TERMS OF REFERENCES (TORS)
PAKISTAN RAISES REVENUE PROJECT (PRRP)
FEDERAL BOARD OF REVENUE (FBR)

DEVELOPMENT OF AN INTEGRATED AI-POWERED KNOWLEDGE, TRAINING & ASSESSMENT PLATFORM FOR PAKISTAN CUSTOMS

1. Introduction:

The Federal Board of Revenue (FBR) is Pakistan's apex tax authority under the Ministry of Finance. It formulates and enforces tax policies, collects federal taxes and duties, and works to broaden the tax base and promote compliance for sustainable economic growth. Federal Board of Revenue is implementing the Pakistan Raises Revenue Project (PRRP) [P165982] with the assistance of the World Bank to contribute to a sustainable increase in domestic revenue by broadening the tax base and facilitating compliance. The Federal Board of Revenue has received financing from the World Bank towards the cost of the Pakistan Raises Revenue Program (PRRP) and intends to apply part of the proceeds for the captioned consulting services.

The **Customs Academy of Pakistan (CAP)**, operating under the mandate of Pakistan Customs, is issuing this REOI/TORs/Request for Proposal (RFP) to solicit proposals from qualified vendors for the development and implementation of the **Integrated AI-Powered Knowledge, Training & Assessment Platform**.

This initiative is a strategic modernization program designed to fundamentally re-engineer how Pakistan Customs manages its intellectual capital. In an era where regulatory complexity is increasing, FBR requires a dynamic, AI-driven ecosystem that serves two distinct but interconnected goals: **External Trade Facilitation** and **Internal Capacity Building**.

Furthermore, this project is a compliance imperative under Pakistan's international commitments. As a signatory to the WTO Trade Facilitation Agreement (TFA), Pakistan is obligated under Article 1 (Publication and Availability of Information) to ensure that trade procedures are transparent and easily accessible to stakeholders. This is a mandate directly fulfilled by the AI Knowledge Hub. Concurrently, the World Customs Organization (WCO) Revised Kyoto Convention (RKC) emphasizes the critical necessity of "Capacity Building" to ensure the uniform and professional application of customs controls. This platform operationalizes these commitments, transforming them from policy text into tangible, digital infrastructure.

To achieve this, the project creates a single, unified platform comprising two powerful, integrated applications:

1.1. The AI-Powered Knowledge Hub (External & Internal):

A Generative AI (RAG-based) chatbot acting as the "Single Source of Truth." It will digest the entire corpus of Customs laws, rules, and tariffs to provide instant, citation-backed answers to stakeholders (Traders, Clearing Agents) and act as a decision-support tool for Customs Officers.

1.2. The Customs Academy of Pakistan Learning Management System (CAPLMS):

This component is a full-fledged, enterprise-grade Learning Management System (LMS) designed to manage the entire lifecycle of professional development and assessment for diverse stakeholders. Unlike static training software, CAPLMS is an intelligent engine that serves:

- **Customs Officers:** A continuous professional development platform offering AI-curated learning paths, virtual classrooms, and mandatory promotional trainings.

- **Licensing Candidates (Agents/Brokers):** A secure, high-stakes examination engine for the licensing of Customs Agents, Shipping Agents, and Bonded Carriers, replacing outdated paper-based testing with transparent, computer-based assessments.

- **The General Public & SMEs:** A public-facing e-learning portal designed to foster economic inclusion. It will offer specialized courses for **Women Entrepreneurs and Small & Medium Enterprises (SMEs)** on critical topics such as complying with international export regulations, registering businesses for WeBOC/PSW/SECP/FBR/etc, and navigating global trade. *(Note that this is a future use-case at this stage, contingent upon development of the curriculum).*

- **The Academy Administration:** A centralized management hub for curriculum design, trainee progress tracking, and automated certification, powered by the core AI engine to dynamically generate training content and assessment questions.

1.3. The "AI Brain" as a Foundational Asset:

Crucially, this project is architected to look beyond current requirements. The Core AI Engine (The "AI Brain") is designed as a foundational infrastructure layer, not a single-use tool. By ingesting and vectorizing the complete legal and procedural corpus of Pakistan Customs, this engine becomes a reusable intelligence asset. Future applications, for instance, a Legal Case Management System to assist with litigation, an Automated Valuation Advisory tool, or advanced Risk Management Modules can be built on top of this same "Brain" via APIs. This ensures that FBR's investment today establishes a scalable, intelligent core capable of powering the next decade of digital innovation.

2. Strategic Rationale & Business Case:

This project is not a simple IT upgrade; it is a fundamental re-engineering of how Pakistan Customs shares knowledge and builds human capital. The section is built on evidence from OECD and Japanese Ministry of Finance publications. [1,2]

The global public sector is at a pivotal moment, tasked with improving service delivery and operational efficiency in an environment of increasing complexity. For Customs administrations, this challenge is amplified by rising trade volumes, intricate regulations, and the demand for 24/7 public service. Artificial Intelligence (AI) has emerged as the definitive enabling technology to meet these challenges, with leading organizations already demonstrating significant returns.

This document outlines a single, integrated strategy to develop an AI-powered platform. The business case is built on three interconnected pillars that address critical operational gaps with proven, high-impact solutions.

2.1. Pillar 1: Enhance Public Service Delivery & Trade Transparency

- *The Problem:* The current "information asymmetry" creates an uneven playing field for traders and burdens the public with navigating a complex web of customs laws. This leads to stakeholder frustration, compliance errors, and inefficient trade.
- *The Solution:* An AI-Powered Knowledge Hub, which acts as a "single source of truth" for all stakeholders.

