Administrative Process Optimization for Integrated Electrical Compliance and Asset Management in a PEZA Design-and-Build Project

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ABSTRACT

This study examines the administrative processes during the turnover of government infrastructure projects at the Philippine Economic Zone Authority (PEZA). It focuses on how Electrical Compliance requirements and Asset Management data are managed and combined in a Design-and-Build project. The study evaluates inter-team coordination, specifically between compliance processes under the Office of the Building Official (OBO) and the preparation of technical asset data for systems such as the Computerized Maintenance Management System (CMMS). Key dimensions evaluated include documentation accuracy, submission timelines, data validation, inter-unit communication, and overall facility turnover readiness. Furthermore, the study compares current practices with a proposed Integrated Administrative Framework.

Salient findings reveal that delays in project turnover are primarily driven by scattered documentation, a lack of standardized formats, weak coordination among technical teams, and inconsistent asset data verification. Because these workflows operate in silos, projects frequently result in incomplete technical records, delayed issuance of the Certificate of Final Electrical Inspection (CFEI), and facilities that are not operationally ready upon handover.

Statistical analysis demonstrates a strong positive correlation (correlation coefficient (r)= 0.82, probability value (p) = 0.001) between integrated administrative processing and facility turnover efficiency, as well as a strong positive correlation (correlation coefficient (r)= 0.76, probability value (p)= 0.003) with post-construction maintenance readiness. The study concludes that combining Electrical Compliance and Asset Management into a unified system significantly improves efficiency, document accuracy, and administrative coordination. The proposed Integrated Administrative Framework offers a structured operational mechanism to ensure complete asset records, expedite regulatory clearances, and support long-term infrastructure sustainability.

Keywords: electrical compliance, asset management, project turnover, integrated administrative framework, public administration, statistical method, Lapu-Lapu City, Cebu, PH

INTRODUCTION

Government agencies are increasingly expected to uphold high standards of transparency, efficiency, and accountability in managing capital infrastructure projects. For the Philippine Economic Zone Authority (PEZA), which plays a vital role in national economic development, achieving public accountability requires not only completing physical structures but also ensuring seamless administrative handover from construction to actual operation. Public infrastructure literature highlights that administrative deficiencies—such as fragmented documentation, communication gaps between regulatory and facility management units, and incomplete data submission—frequently cause operational delays and compromise asset longevity.

In contemporary public capital projects, regulatory compliance and asset management are typically treated as isolated workflows. The Electrical Compliance process, administered by PEZA acting as the Office of the

Building Official (OBO) pursuant to Presidential Decree (PD) No. 1096, otherwise known as the National Building Code of the Philippines, and the New Electrical Engineering Law (RA 7920), operates independently of the Asset Management onboarding process required for Computerized Maintenance Management Systems (CMMS). This disconnect causes administrative bottlenecks, delayed issuance of the Certificate of Final Elec-

trical Inspection (CFEI), unverified equipment specifications, and missing technical manuals. When facility management teams receive incomplete asset data at turnover, post-construction maintenance becomes reactive and costly, leading to premature asset degradation. Contemporary infrastructure governance increasingly emphasizes structured data exchange protocols to bridge the gap between construction completion and facility management. International standards such as ISO 55000 for asset management and COBie (Construction-Operations Building information exchange) establish benchmarks for capturing asset attributes during project handover. Within public sector frameworks, however, integrating these standards with regulatory enforcement—such as electrical compliance inspections—remains underexplored, providing the motivation for this study.

This research addresses this gap by analyzing administrative workflows in PEZA capital projects for the year 2026 and onwards. The conceptual foundation integrates four distinct perspectives:

1. **New Public Management (NPM):** Focuses on administrative efficiency, performance measurement, output orientation, and public sector modernization (Hood, 1991).

2. **Life-Cycle Costing (LCC) Theory:** Asserts that total asset cost encompasses design, construction, operation, maintenance, and disposal. LCC provides the fiscal justification for early maintenance data capture to optimize long-term asset utility (Woodward, 1997).

3. **Regulatory Compliance Theory:** Examines rule-based enforcement, non-discretionary control checks, and evidence-based verification under the Philippine Electrical Code (Gunningham & Grabosky, 1998).

