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## EVALUATING THE LEGAL FRAMEWORK FOR DIGITAL CUSTOMS CLEARANCE: A STUDY ON AI-BASED RISK MANAGEMENT UNDER INDIAN CUSTOMS

~ *Bhuvan Raj*

### ABSTRACT

This article provides a detailed analysis of the changing legal regime surrounding digital customs clearance in India, particularly focusing on the Risk Management Systems (RMS) based on Artificial Intelligence (A.I.), which have been adopted by the Central Board of Indirect Taxes and Customs (CBIC). The growing digitization of trade processes under the Customs Act, 1962 and associated digital initiatives—such as with the ICEGATE platform and the Faceless Assessment Scheme—represents a significant change in the way customs governance and operations are realized and regulated in India.

Central to this change are A.I.-based risk analytics that identify and prioritize those shipments most likely to be non-compliant with the Customs Act; thereby "facilitating" trade and affording "revenue protection". These A.I.- systems rely on a combination of rule-based models, statistical anomaly detection, and machine learning algorithms to triage shipments, determine inspection priorities, and facilitate data-driven decisions. As algorithmic systems take greater control in affecting administrative decisions such as detention or clearance orders, along with any examination orders, further legal, ethical, and governance considerations arise. The study identifies the legal, regulatory, and policy frameworks that shape the digital customs environment in India, including the Customs Act<sup>1</sup>, the Digital Personal Data Protection Act<sup>2</sup>, and various circulars and notifications issued by CBIC<sup>3</sup> between 2024-2025 that provide operational guidance regarding AI-assisted processes. Collectively, these frameworks represent India's ongoing harmonization of customs administration to global best practice, while still

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<sup>1</sup> The Customs Act 1962 (India).

<sup>2</sup> The Digital Personal Data Protection Act 2023 (India)

<sup>3</sup> CBIC, 'Circular on Enhancement of Risk Management System for Customs Procedures' Circular No 12/2024-Cus (2024)

addressing domestic obligations regarding data protection, procedural fairness, and administrative transparency.

Finally, the study lays out some recommendations to assist in creating a digital customs environment in India that balances efficiency, legality and fairness. These recommendations include increased statutory safeguards around algorithmic decision making, period audits of AI systems, increased transparency of risk management standard, and for high-risk legal determinations create the opportunity for human-in-the-loop processes. Therefore, this study highlights that effective law and governance reform, appropriately developed through domestic law and international benchmarks, will provide for a lawful, trustworthy and trade facilitating customs environment in the digital age.

## **1. Introduction**

Across the world, customs authorities are implementing digital technologies aiming at betterment of trade, getting supply chain and ensure following with revenue and non-revenue Rules. India has becoming superior in this change by reducing the traditional manual inspections and subjective officer test to an automated and digitally compressing customs framework, which uses data analysis and Artificial Intelligence (AI) for decision making. The Central Board of Indirect Taxes and Customs (CBIC) wants to set up AI-enabled Risk Management Systems (RMS) to accurate and effective identify and target high-risk shipment while getting faster clearance of low-risk shipment.

This shift will improve operational efficiencies and contribute to India's commitment to adhere to the international trade facilitation standards, including the World Customs Organization (WCO) standards and the WTO-TFA<sup>4</sup>, to which India has signed on in its efforts to address trade facilitation more broadly.

However, the use of AI and data-driven processes by customs authorities introduces a number of complicated legal and ethical questions. Some of these questions relate to the standards of the Customs Act, 1962, and whether there is sufficient statutory authority; concerns about whether these actions are undermining principles of data privacy and proportionality under the Digital Personal Data Protection Act, 2023 (DPDP Act); and questions about administrative fairness and algorithmic transparency and accountability.

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<sup>4</sup> World Trade Organization, Trade Facilitation Agreement (signed 7 December 2013, entered into force 22 February 2017).