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[1] https://www.mof.go.jp/english/pri/publication/pp_review/ppr21_2_01.pdf

[2] OECD (2025), *Governing with Artificial Intelligence: The State of Play and Way Forward in Core Government Functions*, OECD Publishing, Paris, https://doi.org/10.1787/795de142-en.

- **Evidence & Use Case:** This directly mirrors the successful use of AI by Japan's Ministry of Finance (Customs) to provide automated 24/7 responses to a high volume of public inquiries on tariffs and procedures. By providing a single, accessible, and AI-powered interface, the platform directly improves the "responsiveness of public services" and can offer "tailored" guidance to stakeholders, a key benefit of AI in government identified by the OECD. The Inland Revenue Authority of Singapore has the **IRAS Bot** that provides answers to common queries and allows users to perform secure transactions for different tax types. [3]

Benefits:

- **For Stakeholders:** Provides instant, 24/7, and consistent answers to queries, reducing the administrative burden on traders, importers, and clearing agents.
- **For Customs:** Establishes a transparent and level playing field, which fosters trust and can directly improve voluntary compliance.

2.2. Pillar 2: Drive Internal Efficiency & Optimize High-Value Resources

- **The Problem:** Highly skilled and expensive customs officers are currently forced to spend a significant portion of their time on low-value, repetitive administrative tasks, such as answering routine phone calls and email inquiries about basic procedures.
- **The Solution:** The same AI-Powered Knowledge Hub, used as an internal efficiency engine.
- **Evidence & Use Case:** This is the primary driver for Japan Customs' AI adoption. Their stated goal was to "reduce the burden of responding to inquiries" so that human officers could be "reassigned to more complicated tasks". This approach is strongly endorsed by the OECD, which identifies the automation of "routine administrative tasks" as a core AI capability. This automation frees up civil servants to focus on "higher-value tasks" that require uniquely human skills like "judgement, empathy, and critical thinking".

Benefits:

- **Direct ROI:** Generates a powerful return on investment by automating low-value work and redirecting invaluable, experienced human resources to high-impact areas like complex risk analysis, investigations, enforcement, and stakeholder engagement.
- **Data-Driven Insights:** The platform's analytics dashboard will capture data on the most common public and internal queries, providing FBR with unprecedented, real-time insights into areas where regulations are most confusing, procedures are least clear, and compliance is weakest.

2.3. Pillar 3: Ensure Long-Term Sustainability & Future-Proof the Workforce

- **The Problem:** Deploying advanced AI tools without a parallel investment in human capital is the single greatest risk to a digital transformation project. The OECD explicitly identifies that a lack of "skills" and "capacity" are the most significant barriers to AI adoption in the public sector.
- **The Solution:** The Customs Academy Pakistan Examination System (CAPLMS), a comprehensive Learning Management System (LMS) and assessment platform.
- **Evidence & Use Case:** The OECD paper issues an urgent call for the "massive upskilling and reskilling" of the public sector workforce. It states that civil servants need both new "digital skills" to use and manage AI tools, and enhanced "human-centric skills" (like critical judgment) to perform the high-value tasks that AI will leave for them.

Benefits:

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[3] https://www.iras.gov.sg/digital-services/others/iras-bot

- *Mitigates Project Risk:* CAPLMS is the engine that will deliver this essential upskilling. It ensures that the FBR workforce has the capacity to effectively use, manage, and govern the new AI platform, securing the long-term sustainability of the entire investment.
- *Builds Human Capital:* It provides a modern, scalable platform to manage the training, certification, and continuous professional development of the entire customs cadre, future-proofing the workforce for the next generation of digital challenges.

3. Background and Context:

Pakistan Customs plays a pivotal role in regulating international trade, enforcing national laws, and contributing to the national economy. However, the regulatory landscape is characterized by a complex and dispersed network of legal instruments, including the Customs Act 1969, Customs Rules 2001, Statutory Regulatory Orders (SROs), Customs General Orders (CGOs), and the Pakistan Customs Tariff. Additionally, there are a number of allied laws and rules of Other Government Agencies (OGAs) that are involved in the international trade chain.

This complexity presents two significant operational challenges that this project aims to resolve:

- **Information Asymmetry and Inefficiency:** Stakeholders often struggle to navigate the intricate web of regulations, leading to an "information asymmetry" that creates an uneven playing field and hinders efficient trade. The Customs Academy recognizes the urgent need to address this gap by leveraging advanced AI technologies to create a centralized, user-friendly, and 24/7 accessible platform for information dissemination. This will reduce administrative burdens and foster a more transparent customs environment.
- **Outdated Learning & Examination Processes:** The existing examination system for licensees is paper-based, infrequent, and administratively burdensome. For instance, the qualification test for Shipping Agents, mandated under Rule 656 of the Customs Rules 2001, was last conducted in 2011. This has resulted in 163 provisional licensees who must undergo a renewal process every six months, creating a significant workload for the Licensing Authority and a recurring hassle for the agents themselves. There is a clear need to substitute this outdated method with a modern, computerized examination system that minimizes human intervention and upholds the principles of transparency, efficiency, and integrity.

This integrated platform is envisioned as the strategic solution to both challenges. By creating a single, authoritative knowledge base and a powerful AI engine, Pakistan Customs can simultaneously modernize how it shares information with the world and how it assesses the knowledge of its key stakeholders.

