Relationship Between Cost Overruns and Structural Quality Outcomes of Farm-to-Market Roads in Selected Districts of the Philippines

Johanna Marie F. Espina, Sheanne Marie E. Iglesia, Mike A. Villafuerte, Ma. Magdalena V. Gatdula

Department of Civil Engineering, Bulacan State University, Malolos, Bulacan, Philippines

DOI: https://doi.org/10.47772/IJRISS.2026.100600894

Received: 20 June 2026; Accepted: 25 June 2026; Published: 08 July 2026

THE PROBLEM AND ITS BACKGROUND

Introduction

In a developing country like the Philippines, agriculture development serves a vital role in the nation's support for economic expansion, rural development, and food security. Farm-to-market roads (FMRs) serve as crucial links between agricultural production areas and markets. The continued investment of the government to FMRs hope to improve the access of farmers to markets to significantly upgrade the flow of goods. An improved accessibility means efficiency in transport and logistics of goods, reducing costs, maximizing farmers' income, and eventually enhanced economic development.

Although the implementation of farm-to-market roads received substantial funding and planning, many of these projects still face adversity, especially in terms of the cost overruns. Cost overruns happen when the actual cost of a project exceeds its initial cost estimate throughout the completion of the project. This can be brought up by various factors such as inaccurate cost estimation, poor planning and management, sudden change in material costs, design modifications, and unforeseen circumstances. It becomes more demanding that FMRs experience cost overruns since it includes public resources and may lead to delay of public service delivery.

The implications of cost overruns not only focuses on the financial consequences but also on the structural quality outcomes of the farm-to-market roads. Every infrastructure should meet the established structural standards in terms of specific criterias. When cost overruns happen, contractors will face financial constraints, which can lead to cost-cutting measures like using substandard materials, and reduction of manpower and labor. In other cases, cost overruns can also positively influence a construction by addressing design improvements and compliance requirements. These adjustments may have a huge impact on the overall quality and long-term performance of the infrastructure. Having this said, the relationship between cost overruns and structural quality outcomes may not always be negative. There is a need for in depth analysis for their relationship because it determines whether increased project costs contribute to the improvement of the infrastructure or lead to compromised quality.

In the Philippines, concerns involving cost overruns and structural quality outcomes have been addressed in reports and studies, stressing the need for a more in-depth investigation. However, existing papers often study cost overruns and structural quality individually with minimal focus on how cost overruns are associated with the structural quality of farm-to-market roads. Given these concerns, this study aims to examine the relationship between cost overruns and structural quality outcomes of Farm-to-Market Roads in selected districts of the Philippines. By highlighting how variations in project costs are linked with various structural quality, the study seeks to have a better insight that can inform better project and cost management. The findings of this study may contribute to the improvement of accountability, efficiency, and overall performance of Philippine farm-to-market roads.

Statement of the Problem

This study aims to determine the relationship between cost overruns and structural quality outcomes of Philippine government infrastructure projects, specifically the Farm-to-Market Roads in Selected Districts of the Philippines.

Specifically, this study will find answers to the following questions:

1. What is the extent of cost overruns in these projects in terms of budget variance from the original contract cost?

2. What are the observed structural quality outcomes of completed government infrastructure projects in terms of compliance with specifications, presence of defects, and overall performance?

3. Is there a significant relationship between cost overruns and structural quality outcomes in Philippine government infrastructure projects?

Significance of the Study

The in depth analysis of this study provides a comprehensive understanding of the relationship between cost overruns and structural quality outcomes of Farm-to-Market Roads in selected districts in the Philippines. The study is beneficial in the field of civil engineering, specifically in construction management. The study presents functional information on project planning, management, and implementation to come up with economical, effective, and adaptive quality construction practices in the Philippines.

For civil engineering students, this study reveals how theoretical concepts like scheduling, estimation, and quality assurance should be implemented in real life. Understanding the crucial parts will assure a proper application in professional practice.

For the faculties, this study gives an important take that should be included both in the academe and in the production of more research papers. The proper integration of this topic can create healthy classroom conversations regarding construction performance and infrastructure quality.

For policy makers and the administrators, the proper management and planning techniques in construction can be achieved by understanding the key components presented in this study. The relationship between variables, whether positive or negative, should improve accountability and proper allocation of public funds.

For future researchers, the lapses of this paper can be an open door for more questions and exploration to create more in depth analysis of the relationship between cost overruns and structural quality outcomes.

For other stakeholders, the perspective of this study will be beneficial to the public. The proper integration of processes will create a better construction industry that will pave the way for the public to gain more access and experience improved quality outcomes in government funded infrastructure projects.