Customs authorities across the world are more frequently adopting information technology<sup>5</sup> as a mechanism for improving trade facilitation, advancing supply-chain security, and enforcing compliance with revenue and non-revenue regulatory requirements. India is a leader in this movement, transitioning<sup>6</sup> from manual inspections and officer assessments of customs shipments to an integrated digital and automated approach that supports data analytics and Artificial Intelligence (AI) risk assessment decisions. The Central Board of Indirect Taxes and Customs (CBIC) is implementing an AI-driven Risk Management Systems<sup>7</sup> (RMS) that will help to better identify and target high-risk consignments, while at the same time to more quickly expedite customs clearances for consignments categorized as low-risk. These developments improve operational efficiency and respond to India's obligations under the international trade facilitation agenda of the World Customs Organization (WCO)<sup>8</sup> and the WTO-TFA agreement. The incorporation of AI and data-driven systems into customs processes, however, raises several complicated legal and ethical issues. There are many issues to think, covering whether the provisions which can be used in the Customs Act of 1962 provide enough legal aspect; greater violations of data privacy and proper rules under the Digital Personal Data Protection Act of 2023; due process rights; as well as algorithmic transparency and accountability.

In this context, this article aims to assess the status of AI-enabled risk management in the Indian customs context. It evaluates whether prevailing legal and institutional framework enables (or disables) AI-based systems, assesses the level of India's alignment to international benchmarks and best practices, and suggests legal, institutional, and technical reforms. The overarching aim is to ensure that India's customs modernisation provides for efficient trade while operating in an environment that upholds legality, procedural fairness, and accountability for administrative decision-making.

## 2. Context: Digitalisation of Customs and Use of AI in Risk Management

Risk Management Systems (RMS) are a key aspect of modern customs, serving a role of classifying shipments based upon risk, and determining examinations, documentary checks, or

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<sup>5</sup> World Customs Organization, International Convention on the Simplification and Harmonization of Customs Procedures (Revised Kyoto Convention) (2006).

<sup>6</sup> Stephen Holloway, 'The Transition from eCustoms to eBorder Management' (2011) 3(1) World Customs Journal 13.

<sup>7</sup> Chris Thibedeau, 'Perspective on Risk Management Systems for Customs Administrations' (22 October 2019) World Customs Organization Blog/Magazine article.

<sup>8</sup> World Customs Organization, WCO Guide to Smart Borders: Concepts, Principles and Practices (WCO 2021).

to release the shipment immediately. More and more, RMS modules will have machine learning models and automated scoring, as RMS are handling larger volumes of data (manifest, bill of entry, AEO data, carrier profiles, trade history, third-party information, etc.). The CBIC of India has undertaken and put in various reforms to enhance their RMS, incorporating cargo images, speedier assessments, and system improvements as part of their facilitation agenda. These changes are aligned to international obligations under the WTO TFA, aimed towards efficient customs procedures and transparency, and guidance on risk management and digital customs from the WCO<sup>9</sup>.

### **3. Legal and Institutional Framework in India.**

#### **3.1 The Customs Act, 1962 (statutory basis)**

The Customs Act of 1962 is the primary statutory instrument allowing customs officers to apply and collect duties, detain prohibited goods, and undertake examinations and assessments. Provisions such as Section 18 (provisional assessment), Sections addressing detention and examination, and other (both general and specific) procedural sections constitute customs authority. As a statutory appliance, while the legislation provides extra proper enforcement powers, it was validated before the approaching of digital technology and does not state AI or algorithmic decision-making process, allowing explanatory gaps whereby administrative rules can now fill.

#### **3.2 Administrative tools: CBIC Circulars and the RMS**

CBIC provides regular circular and technical advice which serve to operationalize statutory provisions and set the standard for heterogeneous systems like the risk management systems, ICETABs, and online portals (for instance Look Out Circular Portal). The latest CBIC circulars (2024 - 2025), emphasize digitization, the enhancement of RMS, recording images of cargo examinations, submitting reports of examination immediately and a simplification of air cargo. These sorts of administrative tools are the ground of where the introduction of AI is governed. Given that administrative circulars determine the design and nature of RMS, as well as how such systems are employed, they are of particular concern in any legal analysis.

