PAKISTAN LAND PORT AUTHORITY (PLPA)

INTEGRATED DASHBOARD REPORT

Monitoring Infrastructure, Trade, SLA Compliance, and Institutional KPIs
across Border Crossing Points under CAREC-RIBS / ITTMS

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1.0 Executive Summary

This report presents the development and institutional relevance of a multi-page dashboard created for the Pakistan Land Port Authority (PLPA) under the Integrated Transit Trade Management System (ITTMS), supported by the Asian Development Bank (ADB) through the CAREC-RIBS program. Developed between December 2024 and July 2025, the dashboard provides operational intelligence to PLPA and the Federal Board of Revenue (FBR), in support of ADB's Results Framework and Pakistan's border modernization strategy.

The six-page dashboard—developed using Power BI with Oracle SQL Developer as the backend engine—offers structured visibility into border operations, SLA compliance, environmental maturity, and institutional capacity. Data modeling was aligned with WeBOC (Web-Based One Customs) structures and reflects Pakistan Single Window (PSW) data standards for border agency coordination, customs automation, and trade facilitation.

Key features include infrastructure tracking by construction phase, scanner delay diagnostics, and SLA escalation analytics. The system also visualizes environmental performance via SDG-coded audit scoring and supports institutional accountability through gender-disaggregated training and complaint resolution metrics.

Key achievements:
- Simulated and normalized datasets model realistic trade volumes, SLA downtimes, and BCP infrastructure delays, replicating operational dynamics in the absence of live feeds.
- A 6-page Power BI dashboard with 40+ KPIs, designed in accordance with ADB and PSW governance frameworks.
- Operational insights include scanner bottlenecks at Chaman, coordination delays at Torkham, and low resolution rates (34%) for escalated SLA issues, alongside gaps in female staff inclusion (41.7%) in training.

By integrating custom indicators with PSW-aligned schemas and simulating WeBOC event structures, the dashboard provides a governance-ready decision layer for PLPA, PMU, and ADB stakeholders. It enhances transparency, supports proactive infrastructure monitoring, and enables data-driven interventions aligned with WTO-TFA, SDGs, and CAREC corridor strategies.

2.0 Institutional Context

The Pakistan Land Port Authority (PLPA) was established as part of the Government of Pakistan's broader agenda to modernize cross-border trade, facilitate efficient customs processes, and align with international best practices in border infrastructure governance. As a key institutional body under the Federal Board of Revenue (FBR), PLPA operates as the central coordinating entity responsible for overseeing the development, management, and digital integration of Border Control Points (BCPs) across Pakistan.

This initiative forms a core component of the CAREC Regional Improving Border Services (CAREC-RIBS) program and is operationalized through the Integrated Transit Trade Management System (ITTMS), co-financed by the Asian Development Bank (ADB). The ITTMS program aims to strengthen border agency coordination, reduce clearance times, and promote secure, efficient trade corridors linking Pakistan to Central and South Asia.

The PLPA dashboard supports these institutional goals by providing a performance-monitoring layer across BCPs such as Torkham, Chaman, and Wahga, among others. It reflects integration with national systems including:
- WeBOC (Web-Based One Customs): the core digital customs clearance platform under FBR;
- Pakistan Single Window (PSW): the national trade facilitation system enabling single-point submission of import, export, and transit data;
- ADB's Results Framework: guiding project monitoring and evaluation through service-level indicators and SDG alignment.

In aligning with these systems, the dashboard enhances inter-agency visibility, infrastructure tracking, and digital compliance readiness for both national oversight and multilateral donor reporting. This institutional context underscores the dashboard's relevance not only as a monitoring tool, but as a foundational enabler of Pakistan's broader border modernization and trade facilitation agenda under WTO-TFA commitments.

The PLPA's mandate also intersects with Pakistan's commitments under the WTO Trade Facilitation Agreement (TFA), the South Asia Subregional Economic Cooperation (SASEC) framework, and ADB's Corridor Performance Measurement and Monitoring (CPMM) system. The dashboard is designed to feed into these platforms by aligning border-level indicators with real-time tracking of SLA compliance, trade volumes, and infrastructure progress.

