

Big Data, Big Reforms: Policy Hackathon

National Contractor Risk Scoring System

Overview

The Department of Public Works and Highways (DPWH), the principal government agency responsible for steering the Philippines' infrastructure development, occupies a position of profound fiscal and ethical vulnerability. While its function is crucial to economic progress, national connectivity, and disaster resilience, the ongoing issues within the DPWH are not isolated operational deficiencies but rather manifestations of a deep-seated infrastructure-corruption cycle rooted in historical precedent, systemic loopholes, and influential political capture.

This structural pathology enables two primary forms of harm to the public purse and safety. Firstly, market distortion and monopoly flourish. Instead of genuine competitive equilibrium, a small, favored network of contractors, often utilizing opaque or related corporate entities to circumvent regulations, engages in bid-rigging and strategic "contract rotation." This systematic collusion suppresses fair pricing, resulting in inflated project costs and the commissioning of substandard work. Secondly, this systemic failure directly compromises quality, frequently resulting in "ghost projects" or structures built with dangerously weak materials. This negligence culminates in catastrophic failures, turning critical public works into public hazards during natural disasters and necessitating repeated, costly repairs that deplete national resources.

The persistence of these chronic issues is not due to a lack of existing procurement law, but rather a profound failure of effective, integrated enforcement. Critical performance data, such as CPES evaluations and COA audit findings, remain stored in segregated, often non-machine-readable systems. This pervasive lack of data interoperability prevents comprehensive, real-time risk assessment, thereby enabling high-risk actors to operate with impunity. The analytical foundation for reform successfully moves beyond anecdotal evidence by establishing quantitative outcome variables (e.g., Infrastructure Risk, tied to factors like asset age and maintenance recommendations) and linking them directly to verifiable measures of governance failure (e.g., Contractor Financial Integrity and the spatial manifestation of Monopoly and Administrative Discretion). This empirical correlation validates the necessity of the proposed intervention.

The overriding rationale for implementing the National Contractor Risk Scoring System (NCRSS) is the strategic imperative to transform this endemic failure of public procurement into a verifiable system of integrity and performance assurance. The current reactive governance model has proven incapable of safeguarding public funds and ensuring quality infrastructure.

Therefore, the NCRSS is conceptualized as a necessary and targeted administrative countermeasure. It is designed to resolve the crisis by introducing objective, data-driven checks that critically limit subjective administrative discretion, enforce radical transparency through Beneficial Ownership standards, and systematically detect and deter the market manipulation that facilitates monopoly and recurrent contractor failure. The NCRSS thus represents a fundamental and urgent shift toward building an infrastructure of accountability in the Philippines.

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Policy Overview

Problem Statement

The effective execution of the national infrastructure agenda in the Philippines is fundamentally compromised by inherent weaknesses in public procurement governance. These systemic failures facilitate corrupt practices, allow monopoly through market distortion, and introduce excessive administrative discretion, ultimately leading to project failure, fiscal leakage, and diminished public trust. Specifically, the current system lacks a consolidated, objective, and predictive mechanism to assess contractor risk, relying on fragmented data and delayed sanctions that allow disqualified or opaque entities to evade accountability and repeatedly win contracts. The National Contractor Risk Scoring System is designed to address these critical vulnerabilities. This policy is aimed at establishing a data-driven barrier to ensure public funds are entrusted only to demonstrably qualified and transparent contractors.

Policy Proposal

The National Contractor Risk Scoring System is a unified, automated platform that integrates existing procurement and performance data and assigns each contractor a standardized risk score. This score enables agencies to identify high-risk contractors before awarding projects, reduce discretion, and enhances transparency.

1. Data Integration and Consolidation

The NCRSS integrates contractor-related data from existing government systems into a centralized program. These include Constructors' Performance Evaluation System (CPES) performance ratings, Philippine Government Electronic Procurement System (PhilGEPS) registration and beneficial ownership disclosures, Government Procurement Policy Board's (GPBB) Blacklisting Database, Department of Public Works and Highways (DPWH) project progress records, and Commission on Audit (COA) audit findings. The integration resolves the long-standing issue of scattered datasets and provides government agencies with a unified, real-time reference for contractor evaluation.

