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IMPLEMENTATION AND OUTCOMES OF INFRASTRUCTURAL DEVELOPMENT PROJECTS OF DPWH

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ABSTRACT

This study evaluated the implementation and outcomes of infrastructural development projects of the DPWH Third District Engineering Office in Isabela Province. It used a descriptive-correlational research design and involved 46 members of the Project Management Team who were selected through purposive sampling. Data were gathered using an adapted and validated survey questionnaire and were analyzed through frequency, percentage, weighted mean, and Spearman's rho correlation coefficient.

Findings showed that all contractors were involved in medium-scale projects with a project duration of 6–12 months. The level of project implementation was rated High Level, with project planning receiving the highest rating, while project implementation obtained the lowest rating. The challenges encountered were generally rated Manageable; however, environmental and social challenges were assessed as Critical Level, mainly because of weather-related delays and right-of-way concerns. The perceived outcomes of infrastructural development projects were rated Effective, with sustainability and long-term usability receiving the highest assessment. A strong positive and significant relationship was found between the level of project implementation and the perceived project outcomes. These findings indicate that effective planning, proper resource allocation, technical supervision, monitoring and evaluation, stakeholder participation, and management of environmental and social risks are important in achieving successful infrastructural development project outcomes.

KEYWORDS: *Infrastructural Development Projects, DPWH, Project Implementation, Project Outcomes, Spearman's Rho, Infrastructure Development*

INTRODUCTION

Infrastructure serves as the backbone of societal growth, providing essential networks and facilities that enable mobility, trade, and access to vital services. In the Philippine archipelago, bridges are a critical component of the transport network, linking islands and hinterlands, facilitating the movement of goods and people, and contributing to regional economic integration (Francisco, 2024). Yet, the Philippines continues to lag behind its Southeast Asian neighbors in transport infrastructure performance, with structural gaps that constrain economic competitiveness and rural accessibility (Philippine Institute for Development Studies, 2025). In the Philippine, efficient planning, execution, and maintenance of infrastructure projects are central to converting public investments into sustainable development outcomes.

The Department of Public Works and Highways (DPWH), as the primary agency responsible for national and regional infrastructure, oversees the implementation of bridge projects across the country. Research on infrastructure project management within DPWH offices highlights common challenges encountered in planning and execution, including administrative bottlenecks,

coordination issues, and resource constraints that affect project quality and delivery (Aliangan, 2025). Furthermore, studies examining broader infrastructure implementation problems in DPWH reveal that engineering staff recognize deficiencies in project management practices that can undermine performance and stakeholder confidence. While these studies provide insight into infrastructure project challenges at the district level, there is a paucity of empirical research specifically addressing bridge projects, which have unique technical, environmental, and safety considerations.

Isabela Province in Region 2 presents a compelling case for evaluating bridge infrastructure implementation due to its strategic location and history of bridge development issues. For example, incomplete bridge works such as the Dibenbenan Bridge in Palanan have persisted for years, leaving communities without critical connections to markets and services (PIDS, 2025). More recently, the Cabagan–Santa Maria Bridge, an almost one kilometer tied arch bridge constructed to enhance connectivity across the Cagayan River partially collapsed shortly after completion, prompting public concern about project planning, structural integrity, and implementation oversight. This incident shows the need for systematic investigation into the processes and outcomes of bridge projects executed at the district level.

Empirical research on infrastructure performance in the Philippines has shown that factors such as planning quality, resource allocation, stakeholder engagement, and governance

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structures significantly influence project success and sustainability (Rivera & Basilio, 2023). Collaborative governance approaches, which involve coordination between national agencies, local government units (LGUs), and community stakeholders, have been identified as essential for improving infrastructure outcomes by enhancing accountability and responsiveness to local needs. However, there remain gaps in applying these frameworks specifically to bridge projects, where technical standards and monitoring mechanisms play critical roles in ensuring safety and durability.