4. Objectives:

The primary objectives of this integrated project are to design, develop, and deploy a unified platform that addresses the informational and assessment needs of Pakistan Customs and its stakeholders. The specific goals are to:

1. **Develop a Unified Knowledge Base:** Create a single, comprehensive, and searchable digital repository that serves as the authoritative source of truth for all relevant customs laws, regulations, procedures, SROs, CGOs, and the Pakistan Customs Tariff. This knowledge base will be centrally managed and version-controlled to ensure accuracy.
2. **Implement a Core AI Engine:** Design and build a state-of-the-art AI engine capable of two primary functions:
   a. Providing accurate, contextually relevant, and verifiable responses to natural language queries for the public-facing chatbot.
   b. Dynamically generating random, high-quality test questions for the CAPLMS module.

3. **Enhance Information Accessibility:** Significantly improve the accessibility of customs-related information for all stakeholders, including traders, agents, and the public, thereby streamlining trade processes and reducing administrative burdens.
4. **Modernize the Examination Process:** Replace the current paper-based examination system with a secure, efficient, and transparent computerized platform (CAPLMS) that minimizes human intervention, ensures the confidentiality of test materials, and provides immediate results to candidates .
5. **Improve Regulatory Compliance:** Foster better compliance with customs laws and regulations by providing clear, consistent, and easily accessible guidance through the Knowledge Hub.
6. **Strengthen Institutional Capabilities:** Enhance the training and assessment capabilities of the Customs Academy by providing an integrated, interactive platform for learning and knowledge validation, with the future goal of using the system for promotional exams.
7. **Provide Actionable Analytics:** Create a data analytics dashboard to monitor user queries and test performance, providing valuable insights that can be used to identify areas for improvement in customs regulations, procedures, and training programs.
8. **Ensure Seamless System Integration:** Integrate the platform with existing customs systems, such as WeBOC and the Pakistan Single Window (PSW), to provide a unified user experience and ensure seamless data exchange for functions like user authentication.

Based on the foregoing background, context, and project objectives, a conceptual high-level architecture design of the proposed system is given below to augment understanding:
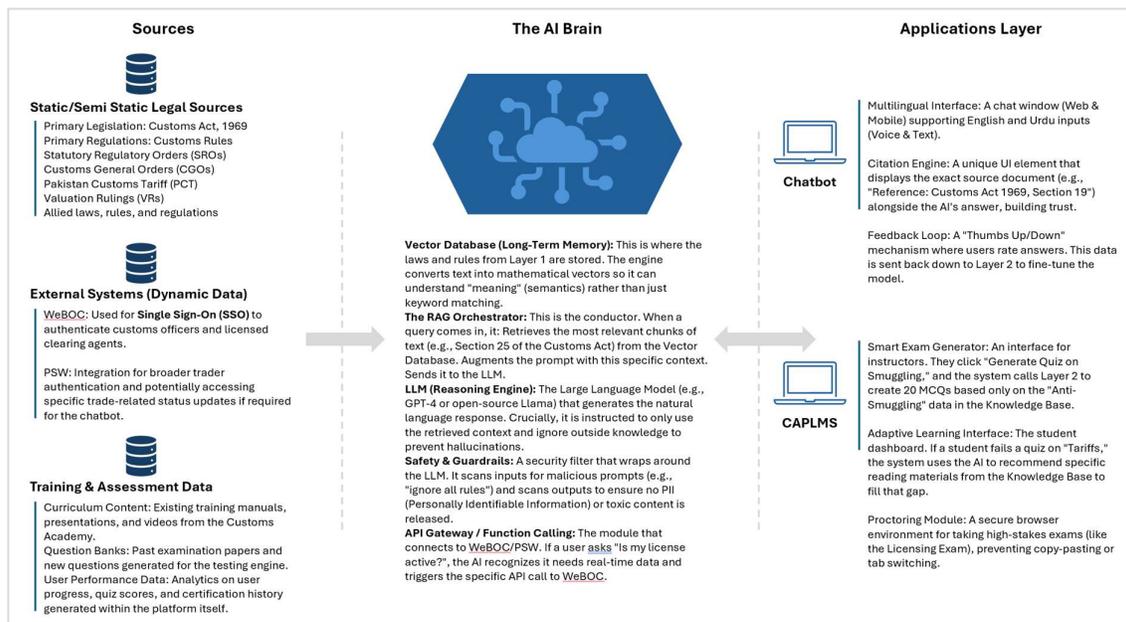
Critical to note is that the AI engine/brain serves as the foundational source of truth capable of ingesting future data sources and application development. To illustrate, to cater to a potential legal assistance use case, the architecture must be capable of ingesting Customs case laws and judicial decisions and enable the development of an application in the applications layer.

5. Scope of Work:

The selected vendor will be responsible for the end-to-end design, development, testing, and deployment of the Integrated AI-Powered Knowledge and Assessment Platform. The scope is broken down into the following phases and activities.

5.1. Phase I: Foundational Knowledge Base, Infrastructure & Core AI Engine

This initial phase is focused on building the shared, foundational components that will power both the Knowledge Hub and the CAPLMS applications.