2. Automated Contractor Risk Scoring

The system generates a standardized risk score for each contractor based on quantifiable indicators such as past delays, cost overruns, contract amendments, substandard performance evaluations, COA red flags, and patterns of political or geographic contractor dominance. Scores are expressed within a fixed scale and grouped into risk categories (Low, Moderate, High, Critical), enabling agencies to objectively compare the performance and integrity of contractors across sectors and regions.

3. Pre-Award Risk Alerts and Decision Support

Before a procuring entity awards a contract, the NCRSS issues a pre-award risk alert corresponding to the contractor's risk category. Low- and Moderate-risk scores allow procurement to proceed normally, while High-risk scores require written justification and additional due diligence. Critical-risk scores trigger mandatory review or temporary withholding of award. This process guides procurement officers toward evidence-based decisions and limits the influence of personal discretion or political pressure.

4. Public Transparency Portal

To promote transparency and citizen oversight, the NCRSS includes a public-facing dashboard that presents simplified contractor profiles, performance histories, and risk classifications. The portal enables civil society, journalists, and the general public to track contractor reliability and monitor patterns of procurement behavior. By opening performance information to scrutiny, the system reinforces accountability and reduces opportunities for hidden arrangements.

5. Preventive Anti-Corruptive Measures

The NCRSS functions as an early-warning mechanism by identifying high-risk contractors before project implementation. By reducing reliance on manual assessments and standardizing evaluations across agencies, the system minimizes the potential for favoritism, opaque decision-making, or manipulation of procurement outcomes. Its automated scoring system also creates a digital trail for all procurement decisions, strengthening traceability and discouraging corrupt practices.

6. Improved Infrastructure Quality and Fiscal Outcomes

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The NCRSS responds directly to long-standing governance issues in Philippine procurement by introducing data-driven early risk detection. It strengthens transparency, minimizes bias, and enhances accountability while making optimal use of existing government systems. The policy is feasible because it builds on what is already in place—CPES, PhilGEPS, BO disclosures, COA audits—while addressing the gaps that prevent these systems from working together.

Implementing Agencies and Institutional Responsibilities

The implementation of the National Contractor Risk Scoring System (NCRSS) requires coordinated action among existing procurement and oversight institutions. The Government Procurement Policy Board–Technical Support Office (GPPB-TSO) will serve as the lead implementing agency, given its mandate to develop procurement policies, oversee compliance, and maintain the national Blacklisting Database. As the governing body for procurement rules, the GPPB-TSO is positioned to institutionalize the NCRSS through amendments to procurement guidelines, circulars, and standardized evaluation tools.

The PhilGEPS Office, under the Department of Budget and Management, will act as the technical operator of the system. Its role includes integrating the NCRSS into the PhilGEPS environment, developing automated scoring algorithms, maintaining contractor registries, and ensuring secure data flows from various agencies. Because PhilGEPS already houses contractor information and registration requirements, embedding the risk scoring module within the platform minimizes costs, reduces redundancy, and accelerates adoption.

The Department of Information and Communications Technology (DICT) will provide systems development, cybersecurity assurance, and interoperability support. DICT will ensure that the NCRSS complies with cybersecurity protocols, government data standards, and the

Philippine Government Interoperability Framework (PGIF). Its participation safeguards platform stability and ensures secure handling of contractor and project information.

The Commission on Audit (COA) will act as a key independent data source, supplying verified audit findings, procurement red flags, and recurring deficiencies that form part of the risk scoring indicators. COA's involvement strengthens the integrity of the NCRSS by ensuring that risk inputs are evidence-based and insulated from manipulation. Its audit observations will also enhance the system's early-warning functions by identifying contractors with repeated irregularities.

Civil society organizations (CSOs) will contribute as transparency monitors and independent validators. Through access to the NCRSS public portal, CSOs can track contractor risk profiles, observe procurement trends, and flag anomalies for further scrutiny. CSOs may also participate in citizen audit programs, social accountability initiatives, and feedback mechanisms that identify gaps in contractor performance and support the continuous improvement of the system. Their role enhances public oversight and strengthens the legitimacy of the NCRSS.

Business associations and private sector groups will serve as compliance partners and integrity advocates. Construction and industry associations may support their members in meeting NCRSS requirements, understanding risk indicators, and adopting internal governance reforms to improve their scores. Private sector groups can also collaborate with GPPB-TSO and PhilGEPS in refining scoring metrics, ensuring fairness, and promoting ethical business practices. Their participation helps align industry incentives with transparent and accountable procurement.