Scope of the Study

This study investigates the correlation between the cost overruns and structural quality outcomes undertaken by the Philippine government, analyzing 20 completed Farm to Market Road (FMR) projects in different districts. This study focuses only at the various Farm to Market Road (FMR) projects.

The primary variables of the study include:

(1) Cost overruns, measured as the percent difference between the actual cost and contract cost; (2) Structural quality outcomes, evaluated through compliance with specifications, presence of defects, and overall operational performance.

The study aims to evaluate how cost overruns are correlated with changes in structural quality outcomes, providing empirical insights applicable to infrastructure management and policy development.

Limitations of the Study

This study has several limitations. Firstly, it focuses on the selected Farm to Market Roads (FMR) projects across multiple districts in the Philippines. Secondly, the research partially depends on reports available in the official government website and self-reported information from project stakeholders, which could lead to response bias or inconsistencies stemming from subjective evaluations or incomplete memories.

Additionally, the accessibility of comprehensive and uniform project documentation may vary among agencies, which could affect the comparability and completeness of data. The assessment of structural quality outcomes is also limited by the availability of evaluation data by the COA, as not all projects receive consistent or long-term performance evaluations.

In addition, external factors such as political influences, purchasing procedure, environmental conditions, and unexpected occurrences are not controlled in the analysis, despite they may affect costs, and quality. Finally, the study employs a correlational research design; although relationships between variables can be identified, care must be taken when making causal inferences.

Despite these limitations, the research presents a focused and evidence-driven analysis of significant performance challenges in Farm to Market Road (FMR) projects in the Philippine government, offering essential insights for enhancing project execution and quality results.

Definition of Terms

Budget Variance. According to PMI (2021), budget variance refers to the difference between the planned budget and the actual cost of a project. In this study, it is defined as the numerical difference between the actual project cost and the original contract cost, expressed in Philippine pesos.

Compliance with Specifications. As defined by Zhang Wei (2021), compliance refers to which construction outputs meet the approved design standards, technical specifications, and regulatory requirements. In this study, it measures the extent to which FMR projects adhered to approved road width, pavement thickness,and shoulder specifications as indicated in project reports and documentation.

Cost Overruns. Cost overrun is the act of a company incurring excess expenses outside of the planned budget for a project. (Sharma, D., 2025). As used in this study, cost overruns refer to when a specific project's initial cost estimate is exceeded throughout the completion of the project.

Farm-to-Market Roads (FMRs). According to the Department of Agriculture (2018), FMRs are roads that provide access from agricultural production areas to nearby markets to facilitate transport of farm produce. In this study, FMRs refer specifically to the road projects included in the COA audit, constructed to improve rural connectivity and access to local and regional markets.

Presence of Defects. Love and Li (2000) describe defects as observable issues such as cracks, spalling, or material failures in a structure. In this study, it refers to construction issues identified during COA audits, including pavement scaling, cracks, and partial shoulder absence.

Structural Quality. A practice of construction that ensures the structures are designed to support the structural load without any sort of breaking or to prevent any possible collapses and downturns. (Pinnacle Infotech, 2024). In this study, it refers to how well the completed FMR projects comply with design standards, maintain structural integrity, and provide safe and durable roads.

ISSN No. 2454-6186 | DOI: 10.47772/IJRISS | Volume X Issue VI June 2026

Structural Quality Outcomes. Zhai Wei (2021) describes structural quality outcomes as the overall performance and condition of constructed infrastructure. In this study, it is assessed based on compliance with specifications, defects observed, and operational performance as recorded in COA audits.

THEORETICAL FRAMEWORK

This chapter presents the review of related literature and studies relevant to the relationship between cost overruns and structural quality outcomes in government infrastructure projects in the Philippines. It includes both local and foreign sources, conceptual framework, and hypothesis of the study. These elements provide a cohesive foundation for the study and help identify the gaps that this study aims to address.

Relevant Theories

This section presents the relevant guiding theories of the study, which provide explanations for the causes of cost overruns and its possible effects on structural quality outcomes. These theories provide behavioral, technical, and process-based perspectives on how the two variables may arise and influence construction performance.

Strategic Misrepresentation Theory (Flyvbjerg, 2002)

Bent Flyvbjerg (2002) explained that some cost estimates in infrastructure projects are intentionally underestimated to increase the chances of winning a bid or any approval. The theory believes that project proponents may deliberately present overly optimistic numbers due to organizational, financial, and political pressures. This leads to cost overruns due to the inaccurate estimates.

