

Project Management Practices and Their Influence on the Timely Completion of Infrastructure Projects in DPWH Pampanga 2nd District Engineering Office

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Abstract- *This study evaluates the effectiveness of project management practices and their direct influence on the timely completion of infrastructure projects at the DPWH Pampanga 2nd District Engineering Office. It is also the aim of this study to determine the specific levels of effectiveness across planning, execution, and monitoring phases, and identify the relationship between project management rigor and actual project timelines. Following a descriptive-quantitative research design, a structured survey questionnaire was utilized by this study to reveal perceptions among technical personnel regarding these management practices and project outcomes. The data collected was also analyzed to measure implementation levels and assess schedule adherence, efficiency, and excellence in project deliverables. Statistical tools, specifically weighted mean and Pearson's correlation coefficient, were used to analyze the data. Results showed that monitoring and control practices achieved the highest level of perceived effectiveness with a mean score of 3.41, while a strong positive significant relationship ($r = 0.7335$) was attained between overall management rigor and timely completion. Moreover, data collected showed that Right-of-Way (ROW) coordination issues and daily monitoring of contractor equipment deployment were among the primary challenges encountered. Findings suggest that inadequate use of modern automated tracking tools and a reliance on traditional manual methods hinder maximizing operational efficiency and maximizing timely delivery across infrastructure projects.*

Index Terms- *DPWH, Infrastructure, Project Management, Timely Completion*

I. INTRODUCTION

The construction industry is a primary pillar of economic growth in the Philippines, with the Department of Public Works and Highways (DPWH) serving as the lead agency for infrastructure development. However, the timely completion of these projects remains a persistent challenge. Delays in infrastructure projects do not merely represent administrative setbacks; they result in increased costs, deferred socioeconomic benefits, and public dissatisfaction.

In the context of the Pampanga 2nd District Engineering Office, the efficiency of project management practices is paramount. Modern project management involves a complex orchestration of planning, resource allocation, risk mitigation, and stakeholder communication. While the DPWH has implemented various reforms, such as the Project and Contract Management Application (PCMA) and stricter monitoring under Department Order No. 193 s. 2016, negative slippages delays where actual progress falls behind the schedule continue to occur.

This study is anchored on the premise that the specific "practices" adopted by project managers ranging from initial detailed engineering designs to onsite supervision directly dictate whether a project meets its deadline. By investigating the correlation between these management practices and project timelines in the Pampanga 2nd District, this research seeks to identify systemic constraints and provide

evidence-based recommendations to enhance the delivery of public infrastructure.

1.1 Literature Review

International research underscores that the success of infrastructure projects is heavily dependent on the maturity of management frameworks. Ahmad et al. (2018) emphasize that in developing nations, the primary cause of delay is often "unrealistic scheduling," where project timelines are drafted without a data-driven assessment of resource availability. Furthermore, Heravi and Mohammadian (2017) argue that the integration of risk management practices during the pre-construction phase significantly reduces the frequency of "excusable delays." Recent global trends, as noted by Welde and Klakegg (2022), indicate a shift toward digital monitoring systems; their findings suggest that agencies utilizing real-time data analytics experience 15% fewer time overruns compared to those relying on traditional manual reporting. These foreign studies establish that while environmental factors are unpredictable, robust management practices serve as the primary defense against project stagnation.

The Commission on Audit (COA, 2025) recently highlighted that over ₱241 billion in infrastructure projects suffered from delays due to "inadequate detailed engineering and poor site supervision." This is complemented by the work of Susanti and Nurdiana (2020), who identified that Right-of-Way (ROW) acquisitions and utility relocations are the most persistent external factors causing work suspensions in the Philippines. Locally, the DPWH Department Order No. 193 (2016) serves as a foundational regulatory practice, mandating the disqualification of contractors with significant negative slippage. This policy reflects the government's recognition that contractor management is a pivotal practice in ensuring accountability.

Thematic analysis of recent publications suggests that communication and coordination are the most critical "soft" management practices. Dizon (2026) notes that in the Central Luzon region, projects often stall not due to lack of funds, but due to a disconnect between the national agency and Local Government Units (LGUs). Additionally, the practice of Monitoring and

Evaluation has evolved; the transition from physical inspections to the Project and Contract Management Application (PCMA) has allowed for better transparency, yet "variation orders" or changes in project design during construction remain a primary cause of technical delays as cited in recent ResearchGate (2025) publications. Collectively, the literature suggests that while the DPWH has the tools for timely delivery, the inconsistent application of these management practices at the district level remains the primary obstacle to achieving "Build Better More" objectives in the Pampanga 2nd District.