Together, these institutions and stakeholder groups create a balanced governance ecosystem for the NCRSS—combining regulatory authority, technical capability, independent oversight, and multi-sectoral participation. This arrangement ensures that the system is feasible, credible, and sustainable within the Philippine procurement landscape.

Technology Stack

The development of the prototype leveraged a streamlined and accessible technology stack to ensure functionality, transparency, and user engagement: *The National Contractor Risk Scoring System*. The front-end interface was implemented using HTML and was hosted and executed via OneCompiler, a web-based integrated development environment that allowed rapid prototyping and testing without dependency on complex server setups. This approach facilitated ease of access for users and rapid iteration during the hackathon process.

The platform integrates multiple functional modules designed to provide actionable insights and support informed decision-making regarding contractor risk management:

1. *Search Bar for Verifying Risk of Contractors* – A user-friendly input interface that allows stakeholders to query contractor information and retrieve a consolidated risk profile.
2. *How NCRSS Works* – An explanatory module presenting the operational framework of the National Contractor Risk Scoring System (NCRSS), including data sources, methodology, and scoring processes.
3. *Why This Matters to You* – Contextual guidance highlighting the relevance of contractor risk assessment for public procurement, transparency, and accountability.
4. *What Does Your Contractor's Score Mean* – A detailed explanation translating numerical risk scores into practical interpretations for end-users.
5. *Risk Indicator Breakdown (The Five Components)* – A structured presentation of the five risk components used in evaluating contractors, enabling stakeholders to identify specific areas of concern.
6. *Public Feedback and Discrepancy Reporting* – A participatory feature allowing users to submit observations, corrections, or feedback, fostering transparency and continuous improvement of the system.

This technology stack prioritizes accessibility, clarity, and responsiveness, ensuring that both technical and non-technical stakeholders can navigate the platform effectively and derive meaningful insights to guide policy decisions.



Figure 2. Search Bar for Verifying Risk of Contractors, How NCRSS Works, and Why This Matters to You