District engineering offices, such as the DPWH Third District Engineering Office in Isabela Province, play a pivotal role in translating national plans into tangible results. These offices manage the design, procurement, construction supervision, and maintenance of infrastructure within their jurisdictions while coordinating with local government units, contractors, and community stakeholders to meet both technical standards and local needs (DPWH, 2024). Local studies revealed that contractor characteristics, such as project category/classification and project duration, significantly influence infrastructure project outcomes. Research on DPWH projects in Catanduanes found that contractors' ability to handle different project scales directly affected implementation quality, showing that experience with specific project types improves performance. Similarly, studies on project delays in the Philippines indicate that contractors with longer involvement in similar projects are better equipped to manage timelines, anticipate challenges, and allocate resources efficiently (Layno & Famadico, 2024). Additionally, research in Batangas Province revealed that contractor classification and technical capacity correlate with their ability to sustain longer-term projects and adapt to evolving requirements (Bajet & Manalo, 2025). These findings suggest that project category and duration are important factors affecting the success of bridge projects in Isabela Province.

This study addresses a gap in the literature by evaluating the implementation and outcomes of DPWH infrastructural development projects in Isabela Province. It focuses on key dimensions such as project planning, resource allocation, project execution, monitoring and evaluation, stakeholder participation, challenges encountered, and perceived project outcomes. By examining local empirical evidence and district-level operational experiences, the study aims to provide useful findings that may help improve infrastructure project planning, implementation, accountability, and sustainability.

Background of the Study

Infrastructure development is a critical driver of socio-economic growth. It supports efficient transportation, improves trade and mobility, and contributes to a better quality of life for communities. In the Philippines, the Department of Public Works and Highways plays a central role in planning, implementing, and maintaining infrastructure projects across the country. These projects are commonly carried out through contracted construction firms to ensure technical expertise, timely completion, and compliance with national standards. Through contractor participation, the DPWH is able to mobilize resources, use specialized equipment, and strengthen accountability in project delivery.

In Isabela Province, the Third District Engineering Office has implemented various infrastructure programs, with bridge construction projects being among the most important. Bridges help connect remote communities, improve access to markets and social services, and strengthen disaster resilience in flood-prone areas. These projects require not only technical and financial planning but also strict monitoring, quality control, and stakeholder coordination to ensure safety, durability, and sustainability.

Given the importance of these initiatives, this study evaluates the implementation and outcomes of infrastructure projects in the DPWH Third District Engineering Office in Isabela. The research focuses on five key dimensions: project planning, resource allocation, project execution, monitoring and evaluation, and stakeholder participation. It also examines the administrative, technical, financial, and environmental or social challenges encountered during project implementation. In addition, the study assesses perceived outcomes in terms of infrastructure quality, community mobility, economic impact, and sustainability.

The findings of this study are expected to provide valuable information on the strengths and areas for improvement in the implementation of DPWH infrastructure projects. The results may also serve as a reference for enhancing project management practices, improving coordination, strengthening accountability, and ensuring that infrastructure projects deliver meaningful and lasting benefits to the communities they serve.

Objectives of the Study

This study aimed to evaluate the implementation and outcomes of infrastructural development projects of DPWH as basis for a development framework.

Specifically, this study sought to answer the following questions:

1. What is the profile of the contractors in terms of:
   1.1. Project Category/Classification;
   1.2. Project Duration?
2. What is the level of implementation of bridge projects in terms of:
   2.1. Project Planning,
   2.2. Resource Allocation,
   2.3. Project Implementation,
   2.4. Monitoring and Evaluation, and
   2.5. Stakeholder Participation?
3. What challenges are encountered in the implementation of bridge projects in terms of:
   2.1. Administrative challenges,
   2.2. Technical challenges,
   2.3. Financial challenges, and
   2.4. Environmental and social challenges?

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4. What is the perceived level of bridge project outcomes in terms of:
   3.1. Quality of completed infrastructure,
   3.2. Impact on community mobility and accessibility,
   3.3. Contribution to local economic development, and
   3.4. Sustainability and long-term usability?
5. What significant relationship exists between the level of bridge project implementation and the perceived bridge project outcomes?