#### **3.3 Data Protection: Digital Personal Data Protection Act, 2023 (DPDP)**

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<sup>9</sup> World Customs Organization, SAFE Framework of Standards (2018).

The DPDP Act, 2023 makes a portion of legal regulation for transferring digital personal data<sup>10</sup> in India and states duties for data guardian that cover purpose limitation, storage limitation, transparency, data subject rights and security. Customs processing involves personal data of importers, consignees, carriers, and other parties; hence, DPDP compliance has implications for lawfulness and limits in personal data use in AI-based RMS (particularly when models process personal data or profiling occurs). Since 2024/2025, draft/implementing rules and notifications have been issued to delineate compliance obligations.

### 3.4 Other instruments: Rules, IT guidance, and port-level SOPs

In addition to national statutes and CBIC circulars, the customs environment relies on technical standards (advisories from DG Systems), security policies (port-level Standard Operating Procedures (SOPs)), and inter-agency memoranda of understanding (MOUs) for data sharing (immigration, ports, licensing authorities). Collectively, these layers will impact legal compliance and procedural fairness of AI decisions<sup>11</sup>.

## 4. Technical Anatomy of AI-Based Risk Management in Customs

### 4.1 Data Inputs and Feature Engineering

AI-Based risk management systems (RMS) generally ingest structured datasets from trade data (e.g., HS codes, invoice values, declared weights, and consignment itineraries); historical compliance data encompassing whether declarations were successful; entity-level data (e.g., Importer and/or Exporter profiles, Authorised Economic Operator<sup>12</sup>(AEO) Status); and unstructured data (e.g., Cargo Images, free-text descriptions). The quality of the data inputs, the provenance of the inputs, and the ability to share between agencies will directly impact the robustness of AI models.

### 4.2 Model Types and Use

Contemporary customs services utilize several forms of analytical and artificial intelligence (AI) models for risk management and clearance. These models may be used to automate processes and, at the same time, perform the risk management function intelligently. In a word,

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<sup>10</sup> Digital Personal Data Protection Act 2023 (Act No 22 of 2023) (India).

<sup>11</sup> Committee to Develop a Framework for Responsible and Ethical Enablement of Artificial Intelligence in the Financial Sector, Report (Reserve Bank of India, 13 August 2025)

<sup>12</sup>World Customs Organization, AEO Implementation and Validation Guidance (2nd edn, WCO 2016)

the method increases structured while following rules control. All method may broad fit into any 1 of the 4:

#### Rule-Based Models:

Rule-based models primarily use predetermined, hard-coded rules<sup>13</sup> based on historical patterns, legal rules, or subject matter expertise domain. For example, shipments originating from higher-risk countries, involving restricted items or goods declared at unusual low values, would be flagged as higher risk consignment. A rule-based model operates on deterministic logic, i.e., a shipment matches a known red flag, then it is flagged. Rule-based models are transparent and usable and offer predictability to enforcement agencies. Rule-based models are limited in flexibility, and may not detect new or evolving threats.

#### Statistical Anomaly Detection:

Statistical models tend to use outlier and probabilistic scoring approaches to identify shipments that fall far away from norms. An example is when, for but not limited to, the historic weight to price ratio of a good varies much, reveals mis-declaration or possible under invoicing.

**Supervised Machine Learning Models:** These models are developed using labelled historical data previous instances in which outcomes (i.e., compliant versus non-Compliant shipments) are known. Algorithms (e.g., decision tree, random forest, or gradient boosting machines) learn patterns that distinguish risky shipments from legitimate shipments. Once models are developed, they can calculate the risk of new shipments based upon multiple features, such as the importer history, transport route, commodity type, and declared value. As more identified data becomes visible, supervised models continue to develop and increase their power and accuracy.

