Digital Transformation and Artificial Intelligence

Navigating Uncertainty: Building Resilience and Strengthening Reform Initiatives in Public Financial Management

1ST PAGBA SEMINAR CUM CONVENTION · SMX CONVENTION CENTER, BACOLOD CITY · MARCH 25–28, 2026

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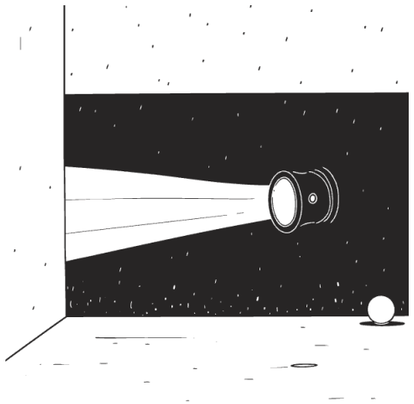
OPENING

Why This Matters: Attention Is Control

Every peso leaves a trace. That trace records **who approved**, what rule justified the action, and what evidence supported it.

AI does not replace your authority. It changes **what you see first**—and what you might miss.



In public financial management, **attention is control**. When a system decides which transactions deserve scrutiny, that shift has governance consequences.

CONCEPTUAL FOUNDATIONS

Three Levels of Digital Change

Under **Republic Act No. 12254 (E-Governance Act)**, these are distinct—and the difference matters for control.

1

Digitization

Converting paper records into digital form. Control is unchanged.

2

Digitalization

Improving workflows using technology. Processes improve.