5.1.1. Deployment Solution Research & Recommendation

The vendor will conduct a comprehensive analysis to determine the optimal hosting and deployment environment for the entire platform. Key tasks will be:

- Investigate on-premises solutions, including hardware requirements (servers, storage, networking), software licensing, scalability, maintenance needs, security implications, and a detailed Capital Expenditure (CAPEX) analysis .
- Investigate cloud-based solutions from major providers (e.g., AWS, Azure, Google Cloud), evaluating their AI/ML services, storage capabilities, security, data sovereignty implications, and a detailed Operational Expenditure (OPEX) analysis .
- Analyze the current state of internet infrastructure within Pakistan and its potential effect on the performance and reliability of cloud-based solutions.
- Conduct a detailed comparative analysis of the on-premises and cloud-based options across all factors such as cost, scalability, security, reliability, and maintenance.

5.1.2. Deliverables

- Deployment Solution Report: A comprehensive report providing a detailed analysis of the pros and cons of each solution , CAPEX and OPEX estimates , analysis of security and data sovereignty implications , an analysis of the internet infrastructure's impact , and a final, justified recommendation on the most suitable deployment solution for the platform.

5.1.3. Unified Knowledge Base Development

The vendor will construct a single, authoritative digital repository to serve as the sole "source of truth" for the entire system. Key tasks will be:

- Digitize, structure, and organize all relevant customs and allied laws, rules, SROs, CGOs, valuation rulings, and the Pakistan Customs Tariff.
- Identify and curate additional data sources, such as anonymized valuation data that can be made a part of the knowledge base.
- Develop a robust information architecture, a structured knowledge base schema, and a data dictionary for efficient information retrieval.
- Implement a Content Management System (CMS) for ongoing updates, document management, and maintenance.
- Implement a mandatory Content Validation and Approval Workflow within the CMS, defining user roles (e.g., Drafter, Reviewer, Approver) to ensure information is verified by a designated Customs official before publication or ingestion in the knowledge base.
- Develop and implement a Legal Document Version Control System that tracks all changes, links new regulations to superseded ones, and ensures the AI defaults to the current, in-force version while retaining the ability to query historical versions.
- Create a comprehensive metadata and tagging system to ensure accurate search and retrieval results.

5.1.4. Deliverables:

- A digitized and indexed repository of all required legal and procedural documents.
- A structured knowledge base schema and data dictionary.
- A fully deployed CMS with a detailed user manual, including documentation for the validation and approval workflow.
- A metadata and tagging strategy document.
- A report detailing the data sources and the process used to create the knowledge base.

5.1.5. AI Core Engine Development

The vendor will build the central AI engine that powers both the chatbot and the examination system. Key tasks include:

- Select a state-of-the-art, open-source Large Language Model (LLM) and provide a detailed justification for the choice of the base model and its parameters.
- Implement a Retrieval-Augmented Generation (RAG) architecture as a critical, mandatory requirement to mitigate AI "hallucinations" and ensure all generated content is grounded in the verified knowledge base.
- Fine-tune the LLM to perform the following functions primary functions:
    - Conversational Q&A: Generate accurate, natural language answers to user queries, with each factual statement accompanied by a direct, verifiable citation.
    - MCQ Generation: Dynamically generate unique, multiple-choice questions based on the source material, ensuring one correct answer and several plausible but incorrect distractors. The system must be capable of automatically grading these.
    - Open Ended Questions Generation: Dynamically generate open ended questions that are clear, focused, and avoid ambiguity, specifying clearly if a description, explanation, argument, list, calculation, etc. is expected. Evaluate and define a feasible grading workflow, i.e. automatic vs. manual.
- Implement a system to display a "confidence score" with its answers to indicate the level of certainty.
- A user feedback mechanism for rating answer accuracy must be implemented.

5.1.6. Deliverables:

- A detailed report on the AI models used, the fine-tuning process, and the specific architecture implemented for hallucination mitigation and dual-capability support.
- The fully functional AI Core Engine, ready for integration.
- The complete source code repository with version control.
- The API documentation must include endpoints for external system querying (to support future modules like Legal/Valuation).

5.2. Phase II: Application Layer Development

This phase focuses on building the user-facing interfaces for the Knowledge Hub and CAPLMS.

5.2.1. Application Layer 1 - Knowledge Hub (Chatbot)

The vendor will develop the public-facing conversational AI interface. Key tasks include:

- Design a user-friendly and intuitive user interface (UI) and user experience (UX).
- Develop a responsive web and mobile interface with multilingual support for both English and Urdu.
- Integrate a user feedback mechanism for rating the accuracy of answers.
- Develop and integrate an analytics dashboard for the Customs Academy to monitor chatbot performance, common queries, and user feedback.
- Integrate functionalities for users to retrieve and download source documents.

5.2.2. Deliverables:

- A fully functional and deployed AI chatbot application.
- User interface (UI) and user experience (UX) design specifications, including wireframes and mockups.

5.2.3. Application Layer 2 – CAP Learning Management System (CAPLMS)

The vendor will develop the secure, computer-based training and testing application. Key tasks include

- Design and develop secure, role-based dashboards for Candidates, Principals, and Directors, etc.
- Develop administrator functionalities including: candidate detail management, secure test generation by authorized personnel, printing of auto-generated admit slips and attendance sheets, viewing and printing of results, and auditable logging.
- Develop the candidate-facing training and testing environment, including a secure login, instruction display, a timed test interface, and the immediate display of auto-calculated results upon completion.
- Liaise with CAP to curate already developed training content and help convert existing materials into engaging e-learning modules.