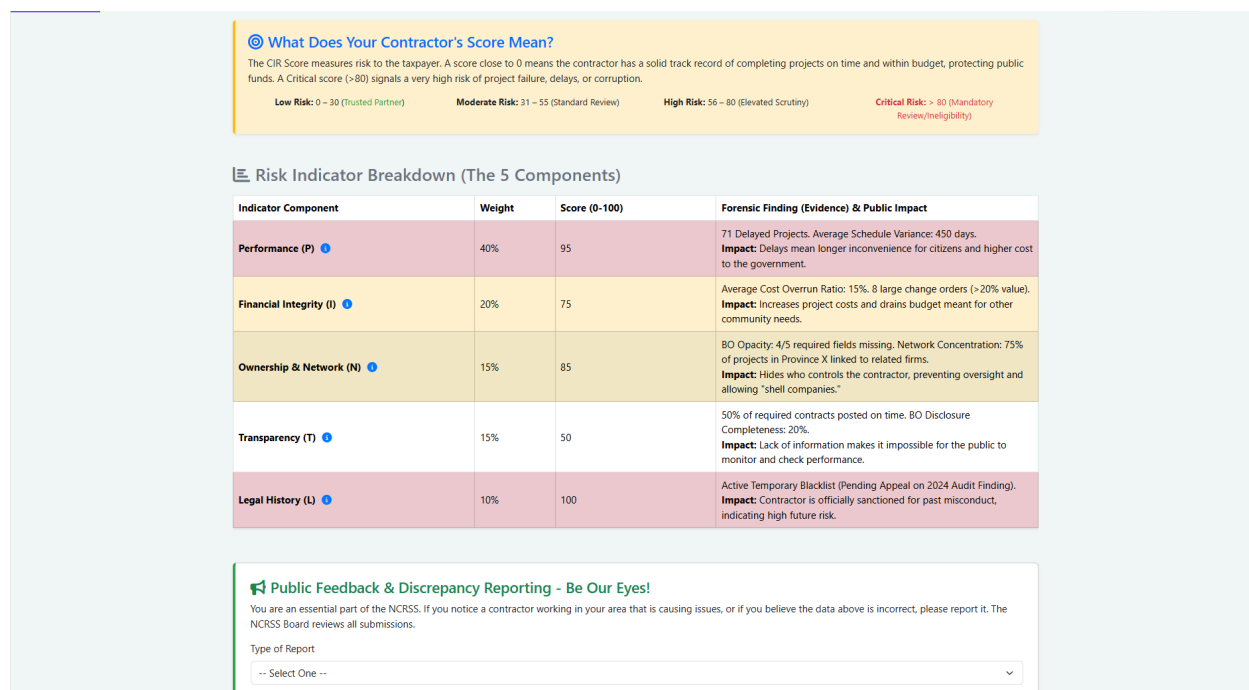


Figure 3. Risk Indicator Breakdown (The Five Components)

Ownership & Network (N) ⓘ	15%	85	BO Opacity: 4/5 required fields missing. Network Concentration: 75% of projects in Province X linked to related firms. Impact: Hides who controls the contractor, preventing oversight and allowing "shell companies."
Transparency (T) ⓘ	15%	50	50% of required contracts posted on time. BO Disclosure Completeness: 20%. Impact: Lack of information makes it impossible for the public to monitor and check performance.
Legal History (L) ⓘ	10%	100	Active Temporary Blacklist (Pending Appeal on 2024 Audit Finding). Impact: Contractor is officially sanctioned for past misconduct, indicating high future risk.

Public Feedback & Discrepancy Reporting - Be Our Eyes!

You are an essential part of the NCRSS. If you notice a contractor working in your area that is causing issues, or if you believe the data above is incorrect, please report it. The NCRSS Board reviews all submissions.

Type of Report
-- Select One --

Details/Evidence (Required)
Provide specific details, dates, and location (e.g., "The contractor on the XYZ Bridge Project in 2023 used substandard materials").

Email (Optional, for follow-up)
youname@example.com

[Submit Report for Review](#)

Verify the Data (Public Transparency)

[View All Project Contracts \(PhilGEPS\)](#) [View Beneficial Ownership Record \(SEC/PhilGEPS\)](#)

Figure 4. Public Feedback and Discrepancy Reporting

Methodology

This study applied a risk-driven data forensics approach to assess systemic weaknesses in public procurement and to determine the operational requirements for the National Contractor Risk Scoring System (NCRSS). The methodology focused on standardizing heterogeneous government datasets, generating objective risk measures, and conducting quantitative tests that isolate structural performance and integrity issues.

Data Sources

The analysis used the following data sets provided:

Data 1: Infrastructure Data

Data 2: Sumbong sa Pangulo - Flood Control

Data 3: COMELEC's Fiscal and Electoral Data from July 2025

Analytical Framework

The research followed a three-pillar Risk-Driven Data Forensics Framework:

1. Feature Engineering and Metric Development

The first phase standardized raw data into measurable risk indicators. Categorical and numerical fields were reformulated into four core NCRSS components—Quality, Performance, Integrity, and Network.

- a. Condition data were converted into ordinal risk scores.
- b. Timeliness variables were transformed into schedule variance metrics.
- c. Cost deviations were computed as overrun ratios.
- d. Contractor linkages were mapped to network concentration indicators.

These formulations established the quantitative basis for subsequent reliability and integrity assessments.

<i>Metric</i>	<i>Formulation</i>	<i>CIR Score Component</i>
Condition Risk Score	Mapped: 'Low' to 1, 'Moderate' to 2, 'High' to 3, 'Critical' to 4	
Schedule Variance	Actual Completion Date - Original Completion Date(in Days)	Performance (P): Core of the Schedule Slippage Index.
Cost Overrun Ratio	$(\text{Actual Cost} - \text{Approved Budget for Contract (ABC)}) / \text{ABC} \times 100$	Integrity (I): Flags financial integrity risk.
Network Concentration	Count of Projects with Inter-Related Contractors/Total Projects	Network (N): The basis for the BO & Collusion Index.

Figure 1. Integrity Metric System

2. Systemic Risk Quantification

The second phase applied descriptive statistics, correlation testing, anomaly detection, and top-group clustering to identify patterns indicative of systemic failure. The procedures included:

- a. Testing relationships across age, condition, delay, and cost metrics.
- b. Detecting statistical outliers in quality, timeliness, and financial performance.
- c. Grouping contractors by frequency and severity of performance deviations.
- d. Assessing concentration levels within contractor networks and local political environments.