3.0 Objectives of the Dashboard

The PLPA dashboard was developed with the following strategic and operational goals:

- **Operational Intelligence for PLPA and FBR:** Enable near-real-time monitoring of trade volumes, infrastructure readiness, SLA maintenance, and institutional KPIs across Pakistan's land border crossings.

- **Alignment with Donor Frameworks:** Structure all dashboard components to align with the **ADB Results Framework**, **CAREC Corridor performance strategies**, and the **United Nations Sustainable Development Goals (SDGs)**.

- **Improved SLA Monitoring & Grievance Handling:** Visualize scanner and RPM downtimes, escalation trends, and issue resolution bottlenecks at the operational level.

- **Environmental Performance Tracking:** Introduce a replicable **SDG-based audit layer**, enabling environment-related performance reviews through spider charts and maturity indicators.

- **Institutional Accountability & Inclusion:** Report on gender participation in training, complaint types, and resolution rates to support governance transparency and equity-focused interventions.

4.0 Technical Scope & Architecture

The PLPA Integrated Dashboard was developed as a structured digital oversight tool using **Microsoft Power BI** as the frontend analytics engine and **Oracle SQL Developer** as the backend simulation and schema environment. In the absence of live transactional access to WeBOC and PSW systems, a **proxy dataset structure** was designed to reflect operational realities of Border Crossing Points (BCPs) such as **Torkham**, **Chaman**, and **Wahga**.

This section describes the dashboard's design logic, data modeling technique, and visualization architecture, referencing the broader **ITTMS and CAREC-RIBS program requirements** for project monitoring and Results Framework alignment.

Data Modeling & Schema Integration

The dataset simulation followed the methodology used in decision modeling literature, where **normalized surrogate data** is modeled on official schemas to replicate system dynamics in the absence of live integrations. This approach is similar to the **Analytic Hierarchy Process (AHP)**

research framework where indirect measurements (stakeholder inputs or simulated values) are used for priority modeling and sensitivity analysis (Bhatti & Hanjra, 2018).

Key schema elements included:

- **SLA Logs**: Simulated fault start/end times, escalation flow, response tiers
- **Construction Progress**: Modeled after FIDIC milestone tables (phase codes, % complete, delay reason)
- **Trade Movement Data**: TEUs, reverse flow, and transit shares modeled on WeBOC log structures
- **Environmental Scores**: ENV_QUESTIONNAIRE responses coded into SDG alignment indicators
- **HR/Grievance Data**: Gender-tagged training and complaints classified by category and resolution lag

5.0 Dashboard Structure and Navigation

Page	Focus Area	Key Visual Elements
Page 1	Overview	High-level KPIs, early warning signals, red/green thresholds
Page 2	Infrastructure Tracker	Gantt chart, % completion by port, issue notes
Page 3	Trade & Logistics Flow	Map visuals, TEU trends, reverse flow analysis
Page 4	SLA Compliance	Fault heatmaps, escalation resolution rates
Page 5	Environmental Performance	SDG spider chart, maturity donut, scoring heatmap
Page 6	Institutional Accountability	Gender-disaggregated training metrics, complaint resolution dashboard

Each page contains **interactive filters** for BCP site, month, and indicator category, allowing granular review during field performance meetings or ADB reviews. Pakistan's land border trade routes span key regional corridors and transit points, as mapped by the national border infrastructure overview (Appendix A3).

5.1 Simulation Architecture

The underlying logic mimics Pakistan's national transit systems (WeBOC, PSW) and is designed to be **integration-ready** for future data pipelines. The data model follows a **star schema** for efficient DAX queries, with fact tables for incidents and transactions and dimension tables for ports, KPIs, and escalation levels. While the current build is based on **static simulation**, the schema has been validated for conversion to **DirectQuery or API-based sync** as soon as live PSW/Customs integration becomes available.