The system must conform to the key characteristics typical of learning management systems, i.e. centralized content management for courses and assessments, user management with roles and permissions, reporting and analytics to track progress, mobile accessibility, and integration capabilities with other systems. Advanced features often include gamification, AI-powered personalization, robust security, and automation of administrative tasks to enhance user experience and efficiency. Specifically, the system must allow for:

Content Management & Delivery

- Course Creation: Tools to build, organize, and publish courses with various content types like videos, documents, and presentations.
- Assessment Tools: Features for creating quizzes, tests, assignments, and tracking learner performance and completion rates.
- Centralized Platform: Consolidates all training content and user data in one location for efficient management and access.
- Blended Learning Support: Facilitates both online and face-to-face instruction, offering flexible learning environments.

User Experience & Accessibility

- User-Friendly Interface: An intuitive design that is easy to navigate for learners, instructors, and administrators.
- Mobile Learning: Enables users to access courses and learning activities from smartphones and tablets.
- Accessibility: Supports different learning styles and ensures content is accessible to users with disabilities, and often includes localization features.
- Gamification: Incorporates game elements like points, badges, and leaderboards to increase user engagement and motivation.

Tracking & Analytics

- Performance Monitoring: Tracks user progress, engagement, and success rates for individual learners and groups.

- Reporting & Analytics: Provides customizable dashboards and reports to offer insights into learning patterns and areas for improvement.
- Certifications & Skills Tracking: Manages and tracks skills development and certifications to measure performance and improvement over time.

Administration & Integrations

- User and Role Management: Allows for defining different user roles (admin, instructor, learner) and controlling access permissions.
- Automation: Automates repetitive administrative tasks, such as user enrollment and sending notifications.
- Integration Capabilities: Complies with learning standards and integrates with other business and learning tools.
- Security: Incorporates advanced security features to protect data and content within the platform.
- Scalability: The ability of the system to handle growth in users, content, and functionalities.

5.2.4. Deliverables:

- A fully functional CAPLMS application with all specified modules and dashboards.
- Detailed user manuals for each user role (Candidate, Principal, Director).

5.3. Phase III: Integration, Testing, Deployment & Knowledge Transfer

This final phase ensures the platform is robust, integrated, successfully launched and an in-depth knowledge transfer has been conducted to ensure project sustainability and resilience.

5.3.1. System Integration, Testing & Quality Assurance

- Develop and implement APIs for user authentication via the Pakistan Single Window (PSW) system.
- Develop a framework of APIs to allow for potential future integrations with other systems like WeBOC.
- The API documentation must include endpoints for external system querying (to support future modules like Legal/Valuation).
- Conduct comprehensive Quality Assurance, including unit, integration, performance, and security testing.
- Develop and execute a pilot test with a defined group of stakeholders (traders, agents, officers) to gather feedback and refine the platform.
- Develop and execute a User Acceptance Testing (UAT) plan with representative users to validate all functionality against requirements and obtain official sign-off.

5.3.2. Deliverables:

- API integration documentation.
- Comprehensive test plans, test cases, and test execution reports.
- Performance and security testing reports.
- A pilot test plan and a report detailing the process, feedback, and resulting changes.
- A User Acceptance Testing (UAT) report and official sign-off documentation from Pakistan Customs/Customs Academy of Pakistan.

5.3.3. Full Deployment

Develop a detailed deployment plan, including a rollback plan, and deploy the fully tested platform to the production environment.

5.3.4. Deliverables:

- The fully deployed and live platform on the production environment.

5.3.5. Knowledge Transfer & Sustainability

The successful launch of the platform is not the final deliverable; it is the beginning of its operational life. The vendor is responsible for ensuring the full, sustainable transfer of operational and strategic knowledge to the designated teams at the Customs Academy of Pakistan, Pakistan Customs, and PSW. The following tasks are required:

Develop a Comprehensive Sustainability & Knowledge Transfer Plan:

- This plan must be submitted for approval within 60 days of project kick-off.
- It must identify the specific knowledge (administrative, technical, and strategic) required for platform sustainability.
- It must map this knowledge to the designated recipient teams at CAP, FBR (IT/HR), and PSW.
- It must detail the methodologies for knowledge transfer (e.g., workshops, paired work, documentation, train-the-trainer).

Conduct Role-Based Administrative Training:

- "Train-the-Trainer" Program (for CAP): Conduct dedicated "Train-the-Trainer" sessions for the core CAP team. This team will then be responsible for the continuous training of new end-users, instructors, and administrators.
- CAPLMS/LMS Administration: In-depth training for CAP personnel on using the full suite of LMS tools, including course creation, assessment design, user and role management, and pulling analytics reports.
- Knowledge Hub CMS Administration: In-depth training for the CAP/FBR content team on the complete Content Validation and Approval Workflow , managing the Legal Document Version Control System, and updating the knowledge base.

Execute Technical & AI Architecture Knowledge Transfer:

- Target Audience: A designated "Platform Sustainability Team" from FBR/CAP's technical directorate.
- AI Core Engine Deep Dive: Conduct workshops explaining the AI Core Engine, the RAG architecture, and the fine-tuning methodology. This includes how to monitor the model for accuracy, interpret confidence scores , and understand the user feedback mechanisms.
- Technical "Runbook" Development: Provide a detailed operational "runbook" for the technical team. This must include procedures for standard maintenance, troubleshooting common errors, and monitoring system health (e.g., cloud resource usage, API response times).
- Source Code & Architecture Walkthrough: A comprehensive, multi-session walkthrough of the complete source code repository , data schemas, and overall system architecture.