METHODOLOGY

This study employed a descriptive-correlational research design to examine the implementation and outcomes of infrastructural development projects of the DPWH Third District Engineering Office in Isabela Province. The descriptive component was used to determine the profile of the contractors, the level of project implementation, the challenges encountered during implementation, and the perceived outcomes of the projects.

In addition, the correlational aspect was utilized to determine whether a significant relationship exists between the level of implementation of infrastructural development projects and their perceived outcomes. This design was appropriate because the study aimed to describe existing project implementation practices and examine the association between implementation and project results without manipulating any variables.

Sampling Design

The respondents of the study were members of the Project Management Team of the DPWH–Isabela Third District Engineering Office. They included project engineers, junior project engineers, materials engineers, and a project inspector who were directly involved in the planning, supervision, monitoring, evaluation, and implementation of infrastructure development projects.

A total of 46 personnel participated in the study. The study employed purposive sampling as the sampling technique. This method was appropriate because the respondents were selected based on their direct involvement, technical knowledge, and experience in infrastructure project implementation. Since the study required information from personnel who were familiar with project planning, resource allocation, construction supervision, quality control, monitoring, and evaluation, purposive sampling allowed the researcher to gather relevant and experience-based data from qualified respondents.

Research Instrument

Data were gathered using an adapted and validated survey questionnaire designed to assess the implementation, challenges, and perceived outcomes of infrastructural development projects. The instrument consisted of four parts.

Part I gathered the profile of the contractors in terms of project category or classification and project duration. Part II assessed the level of project implementation in terms of project planning, resource allocation, project implementation, monitoring and evaluation, and stakeholder participation. Part III examined the challenges encountered during project implementation, including administrative, technical, financial, and environmental or social challenges. Part IV measured the perceived outcomes of the projects in terms of quality of completed infrastructure, impact on community mobility and accessibility, contribution to local economic development, and sustainability and long-term usability.

The questionnaire used a five-point Likert scale to measure the responses of the participants. The instrument was adapted from recognized project management, infrastructure assessment, and monitoring references, including DPWH manuals, PMBOK standards, Asian Development Bank tools, World Bank indicators, and OECD-related infrastructure assessment tools. It was validated by experts in infrastructure project management. A pilot test was also conducted, and the instrument obtained a Cronbach's alpha of 0.93, indicating excellent reliability.

Statistical Design

The study used appropriate statistical tools to analyze the data gathered from the respondents. Frequency counts and percentages were used to describe the profile of the contractors in terms of project category or classification and project duration.

The weighted mean was used to determine the level of implementation of infrastructural development projects in terms of project planning, resource allocation, project implementation, monitoring and evaluation, and stakeholder participation. It was also used to assess the extent of challenges encountered and the perceived outcomes of the projects.

Spearman's rho correlation coefficient was employed to determine the significant relationship between the level of implementation of infrastructural development projects and the perceived project outcomes. This statistical tool was appropriate because the study examined the association between ranked or ordinal variables gathered through a Likert-scale questionnaire.

RESULTS AND DISCUSSIONS

This chapter presents the interpretation and analysis of the data gathered following the sequence of the statement of the problem as well as the objectives and the hypotheses of the study.

PROFILE OF THE CONTRACTORS

This section presents the profile of the contractors involved in the bridge projects. It covers their project category/classification and project duration to describe their participation in project implementation.

Table 1
Distribution of the Contractors According to Their Demographic Profile

Project Category/Classification	f	%
Medium Scale	46	100.0
Project Duration	**f**	**%**
6-12 Months	46	100.0

Table 1 shows that all 46 contractors, or 100.0 percent, were classified under medium-scale projects. The same table also

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shows that all 46 contractors, or 100.0 percent, had a project duration of 6 to 12 months. This means that the respondents were uniform in terms of both project classification and length of project involvement.