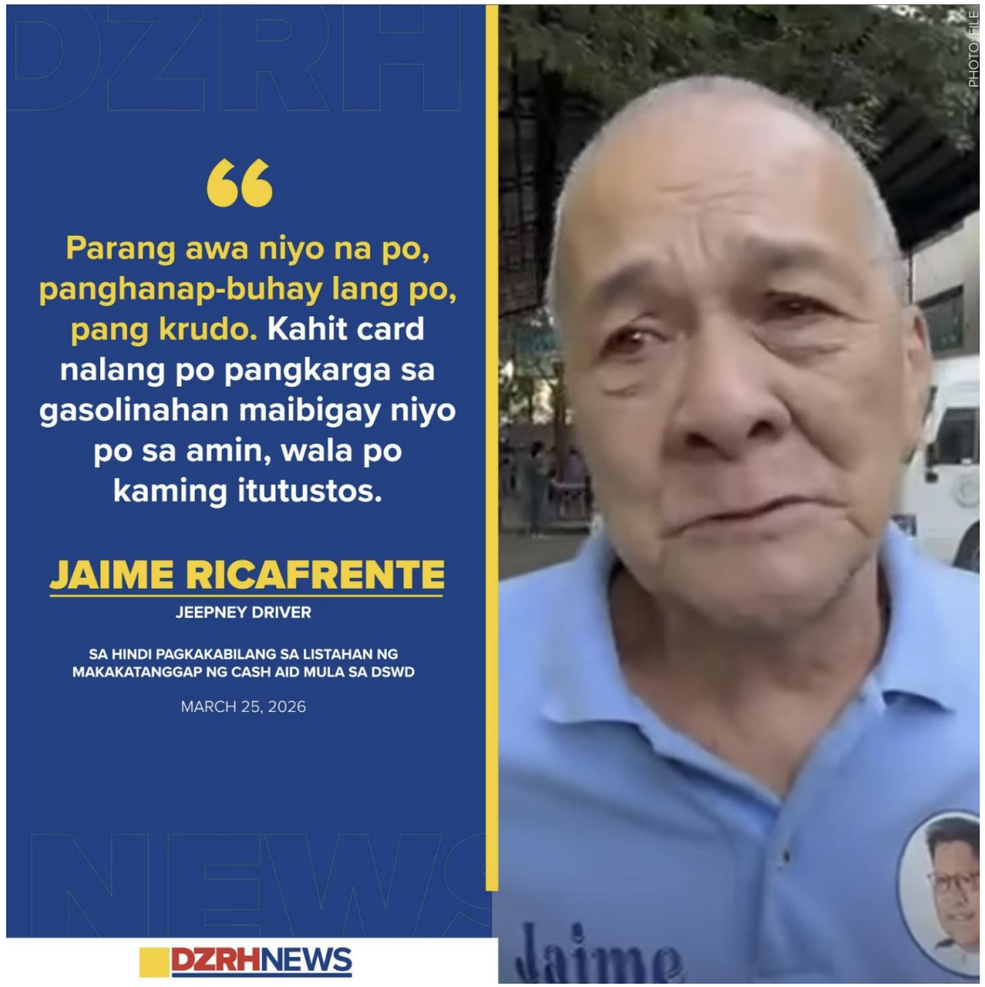
3

Digital Transformation

Restructuring how work and **control** operate. This changes accountability.

If your agency encodes vouchers *after* disbursement, you achieved only digitization—not transformation.

Digital Transformation



AI FUNDAMENTALS

AI in Simple Terms

Artificial Intelligence (AI) isn't magic, but a set of technologies designed to simulate human-like intelligence for specific tasks. It empowers machines to perceive, reason, learn, and act.

Learning from Data

AI systems can analyze vast amounts of information to identify patterns, make predictions, and continuously refine their understanding.

Pattern Recognition

They excel at spotting anomalies, trends, or relationships within complex data that might be invisible or too time-consuming for humans.

Automated Insights

AI can automate repetitive analytical tasks, generate reports, and provide data-driven recommendations to support human decision-making.

AI TYPES IN PFM

AI in Public Financial Management

Artificial Intelligence in PFM is about practical tools to enhance efficiency, accuracy, and oversight in public finance.

Data-Driven Insights

Algorithms process massive datasets to identify patterns, predict budget variances, and uncover hidden risks.

Automated Efficiency

AI automates repetitive tasks like data reconciliation, report generation, and initial transaction screening, improving speed and reducing human error.

Enhanced Decision Support

By providing predictive analytics and flagging anomalies, AI empowers PFM professionals with better information for strategic choices and compliance.

CONCEPTUAL FOUNDATIONS

AI Types in PFM

You do not need complex theory. You need mapping.

Machine Learning

Detects anomalies, predicts patterns in transaction data.

Predictive Analytics

Forecasts spending trends and fiscal risks.

Generative AI

Drafts narratives, summaries, and audit reports.

RPA

Automates repetitive encoding and reconciliation tasks.

Key principle: AI suggests. **You decide.**

PMI Dashboard

AI USE CASES

Long-Hanging Fruit: Immediate AI Wins

AI adoption doesn't always require massive overhauls. Here are practical use cases that deliver quick value in PFM offices.

Automated Document Intake

AI can classify and route incoming financial documents (invoices, receipts, contracts) to the correct department or process queue, reducing manual sorting and speeding up initial processing.

Policy Compliance Checks

Algorithms can quickly scan expense reports or procurement requests against established PFM policies and flag potential non-compliance or missing information for human review, ensuring adherence to regulations.

Routine Report Generation

Generative AI can draft standardized financial summaries, budget status updates, or routine audit findings by aggregating data from various systems, freeing up staff for more analytical tasks.

Intelligent Data Query

Staff can use natural language to query historical financial data, quickly retrieving specific budget lines, past procurement records, or audit trails without needing complex database searches.

Forensic Audit Report on DPWH Flood Control Projects

Uncovering patterns of inefficiency and potential corruption in flood control infrastructure spending

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Dataset Overview

Data Source

Sumbong sa Pangulo - Flood Control Projects (Excel dataset)

Total Projects

9,000+ projects analyzed across multiple regions and timeframes

Key Fields

Project title, region, province, contractor, contract cost, duration, start and end dates

Timeframe

Projects from 2018 onwards, covering recent DPWH infrastructure activity

Project Categorization

To decode the massive dataset, we categorized the projects based on keywords in their titles. The aim was to determine if certain types of projects are more vulnerable to manipulation than others.