1.2 Conceptual Framework

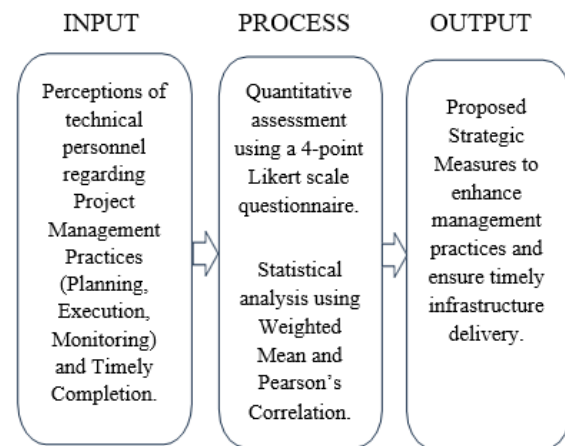


Fig. 1. Conceptual Framework

The conceptual framework of this study is anchored in the Input-Process-Output (IPO) system framework. This model illustrates the logical flow of the research, from the initial assessment of variables to the final development of management enhancements.

Input: This stage focuses on the perceptions of the thirty-one (31) technical personnel regarding the effectiveness of Project Management Practices and the current status of Timely Completion.

Process: This stage involves the systematic assessment of the gathered data using a structured questionnaire. Statistical treatments, such as the weighted mean and Pearson's correlation, are employed to measure implementation levels and analyze the relationship between management rigor and completion timelines.

Output: The final stage presents the proposed measures and strategic initiatives intended to optimize project management protocols and ensure the timely delivery of infrastructure in the district.

1.3 Statement of the Problem

The following research questions were formulated to guide the scope and direction of this study. It is imperative that these core queries remain the primary focus throughout the investigation as the research aims to answer:

1. What is the perceived effectiveness of project management practices in terms of:
 - 1.1 Pre-Construction & Planning
 - 1.2 Project Execution & Quality Control
 - 1.3 Monitoring & Control
2. What is the impact of timely completion among infrastructure projects in the district?
 - 2.1 Effectiveness (Schedule Adherence)
 - 2.2 Efficiency (Resource & Time Optimization)
 - 2.3 Excellence (Quality & Innovation)
3. Is there a significant relationship between project management practices and timely completion?
4. What measures can be proposed to optimize project delivery?

1.4 Significance of the Study

This research holds potential benefits for several stakeholders and advances the body of knowledge in public infrastructure management.

- DPWH Pampanga 2nd District Engineering Office: The findings may serve as a diagnostic tool to identify strengths and weaknesses in current project lifecycles, enabling data-driven decisions to enhance organizational effectiveness.
- Government Organizations and Agencies: Other regional offices may utilize the insights as a reference for best practices in reducing negative slippage and improving the provision of public services.
- Project Engineers and Technical Staff: The study highlights the importance of Job Resources (tools, training, and clear communication) in fulfilling their roles and achieving project excellence.
- The General Public: The communities in Pampanga benefit from the more efficient and timely completion of vital infrastructure, such as

roads and flood control systems, ensuring better safety and connectivity.

II. METHODS

2.1 Research Design

The study used a descriptive research design within a quantitative framework. Utilizing the survey method, the researcher collected data through a questionnaire checklist to evaluate the current state of project management practices and determine if there is a significant relationship between these practices and the timely completion of infrastructure projects.

2.2 Samples and Sampling Procedures

The DPWH Pampanga 2nd District Engineering Office comprises a total population of thirty-one (31) technical personnel, specifically including project engineers, project inspectors, and material engineers. Given the limited and specialized nature of this population, the researcher utilizes a universal sampling technique (also known as total population sampling). This method involves including the entire population of qualified technical professionals in the study, thereby eliminating sampling error and providing a comprehensive assessment of the district's project management practices.