LEVEL OF IMPLEMENTATION OF BRIDGE PROJECTS

Table 2
Level of Implementation of Bridge Projects

Project Planning	M	Interpretation
1. Project needs are clearly identified before implementation.	4.46	Excellent Level
2. Project plans are aligned with local and national development goals.	4.20	High Level
3. Feasibility studies and design documents are complete and accurate.	3.91	High Level
4. Risk assessments are conducted prior to project implementation.	4.33	Excellent Level
5. Project timelines are well-defined and realistic.	3.52	High Level
6. Stakeholder needs are considered during planning.	4.30	Excellent Level
Catgeory Mean	4.12	High Level

Table 2 shows that project planning obtained a category mean of 4.12, interpreted as High Level. This indicates that the planning aspect of bridge project implementation was generally carried out well based on the assessment of the respondents.

Among the indicators, the highest mean was recorded for "Project needs are clearly identified before implementation" with a mean score of 4.46, interpreted as Excellent Level. This was followed by "Risk assessments are conducted prior to project implementation" with a mean of 4.33, and "Stakeholder needs are considered during planning" with a mean of 4.30, both also interpreted as Excellent Level. Next, "Project plans are aligned with local and national development goals" obtained a mean of 4.20, interpreted as High Level, followed by "Feasibility studies and design documents are complete and accurate" with a mean of 3.91, also at High Level. The lowest mean was recorded for "Project timelines are well-defined and realistic" with a mean of 3.52, interpreted as High Level.

Table 3
Level of Implementation of Bridge Projects

Resource Allocation	M	Interpretation
1. Budget allocation is timely and sufficient for project needs.	4.39	Excellent Level
2. Personnel assigned to the project possess adequate qualifications.	4.02	High Level
3. Equipment and materials are available when needed.	4.17	High Level
4. Procurement processes are efficient and transparent.	3.30	Moderate Level
5. Resource allocation supports the timely completion of project activities.	3.17	Moderate Level
Catgeory Mean	3.81	High Level

Table 3 shows that resource allocation obtained a category mean of 3.81, interpreted as High Level. This means that the allocation of resources for bridge projects was generally carried out well, although some areas were rated lower than others.

Among the indicators, the highest mean was recorded for "Budget allocation is timely and sufficient for project needs" with a mean score of 4.39, interpreted as Excellent Level. This was followed by "Equipment and materials are available when needed" with a mean of 4.17, and "Personnel assigned to the project possess adequate qualifications" with a mean of 4.02, both interpreted as High Level. Meanwhile, "Procurement processes are efficient and transparent" obtained a mean of 3.30, interpreted as Moderate Level. The lowest mean was recorded for "Resource allocation supports the timely completion of project activities" with a mean score of 3.17, also interpreted as Moderate Level.

Table 4
Level of Implementation of Bridge Projects

Project Implementation	M	Interpretation
1. Project activities follow approved plans and specifications.	4.35	Moderate Level
2. Contractors comply with technical standards and safety protocols.	2.85	Moderate Level
3. Work progress is aligned with the approved project timeline.	2.96	Moderate Level
4. Quality control procedures are strictly implemented.	2.89	Moderate Level
5. Variations or changes are properly documented and approved.	4.09	High Level
Catgeory Mean	3.43	High Level

Table 4 shows that project implementation obtained a category mean of 3.43, interpreted as High Level. This means that bridge project implementation was generally rated positively, although several specific indicators were assessed only at a moderate level.

Among the indicators, the highest mean was recorded for "Project activities follow approved plans and specifications" with a mean score of 4.35, interpreted in the table as Moderate Level. This was followed by "Variations or changes are properly documented and approved" with a mean of 4.09, interpreted as High Level. Next, "Work progress is aligned with the approved project timeline" obtained a mean of 2.96, followed by "Quality control procedures are strictly implemented" with a mean of 2.89, and "Contractors comply with technical standards and safety protocols" with a mean of 2.85. These three indicators were all interpreted as Moderate Level.