Implement Integration & MLOps/DevOps Upskilling:

- Integration Partner Workshop (for PSW/FBR-IT): Conduct dedicated workshops for the technical teams at PSW and FBR detailing the API frameworks, authentication protocols (SSO), and data exchange logs. This must include troubleshooting procedures for integration failures.
- Paired Work Program: For the final three (3) months of the development phase, key members of the vendor's technical team (e.g., Lead AI Engineer, DevOps Engineer) must work in a "paired programming" or "shadowing" model with their designated counterparts in the FBR/CAP "Platform Sustainability Team" to ensure practical, hands-on knowledge transfer.

Provide Post-Deployment Support:

- Provide a 90-day warranty period for post-deployment monitoring and stability support.
- Provide support to the CAP team for 2 years to assist with updating the knowledge base, particularly with changes stemming from new federal government budgets.
- The 2-year support plan must include the Service Level Agreements (SLAs) for surge support, especially during annual budgetary cycles when frequent regulatory and legislative changes occur.

5.3.6. Deliverables

- Sustainability & Knowledge Transfer Plan: A formal, detailed plan, approved by the Steering Committee.
- Comprehensive Documentation (Beyond User Manuals):
  - Technical Architecture Documents: Including all system diagrams, data models, and schema definitions.
  - Operational "Runbook": A detailed guide for the technical team on supporting and maintaining the platform in production.
  - API & Integration Guide: A dedicated manual for PSW and FBR-IT teams.
  - AI Model "Card": A document detailing the AI model, its fine-tuning process, its data sources, and its known limitations.
- Training Materials: All slide decks, user guides, admin manuals, and online training modules created for the various training sessions.
- Knowledge Transfer Completion Report: A formal sign-off document at the end of the 15-month deployment phase, co-signed by the Vendor and the Project Director, confirming that all elements of the Knowledge Transfer Plan have been successfully completed.

6. Critical Project Requirements & Mandates

In addition to the detailed Scope of Work, all proposals must explicitly address and demonstrate the capacity to adhere to the following critical cross-cutting requirements. These mandates are considered foundational to the project's success and will be a key factor in the evaluation of submissions.

6.1. Mandatory Policy & Legal Compliance

The proposed solution, including its hosting, data processing, and AI model inference, must be in full compliance with the Government of Pakistan's Cloud-First Policy (2022), the provisions of the draft Personal Data Protection Bill, and the safety and governance principles outlined in the National AI Policy (2025). The vendor must provide evidence of compliance, such as a Data Protection Impact Assessment (DPIA) and relevant security certifications.

6.2. Reuse-First and Integration Principle

Proposals should prioritize a 'Reuse-First' approach. The vendor is required to evaluate and propose integration with existing government systems, including any current Customs Academy of Pakistan TMS/LMS and certified domestic CBT providers, to prevent duplication and ensure cost-effectiveness. A standalone build will only be considered if a clear business case demonstrates the infeasibility of integration.

6.3. Generative AI Security and Safety

The platform must implement strict safety guardrails. All responses from the AI Knowledge Hub must be grounded by the Retrieval-Augmented Generation (RAG) architecture with verifiable citations. The vendor must conduct specialized Generative AI security testing, including 'red-teaming' exercises and testing against the OWASP LLM Top-10 vulnerabilities. Safety filters to prevent harmful or biased outputs are mandatory.

6.4. Critical Dependencies as Project Gates

The project is to be structured with hard performance gates, i.e. the project will be halted if these gates are not passed:

Gate 1: The Prototype Gate

- The vendor must demonstrate the AI Core Engine is functional and the Deployment Solution is viable.
- If the AI hallucinates wildly or fails basic RAG retrieval tests here, the project pauses/terminates before we build the front-end apps.

Gate 2: The Integration Gate

- Successful connectivity with WeBOC/PSW APIs.

As noted in the TORs, these are mandatory performance gates. We will reinforce that failure here triggers a "cure period" or contract termination.

6.5. Valuation Data Governance

The inclusion of any valuation data in the knowledge base is subject to strict governance. The dataset will be access-controlled, provided in an anonymized format only, and subject to the direct oversight and approval of the Directorate General of Valuation. The platform must display clear disclaimers regarding the indicative nature of this data.

6.6. Digital Transformation & Change Management

This phase is a continuous activity that runs in parallel with Phases I, II, and III. Its objective is to manage the human and cultural shift within FBR/Customs and among external stakeholders to ensure the platform is not just deployed, but fully adopted and its benefits realized. The vendor will be responsible for developing and executing a comprehensive change management strategy. The vendor will be responsible for the following tasks:

Develop a Stakeholder Analysis and Change Impact Assessment:

- Identify all key internal and external stakeholder groups (e.g., FBR/Customs officers, CAP trainers, PSW operators, traders, clearing agents).
- Analyze the "as-is" processes and "day-in-the-life" of each group to understand the specific impacts (positive and negative) of the new platform on their roles.
- Identify potential sources of resistance, key motivators, and cultural barriers to adoption.

Formulate a Strategic Change Management & Communications Plan:

- Develop a comprehensive plan detailing the why, what, when, and how of all project communications.
- Define tailored key messages, communication channels (e.S., town halls, newsletters, official memos, portal banners), and a timeline for each stakeholder group.
- The plan's goal is to build awareness, generate buy-in from leadership and users, manage expectations, and clearly articulate the benefits (WIIFM - "What's In It For Me?").

Establish and Support a "Change Champions Network":

- Work with CAP and FBR leadership to identify and empower a network of "Change Champions" from various directorates and stakeholder groups.
- Equip this network with the training and materials needed to act as local advocates, provide peer support, and channel constructive feedback from the ground up to the project team.