5.2 Technical Value Proposition

Much like the AHP-based decision models used in national port selection (Bhatti & Hanjra, 2018), the PLPA dashboard brings structure to what is otherwise a fragmented information landscape. By centralizing KPI narratives into an interactive visual layer, it offers:

- Cross-departmental synchronization between engineering, customs, and HR units
- A donor-aligned visualization of Results Framework indicators
- Replicability for future PLPA nodes (e.g., Kharlachi, Badini) or dry ports under the National Logistics Strategy

6.0 Dashboard Components

The PLPA Integrated Dashboard consists of **six structured pages**, each tailored to address a specific strategic pillar of the land port modernization effort. These components were designed using **Power BI**, incorporating a mix of visual diagnostics, red-flag triggers, and Results Framework-aligned KPIs. The sections below describe each dashboard page in detail.
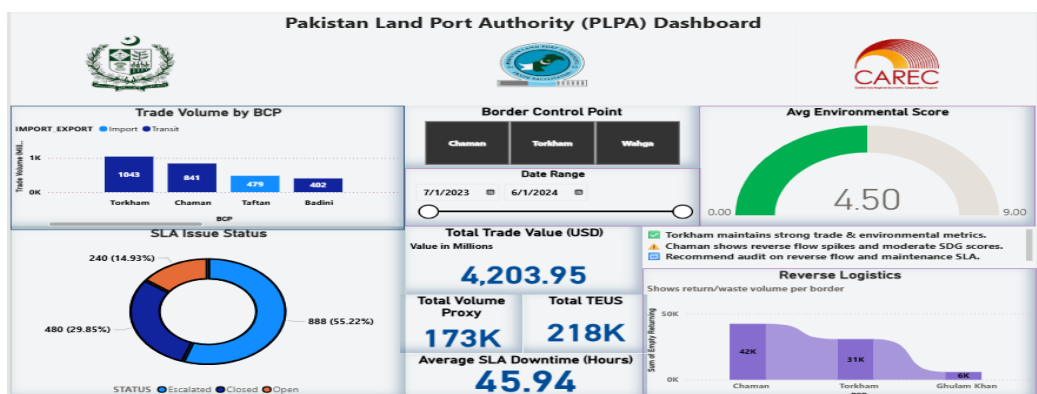
6.1 – Overview Dashboard: Operations & Alerts

Figure 1.0

The Overview Dashboard provides a **high-level snapshot of operational health** across Pakistan's major Border Crossing Points (BCPs). It functions as an early warning system for trade slowdowns, SLA compliance gaps, and environmental underperformance.

Key Features:

- KPI tiles tracking: **scanner uptime, TEUs handled, complaint resolution rate**
- Color-coded performance bands (green/yellow/red) based on defined thresholds
- Monthly timeline filters for trend shifts and anomaly detection
- Embedded DAX logic to surface red-flag zones (e.g., SLA < 70%)

This page serves as the **primary entry point** for PLPA decision-makers, PMU analysts, and ADB Mission reviewers.

6.2 – BCP Infrastructure Tracker
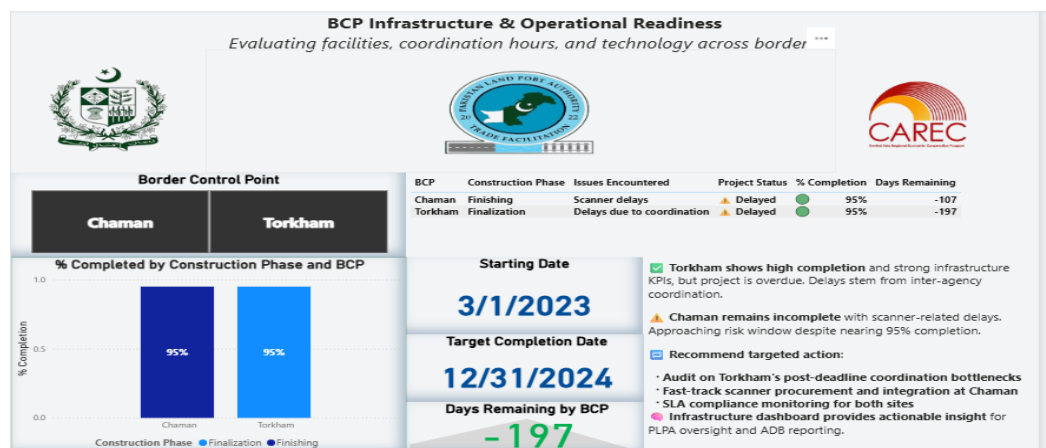
Figure 2.0

This page visualizes **construction progress** across BCP projects, aligning with **FIDIC Yellow Book milestones** and civil works packages.