4. **Republic Act 9184 (Government Procurement Reform Act):** Mandates legal rigor, transparency, and complete contractual fulfillment in Design-and-Build public procurement (Official Gazette, 2003).

This study directly aligns with several United Nations Sustainable Development Goals (SDGs): **SDG 9** (Industry, Innovation, and Infrastructure) by promoting standardized, digital infrastructure management; **SDG 12** (Responsible Consumption and Production) by optimizing long-term public asset utilization; and **SDG 16** (Peace, Justice, and Strong Institutions) by enhancing administrative transparency and governance accountability.

METHODOLOGY

Research Design

This study utilized a descriptive-correlational quantitative research design supported by supplementary qualitative administrative document audits. The quantitative component evaluated indicators of administrative efficiency (NPM), asset data completeness (LCC), and compliance enforcement (Regulatory Compliance Theory). The qualitative component explored operational bottlenecks and structural gaps across administrative units.

Environment and Respondents

The study was conducted at the PEZA Mactan Office in Lapu-Lapu City, Cebu, a critical administrative and technical hub overseeing economic zones across the Visayas, Mindanao, and Palawan regions.

The study involved a total of thirty target respondents ($n = 30$) selected via purposive sampling, representing both public administration and private sector execution perspectives:

- **PEZA Personnel ($n = 20$):**

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  - Engineers / Compliance Officers (OBO functions): n = 8 (40%)
  - Project Managers / Administrative Staff: n = 8 (40%)
  - Officers / Key Management: n = 4 (20%)
- **Private Sector Stakeholders (n = 10):**
  - Contractor Project Managers: n = 5 (50%)
  - Locator Technical Representatives / Professional Electrical Engineers: n = 5 (50%)

Data Collection Instruments and Procedures

Data were gathered using structured survey questionnaires and semi-structured interview guides adapted and modified for PEZA's technical and administrative context:

- **Part I:** Measured Administrative Efficiency (NPM) and Regulatory Rigor under the Philippine Electrical Code (PEC).
- **Part II:** Evaluated Asset Data Handover completeness for CMMS integration (LCC Theory) and contractual compliance under RA 9184.
- **Part III:** Semi-structured qualitative interviews with key managerial and technical personnel to triangulate survey findings.

The survey instrument underwent content validation through expert administrative review by institutional advisers, yielding a high internal consistency reliability coefficient (Cronbach's $\alpha > 0.85$). Sample survey items are available upon request.

Statistical Analysis and Scoring

Collected data were validated, tabulated, and analyzed using the following statistical measures:

1. **Percentage and Frequency Distribution:** To profile respondent distributions.
2. **Weighted Mean:** To evaluate administrative efficiency, compliance rigor, and asset management readiness.
3. **Pearson's r Correlation:** To determine the strength and direction of relationships between administrative processing integration and post-turnover facility maintenance readiness.

Data analysis reflects aggregate group responses from PEZA personnel ($n = 20$) and private-sector stakeholders ($n = 10$). Weighted composite means were utilized to account for group size differences, with bivariate linear associations assessed via Pearson's correlation. Composite variables were formulated by averaging mean scores across related survey indicators. Pearson's correlation coefficient (r) was applied as a parametric approximation for ordinal Likert responses, consistent with standard public administration evaluative research.

Indicators were evaluated using a 5-point Likert scale with corresponding verbal interpretations:

- 4.21 - 5.00: Strictly / Adequately Observed and Implemented
- 3.41 - 4.20: Adequately Observed / Implemented
- 2.61 - 3.40: Sometimes Observed and Implemented

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- 1.81 - 2.60: Hardly Observed and Implemented
- 1.00 - 1.80: Never Observed and Implemented

To account for sample size differences between PEZA personnel (n = 20) and private-sector stakeholders (n = 10), weighted composite means were applied across all evaluative tables. Pearson's correlation coefficient was utilized to measure the strength of linear association between ordinal-approximated variables.

RESULTS

1. Status of Project Documentation and Compliance Profile

The evaluation of general project documentation yields an overall mean of 2.67 (*Sometimes Observed and Implemented*), reflecting fragmented, unstandardized record-keeping during project closure.