2.3 Research Instrument

In this study, data is primarily collected utilizing a structured questionnaire as the main data-gathering instrument. The instrument is divided into two distinct parts: Part I. Project Management Practices (Technical). It has fifteen (15) items, regarding: Pre-Construction & Planning, Project Execution & Quality Control, and Monitoring & Control. Part II: Impact on Project Outcomes. It has fifteen (15) items, regarding: Effectiveness (Schedule Adherence), Efficiency (Resource & Time Optimization), and Excellence (Quality & Innovation). A 4-point Likert scale is utilized for rating the evaluations. Respondents are asked to state their level of agreement or perceived impact on a scale ranging from 1.00 to 4.00, providing a quantitative basis for the qualitative descriptions of "Highly Effective" or "Direct Impact".

2.4 Data Gathering Procedure

The researcher utilized Google Forms to develop the questionnaire. As cited by Vasantha Raju et al. (2016), the tool’s free access and its capability to automatically compile responses into a spreadsheet simplify both data collection and analysis. The survey link was distributed to respondents via email and Facebook Messenger. Participants were informed of the study’s purpose and assured that their responses would remain confidential. After obtaining the required number of responses, the researcher generated, summarized, evaluated, and analyzed the results.

2.5 Data Analysis and Technique

The gathered information is subjected to the following statistical treatments:

1. Weighted Mean: To assess the overall level of effectiveness regarding project management practices and the status of timely completion.
2. Pearson’s Correlation: To calculate the correlation coefficient and determine the strength of the relationship between project management rigor and completion timelines.
3. The questionnaire used utilizes 4-point Likert Scale. The scale has the following descriptions:

Scale	Range	Qualitative Description
4	3.26 – 4.00	Always or Very Effective / Direct Impact
3	2.51 – 3.25	Often or Effective / Moderate Impact
2	1.76 – 2.50	Sometimes or Slightly Effective / Slight Impact
1	1.00 – 1.75	Never or Not Effective / No Impact

Fig. 2. 4-point Likert Scale

III. RESULTS AND DISCUSSIONS

A. Perceived Effectiveness of Project Management Practices

1) Pre-Construction and Planning

Table 1
Mean distribution of respondents on the perceived effectiveness of project management practices in terms of Pre-Construction & Planning

Pre-Construction & Planning	Weighted Mean	Verbal Interpretation
The Program of Work (POW) is prepared with high technical accuracy before bidding.	3.26	Always or Very Effective
The Approved Budget for the Contract (ABC) is sufficient to cover current market prices for materials.	3.35	Always or Very Effective
PERT/CPM networks are strictly utilized to define the project’s critical path.	3.16	Often or Effective
Coordination with the Planning and Design Section ensures that Right-of-Way (ROW) issues are identified early.	3.06	Often or Effective
Technical personnel are assigned base specific infrastructure types.	3.35	Always or Very Effective
Total Weighted Mean	3.24	Often or Effective

Table 1 shows the mean distribution of respondents on the perceived effectiveness of pre-construction and planning. With a total weighted mean of 3.24, the respondents generally perceived these practices as "Often or Effective." The highest rated areas include the sufficiency of the Approved Budget for the Contract (ABC) and the assignment of technical personnel based on specialized experience (both Mean = 3.35). Conversely, coordination regarding Right-of-Way (ROW) issues received the lowest mean of 3.06, suggesting this remains a challenging area in the early stages of project development.

2) Project Execution and Quality Control

Table 2
Mean distribution of respondents on the perceived effectiveness of project management practices in terms of Project Execution & Quality Control

Project Execution & Quality Control	Weighted Mean	Verbal Interpretation
Materials Testing is conducted rigorously to meet the Minimum Test Requirements.	3.42	Always or Very Effective
The Notice to Proceed (NTP) is issued and acted upon without administrative delay.	3.35	Always or Very Effective
Site Instructions are documented clearly in the project logbook to guide contractors effectively.	3.23	Often or Effective
Equipment and manpower deployment by contractors are monitored daily against the approved schedule.	3.10	Often or Effective
Quality Assurance (QA) units perform regular spot-checks to en standards.	3.35	Always or Very Effective
Total Weighted Mean	3.29	Always or Very Effective

As revealed in Table 2, respondents interpreted execution practices as "Always or Very Effective" with a total weighted mean of 3.29. Rigorous materials testing recorded the highest mean (Mean = 3.42), while the daily monitoring of equipment and manpower deployment by contractors was the lowest (Mean = 3.10), indicating a potential area for more stringent field supervision.