Key Features:

- Gantt charts showing phase-level timelines (foundation, roofing, installation)
- % Completion by workstream and port (Torkham, Chaman, Wahga)
- Issue tagging (e.g., design delays, contractor handover lag)
- Comparison of planned vs. actual progress

The tracker enables **site-specific diagnostics** and is suitable for review during **monthly engineering coordination meetings** or progress briefings to ADB.

6.3 – Trade & Logistics Flow

Figure 3.0

This component visualizes cross-border cargo dynamics to identify corridor bottlenecks or underutilized routes.

Key Features:

- TEU inflow/outflow charts by BCP and month
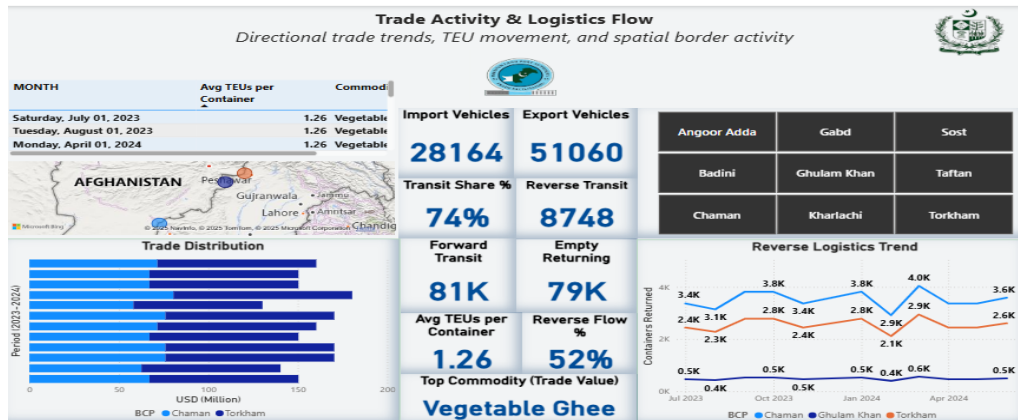- **Transit share vs. reverse flow** analysis
- Map-based cargo origin-destination overlays
- Import/export splits visualized by commodity class

Insights from this page help FBR and PLPA optimize **corridor planning, reverse logistics**, and post-arrival clearance strategy.

Simulated trade volumes, TEU flows, and value indicators displayed in the dashboard were calibrated using verified summaries from the Directorate of Transit Trade (Peshawar), official customs briefs from Chaman Customs Station, and data received through ITTMS coordination channels covering the 2023–2024 operational window. These values informed the dashboard's trade volume layer, reverse flow visualizations, and total TEU metrics across Torkham and Chaman.[1]

Torkham's forward trade exceeded **USD 1.04 billion**, while over **30,000 containers** returned empty — underscoring corridor inefficiencies.

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[1] Based on official figures from the Directorate of Transit Trade, PRAL, "Request for Transit Trade Data" memo, Dec 2024.

Forward and reverse TEU volumes used in the dashboard for Torkham and Ghulam Khan were drawn from official customs summaries issued by the Directorate of Transit Trade, FBR (see Appendix A1).