Table 5
Level of Implementation of Bridge Projects

Monitoring and Evaluation	M	Interpretation
1. Monitoring activities are conducted regularly.	3.59	High Level
2. Inspection reports accurately reflect project conditions.	3.00	Moderate Level
3. Issues identified during monitoring are addressed promptly.	3.52	High Level
4. Documentation for project milestones is complete and updated.	3.98	High Level
5. Evaluation findings are used for decision-making.	4.17	High Level
Catgeory Mean	3.65	High Level

Table 5 shows that monitoring and evaluation obtained a category mean of 3.65, interpreted as High Level. This means that monitoring and evaluation practices in bridge project implementation were generally carried out well based on the assessment of the respondents.

Among the indicators, the highest mean was recorded for "Evaluation findings are used for decision-making" with a mean score of 4.17, interpreted as High Level. This was followed by "Documentation for project milestones is complete and updated" with a mean of 3.98, also interpreted as High Level. Next, "Monitoring activities are conducted regularly" obtained a mean of 3.59, followed by "Issues identified during monitoring are addressed promptly" with a mean of 3.52, both interpreted as High Level. The lowest mean was recorded for "Inspection

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reports accurately reflect project conditions" with a mean score of 3.00, interpreted as Moderate Level.

Table 6
Level of Implementation of Bridge Projects

Stakeholder Participation	M	Interpretation
1. Local government units are adequately involved in project activities.	3.96	High Level
2. Community members are informed about project details.	4.39	Excellent Level
3. Stakeholder concerns are considered during implementation.	4.26	Excellent Level
4. Feedback mechanisms are accessible to the public.	3.57	High Level
5. Collaboration between DPWH and LGUs is strong and efficient.	3.57	High Level
Catgeory Mean	3.95	High Level

Table 6 shows that stakeholder participation obtained a category mean of 3.95, interpreted as High Level. This means that the involvement of stakeholders in bridge project implementation was generally practiced well based on the respondents' assessment.

Among the indicators, the highest mean was recorded for "Community members are informed about project details" with a mean score of 4.39, interpreted as Excellent Level. This was followed by "Stakeholder concerns are considered during implementation" with a mean of 4.26, also interpreted as Excellent Level. Next, "Local government units are adequately involved in project activities" obtained a mean of 3.96, interpreted as High Level. The lowest mean scores were recorded for "Feedback mechanisms are accessible to the public" and "Collaboration between DPWH and LGUs is strong and efficient," both with a mean of 3.57, interpreted as High Level.

CHALLENGES ENCOUNTERED IN THE IMPLEMENTATION OF BRIDGE PROJECTS

Table 7
Challenges Encountered in the Implementation of Bridge Projects

Administrative Challenges	M	Interpretation
1. Delays occur due to administrative processing.	2.63	Manageable Level
2. Insufficient staff affects project implementation.	3.33	Manageable Level
3. Coordination among offices is a challenge.	2.78	Manageable Level
4. Documentation requirements cause project delays.	2.52	Minimal Level
Catgeory Mean	2.82	Manageable Level

Table 7 shows that administrative challenges obtained a category mean of 2.82, interpreted as Manageable Level. This means that administrative concerns were present during bridge project implementation, but they were not rated as severe by the respondents.

Among the indicators, the highest mean was recorded for "Insufficient staff affects project implementation" with a mean score of 3.33, interpreted as Manageable Level. This was followed by "Coordination among offices is a challenge" with a mean of 2.78, and "Delays occur due to administrative processing" with a mean of 2.63, both also interpreted as Manageable Level. The lowest mean was recorded for "Documentation requirements cause project delays" with a mean score of 2.52, interpreted as Minimal Level.

Table 8
Challenges Encountered in the Implementation of Bridge Projects

Technical Challenges	M	Interpretation
1. Unforeseen site conditions affect project progress.	4.48	Critical Level
2. Technical specifications are difficult to meet.	2.26	Minimal Level
3. Skilled technical personnel are insufficient.	3.43	Significant Level
4. Technical problems cause delays or rework.	3.80	Significant Level
Catgeory Mean	3.49	Significant Level

Table 8 shows that technical challenges obtained a category mean of 3.49, interpreted as Significant Level. This means that technical concerns were experienced in the implementation of bridge projects and were rated as a notable challenge by the respondents.