**Unsupervised Learning and Clustering:** Unsupervised models, particularly clustering algorithms, are applied to identify emergent or latent patterns within large customs datasets. Clustering algorithms<sup>14</sup> differ from supervised models by utilizing unlabelled data, as they create groupings based on shipments with similar characteristics that may represent potential new risk profiles, as well as previously unidentified risk profiles. This also allows customs

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<sup>13</sup> Jim Sinur, "Business Rules Are Everywhere — Part 3: Just Say 'No' to Hard-Coded Logic" (Business Rules Journal, Jan 2016)

<sup>14</sup> Yu Wang and Hongshan Xiao, 'A Risk Decision-Making Approach to Customs Targeting' (2012)

authorities to identify organized, or systemic patterns of fraud that traditional methodology would not capture.

#### AI Outputs and Administrative Decision-Making

Once an AI model is operationalized to triage shipments, the model's output — a risk score or risk category — becomes the essential factor in the decision to release, detain, or further examine a shipment. This is where the application of algorithmic decision-making intersects directly with administrative action<sup>15</sup>. The model's result can state the getting of analysis orders, the inspection of goods, or the initial phase of a customs inquiry under the Customs Act of 1962.

Because of these legal and procedural impacts, clarity, integrity, fairness, and human control are all essential components.

Customs authorities will need an explanation for any consignment that was either flagged, or released, especially given the potential effect of these decisions on trade facilitation and compliance obligations.

Customs authorities in many jurisdictions, including the Indian Central Board of Indirect Taxes and Customs (CBIC), have introduced a “human-in-the-loop” model of oversight with the goal of mitigating risks related to algorithmic bias<sup>16</sup> or random decision-making. In this model, the AI system provides an indication of risk — but for higher risk determining factors who the shipments as flagged risk or low risk is left to the trained customs officer to confirm and validate the AI systems assessment.

Additionally, regular audits of the model and assessments of fairness are necessary to demonstrate compliance with relevant principles relevant to non-discrimination, data protection, and proportionality. Regular and repeat training with newly collected datasets also serves to retrain the model to ensure it is regularly updated and relevant to trade flows.

#### 4.3 System Integration and Workflow

In practice, RMS are integrated with e-clearances platforms (ICEGATE/ICETABs modules in India), Port Operating Systems and enforcement databases (look-out lists, sanctions). CBIC circulars have authorized integration features like the ability to capture cargo images, and that exam reports may be submitted immediately, thus, ensuring these delays don't occur and

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<sup>15</sup> Canon India Pvt. Ltd. v Commissioner of Customs (2024) Supreme Court of India

<sup>16</sup> Sandra Wachter, Brent Mittelstadt and Chris Russell, 'Bias Preservation in Machine Learning: The Legality of Fairness Metrics Under EU Non-Discrimination Law' (2021) 23 W Va L Rev 571.

providing auditable records. These features and processes are both facilitative and provide digital traces necessary for administrative scrutiny.

## **5. International Standards and Comparative Practices**

### **5.1 WCO (World Customs Organization)**

The WCO highlights risk management as a fundamental customs function and provides helpful advice on adopting technology to support risk analysis. The WCO supports transparency, proportionality and capacity-building principles for member administrations (including India) adopting AI. The WCO has published resources, including a guide to ‘smart border’<sup>17</sup> practices and professional development resources on risk management.

### **5.2 WTO — Trade Facilitation Agreement (TFA)**

The WTO TFA supports simplifying and speeding up customs processes, encouraging paperless trade and risk-based controls. The TFA core obligations support members (including India) pursue simplified processes for expediting movement, release and clearance of goods within risk management frameworks that are transparent and non-discriminatory. The TFA provides a normative framework for adopting AI, striking a balance between control and facilitation.