Flood Mitigation

4,861 projects - The largest category, representing core flood prevention infrastructure

Multi-purpose / Other

1,812 projects - Broad category with potential for misclassification

Drainage System

998 projects - Urban water management infrastructure

Slope Protection

878 projects - Landslide and erosion prevention structures

Geographic Distribution Analysis

Regional Trends

A regional breakdown revealed concentration in key areas that raise questions about allocation priorities:

Region III (Central Luzon)

Highest concentration of projects, accounting for significant portion of national total

Region VI (Western Visayas)

Second highest allocation, raising questions about geographic equity

Region IX (Zamboanga Peninsula)

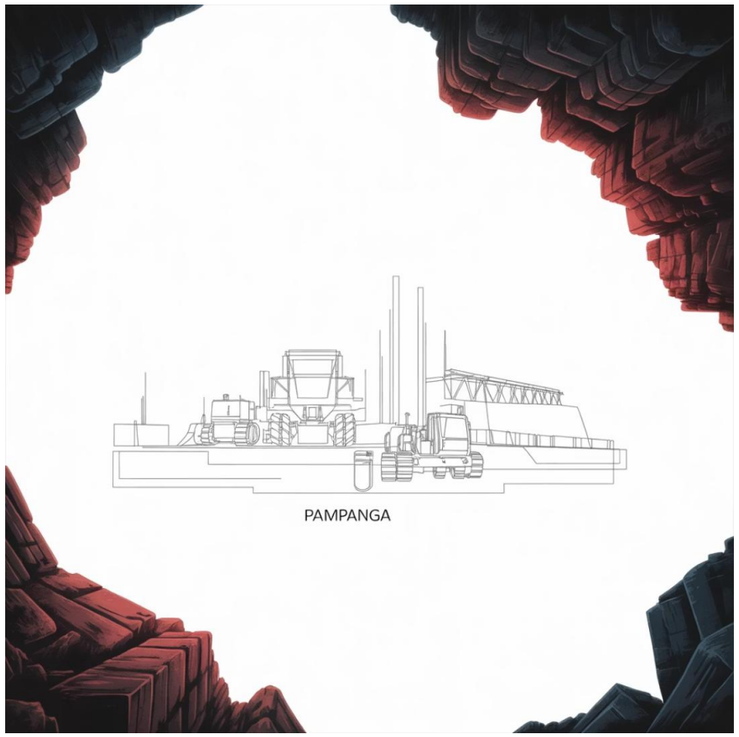
Substantial project clustering in politically strategic area

These regions alone accounted for a significant portion of the national total. This raises a key question: Are these areas truly the most flood-prone—or the most politically strategic?

Provincial Concentration

On a provincial level, project clustering is even more concerning. Three provinces consistently appear at the top of allocation lists:

Pampanga



Highest provincial allocation with repeated contractor appearances

Iloilo

Significant clustering of similar project types and costs

Zamboanga del Sur

Outsized allocation relative to population and documented flood risk

These provinces consistently appear at the top of the list—suggesting either an outsized need or potential misuse of infrastructure allocation.

Anomaly Detection: Overpriced Projects

We used statistical z-score methods to detect outliers in project cost within each category. The results were eye-opening:

₱289.5M

Drainage Projects

Butuan City project with Z-score of 7.4 - far above normal range

₱289.5M

River Floodways

Tarlac project with Z-score of 6.2 - statistically abnormal

7.4

Highest Z-Score

Several standard deviations above category average

These values are several standard deviations above their category averages, indicating highly abnormal cost structures that warrant immediate investigation.

Cost-per-Day Outliers

Next, we calculated cost per day by dividing contract cost by project duration. This revealed how much was being spent on a daily basis—exposing cases of extreme financial intensity:

Siffu River (Isabela)

₱4.59 million/day with Z-score of 17.5 - the most extreme outlier detected

Nueva Vizcaya Drainage

₱2.36 million/day with Z-score of 12.9 - far beyond normal spending rates

La Union Flood Control

₱3.43 million/day each - multiple projects with identical suspicious rates

If building infrastructure is about value over time, these projects defy logic and demand immediate scrutiny.