Indicators	Mean	Verbal Description
1. Completeness of "As-Built" Plans and Drawings	3.25	Sometimes Observed and Implemented
2. Timeliness of Electrical Permit Submissions	2.8	Sometimes Observed and Implemented
3. Availability of Equipment Technical Manuals	2.45	Hardly Observed and Implemented
4. Verification of Contractor Compliance Certificates	3.1	Sometimes Observed and Implemented
5. Centralized Digital Storage of Project Files	1.75	Never Observed and Implemented
Overall Mean	**2.67**	**Sometimes Observed and Implemented**

(Table 1)

2. Assessment of Electrical Compliance Requirements (OBO Function)

Evaluation of electrical compliance processing reveals an overall mean of 3.15 (*Sometimes Observed*). While physical inspections maintain high technical rigor (4.20), administrative document processing and CFEI approval speeds remain major bottlenecks (2.05).

Indicators	PEZA (n=20)	Private (n=10)	Overall Mean	Verbal Description
1. Clarity of OBO permit requirements	3.5	3.2	3.35	Sometimes Observed
2. Speed of CFEI processing	2.1	2	2.05	Hardly Observed
3. Rigor of technical inspections	4.3	4.1	4.2	Adequately Observed
4. Document verification process	3.1	2.9	3	Sometimes Observed
Overall Mean	**3.25**	**3.05**	**3.15**	**Sometimes Observed**

(Table 2)

3. Level of Asset Management Data Collection Readiness (CMMS Readiness)

Asset management readiness scores an overall mean of 2.39 (*Hardly Observed*), demonstrating that facility technical data are rarely captured in a structured format suitable for post-construction maintenance operations.

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Indicators	PEZA (n=20)	Private (n=10)	Overall Mean	Verbal Description
1. Availability of Asset Tags and Coding	2.4	2.5	2.45	Hardly Observed
2. Standardization of Equipment Data Sheets	2.2	2.1	2.15	Hardly Observed
3. Submission of Preventive Maintenance Schedules	2.8	3.1	2.95	Sometimes Observed
4. Integration of Warranty and Spare Parts Info	1.9	2.1	2	Hardly Observed
Overall Mean	**2.33**	**2.45**	**2.39**	**Hardly Observed**

(Table 3)

4. Perception of Administrative Coordination Gaps

Administrative coordination across departments receives an overall mean of 2.34 (*Hardly Observed*), pointing to significant inter-departmental communication barriers and inconsistent feedback.

Indicators	PEZA (n=20)	Private (n=10)	Overall Mean	Verbal Description
1. Inter-departmental communication flow	2.55	2.3	2.43	Hardly Observed
2. Consistency of feedback from OBO to Contractors	2.15	1.8	1.98	Hardly Observed
3. Clarity of administrative roles in turnover	2.9	2.6	2.75	Sometimes Observed
4. Responsiveness to documentation revisions	2.4	2	2.2	Hardly Observed
Overall Mean	**2.5**	**2.18**	**2.34**	**Hardly Observed**

(Table 4)

5. Compliance and Asset Gate Review Assessment

The current gate review process scores an overall mean of 2.75 (*Sometimes Observed*). While technical compliance verification is strong (4.05), final asset audits (2.20) and facility end-user participation (1.90) are severely deficient.

Indicators	PEZA (n=20)	Private (n=10)	Overall Mean	Verbal Description
1. Presence of a formal turnover checklist	3.1	2.6	2.85	Sometimes Observed
2. Verification of PEC compliance during review	4.25	3.85	4.05	Adequately Observed
3. Final audit of technical asset data	2.3	2.1	2.2	Hardly Observed
4. Participation of maintenance end-users	1.85	1.95	1.9	Hardly Observed
Overall Mean	**2.88**	**2.63**	**2.75**	**Sometimes Observed**

(Table 5)

6. Perceived Effectiveness of Standardized Digital Templates

Stakeholders express strong support for standardized digital tools, yielding an overall mean of 4.00 (*Adequately Observed*). Historical data accessibility received the highest rating (4.25).