These methods enabled the isolation of recurrent, cross-dataset failure points.

3. Cross-Domain Integrity Mapping

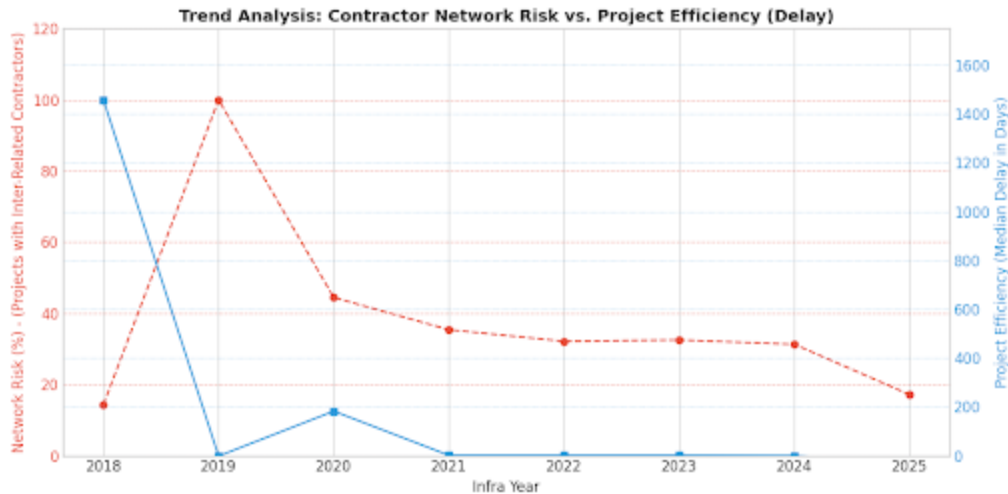
The third phase connected procurement outcomes with network and political concentration indicators. Beneficial ownership linkages, inter-related contractor patterns, and electoral dynamics were cross-referenced using proportional and concentration-ratio techniques. This step provided a consolidated view of vulnerability to collusion, repeat offending, and opaque contracting relationships.

Data Treatment and Validation

Quality checks included standard missing-value treatments, consistency verification across merged datasets, and sensitivity testing on derived metrics. Detailed formulations, classification rules, and statistical outputs are contained in the appendices.

Purpose of the Methodological Approach

This methodology was designed to produce an objective, evidence-driven foundation for evaluating procurement system performance and determining the operational design of the NCRS. It enabled a shift from descriptive reporting toward quantifiable, replicable indicators of quality, accountability, and transparency risks.



Insights and Analyses

Systemic Infrastructure Vulnerabilities

Analysis of infrastructure data reveals that deterioration occurs independently of asset age, indicating that structural failure is embedded within the procurement and construction process rather than arising from natural physical wear. Even infrastructure built after 2010 shows significant vulnerabilities, with forty-five projects classified as poor or bad. This pattern suggests that deficiencies in project planning, execution, and oversight are systemic rather than incidental. Geographic analysis further demonstrates that high-risk infrastructure is localized rather than evenly distributed, with provinces such as Pangasinan exhibiting higher concentrations of vulnerable projects. This highlights the necessity for targeted, region-specific interventions to mitigate systemic risk and improve infrastructure resilience.

Contractor Networks and Concentration Risk

The concentration of contractors with discretionary authority correlates strongly with elevated project risk. Contractors who operate across multiple projects are disproportionately associated with substandard outcomes, demonstrating the potential for collusion and monopolistic practices. Beneficial ownership analysis shows that certain contractors maintain multiple related entities, allowing sanctioned or high-risk individuals to sustain a market presence through shell companies. Cross-referencing contractor networks with political and electoral data indicates that projects in politically dominated regions are often prioritized based on visibility or financial incentives rather than genuine public need. This dynamic amplifies systemic vulnerabilities and contributes to suboptimal governance outcomes.

Anti-Corruption and Governance Implications

The National Contractor Risk Scoring System (NCRSS) introduces mechanisms that directly address corruption risks by linking contractor performance and blacklisting status to individual beneficial owners. By enforcing transparency and penalizing opaque ownership structures, the system diminishes opportunities for evasion and repeated contract awards to high-risk entities. Network concentration analysis further enables procurement agencies to detect clusters of related firms that dominate bidding processes, providing a critical tool to counter rigged bids and suppressed competition. The use of a standardized, objective 0–100 risk score with mandatory thresholds for high-value projects limits discretionary decision-making by procurement officials. By shifting the burden of proof to contractors and ensuring decisions are supported by verifiable data, the system creates a transparent audit trail that deters political influence and favoritism.