INSTITUTIONAL CONTEXT

Philippine Legal & Institutional Framework

Your work is shaped by mandates, not preferences. These agencies define who controls each part of the data pipeline.

DBM

Budget execution systems, BTMS

DOF

Reform direction, fiscal policy

COA

Audit standards, accountability

DICT

Interoperability, digital infrastructure

NPC

Data Privacy Act of 2012

GPPB

New Government Procurement Act

ENABLING INFRASTRUCTURE

PFM Reforms & BTMS as the Foundation

PFM Reforms Roadmap 2024–2028

Systems must link through **APIs**. Transaction data must flow across agencies. Interoperability is not optional—it is the precondition for AI to function.

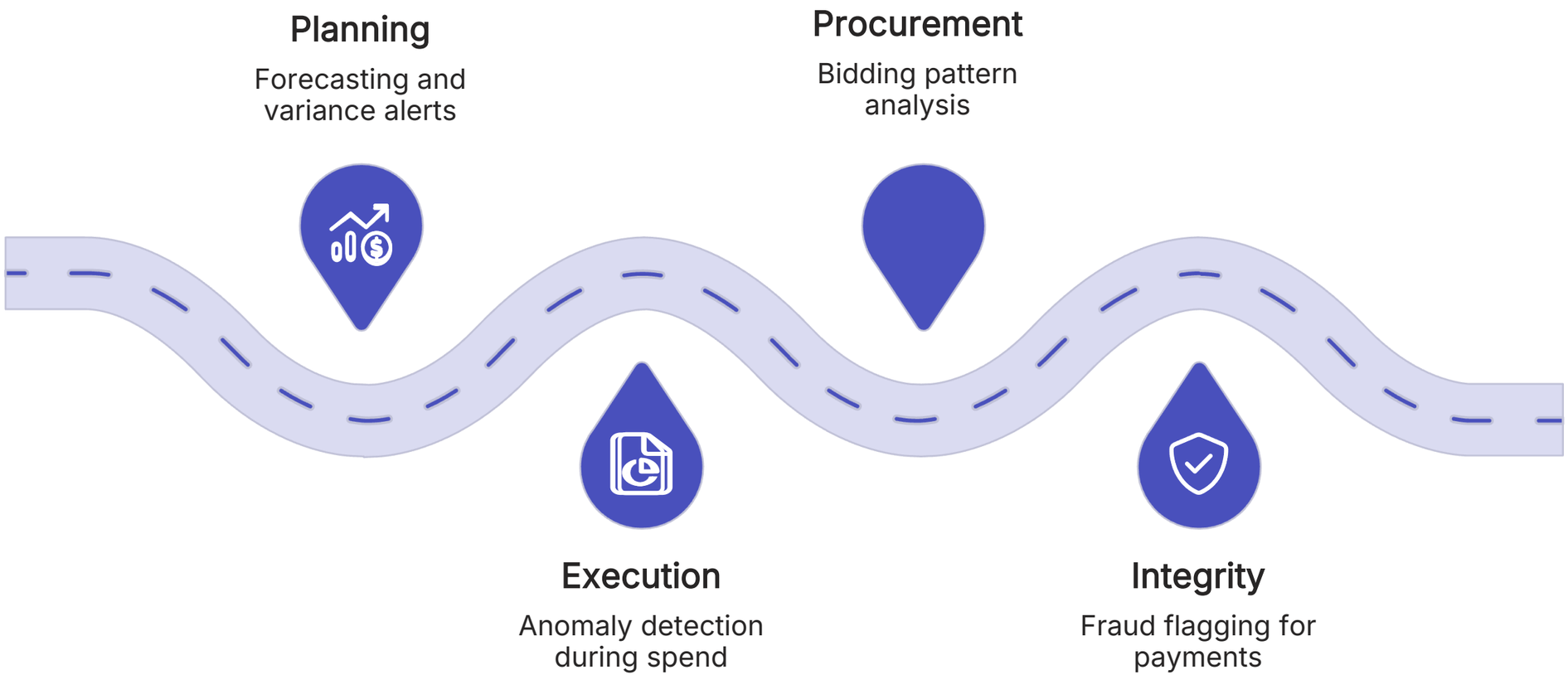
BTMS as the Core System

The Budget and Treasury Management System captures the full transaction path: request → obligation → disbursement → audit trail.