Indicators	PEZA (n=20)	Private (n=10)	Overall Mean	Verbal Description
1. Reduction in manual encoding errors	4.1	3.9	4	Adequately Observed
2. Accessibility of historical project data	4.35	4.15	4.25	Strictly Observed
3. Uniformity of technical asset reports	4.2	4	4.1	Adequately Observed
4. Integration with existing PEZA systems	3.8	3.5	3.65	Adequately Observed
Overall Mean	**4.11**	**3.89**	**4**	**Adequately Observed**

(Table 6)

7. Inferential Analysis: Correlation Findings

Inferential testing using Pearson's r confirms statistically significant relationships between administrative integration, turnover speed, maintenance readiness, and documentation quality.

Variables	Pearson's r	p-value	Interpretation
Integrated Admin Processing vs. Facility Turnover Efficiency	0.82	0.001	Strong Positive Correlation
Integrated Admin Processing vs. Maintenance Readiness (CMMS)	0.76	0.003	Strong Positive Correlation
Compliance Rigor vs. Documentation Completeness	0.68	0.005	Moderate Positive Correlation

(Table 7)

DISCUSSION

Interpretation of Synthesis

The empirical findings reveal a structural disconnect in how PEZA handles capital project handovers. The low score for centralized digital storage (1.75) and equipment technical manuals (2.45) directly causes turnover delays and creates a "Systemic Information Void." When physical structures are completed without digital asset data, facilities enter service without technical documentation. Maintenance personnel are forced to manually reconstruct asset inventories, delaying preventive maintenance and compromising long-term life-cycle management.

The quantitative findings expose operational silos within the administration. The Office of the Building Official (OBO) enforces safety codes strictly (4.20), but administrative processing times remain slow (2.05). Inter-departmental coordination is rated low (2.34), driven by inconsistent feedback (1.98) and slow document revisions (2.20). Furthermore, maintenance end-users are rarely included in pre-turnover reviews (1.90). This

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demonstrates that PEZA's legacy administrative process treats regulatory compliance and asset management as separate activities rather than unified deliverables.

The correlation analysis (r = 0.82, p = 0.001) confirms that higher levels of administrative integration **are strongly associated with enhanced** turnover efficiency and post-construction facility readiness (r = 0.76, p = 0.003). Streamlining workflows, eliminating manual documentation errors, and implementing digital asset load-sheets directly improve administrative speed and asset longevity.

Theoretical Alignment

1. **New Public Management (NPM):** The lack of digital integration and administrative delays reflect weak NPM alignment. Re-engineering workflows through automated digital portals improves administrative output, transparency, and resource efficiency.

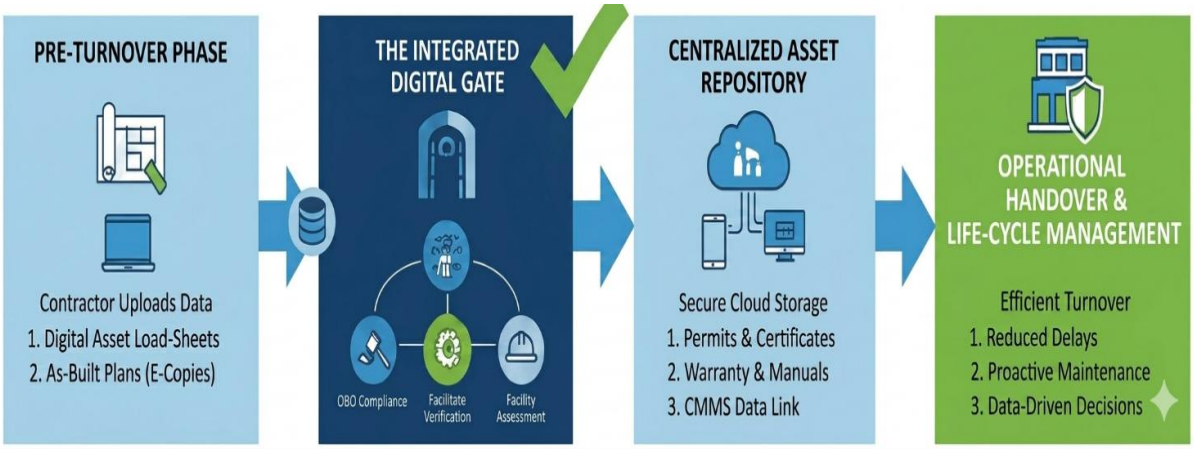
2. **Life-Cycle Costing (LCC) Theory:** Current turnover practices fail to capture critical baseline asset data (warranties, spare parts list, and asset tags score 2.00 - 2.45). Integrating structured data collection at turnover prevents premature equipment failure and lowers operational life-cycle costs.