Execute Awareness & Engagement Campaigns:

- This is distinct from end-user training. The vendor will design and help execute awareness campaigns (e.g., informational roadshows, webinars, demo sessions) that build excitement and understanding before the system is launched.
- Utilize the Pilot Test as a key change management tool to gather feedback from real users, demonstrate the value of the platform, and create early success stories.

Develop a User Adoption Measurement Framework:

- Develop a framework and dashboard (leveraging the platform's own analytics) to monitor user adoption rates post-launch.
- This framework must track Key Performance Indicators (KPIs) such as login rates, query frequency (for the chatbot), course completion rates (for CAPLMS), and user satisfaction scores (from the feedback mechanism).

Deliverables:

The vendor will be required to deliver the following:

- Stakeholder Analysis & Change Impact Report: A formal report detailing the findings from the initial assessment.
- Strategic Change Management & Communications Plan: A comprehensive, time-bound plan, approved by the Steering Committee.
- Change Champions Program Charter: A document outlining the network's structure, goals, members, and support plan.
- Communications Toolkit: A package of ready-to-use materials for the awareness campaign (e.g., email templates, presentation slides, posters, FAQs).
- User Adoption Baseline Report: A report delivered 90 days post-launch that establishes the baseline for user adoption metrics and provides recommendations for targeting low-adoption groups.

7. Timelines:

The total estimated project duration, from kick-off to full deployment, is approximately 15 months.

7.1. Phase I: Foundational Work & Core AI Development (Months 1-5)

This initial phase is dedicated to establishing the project's foundation, gathering data, and building the core intelligence of the system.

7.1.1. Months 1-2:

- Project Kick-off and Inception
- Begin digitization and structuring of the Unified Knowledge Base
- Finalize AI/Data Architecture and technology stack

7.1.2. Months 3-5:

- Intensive development of the AI Core Engine (RAG implementation and fine-tuning)
- Continued development and population of the Unified Knowledge Base, including CMS setup and approval workflow implementation
- UI/UX design for both the Knowledge Hub and CAPLMS applications

7.2. Phase II: Application Layer Development (Months 3-10)

This phase, which overlaps with the end of Phase I, focuses on building the user-facing applications. Development can proceed in parallel tracks.

7.2.1. Months 3-6:

- Development of the Knowledge Hub (Chatbot) application, including the web interface and analytics dashboard.

7.2.2. Months 5-10:

- Intensive development of the more complex CAPLMS application, including all administrator and candidate dashboards, course creation tools, and assessment features.

7.2.3. Month 10:

- Completion of primary feature development for both applications and initial integration with the AI Core Engine.

7.3. Phase III: Integration, Testing, and Deployment (Months 11-15)

The final phase is focused on ensuring the platform is robust, seamlessly integrated, user-approved, and successfully launched.

7.3.1. Months 11-12:

- System Integration with PSW and WeBOC APIs
- Comprehensive Quality Assurance and Performance Testing
- Pilot Testing with a selected group of stakeholders to gather initial feedback

7.3.2. Month 13:

- Refinement and feature adjustments based on feedback from the pilot test

7.3.3. Month 14:

- Formal User Acceptance Testing (UAT) with customs officials and end-users to secure final approval

7.3.4. Month 15:

- Final bug fixes and deployment preparation
- Full production deployment and official launch of the platform
- Commencement of administrator and user training workshops

8. Firm Qualifications, Proposed Core Team, and Responsibilities:

To be eligible for this assignment, the proposing firm (or lead firm in a consortium) must demonstrate the following mandatory organizational qualifications. These criteria are designed to ensure the vendor possesses not just individual talent, but the institutional maturity to deliver a mission-critical AI platform for the public sector.

1. General Corporate Experience:

- The firm must be a registered legal entity with a minimum of three (3) years of verifiable operation in the field of software development, system integration, or digital transformation.

2. Specific Experience in AI & Machine Learning:

- Mandatory AI Projects: The firm must provide evidence of successfully completing at least two (2) projects that specifically involved the deployment of Natural Language Processing (NLP), Conversational AI (Chatbots), or Machine Learning (ML) solutions.
- Note: General web development projects do not count toward this criterion.
- RAG Architecture Capability: The firm must demonstrate a clear technical understanding and prior capability in deploying Retrieval-Augmented Generation (RAG) or semantic search architectures, given the project's strict requirement for verifiable citations and hallucination mitigation.

3. Data Privacy & Security Compliance:

- The firm must demonstrate experience in adhering to strict data governance standards.
- Evidence of developing applications that comply with OWASP security standards (specifically top vulnerabilities for LLMs/Web Apps) is strongly preferred.

Vendors must propose a team with the following minimum roles, demonstrating their expertise and capacity to successfully deliver the project:

8.1. Project Manager:

Responsibilities:

- Overall project planning, execution, and monitoring.
- Managing project scope, budget, and timeline.
- Facilitating communication and collaboration among team members and stakeholders.
- Risk management and issue resolution.
- Reporting project progress to the Customs Academy of Pakistan.

Qualifications:

- A Bachelor's or Master's degree in Project Management, Business Administration, IT, or a closely related discipline.
- Proven experience in managing complex IT projects, preferably involving AI and software development.
- Strong leadership, communication, and interpersonal skills.
- Project Management Professional (PMP) or equivalent certification is highly desirable.