Without complete, standardized, interoperable data in BTMS, AI produces **noise, not insight**.

AI ACROSS THE BUDGET CYCLE

Where AI Fits in PFM



AI does not operate outside the budget cycle. It is a decision-support layer applied at each phase—always subject to human review and institutional accountability.

USE CASE 1

Budget Planning & Forecasting

Data Input

Historical obligations and disbursements from BTMS

AI Output

Projected spending deviations and variance alerts

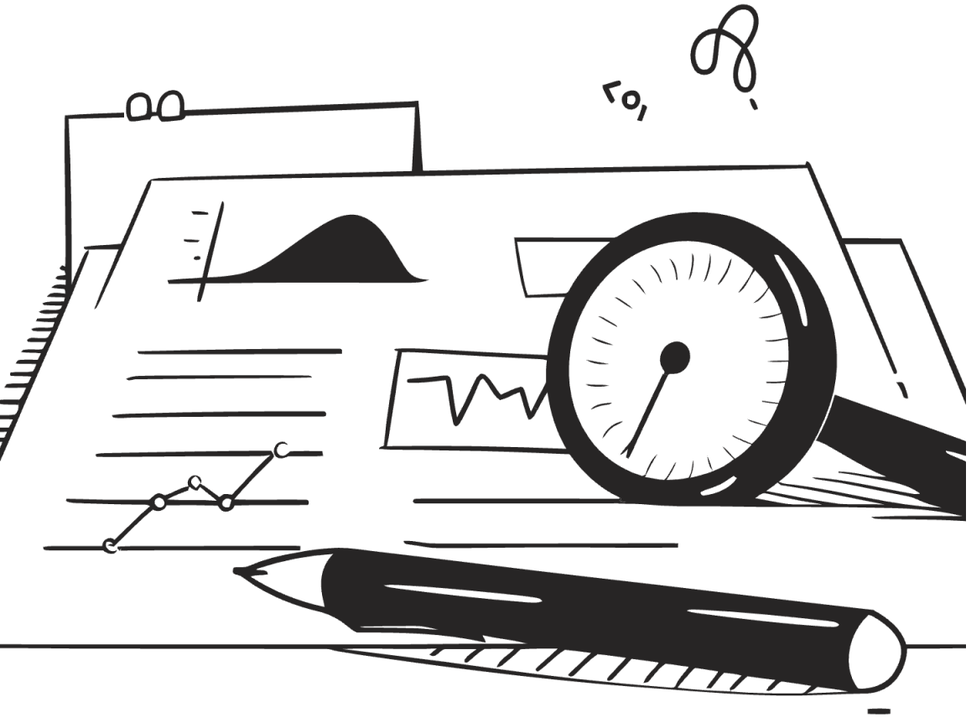
What You Gain

Early signals for budget realignment decisions

Key Risk

Overreliance on model output; model drift over time

You gain **early signals**. You do not gain certainty. The approving officer remains accountable for all budget decisions.



USE CASE 2

Procurement Anomaly Detection

What AI Detects

Unusual bidding patterns, repeated winners, abnormal pricing, contract amendments, identical pricing across suppliers.

Output

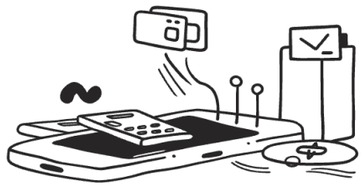
Risk scores per contract or supplier. AI **prioritizes scrutiny**—it does not cancel contracts.

Key Risk

Bias against small vendors or regional suppliers. Flag patterns must be reviewed for structural inequity.