Buhl, Flyvbjerg, and Holm (2002) analyzed 258 infrastructure projects across the world and found out that cost estimates were consistently underestimated. Their study concluded that the said underestimations did not come from technical errors alone but by strategic misrepresentation. The findings suggest that the overruns are the result of intentional and deliberate actions during the planning stage of the projects. Similarly, Baerenbold (2023) revealed in her study that the primary cause of cost overruns in large infrastructure projects are optimism bias and misrepresentation. There are identified biases in planning endeavours that resulted in budget deviations during the completion of the project.

This theory provides the present study with a foundation for understanding that cost overruns may arise from intentional actions during the planning phase. It supports the analysis of how these financial deviations may be associated with structural quality outcomes.

Technical and Economic Inaccuracy Theory (Odeck and Wachs, 2004)

The theory of technical and economic inaccuracy states that cost overruns in construction occur due to the unforeseen and unintentional errors in forecasting. This is caused by incomplete data during estimation, limitations in techniques, and even economic uncertainties. According to Odeck and Wachs, these inaccuracies are possibly from unpredictable market conditions as well as limitations posed in such situations.

A study by Cantarelli et al. (2013), identified that the main causes of cost overruns in large-scale infrastructure projects are technical. These include changing project conditions, incomplete estimates, and insufficient data. These findings support the claim of this theory that cost overruns may result from technical inaccuracies.

This theory is relevant to the present study as it presents how cost overruns may result from technical and unforeseen estimation errors rather than intentional and deliberate actions. It also provides a basis for analyzing cost performance and its possible deviations.

Transformation-Flow-Value (TFV) Theory (Koskela, 2000)

Lauri Koskela (2000) believes that construction should be a system composed of transformation, flow, and value. According to Koskela, traditional construction focuses mainly on the conversion of input to output (transformation) while neglecting the importance of flow and value to the whole process of construction. The inefficient flow of construction and value generation lead to delays, work interruptions, waste, and increased cost.

Tayyab Ahmad (2020) emphasized that the TFV theory serves as a system in analyzing inefficiencies, waste, and value generation in construction processes, which directly influence the project performance. By highlighting the importance of flow and value, the study identified the causes of process inefficiencies and quality deficiencies.

This theory is relevant to the present study as it emphasizes how inefficiencies and deficiencies in the construction process may lead to additional cost and may directly affect structural quality outcomes.

Pathogen Theory (Rework-Overrun Link) (Love, 2012)

Underlying issues in construction projects such as design errors, poor communication, unsatisfactory project management are considered as “pathogens”. These pathogens lead to error and rework, which will subsequently increase construction cost and labor.

According to “Quantifying the Causes and Costs of Rework in Construction” by Love and Li (2000), the occurrence of rework is a common recurring problem in construction due to design errors and poor management.

This theory is relevant to the present study as it presents the link between cost overruns and structural quality outcomes through rework.

RELATED LITERATURE

This section presents relevant literature that helps the proponents end up with the conceptual framework of this study. Thus, these sources containing key theories help the proponents support the independent and dependent variables of this study (cost overruns and structural quality outcomes, respectively) and answer the research problems consequently.

Causes of Cost Overruns

According to Abdelalim et al. (2024), cost overruns are rooted from both technical and managerial factors including weak financial strategy, poor planning and design management, and inaccurate cost estimation. Odeck and Wachs (2024), in the Technical and Economic Inaccuracy Theory, explains that deficiencies in planning which involves cost estimation are factors resulting in cost overruns and this was aligned with the former claim by Abdelalim et al.

In addition to this - according to Aljohani et al. (2017), through a comprehensive literature, the cost performance of an infrastructure including cost overruns can only be improved when causes are taken into account. Thus, external economic factors such as project complexity and ambiguous scope, and uncertain economic conditions together with inaccurate estimations are the root causes of cost overruns. This aligns with the abovementioned Technical and Economic Inaccuracy Theory by Odeck and Wachs in 2024.

Flyvbjerg (2017) stated that the tendency of infrastructure projects to go over the initial budget and schedule attributes to strategic misrepresentation and optimism bias where project costs are intentionally underestimated as explained by the “Iron Law of Megaproject Management”. The literature is based on Strategic Misrepresentation Theory (Flyvbjerg, 2002) that highlights the existence of institutional pressure in decision-making in construction which leads to intentional undermining of project costs.

From the Pathogen Theory (Love, 2012) which explains that errors and rework behaves like “pathogens”, Simushi and Wium (2020) identified that cost overruns come from inadequate planning and management, even communication mishaps lead to work delays which will eventually require rework. These cause waste of resources and labor. The literature highlights the importance of proper coordination and control in construction.