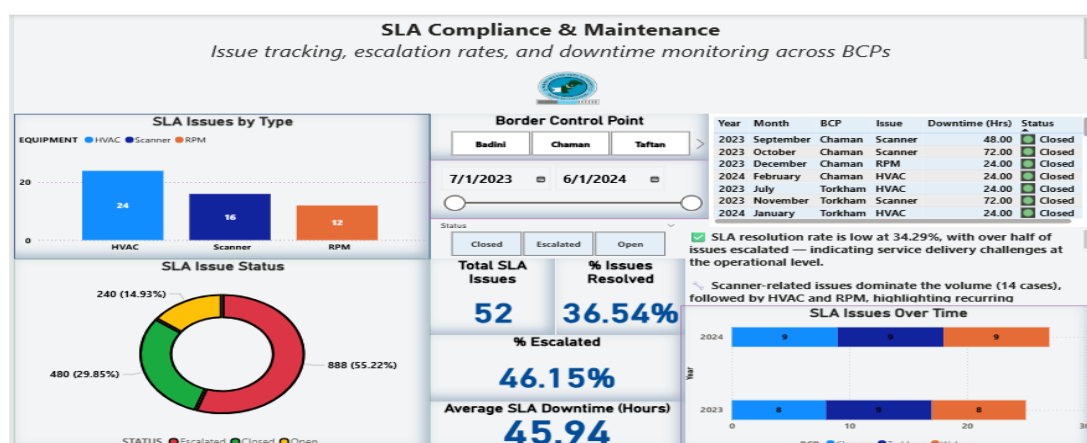## 6.4 – SLA Compliance Dashboard

Figure 4.0

This dashboard provides an interactive view of **Service Level Agreement (SLA) adherence**, fault escalation patterns, and scanner diagnostic performance.

Key Features:

- Scanner/radiation portal **downtime logs**, average resolution time, escalation levels
- Breakdown by **issue type** (technical, operator delay, customs handoff)
- Red-flag triggers if **downtime exceeds 48 hours**
- SLA funnel visuals and escalation trend lines

This page supports **contractor performance evaluation**, ensuring accountability in equipment uptime and operator response.

6.5 – Environmental Sustainability & SDG Monitoring

Built upon the **ENV_QUESTIONNAIRE**, this component visualizes environmental performance mapped to the **UN Sustainable Development Goals (SDGs)**.

Key Features:

- SDG **Spider Chart** across key goals (11, 12, 13, 15, 17)
- Maturity **Donut Visuals** showing compliance readiness

- Indicator scoring matrix based on local environmental audit responses

This page allows the ADB and Ministry of Climate Change to assess **green compliance gaps** and integrate border infrastructure with **sustainability audits**.

6.6 – Institutional Capacity & Accountability

This page tracks **HR development**, grievance handling, and gender mainstreaming within the PLPA system.

Key Features:

- Gender-segmented **training participation metrics**
- Complaint registration vs. resolution trends
- Thematic classification of complaints (e.g., scanner delay, staff misconduct)
- Month-on-month change tracker for institutional KPIs

The component is critical for **Results Framework monitoring** and helps ensure that **equity and inclusion targets** are embedded in land port operations.

7.0 Key Insights & Use Cases

The PLPA dashboard reveals systemic insights across Pakistan's land ports — uncovering operational gaps, environmental readiness disparities, and institutional capacity challenges. These findings, surfaced through structured KPI diagnostics and visual scorecards, support policy alignment with the **CAREC-RIBS Results Framework**, **WTO-TFA commitments**, and **ADB's digital governance agenda**.

7.1 SLA Compliance and Operational Bottlenecks

The **Service Level Agreement (SLA)** diagnostics point to recurring performance gaps at both **Chaman** and **Torkham**. While Chaman recorded a total of 17 SLA issues and Torkham 18, resolution rates remained critically low — **35.29% and 33.33%** respectively. Over half of all incidents escalated, with average downtimes exceeding **40 hours** and peaking at **72 hours** during scanner breakdowns in October 2023.

At Chaman, scanner faults dominated the issue types, suggesting aging hardware or calibration issues. Torkham, on the other hand, exhibited broader stress across **HVAC, RPM, and scanner units**, indicating more complex operational dependencies. Notably, escalation rates at Torkham were the highest across all BCPs at **61.11%**, underscoring critical gaps in service coordination and local repair capabilities.

These persistent escalations and downtime clusters confirm a **structural weakness in technical response chains**, warranting an urgent review of SLA terms, real-time fault tracking, and deployment of scanner-level field maintenance teams.

Chaman saw over **PKR 235 billion** in forward value but faced repeated SLA escalations — highlighting the urgency for field-level response upgrades.[2]

The magnitude of forward and reverse container flows at Chaman — exceeding 58,000 TEUs — is corroborated by field data from Customs Chaman (see Appendix A2), supporting observed SLA escalations and operational backlogs.