USE CASE 3

Payment Integrity & Fraud Detection



How It Works

AI scans payment logs for duplicate payments, unusual transaction timing, and inconsistent beneficiary data. Flagged items enter a **review queue**—not automatic rejection.

Data

Payment logs, beneficiary records

Risk

Delayed legitimate payments; due process obligations

USE CASE 4

Audit Analytics & Risk-Based Review

AI shifts audit strategy from **random sampling** to **high-risk cluster prioritization**.

1 Traditional Audit

Random sample selection; uniform coverage across transactions

2 AI-Assisted Triage

Transactions ranked by risk score; high-risk clusters reviewed first

3 Auditor Review

Human judgment applied to flagged items; findings documented

4 Accountability

Audit conclusions remain the auditor's responsibility—not the model's

Critical question: Does risk-based AI coverage create blind spots in areas the model consistently deprioritizes?

DATA INFRASTRUCTURE

Data & Interoperability Constraints

Common Realities in Philippine Agencies

- Duplicate supplier records across systems
- Inconsistent account coding and classification
- Disconnected systems with no API linkage
- Vouchers encoded after disbursement

The Core Constraint

AI fails where data fails.

Without complete, standardized, interoperable transaction data, AI produces noise—not insight.

The PFM Roadmap 2024–2028 mandates API linkage and cross-agency data flow. This is the prerequisite, not the outcome.

RISKS & GOVERNANCE

Risks, Ethics & Legal Constraints

False Positives

Legitimate transactions flagged. Who answers to the supplier? Who authorizes delay?

Bias

Certain vendors or regions flagged more often. Is that risk—or structural discrimination?

Accountability Gap

If AI influences your decision, who is responsible for the outcome?

Legal Constraints

Data Privacy Act of 2012 limits data use. New Government Procurement Act requires transparency and explainability.

AI must remain **auditable, explainable, and contestable** under Philippine law.

IMPLEMENTATION

Implementation Roadmap

Start with discipline, not ambition.

Step 1: Diagnose Data

Are records complete? Are identifiers consistent across systems?

Step 2: Select One Use Case

Procurement anomaly detection or payment duplication—not both.

Step 3: Build Governance

Define data ownership. Set review protocols and accountability chains.

Step 4: Pilot

Limited scope. Human-in-the-loop. No full automation at launch.