3) Monitoring and Control

Table 3
 Mean distribution of respondents on the perceived effectiveness of project management practices in terms of Monitoring & Control

Monitoring & Control	Weighted Mean	Verbal Interpretation
Materials Testing is conducted rigorously to meet the Minimum Test Requirements.	3.42	Always or Very Effective
The Notice to Proceed (NTP) is issued and acted upon without administrative delay.	3.23	Often or Effective
Site Instructions are documented clearly in the project logbook to guide contractors effectively.	3.42	Always or Very Effective
Equipment and manpower deployment by contractors are monitored daily against the approved schedule.	3.45	Always or Very Effective
Quality Assurance (QA) units perform regular spot-checks to ensure standards.	3.52	Always or Very Effective
Total Weighted Mean	3.41	Always or Very Effective

Table 3 indicates the highest level of perceived effectiveness among the management phases, with a total weighted mean of 3.41 ("Always or Very Effective"). Quality Assurance (QA) units performing regular spot-checks to ensure DPWH standards were particularly noted with a mean of 3.52.

The respondents' perception of project management practices as "Often or Effective" reflects a structured approach to infrastructure delivery within the district. The high rating for the sufficiency of the Approved Budget for the Contract (ABC) and the assignment of specialized technical personnel aligns with the findings of Rivera et al. (2020), who emphasize that inadequate planning and the lack of experienced construction managers are primary drivers of project delays in developing nations. By ensuring that technical staff are matched with their expertise, the DPWH District Office mitigates risks associated with poor human resource allocation.

However, the lower mean score for Right-of-Way (ROW) coordination identifies a persistent bottleneck. Scientific literature highlights that land disputes and expropriation issues are among the most significant external factors impacting road construction timelines globally. Strengthening proactive stakeholder engagement and legal coordination is essential to prevent these early-stage hurdles from cascading into terminal slippage.

B. Impact of Timely Completion Among Infrastructure Projects

1) Effectiveness (Schedule Adherence)

Table 4
 Mean distribution of respondents on the impact of timely completion among infrastructure projects in the district in terms of Effectiveness (Schedule Adherence)

Effectiveness (Schedule Adherence)	Weighted Mean	Verbal Interpretation
Infrastructure projects reach Physical Completion within the original contract duration.	3.23	Moderate Impact
The use of Catch-up Plans effectively prevents projects from falling into "Terminal Slippage".	3.16	Moderate Impact
Stakeholders (LGUs and Communities) express satisfaction with the delivery of the facility.	3.35	Direct Impact
As-Built Plans align closely with the initial project scope and requirements.	3.32	Direct Impact
Projects contribute directly to the DPWH's strategic regional infrastructure goals.	3.39	Direct Impact
Total Weighted Mean	3.29	Direct Impact

With a total weighted mean of 3.29, respondents agreed that timely completion has a "Direct Impact" on project effectiveness. The highest impact is seen in projects contributing to strategic regional infrastructure goals (Mean = 3.39), while the use of catch-up plans to prevent "terminal slippage" had the lowest mean (Mean = 3.16).

2) Efficiency (Resource and Time Optimization)

Table 5
Mean distribution of respondents on the impact of timely completion among infrastructure projects in the district in terms of Efficiency (Resource & Time Optimization)

Efficiency (Resource & Time Optimization)	Weighted Mean	Verbal Interpretation
Administrative workflows for Progress Billings are streamlined to prevent financial bottlenecks.	3.32	Direct Impact
Modern project management software is leveraged to automate tracking and reporting.	3.13	Moderate Impact
Variation Orders are resolved with minimal conflict or indecision among the project team.	3.23	Moderate Impact
The office demonstrates agility in responding to sudden site challenges or weather disruptions.	3.23	Moderate Impact
Manpower and budget are utilized optimally throughout the project lifecycle.	3.29	Direct Impact
Total Weighted Mean	3.24	Moderate Impact

As revealed in Table 5, the total weighted mean of 3.24 indicates a "Moderate Impact" on efficiency. Efficient administrative workflows for Progress Billings had the highest impact (Mean = 3.32). The influence of modern project management software for automated tracking received the lowest mean of 3.13.