8.2. Data and AI Architect:

Responsibilities:

- Designing the overall data architecture and AI strategy for the entire system.
- Selecting appropriate AI and machine learning algorithms and technologies.
- Defining data storage, processing, and retrieval mechanisms.
- Ensuring the scalability, security, and performance of the AI system.
- Overseeing the integration of data from various sources.

Qualifications:

- Master's or Ph.D. in computer science, artificial intelligence, or an IT related discipline.
- Extensive experience in designing and implementing AI and machine learning solutions.
- Deep understanding of data architecture, database systems, and cloud computing.
- Expertise in NLP, LLM, RAG, and related AI technologies.
- Experience with knowledge graphs, and semantic web technologies is highly desirable.

8.3. Lead AI/NLP Engineer:

Responsibilities:

- Developing and implementing the AI chatbot's NLP engine.
- Training and fine-tuning machine learning models.
- Integrating AI components with the overall system.
- Troubleshooting and resolving AI-related issues.
- Implementing and maintaining the AI models.

Qualifications:

- Bachelor's or Master's degree in computer science, artificial intelligence, or an IT related discipline.
- Strong programming skills in Python or other relevant languages.
- Experience with NLP libraries and frameworks (e.g., TensorFlow, PyTorch, NLTK, spaCy).
- Experience with LLM's and their API's.

8.4. Knowledge Management Specialist:

Responsibilities:

- Developing and maintaining the knowledge base's structure and content.
- Ensuring the accuracy and consistency of information.
- Implementing content management workflows.
- Developing metadata and tagging systems.
- Working with the AI engineers to improve information retrieval.

Qualifications:

- Bachelor's or Master's degree in library science, information management, or a related field.
- Experience in developing and managing knowledge bases.
- Strong research and analytical skills.
- Familiarity with content management systems and information architecture.

8.5. Software Developers:

Responsibilities:

- Developing and maintaining the systems backend and frontend components.
- Integrating the chatbot with existing customs systems.
- Implementing APIs for data exchange.
- Ensuring the security and performance of the application.

Qualifications:

- Bachelor's degree in computer science or an IT related discipline.
- Proficiency in relevant programming languages (e.g., Python, Java, JavaScript).
- Experience with web development frameworks (e.g., React, Angular, Node.js).
- Experience with database systems and cloud platforms.

8.6. UX/UI Designer:

Responsibilities:

- Designing the system's user interface and user experience.
- Creating wireframes, mockups, and prototypes.

- Ensuring the chatbot's usability and accessibility.
- Conducting user research and gathering feedback.

Qualifications:

- Bachelor's degree in design, human-computer interaction, or an IT related discipline.
- Experience in designing user interfaces for web and mobile applications.
- Proficiency in design tools (e.g., Adobe XD, Figma, Sketch).
- Strong understanding of user-centered design principles.

8.7. Quality Assurance Engineer:

Responsibilities:

- Developing and executing test plans and test cases.
- Identifying and reporting software defects.
- Performing performance and security testing.
- Ensuring the quality and reliability of the chatbot.

Qualifications:

- Bachelor's degree in computer science or an IT related discipline.
- Experience in software testing and quality assurance.
- Familiarity with testing tools and methodologies.

8.8. Training and Documentation Specialist:

Responsibilities:

- Developing and delivering training materials for customs officers and administrators.
- Creating user manuals and technical documentation.
- Conducting training sessions and workshops.
- Creating on line training modules.

Qualifications:

- Bachelor's degree in education, instructional design, or an IT related discipline.
- Experience in developing and delivering technical training.
- Strong communication and presentation skills.
- Experience with creating online learning tools.

8.9. eLearning Specialist:

Responsibilities:

- Collaborate with CAP/Pakistan Customs Subject Matter Experts (SMEs) to analyze training needs and define clear learning objectives for various courses.
- Apply proven instructional design methodologies and adult learning principles to design and structure engaging eLearning curricula and modules.
- Create compelling training content using a variety of formats, including interactive presentations, instructional videos, simulations, and assessments, using the platform's built-in course creation tools.
- Organize content into logical learning paths and ensure a user-friendly and intuitive learning experience for trainees.

- Develop quizzes, knowledge checks, and other assessments to measure learning effectiveness and skill acquisition.
- Work with the Quality Assurance Engineer to test and validate training modules for functionality, clarity, and educational impact before they are published.
- Continuously review and update existing course content to ensure it remains current with the latest laws and procedures.

Qualifications:

- Bachelor's or Master's degree in Instructional Design, Education Technology, Adult Learning, or an IT related discipline.
- Proven experience in designing and developing comprehensive eLearning courses, preferably for technical or regulatory subjects.
- Proficiency with industry-standard eLearning authoring tools (e.g., Articulate Storyline, Adobe Captivate) and experience working within a Learning Management System (LMS) environment.
- Strong understanding of adult learning theories and instructional design models preferred.
- Excellent communication and interpersonal skills for effectively collaborating with subject matter experts who may not be familiar with eLearning design.
- Ability to translate complex, dry information into clear, engaging, and effective learning materials.

9. Selection Process

A firm will be selected in accordance with the Quality and Cost-Based Selection (QCBS) arrangements described in the World Bank's "Procurement Regulations for IPF Borrowers" Fifth Edition September, 2023 ("Procurement Regulations"), which can be perused at the website: https://projects.worldbank.org/en/projects-operations/projects-home

10. Compliance

The selection must comply with WB Procurement Regulations for IPF Borrowers, including conflict of interest guidelines.