and <20%
No improvement	★	<= 0%	<= 0%	<= 0%	<= 0%	<= 0%

The eight major processes (level 2) of the port value chain (Figure 2) are rated by the five key issues (level 1) presented in Table 1. If any process earns three or more stars of a single color, it is recorded as the overall rating for the process. Any other combination of colors would indicate an overall yellow rating of moderate improvement.

For example, if pre-vessel clearance gets a yellow rating for three of the issues (say, number of hard copy submissions, number of physical touch points, and number of redundant documents), a red rating for instances of multiple submissions, and a green rating for number of redundant processes, its overall rating would be yellow given it had a yellow rating for at least three of the key issues.

The overall rating for port processes (level 3) is derived from the level 2 ratings for all of the eight processes; five or more ratings of one color indicate an overall rating of that color. Like level 2, any other combination of colors would indicate an overall rating yellow of moderate improvement.

For further illustration, please see the Annex.

CONCLUSION

Ports represent complex and dynamic operational and regulatory ecosystems. While the quality, capacity, and sophistication of physical infrastructure is one aspect of port efficiency, the management of processes across multiple stakeholders covering different stages and the cumbersome manual documentation in the port ecosystem represents the other.

This brief documents a detailed mapping of all port processes, highlights the key challenges based on a deep dive for each process and its subprocesses, and offers policy recommendations

including adoption of a self-audit toolkit for continuous measurement and improvement of port procedures. Such a toolkit is critical to the overall agenda for driving logistics and trade facilitation.

While a traditional time release study (TRS) conducted in a port can map inefficiencies within the system and identify the processes that cause delays or congestion, it requires micro-level analysis of process design and the way business is actually conducted around it to pinpoint the precise challenges that need to be addressed.

To that end, this mapping study and the associated recommendations that emerge out of it complement the TRS typically conducted by customs authorities in ports. A combination of regular TRS and routine mapping of processes at the micro-level using the basic structure outlined in this paper and customizing it for the specific port in question will allow robust stock-taking by ports, providing them the insights to drive comprehensive reforms in both operations and processes.

Annex Table 1 presents illustrative self-audit findings for a port across eight major processes and five issues in Year 1 and Year 2.

Based on the rating framework explained in Table 1, improvements across the issues and processes are presented in Annex Table 2.

Since four processes are rated yellow and three green, the overall port processes have been assigned a moderate improvement rating.

While the rating scale compares the performance of the same port across 2 years, it does not benchmark the performance of two different ports as they differ significantly in terms of hard and soft infrastructure and commodity types.

ANNEX: ILLUSTRATIVE RATING OF PORT PROCESSES OVER 2 YEARS

Annex Table 1: Findings from Self-Audit Toolkit in Year 1 and Year 2

No. Process	No. of hard copy submissions		Instances of multiple submissions		No. of physical touchpoints		No. of redundant processes		No. of redundant documents	
	Year 1	Year 2	Year 1	Year 2	Year 1	Year 2	Year 1	Year 2	Year 1	Year 2
1. Pre-vessel arrival clearance	24	20	31	21	8	7	3	3	9	10
2. Vessel berthing and clearance	40	30	20	25	2	3	2	1	5	3
3. Vessel sail-out clearance	30	28	10	8	1	1	1	1	20	19
4. Cargo clearance for imports	25	15	15	13	2	0	0	0	10	9
5. Cargo clearance for exports	20	12	20	5	2	0	1	0	2	4
6. Cargo handling at terminal	10	10	2	0	0	0	0	0	0	0
7. Cargo delivery for imports	15	18	10	12	2	1	1	0	5	2
8. Cargo delivery for exports	10	12	8	8	1	1	0	1	5	6

Annex Table 2: Rating of Issues across Processes and Overall Rating

- Level 1: Rating of issues on the basis of improvement.
- Level 2: Based on the ratings of issues, each process improvement was assigned a rating.
- Level 3: Based on the level 2 process ratings across issues, the overall port-process rating was derived.

Process	No. of hard copy submissions		Instances of multiple submissions		No. of physical touchpoints		No. of redundant processes		No. of redundant documents		Overall rating for process (Level 2)
	Improvement	Rating	Improvement	Rating	Improvement	Rating	Improvement	Rating	Improvement	Rating	
Pre-vessel arrival clearance	17%	★	32%	★	13%	★	0%	★	-11%	★	★
Vessel berthing and clearance	25%	★	-25%	★	-50%	★	50%	★	40%	★	★
Vessel sail-out clearance	7%	★	20%	★	0%	★	0%	★	5%	★	★
Cargo clearance for imports	40%	★	13%	★	100%	★	-		10%	★	★
Cargo clearance for exports	40%	★	75%	★	100%	★	100%	★	-100%	★	★
Cargo handling at terminal	0%	★	100%	★	-		-		-		★
Cargo delivery for imports	-20%	★	-20%	★	50%	★	100%	★	60%	★	★
Cargo delivery for exports	-20%	★	0%	★	0%	★	-		-20%	★	★

No improvement

Moderate improvement

Significant improvement

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