Among the indicators, the highest mean was recorded for "Unforeseen site conditions affect project progress" with a mean score of 4.48, interpreted as Critical Level. This was followed by "Technical problems cause delays or rework" with a mean of 3.80, interpreted as Significant Level, and "Skilled technical personnel are insufficient" with a mean of 3.43, also interpreted as Significant Level. The lowest mean was recorded for "Technical specifications are difficult to meet" with a mean score of 2.26, interpreted as Minimal Level.

Table 9
Challenges Encountered in the Implementation of Bridge Projects

Financial Challenges	M	Interpretation
1. Delays in fund release affect project implementation.	2.26	Minimal Level
2. Budget shortages limit project activities.	2.26	Minimal Level
3. Cost overruns occur during project implementation.	2.54	Minimal Level
4. Financial reporting requirements cause delays.	2.26	Minimal Level
Catgeory Mean	2.33	Minimal Level

Table 9 shows that financial challenges obtained a category mean of 2.33, interpreted as Minimal Level. This means that financial concerns were present but were rated by the respondents as having only a low effect on the implementation of bridge projects.

Among the indicators, the highest mean was recorded for "Cost overruns occur during project implementation" with a mean score of 2.54, interpreted as Minimal Level. This was followed by "Delays in fund release affect project implementation," "Budget shortages limit project activities," and "Financial reporting requirements cause delays," all with the same mean score of 2.26 and all interpreted as Minimal Level.

Table 10
Challenges Encountered in the Implementation of Bridge Projects

Environmental and Social Challenges	M	Interpretation
1. Environmental restrictions impact project activities.	4.00	Significant Level
2. Weather conditions cause frequent delays.	4.96	Critical Level
3. Right-of-way issues delay project implementation.	4.50	Critical Level
4. Community resistance affects project progress.	3.59	Significant Level
Catgeory Mean	4.26	Critical Level

Table 10 shows that environmental and social challenges obtained a category mean of 4.26, interpreted as Critical Level. This means that these concerns were strongly experienced in the implementation of bridge projects.

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Among the indicators, the highest mean was recorded for "Weather conditions cause frequent delays" with a mean score of 4.96, interpreted as Critical Level. This was followed by "Right-of-way issues delay project implementation" with a mean of 4.50, also interpreted as Critical Level. Next, "Environmental restrictions impact project activities" obtained a mean of 4.00, interpreted as Significant Level. The lowest mean was recorded for "Community resistance affects project progress" with a mean score of 3.59, also interpreted as Significant Level.

PERCEIVED LEVEL OF BRIDGE PROJECT OUTCOMES

Table 11
Perceived Level of Bridge Project Outcomes

Quality of Completed Infrastructure	M	Interpretation
1. Completed structures meet quality standards.	3.89	Effective
2. Materials used are durable and appropriate.	3.83	Effective
3. Workmanship is of high quality.	4.24	Highly Effective
4. Completed projects require minimal early repairs.	4.30	Highly Effective
Catgeory Mean	4.07	Effective

Table 11 shows that quality of completed infrastructure obtained a category mean of 4.07, interpreted as Effective. This means that the completed bridge projects were generally assessed positively in terms of quality, durability, workmanship, and need for early repairs.

Among the indicators, the highest mean was recorded for "Completed projects require minimal early repairs" with a mean score of 4.30, interpreted as Highly Effective. This was followed by "Workmanship is of high quality" with a mean of 4.24, also interpreted as Highly Effective. Next, "Completed structures meet quality standards" obtained a mean of 3.89, interpreted as Effective. The lowest mean was recorded for "Materials used are durable and appropriate" with a mean score of 3.83, also interpreted as Effective.

Table 12
Perceived Level of Bridge Project Outcomes

Impact on Community Mobility and Accessibility	M	Interpretation
1. The project improved road accessibility.	4.41	Highly Effective
2. Travel time was reduced after the project.	4.41	Highly Effective
3. Mobility of residents improved significantly.	3.87	Effective
4. Transport of goods became more efficient.	4.39	Highly Effective
Catgeory Mean	4.27	Highly Effective

Table 12 shows that impact on community mobility and accessibility obtained a category mean of 4.27, interpreted as Highly Effective. This means that the bridge projects were assessed very positively in terms of improving access, reducing travel time, supporting residents' movement, and making the transport of goods easier.