Climate and Socioeconomic Consequences

Failures in critical infrastructure, such as flood control structures, represent a form of climate injustice, as corruption directly undermines the nation's capacity to adapt to environmental risks. Each peso lost to misprocurement reduces disaster resilience and endangers lives and livelihoods. Regions dominated by political dynasties are particularly vulnerable, experiencing poor governance outcomes despite high levels of initial infrastructure spending. Projects in these areas are often designed to maximize political gain or kickbacks rather than address genuine public needs, further compounding systemic inefficiencies and societal harm.

Statistical Patterns and Cross-Domain Insights

Quantitative analysis highlights that systemic failures are concentrated rather than random. Projects exhibiting poor quality, repeated delays, or financial irregularities are often associated with contractors who show extreme deviations in one or more risk indicators. Network and cross-domain mapping demonstrate that vulnerabilities are amplified by interdependencies between performance, integrity, and contractor concentration. Beneficial ownership linkages and political affiliations further compound these risks. This evidence underscores the need for multidimensional monitoring that captures operational, structural, and governance-related vulnerabilities across projects.

Operational and Strategic Implications for the NCRSS

The NCRSS provides a centralized, evidence-based source of truth by integrating previously siloed datasets, including CPES, PhilGEPS, blacklisting records, and COA audits. This integration enhances transparency and enables agencies to make informed, data-driven decisions. By standardizing contractor evaluations and incorporating automated risk scoring, the system reduces discretionary bias and provides early warning signals to prevent delays, cost overruns, and poor project execution. Operationally, NCRSS improves fiscal efficiency by avoiding contractors with histories of underperformance and enabling more strategic resource allocation. Its public-facing portal strengthens social accountability, allowing civil society, media, and citizens to monitor procurement performance. Multi-stakeholder governance ensures balanced oversight, mitigates regulatory capture, and fosters compliance through industry engagement and independent monitoring.

Strategically, the NCRSS represents a shift from reactive to preventive governance. By assessing contractor risk prior to project awards, the system minimizes opportunities for corruption, reduces project failures, and promotes efficient use of public funds. Its scalable design allows for pilot implementation in select agencies or project types, such as DPWH flood control infrastructure, with potential for nationwide adoption. Aggregated data from the system can guide broader procurement reforms, inform budget allocation decisions, and support evidence-based policymaking, creating a continuous cycle of improved transparency, accountability, and governance outcomes.

The evidence indicates that infrastructure risk is systemic, concentrated among specific contractors and regions, and exacerbated by political influence and opaque ownership structures. Quantitative risk scoring and network analysis provide actionable tools for policymakers to identify high-risk contractors, mitigate collusion, and enforce accountability. By linking operational performance with governance indicators and anti-corruption measures, the NCRSS enables targeted interventions, preventive governance, and strategic reform. This integrated approach ensures that procurement decisions are both data-driven and aligned with public

interest, while reinforcing transparency, ethical standards, and resilience in critical infrastructure systems.

Setup and Installation Guide

The National Contractor Risk Scoring System (NCRSS) is designed for immediate deployment with minimal technical requirements. Users can access and install the system via a single web-based link: <https://tinyurl.com/NCRSS-NCPAG>

Installation Process:

1. *Access the Link* – Open the URL in any standard web browser. The platform is fully compatible with modern browsers and requires no additional software.
2. *Load the System* – Upon opening the link, the NCRSS interface will load automatically. No local server setup or configuration is required.
3. *Navigate Modules* – Users can immediately interact with all platform components, including contractor search, risk scoring, indicator breakdowns, and feedback submission.
4. *System Readiness* – The platform is fully operational upon access, ensuring immediate usability for both policy stakeholders and technical users.

This setup procedure emphasizes simplicity and accessibility, ensuring that public procurement officers, contractors, and other relevant stakeholders can engage with the system efficiently and without technical barriers.

Data Sources

Department of Public Works and Highways. (n.d.). *About DPWH*.
<https://www.dpwh.gov.ph/dpwh/content/about-dpwh>