3. **Regulatory Compliance Theory:** While physical inspection rigor under the PEC is high, compliance verification lacks structured administrative gate controls. Implementing non-discretionary review gates ensures compliance standard enforcement prior to contractual release.

4. **RA 9184 Compliance:** Making final financial clearance contingent upon verified digital asset submission enforces strict contractor accountability under public procurement guidelines.

Proposed Output: The Optimized Administrative Framework (OAF)

To address these administrative challenges, this study proposes the **Optimized Administrative Framework (OAF)** — a structural model that mandates a **"Data-Before-Approval"** policy.



The feasibility and legal basis of the OAF are anchored on existing public procurement mandates under Republic Act 9184 and administrative process optimization principles, having been validated through stakeholder feedback during the study's administrative interviews.

Core Operational Components of the OAF:

1. **Unified Compliance Portal & Integrated Digital Gate (IDG):** A cloud repository requiring contractors to submit validated "As-Built" drawings and Digital Asset Load-Sheets as a mandatory prerequisite for CFEI issuance and final payment.

2. **Standardized Asset Load-Sheets:** Mandatory digital templates capturing granular asset data (serial numbers, warranties, spare parts list, maintenance intervals) prior to physical turnover.

3. **Multi-Disciplinary Gate Review Committee:** Joint review sign-offs involving OBO officers, engineering personnel, and facility managers to ensure physical structures are both legally compliant and operationally maintainable.

4. **Direct CMMS Integration:** Automatic migration of verified digital asset records into PEZA's maintenance system, enabling proactive maintenance management from day one.

LIMITATIONS OF THE STUDY

While this study provides actionable insights into public infrastructure handovers, several limitations should be noted. First, the scope is geographically concentrated at the PEZA Mactan Office in Cebu, meaning operational workflows may vary when applied to other regional economic zones with differing administrative setups. Second, the cross-sectional research design captures stakeholder perceptions at a specific snapshot in time, suggesting that longitudinal tracking of post-implementation data would further validate the long-term efficacy of the Optimized Administrative Framework (OAF).

CONCLUSION AND RECOMMENDATIONS

Conclusion

The current administrative process for managing electrical compliance and asset management in PEZA Design-and-Build capital projects is fragmented, manual, and uncoordinated. Siloed operations between regulatory compliance units (OBO) and operational maintenance teams lead to recurring documentation delays, slow CFEI issuance, missing equipment technical records, and unorganized asset data handovers. These deficiencies undermine public sector efficiency, delay facility occupancy, and increase long-term asset maintenance costs.

Statistical findings prove that integrated administrative workflows strong correlate with turnover efficiency ($r = 0.82$) and facility maintenance readiness ($r = 0.76$). Transitioning from legacy manual procedures to an integrated, data-driven administrative framework is essential to establish institutional accountability, protect public infrastructure investments, and fulfill public governance mandates.

Recommendations

1. **Institutionalize the Optimized Administrative Framework (OAF):** Formally adopt the OAF as standard operating policy across PEZA capital projects to unify OBO regulatory checks and facility asset onboarding.

2. **Mandate Standardized Digital Asset Load-Sheets:** Require contractors to submit uniform digital equipment templates aligned with CMMS standards prior to project acceptance.

3. **Enforce Compliance and Asset Gate Reviews:** Implement non-discretionary review gates linking final financial settlements and CFEI issuance to complete digital asset data submission under RA 9184.

4. **Establish a Centralized Cloud Compliance Portal:** Replace paper-based workflows with a unified digital portal to streamline inter-departmental document reviews, maintain audit trails, and reduce retrieval times.

5. **Incorporate Life-Cycle Costing (LCC) into Guidelines:** Update PEZA Design-and-Build procurement guidelines to formally incorporate LCC principles, requiring full data handovers to optimize long-term operational performance.

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