3) Excellence (Quality and Innovation)

Table 6
Mean distribution of respondents on the impact of timely completion among infrastructure projects in the district in terms of Excellence (Quality & Innovation)

Excellence (Quality & Innovation)	Weighted Mean	Verbal Interpretation
The completed infrastructure consistently meets or exceeds DPWH Quality Assurance ratings.	3.35	Direct Impact
Innovation is encouraged when solving site-specific engineering hurdles.	3.16	Moderate Impact
Proactive Risk Management prevents costly rework or structural failures.	3.23	Moderate Impact
Client and public feedback reflect high trust in the project's durability and service.	3.35	Direct Impact
Strict adherence to Industry Standards is maintained despite tight timelines.	3.16	Moderate Impact
Total Weighted Mean	3.25	Moderate Impact

Table 6 shows a total weighted mean of 3.25 ("Moderate Impact"). Respondents identified that completed infrastructure meeting QA ratings and maintaining public trust are key indicators of excellence, both scoring 3.35. Encouraging

innovation for site-specific hurdles and maintaining standards under tight timelines both received lower means of 3.16.

The direct impact of timely completion on project effectiveness is supported by the "Blue Book" standards of the DPWH, which prioritize material testing and progress monitoring to ensure durability and public trust. Efficient administrative workflows for Progress Billings were identified as a high-impact factor, echoing research by Santos (2019) which suggests that effective resource allocation and comprehensive support systems—including financial fluidity—significantly enhance engineering outcomes.

Conversely, the lower impact of catch-up plans and automated tracking software suggests a reliance on traditional, manual monitoring methods. As noted in contemporary project management studies, the integration of tools like PERT/CPM and specialized software is critical for identifying the "critical path" and making real-time adjustments to maintain schedule adherence.

C. Relationship Between Project Management Practices and Timely Completion

Table 7
 Correlation of project management practices and timely completion

Project Implementation	Computed r	Correlation
Project Management Practices	0.7335	Positive (Strong)
Timely Completion		

Table 7 illustrates the relationship between these two variables. The computed Pearson correlation coefficient (r) of 0.7335 indicates a statistically significant strong positive relationship. This finding suggests that as the effectiveness of project management practices improves, there is a strong tendency for infrastructure projects to achieve timely completion.

This correlation is a "universal truth" in infrastructure development: solid management practices, proactive risk reduction, and efficient communication are the primary defenses against delays. The findings imply that the district's focus on Monitoring and Control—particularly regular spot-checks by Quality Assurance (QA) units serves as a vital mechanism for maintaining standards under tight timelines. This proactive supervision helps bridge the gap between

pre-established specifications and actual field execution, which is often a challenge for contractors in the Philippine context.

D. Proposed Measures to Optimize Project Delivery

To optimize the delivery of infrastructure projects within the district, several key recommendations are proposed based on the data findings regarding project management practices and their strong correlation with timely completion.

1. Foster effective project planning by strictly utilizing PERT/CPM networks and modern project management software for automated tracking. These tools can help technical personnel identify the critical path and streamline reporting, allowing the team to anticipate potential delays and address them before they impact the final completion timeline.

2. Promote operational efficiency by establishing proactive coordination for Right-of-Way (ROW) issues and streamlining administrative workflows for progress billings. Early identification of site hurdles and the optimization of financial processes can help minimize bottlenecks and legal delays, ensuring that project outcomes align closely with the initial scope and requirements.

3. Enhance field execution by institutionalizing rigorous daily monitoring of equipment and manpower deployment against the approved schedule. Regular spot-checks by Quality Assurance units, combined with a proactive approach to risk management and engineering innovation, can help maintain high industry standards and ensure infrastructure durability despite tight timelines.

IV. CONCLUSION

1. The project management practices at the district office exhibit high levels of effectiveness, particularly in the Monitoring, Control, and Execution phases. This indicates that the office is consistently invested in the oversight and technical quality of its infrastructure projects.

2. Timely completion has a direct impact on project outcomes, enhancing the effectiveness, efficiency, and quality of the final infrastructure. This suggests that on-time delivery is a primary driver of public trust and infrastructure development.

3. There is a strong positive relationship between management practices and timely completion. This implies that as the district office continues to refine its planning and monitoring processes, there will be a corresponding and significant improvement in the success rate of infrastructure projects.

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