7.2 Environmental Compliance and SDG Readiness

Figure 5.0

Environmental scorecards show **a stark contrast** between Torkham and Chaman. Torkham achieved a commendable **average environmental score of 4.76**, with **100% indicator availability** and strong alignment across SDG 11 (Sustainable Cities), SDG 13 (Climate), and SDG 15 (Life on Land). No red flags were recorded, and over **63% of indicators scored in the green zone**.

Conversely, Chaman presented a **vulnerable profile**, with an average score of **3.29**, and only **43% indicator availability**. A red flag emerged under **SDG 7 (Clean Energy)** with a critically low score of **2.0**, highlighting deficiencies in ventilation, lighting, and sustainable infrastructure standards. Spider chart comparisons confirm Chaman's environmental maturity lags behind — both in audit readiness and SDG scoring.

These findings reinforce the need for **targeted environmental remediation** at Chaman,while positioning Torkham as a **compliance-ready benchmark** for future ADB-supported assessments.

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[2] Source: Customs Chaman summary — "Transit Trade Station Data, 2024.

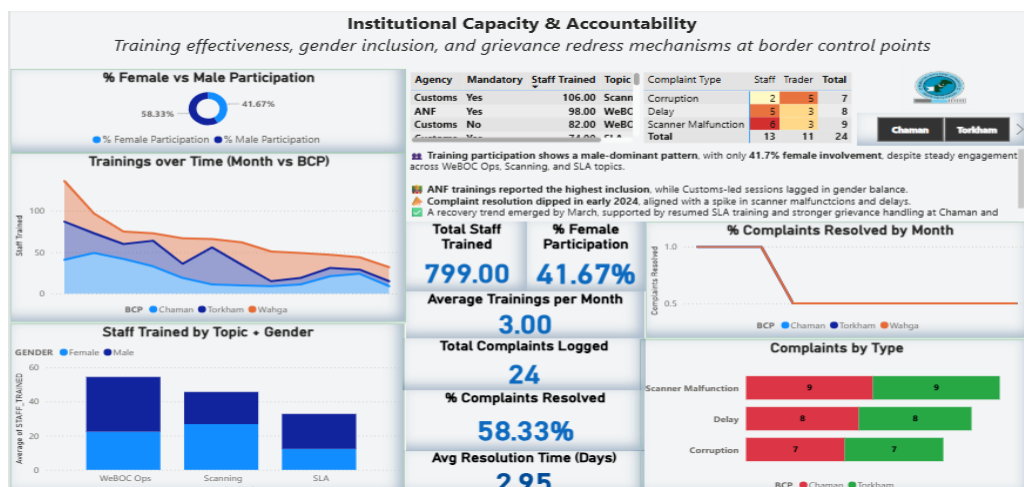## 7.3 Institutional Capacity, Gender Equity & Accountability

Figure 6.0

Training and HR diagnostics reveal uneven progress across ports. While **799 staff were trained** during the reporting period, only **41.67%** were women — with Customs-led sessions particularly skewed toward male participation. **ANF-led trainings**, by contrast, showed the highest inclusion and could serve as a model for inter-agency HR reform.

Training participation dropped in early 2024, especially at Wahga, coinciding with operational strain and SLA escalations. This overlap suggests that technical outages may indirectly **disrupt institutional capacity-building programs** as well.

On grievance redress, **12 complaints** were logged — largely relating to scanner malfunction, delays, and corruption. The resolution rate stood at **58.33%**, with an average closure time of approximately **three days**. While functional, the complaints system showed signs of lag, particularly during the scanner fault escalation wave in Q1 2024, when resolution activity slowed sharply.

Together, these trends highlight the need for integrated planning across **technical, HR, and grievance workflows**, ensuring that operational stress doesn't spill over into institutional failure. Embedding **gender equity, real-time complaint visibility**, and monthly SLA-performance analytics into PLPA operations will be essential for long-term governance success.

8.0 Strategic Value

The PLPA Integrated Dashboard represents a significant step toward institutionalizing **data-driven governance** across Pakistan's land ports. Developed under the umbrella of the **CAREC-RIBS/ITTMS-PMU initiative**, the dashboard has been shared with the **Project Director and**

PMU leadership and is actively used in **internal review meetings** for performance monitoring, compliance assessment, and scenario planning.