### **5.3 EU and other advanced practices**

The EU has established<sup>18</sup> rules for customs risk management and emphasizes inter-agency cooperation, data exchange, and compliance with data protection. The EU illustrates a route model, where AI assists but does not implement decision-making, and compliance and data governance and redress safeguards are well-established. Other examples in Singapore and member countries of the OECD illustrate practicable operational safeguards and sandboxing an AI model before fully implemented.

## **6. Legal and Ethical Challenges**

### **6.1 Statutory Authority and Rule-making**

Issue: The Customs Act provides broad and sweeping enforcement authority, but little in the way of express guidance regarding algorithmic decision-making. Despite the Circulars being

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<sup>17</sup>PwC India and FICCI, Smart Border Management: An Indian Perspective (PwC India, September 2016)

<sup>18</sup> European Parliament and Council Regulation (EU) No 952/2013 of 9 October 2013 laying down the Union Customs Code [2013] OJ L 269/1.

almost a technical implementation of the RMS, important policymaking through Circulars raises issues around authorized delegation of lawmaking and procedural legitimacy.

Discussion: Courts routinely engage with administrative action and review for both reasonableness and procedural fairness, and so if the outcome of RMS is a societal deprivation of property (a delayed release or seizure) or regulatory burden without notice or any explanation of the basis for it, it may invoke challenges based on administrative law doctrines.

## 6.2 Transparency, Explainability, and Due Process

Issue: ML models, and especially complex algorithms, are unlikely to deliver an easy human-readable rationalization<sup>19</sup> of the foundation of the model. When a customs decision, either for example (a mandatory examination of goods or higher bond) is made based on the output of a model - stake holders will likely require the reasoning for contesting the decision.

Legal considerations: As interpretative of the principles of natural justice and procedural fairness, an affected trader should have the right to know the reasoning used to arrive at their outcomes, and to challenge that decision. While records created by CBIC in the scope of its investigation may create an audit record, they likely do not substitute for complete explainability of the algorithms used to generate decisions.

## 6.3 Data Protection, Privacy, and Profiling

Problem: The customs processing involves personal data. Data Protection and Digital Personal data (DPDP) Act sets obligations on lawful basis, purpose, limitation, security, and data subject rights. AI profiling of traders or individuals may engage the special safeguards for "sensitive personal data".

Practical problem: Data localization, cross-border sharing for intelligence, and third-party data sourcing (e.g. commercial databases) can complicate compliance<sup>20</sup>. The DPDP regime of India and draft rules for implementation (2024-2025 action) must fit with the flow of RMS data.

## 6.4 Bias, Fairness and Model Validity

Problem: If the training set data reflects a historical enforcement bias (say there was a excessive scrutiny of a subset of agents or route), the AI model could reproduce that discriminatory

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<sup>19</sup> Press Information Bureau, Union Budget 2025-26: Proposals to Remove Seven Customs Tariff Rates for Industrial Goods (1 February 2025)

<sup>20</sup> OECD, Customs Compliance and Trade Facilitation: Best Practices (OECD Publishing, 2021)

targeting and impose a disproportionate burden on certain traders, or small operators. Regular audits of fairness & model validity is important.

### 6.5 Accountability and Auditability

Problem: Who is accountable for wrong AI initiated outputs? Administrative responsibility can be diffuse; where to draw the line on responsibility between system designers, data providers, or the customs officer? A legal framework should establish accountability and require an audit trail for decisions made, a human oversight threshold, and an independent review mechanism.

### 6.6 Legal Remedies and Dispute Resolution

Problem: Traders must have access to rapid legal remedies from wrongful targeting and delays. Existing remedy avenues (appeal to the Commissioner, tribunal, and writ jurisdiction) are lengthy and less efficient for perishable and time sensitive goods. These disaster response remedies would ideally accommodate quicker administrative redress.

## **7. Recommendations (Legal, Institutional, Technical)**

This section outlines a multi-faceted approach that integrates legal clarity, governance, and technical design.