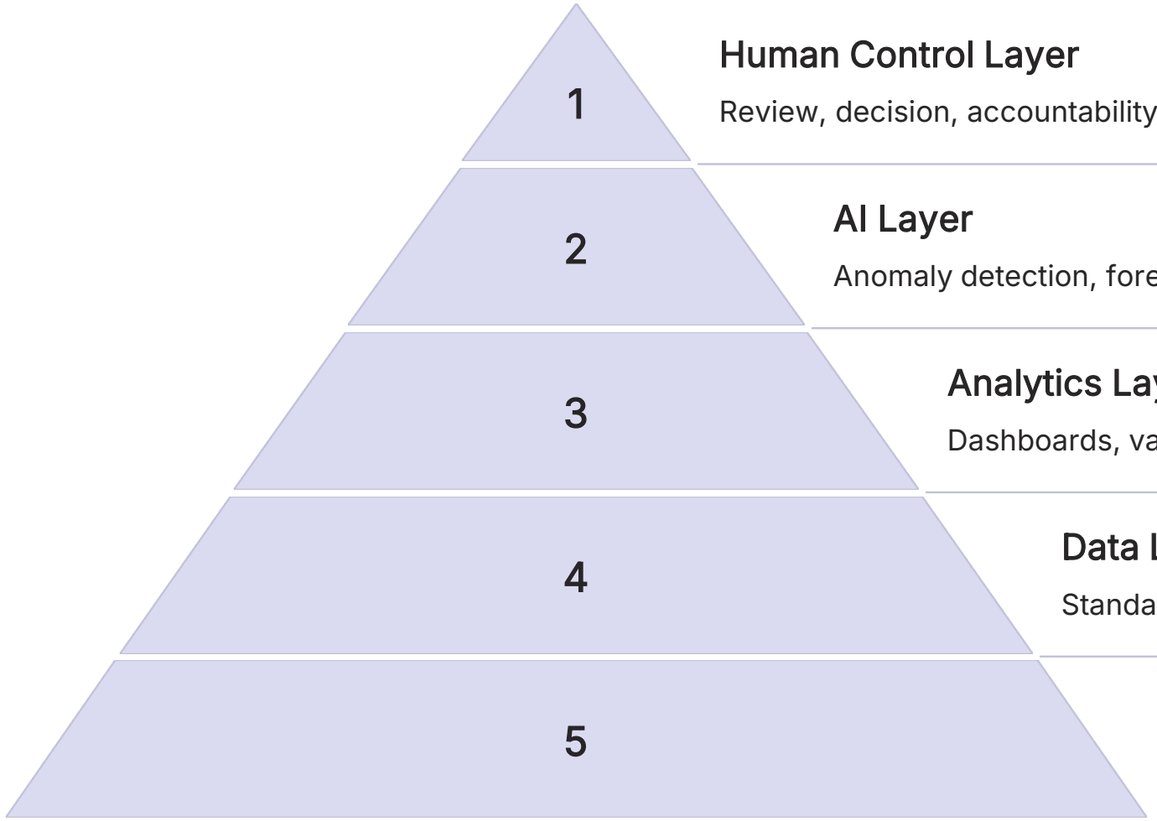
Step 5: Measure

Track error rates, time saved, audit findings. If it fails, stop. If it works, scale.

CONCEPTUAL FRAMEWORK

PFM AI Stack Model

Six layers—failure occurs when the data layer is weak or governance is unclear.



Human Control Layer

Review, decision, accountability

AI Layer

Anomaly detection, forecasting, prioritization

Analytics Layer

Dashboards, variance reports, risk scores

Data Layer

Standardized, interoperable transaction records

Transaction Systems

BTMS, procurement systems, payment platforms

The base layer is **Legal / Policy**: RA 12254, Data Privacy Act, New Government Procurement Act, PFM Roadmap 2024–2028. All layers rest on this foundation.

CASE DISCUSSION 1

Procurement Risk Flag

The Scenario

AI flags a contract. A supplier appears across multiple awards with identical pricing patterns. The system assigns a high risk score and routes the contract to your review queue.

The Decision

Do you **proceed** with payment or **investigate** further? What evidence do you require before action?

If you act

On what documented basis?

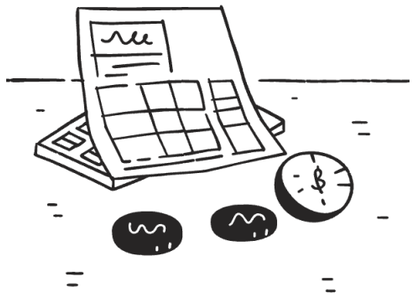
If you delay

Who bears the consequence?

Critical Analysis: AI impact is often overstated. Clean data is required but often absent. There is real risk of automation bias—acting on a flag without independent verification.

CASE DISCUSSION 2

Forecast Failure & Accountability



The Scenario

AI underestimates agency spending by a significant margin. Budget realignment is delayed. Obligations exceed allotments in Q3.

The Question

Who is accountable—**the model** or the **approving officer** who relied on it?

> Evaluation metrics matter: track **data completeness rate**, **duplicate vendor rate**, **false positive rate**, and **audit findings reduction**. Weak metrics hide weak models.

The Central Claim

> AI does not transform public finance. Data, systems, and governance do. AI only amplifies what already works—or fails.

01

Does AI become part of internal control?

If a system determines which transactions receive scrutiny, it is part of your control environment.

02

Who answers for AI-driven errors?

Accountability cannot be delegated to an algorithm under Philippine law.

03

Should interoperability come first?

Without clean, linked data, AI produces noise. Fix the foundation before deploying the tool.

PAGBA PROFESSIONAL LECTURE SERIES

AI IN PUBLIC FINANCIAL MANAGEMENT