Among the indicators, the highest mean scores were recorded for "The project improved road accessibility" and "Travel time was reduced after the project," both with a mean of 4.41, interpreted as Highly Effective. These were followed by "Transport of goods became more efficient" with a mean of 4.39, also interpreted as Highly Effective. The lowest mean was recorded for "Mobility of residents improved significantly" with a mean score of 3.87, interpreted as Effective.

Table 13
Perceived Level of Bridge Project Outcomes

Contribution to Local Economic Development	M	Interpretation
1. The project supports local economic activities.	4.28	Highly Effective
2. Businesses benefited from improved infrastructure.	4.15	Effective
3. Employment opportunities increased because of the project.	3.61	Effective
4. The project improved access to markets and services.	4.30	Highly Effective
Catgeory Mean	4.09	Effective

Table 13 shows that contribution to local economic development obtained a category mean of 4.09, interpreted as Effective. This means that the bridge projects were positively assessed in terms of supporting local activities, improving access to markets and services, benefiting businesses, and creating employment opportunities.

Among the indicators, the highest mean was recorded for "The project improved access to markets and services" with a mean score of 4.30, interpreted as Highly Effective. This was followed by "The project supports local economic activities" with a mean of 4.28, also interpreted as Highly Effective. Next, "Businesses benefited from improved infrastructure" obtained a mean of 4.15, interpreted as Effective. The lowest mean was recorded for "Employment opportunities increased because of the project" with a mean score of 3.61, also interpreted as Effective.

Table 14
Perceived Level of Bridge Project Outcomes

Sustainability and Long-Term Usability	M	Interpretation
1. The infrastructure is expected to last for its intended lifespan.	4.39	Highly Effective
2. Maintenance needs are minimal and manageable.	4.00	Effective
3. The design supports long-term use.	4.83	Highly Effective
4. The project can withstand environmental and weather-related risks.	4.02	Effective
Catgeory Mean	4.31	Highly Effective

Table 14 shows that sustainability and long-term usability obtained a category mean of 4.31, interpreted as Highly Effective. This means that the bridge projects were rated very positively in terms of durability, long-term design, maintenance needs, and ability to withstand environmental and weather-related risks.

Among the indicators, the highest mean was recorded for "The design supports long-term use" with a mean score of 4.83, interpreted as Highly Effective. This was followed by "The infrastructure is expected to last for its intended lifespan" with a mean of 4.39, also interpreted as Highly Effective. Next, "The project can withstand environmental and weather-related risks" obtained a mean of 4.02, interpreted as Effective. The lowest mean was recorded for "Maintenance needs are minimal and manageable" with a mean score of 4.00, also interpreted as Effective.

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RELATIONSHIP BETWEEN THE LEVEL OF BRIDGE PROJECT IMPLEMENTATION AND THE PERCEIVED BRIDGE PROJECT OUTCOMES

Table 15
Relationship Between the Level of Bridge Project Implementation and the Perceived Bridge Outcomes

Variables		Perceived Bridge Outcomes
Level of Bridge Project Implementation	r	0.746
	p-value	<0.001

Table 15 shows that the level of bridge project implementation had a strong positive relationship with the perceived bridge project outcomes, as shown by the Spearman's rho value of r = 0.746. This means that as the level of implementation improves, the perceived outcomes of bridge projects also tend to improve. In other words, better project planning, resource allocation, project implementation, monitoring and evaluation, and stakeholder participation are associated with better outcomes in terms of infrastructure quality, mobility and accessibility, local economic development, and long-term usability.

The p-value of <0.001 shows that the relationship is statistically significant at the 0.05 level of significance. Since the p-value is lower than 0.05, the null hypothesis is rejected. This means that there is a significant relationship between the level of bridge project implementation and the perceived bridge project outcomes. The result shows that effective implementation practices play an important role in achieving favorable bridge project outcomes.