### 7.1 Legal & Regulatory Recommendations

Legislative Clarity: Amend or introduce subordinate legislation under the Customs Act to expressly allow automated decision-support systems to be used for risk targeting, including specified limits around decisions (i.e. what types of decisions is it acceptable to make), data access powers, and minimum procedural protections. This provision would reduce reliance on ad hoc circulars for significant policies.

Algorithmic Governance Insights: CBIC should develop an “Algorithmic Accountability and Governance” custom guideline for governance requiring model validation, documentation (model cards), performance measures, periodical auditing, and remediation. There should be a public consultation prior to release to support legitimacy.

Data Protection Assessments: CBIC should initiate Data Protection Impact Assessments (DPIAs) for RMS modules and ensure data flows comply with DPDP obligations (lawful basis, purpose limitation, retention period, etc.). Special's data warrant even stricter measures.

## 7.2 Institutional & Administrative Recommendations

**Human-in-the-Loop & Escalation Protocols:** Any automation that involves decision making involving flags for high-risk should not occur without an officer's acknowledgement. Officers should have tools that provide explainability of the model, as well as reasoning of the model underpinning officiating decisions.

**Rapid Appeal Mechanism:** Create a rapid administrative review for the release/detention decisions that have an issued red flag, to minimize disruption in trade.

**Interagency Data Governance Board:** Establish an interagency board that will oversee the sharing of data across agencies, develop MOUs, and develop agency data standards, to ensure an existing legal framework to permit lawful joint cooperation (e.g., port agency, immigration agency, tax agency, policing agencies).

**Capacity Building & Training:** Provide capacity building through continued training opportunities for customs officials about the basics of AI, limitations of the model, and how to handle data and notification of rights-based decisions.

## 7.3 Technical & Operational Best Practices

**Transparent Documentation (Model Cards & Data Sheets):** For each RMS model, keep a model card to describe the model's purposes, the data sources, whether it was trained on real-world or simulated data, what validation took place, the model accuracy, and what the limitations in accuracy the model would be most susceptible to.

**Explainability & Local Interpretable Models:** Where possible, choose predicted models with some explainability of the output (e.g., easy-to-understand rule-based hybrids, or simple classifiers with similar performance), or find a simple method for creating local explainers (e.g., LIME/SHAP) for instances that result in a flag.

**Fairness & Bias Audits:** Pursue ongoing fairness audits of the RMS for all demographics and agent-based slices, conduct fairness audits; if fair under-represented demographics are found, retrain the model or related model through population sampling or through active way to impeach bias.

Comprehensive Logging & Forensic Traces: Record inputs, outputs, versions, officer actions, and timestamps to facilitate the audit and review process. This is in line with CBIC's move for capturing cargo images and examination reports.

#### 7.4 Alignment with International Best Practices

WCO & WTO Alignment: Ensure that RMS guidance explicitly maps against WCO principles of risk and the obligations set forth in the WTO-TFA in respect to transparency and non-discrimination. Attend to WCO capacity-building efforts geared toward the adoption of best practices.

### **8. Conclusion**

AI-enabled RMS allows for significant efficiency and security advantages for Indian Customs. However, the law must be able to provide clear statutory backing, ensure data protection compliance, algorithmic accountability and processes that are well-protective of traders' rights. The combination of statutory clarity, administrative guidelines, measures for transparency and technical best practices will ensure that AI becomes a facilitation tool that the trader can trust, not an opaque tool that invites legal action. CBIC's recent protocols<sup>21</sup> and administration reforms (2024-2025) indicate that the administration is committed to digitization and strengthening of the RMS; put into these reforms, a rights-protective governance architecture will enable sustained, lawful and equitable digital customs.

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<sup>21</sup> U.S. Customs and Border Protection, Summary of Changes to the Automated Export System Trade Interface Requirements (AESTIR) (2 July 2024)