By consolidating operational, environmental, and institutional KPIs into a unified interface, the system offers a **structured reporting layer** that supports both national oversight and donor alignment. The tool is designed to complement existing platforms like **WeBOC and Pakistan Single Window (PSW)**, and while not yet integrated into external-facing portals, it is fully schema-ready for **future API linkages and real-time data pipelines**.

Strategically, the dashboard enables:

- **SLA Enforcement and Technical Accountability:**
  Escalation trends, scanner downtimes, and contractor performance are now transparently visualized, allowing the PMU to engage with vendors and service providers using quantifiable evidence.
- **Green Infrastructure Alignment:**
  Environmental maturity scores aligned with **UN SDGs** and **ADB Results Framework** allow targeted upgrades at underperforming sites and provide audit-readiness for sustainability reporting.
- **Institutional Development Tracking:**
  Gender-segmented training, complaints resolution, and HR participation metrics enable compliance with governance benchmarks under **ADB Pillar 2** and **Vision 2025**.
- **Replication and Scale-Up for National Port Strategy:**
  Simulated datasets have been embedded for additional Border Crossing Points (BCPs) including **Badini, Gabd, Taftan, Angoor Adda, Ghulam Khan, Kharlachi, and Sost**. Once live data is received from these sites, the current schema will be refreshed and incorporated into the dashboard with **minimal structural adjustment**, validating the dashboard's **replicability and modularity**.

In its current form, the dashboard serves as a **pilot proof-of-concept** for **institutional visibility**, and its design architecture positions it for adoption under the **National Logistics Policy**, **Trade Facilitation Agreement (WTO-TFA)** compliance, and **Phase-II scale-up of ITTMS** under FBR and ADB guidance.

9.0 Recommendations

The PLPA Integrated Dashboard has laid the foundation for a centralized digital governance tool across Pakistan's border crossing infrastructure. To ensure scalability, sustainability, and long-term institutional integration, the following technical, operational, and strategic enhancements are recommended:

9.1 Technical Enhancements and Integration

Enable Live Data Pipelines:
As actual data becomes available from additional BCPs, the backend schema should be updated to support **DirectQuery or scheduled Oracle SQL refresh**, enabling real-time monitoring of SLA downtimes, infrastructure status, and trade flows.

API Integration with National Systems:
Connect the dashboard to **WeBOC** and **Pakistan Single Window (PSW)** via API feeds to enable automatic ingestion of scanner diagnostics, complaint logs, and infrastructure milestones.

Publish to Power BI Cloud:
Deploy the dashboard to **Power BI Service** to facilitate remote access by stakeholders, including FBR, Customs, NLC, and future ADB mission teams, with role-based access controls.

9.2 Stakeholder Engagement and Field Usability

Include in Training Programs:
The dashboard should be incorporated into **stakeholder capacity-building modules**, particularly for Customs, ANF, and NLC personnel posted at land ports. This will build operational familiarity and embed data-driven decision-making into institutional processes.

Develop Mobile-Friendly Interface:
Build a **responsive layout for tablets and mobile devices**, allowing field officers and port supervisors to access real-time SLA logs, complaints, and progress metrics during site inspections or incident escalations.

9.3 Predictive Analytics and Risk Management

Introduce AI/ML-Driven Risk Detection (Future Scope):
A modular **machine learning layer** can be added in future phases to:

- Forecast SLA escalation risks based on downtime patterns
- Detect anomalies in complaint resolution rates or gender participation
- Recommend proactive actions based on environmental scoring trends
- Generate scenario-based simulations to test system resilience

This will transform the dashboard from a static reporting tool into a **predictive intelligence system**, aligned with global trends in institutional analytics and performance-based governance.

9.4 Policy Governance and Reporting

Institutionalize PMU Reviews:
Use the dashboard for **monthly or quarterly performance reviews**, with frequency determined by data availability. This will standardize how infrastructure progress, SLA enforcement, and institutional KPIs are reported and tracked.