This finding is strongly supported by the literature in the manuscript. Rivera and Basilio (2023) stated that planning quality, resource allocation, stakeholder engagement, and governance structures significantly influence project success and sustainability. Project Management Theory also supports this result, since effective project management requires structured planning, efficient use of resources, proper execution, and monitoring to achieve desired outcomes (Project Management Institute, 2021). The IPO framework of the study also connects contractor inputs, implementation processes, challenges, and project outcomes, which matches the statistical finding that implementation practices are linked with perceived bridge project outcomes.

CONCLUSION

The following are the conclusions for the study that are based on the previously presented findings and their implications.

1. The contractors involved in the bridge projects had a uniform profile. They were all engaged in medium-scale projects with a project duration of 6–12 months. This shows that the bridge projects covered in the study were similar in terms of project classification and length of implementation.
2. The implementation of bridge projects was generally at a high level. The findings show that the DPWH Third District Engineering Office was able to carry out important implementation practices, particularly in project planning, resource allocation, monitoring and evaluation, and stakeholder participation. However, project implementation itself still needs further attention, especially in ensuring contractor compliance, maintaining work progress, and strengthening quality control procedures.
3. The challenges encountered in bridge project implementation were generally manageable. Administrative and financial challenges were not viewed as major barriers. However, environmental and social challenges appeared to be the most serious concerns, particularly weather-related delays and right-of-way issues. Technical challenges also need attention because unforeseen site conditions, technical problems, and limited skilled personnel can affect project progress.
4. The perceived outcomes of bridge projects were effective. The bridge projects were viewed positively in terms of quality, mobility and accessibility, contribution to local economic development, and sustainability. The results show that the projects helped improve access, support movement of people and goods, contribute to community activities, and provide infrastructure that can be useful over the long term.
5. There was a significant relationship between bridge project implementation and perceived bridge project outcomes. This means that better implementation practices are connected with better project results. When planning, resources, execution, monitoring, and stakeholder participation are properly managed, bridge projects are more likely to produce positive outcomes for communities.

RECOMMENDATION

Based on the findings and conclusions of the study, the following recommendations are proposed:

1. The DPWH Third District Engineering Office should strengthen project planning before implementation. Greater attention should be given to realistic project timelines, complete feasibility studies, risk assessment, and early identification of project needs to help reduce delays during construction.
2. The office should improve resource allocation and procurement processes. Budget, materials, equipment, and manpower should be prepared and monitored closely so that project activities can proceed on time and without unnecessary interruptions.
3. Contractor compliance with technical standards and safety protocols should be strictly monitored. Regular site inspections, quality control checks, and safety audits should be conducted to ensure that contractors follow approved plans, specifications, and construction standards.
4. Monitoring and evaluation practices should be made more accurate and consistent. Inspection reports should clearly reflect actual project conditions, and identified issues should be acted upon immediately to prevent delays, rework, or quality problems.
5. Environmental and social risks should be addressed before and during implementation. Since weather conditions and

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right-of-way issues were major challenges, the office should conduct early coordination with concerned agencies, LGUs, and affected communities to reduce possible disruptions.

6. Stakeholder participation should be further strengthened. The DPWH, LGUs, community members, and contractors should maintain open communication so that project concerns, feedback, and community needs are properly considered during implementation.
7. Technical personnel should be given continuous training. Engineers, inspectors, and other project staff should receive capacity-building activities on bridge construction, quality assurance, risk management, documentation, and modern project monitoring tools.
8. Completed bridge projects should undergo regular post-project evaluation. The office should assess the quality, usability, mobility benefits, economic contribution, and maintenance needs of completed bridges to guide future project improvement.
9. The proposed development framework should be adopted and refined by the DPWH Third District Engineering Office. It may serve as a practical guide for improving project planning, implementation, monitoring, stakeholder coordination, and long-term project outcomes.
10. Future researchers may conduct a similar study involving other DPWH district engineering offices or other types of infrastructure projects. This can help compare results and provide broader insights into infrastructure project implementation and outcomes.

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