Generate Automated BCP Scorecards:
Introduce **monthly exportable scorecards** summarizing each port's performance in a standardized PDF format. These can be shared with ADB consultants, FBR leadership, and the Engineering Wing.

Activate Red Flag Alerts:
Configure **visual or email-based alerts** to flag thresholds — e.g., scanner downtimes over 48 hours, unresolved complaints beyond SLA limits, or gender participation falling below target levels — to trigger field interventions.

Conclusion

The PLPA Integrated Dashboard presents a replicable model for institutional analytics and real-time governance in Pakistan's border infrastructure domain. Developed under the CAREC-RIBS and ITTMS-PMU framework, it offers a unified decision-support system aligned with the ADB Results Framework, WTO-TFA obligations, and national digitization priorities.

By consolidating operational, environmental, and institutional KPIs across multiple Border Control Points, the dashboard enables structured monitoring of SLA compliance, infrastructure development, SDG alignment, and human capital inclusion. It has been actively deployed for internal PMU review meetings and is ready for integration into wider policy platforms such as the Pakistan Single Window and national trade facilitation dashboards.

Simulated datasets for additional ports have already been embedded, and the backend architecture has been validated for DirectQuery and API-based live data sync. Future enhancements, including mobile accessibility, AI-driven risk prediction, and auto-generated performance scorecards, position the dashboard as a strategic tool for performance-based governance, audit readiness, and multilateral reporting.

In its current and forthcoming iterations, the PLPA dashboard will not only support data transparency and cross-agency coordination, but also serve as a scalable model for broader logistics modernization under Pakistan's National Logistics Policy.

References

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https://www.researchgate.net/publication/322909936_Port_Selection_for_CPEC_Operationalization_-Decision_Making_through_Analytical_Hierarchy_Process_AHP

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Appendix

GOVERNMENT OF PAKISTAN
DIRECTORATE OF TRANSIT TRADE
CUSTOM HOUSE PESHAWAR
Phone No.091-9216193

C.No.05-01/DTP/2013/Pt-II/ 1245

Dated: 18.12.2024

The Secretary (Transit & Border Trade),
Federal Board of Revenue,
Islamabad.

Subject: **REQUEST FOR TRANSIT TRADE DATA**

Please refer to the Board's letter C.No.1(4)T&BT/2018-235921-R dated 17.12.2014 on the subject cited above.

2.	The requisite information in respect of Directorate of Transit Trade, Peshawar for the financial year 2023-2024 is given below:

Summary Report of Forward & Reverse Transit IRO Directorate of Transit Trade Peshawar for 2023-24

		Forward Transit			Reverse Logistic
S.No	Station	Nos of TEUs	Nos of Containers	Value in US$	Empty Containers
1	Torkham	40147	31660	1043.21	30712
2	Ghulam Khan	11052	6623	339.68	5903
	Total:	51199	38283	1382.89	36615

Values in Millions

* Source PRAL

(Amjad ur Rehman)
Director
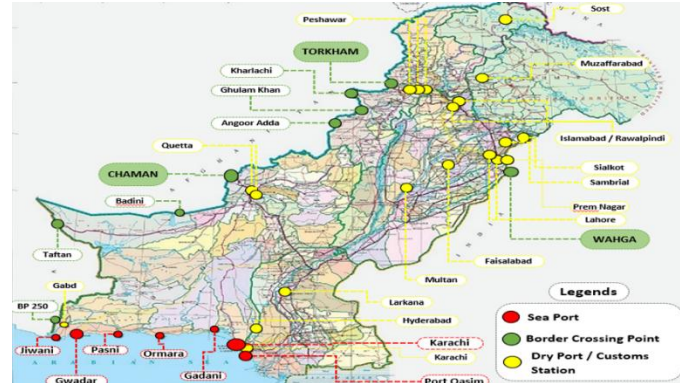
Transit Trade Chaman Station Data
Period from 01.07.2023 to November 2024

Category	Containers	TEUs	Value (in Millions)
Forward Transit	43124	59580	554505.982 (PKR)
Reverse Transit	5525 Trucks	NA	3824.393 (USD)
Empty Returning	42426	58260	NA