Factors Affecting Structural Quality Outcomes

According to Bakeli (2023), practicing integration of theoretical construction concepts into the design of an infrastructure during project execution is part of constructability that helps in achieving a positive project outcome by improving efficiency, minimizing errors, and enhancing structural quality. This is relevant to the abovementioned Transformation-Flow-Value (TFV) Theory of Koskela in 2000 since both explained the significance of the process in obtaining a positive construction outcome.

Meanwhile - according to Sophie (2025), compliance to the standard, conduct of inspection, and proper supervision are methods of quality control in construction projects that are vital for ensuring structural integrity and therefore reducing the defects of a project. This study is also relevant to the abovementioned Transformation-Flow-Value (TFV) Theory of Koskela, 2000 for both emphasizes that consistent practice of quality assurance processes ensures a positive quality outcome.

Lastly, Wawak et al. (2020) explains that structural quality does not depend solely on one factor. Hence, performance of a structure collectively depends on construction key quality factors such as management practices, quality of materials, competence of workforce, and compliance with standards. Simply put, this suggest that both the process and resources are the foundation of a structure which is also aligned with TFV Theory.

Related Studies

This chapter presents existing earlier research on cost overruns on construction and structural quality, offering in depth details and highlighting the gap between the two variables.

Studies on Construction Cost Overruns

A research conducted by Atapattu, Domingo, and Sutrisna (2022) examined 142 journal articles regarding construction cost overruns. They found that cost overruns are a worldwide problem, with numerous projects going over budget by approximately 28 percent. The study highlighted key factors contributing to this issue, including ineffective project management, insufficient risk assessment, lack of thorough cost-benefit analysis, delays in decision-making, and substandard construction practices.

The research highlighted that issues with project performance, such as inadequate cost management, poor time management, and ineffective construction methods, significantly impact project results. This indicates that cost overruns are not just financial issues but are also related to the quality and performance of the project. This study is crucial for the current research as it shows how budget overruns can influence the structural quality and effectiveness of government infrastructure projects.

A recent study by Jonas Eliasson (2025) examined the reasons and potential solutions for cost overruns in transport infrastructure projects in Sweden. The research looked at projects finished between 2004 and 2022 and discovered that most cost increases occurred during the planning phase instead of during construction. The study indicated that initial cost estimates are frequently inaccurate because project designs, technical needs, and project conditions remain uncertain at the start of the planning process.

The research found multiple reasons for cost overruns, such as changes in scope, incorrect cost estimates, ineffective cost management, influence from stakeholders, optimism bias, and inadequate planning choices. It also presented the "lock-in" effect, which occurs when projects proceed despite increasing costs due to commitments made in the initial planning phase.

Studies on Structural Quality Outcomes

Zhang Wei (2021) emphasizes that quality control is crucial in the reinforcement process for building structures. The study emphasizes that the quality of a structure is essential for guaranteeing safety and stability in construction. Reinforcement works are more intricate than new builds due to the need for detailed evaluations of the structure, materials, and various other factors.

The study suggests that the quality of a reinforced structure relies on effective planning, gathering information, and teamwork between designers and builders. Additionally, it was found that insufficient investigation, poor design choices, and a lack of technical skills can impede the reinforcement process, leading to reduced stability of the structure.

Additionally, the research highlighted various typical reinforcement methods, including carbon fiber, steel bonding, and increasing cross-sections. When applied properly, these methods were linked to improved load-bearing capacity and durability. However, the effectiveness of reinforcement relied heavily on strict quality control. Any failures in these processes may result in faulty reinforcement and impact its long-term effectiveness.

Furthermore, the study emphasized that quality control is not solely dependent on technical factors. Rather, it involves thorough assessment before construction, monitoring during its implementation, and examination after finishing. Each of these processes contributes to the attainment of structural outcomes that satisfy safety criteria and are able to function accordingly. Ineffectiveness at any of these steps could contribute to inadequate quality outcomes, and thus the possibility of deteriorations or even structural failures.

The current study finds relevance in this study in terms of emphasizing that quality outcomes in the structural sector depend significantly on how the project is managed and implemented. However, in contrast to Zhang Wei (2021), focused on quality control in structural reinforcement, this study did not provide sufficient information about possible impacts of financial factors, especially cost overruns, on quality outcomes. Thus, more discussion is warranted in relation to this issue, especially in Philippine government infrastructure projects.

Conceptual Framework

Relationship Between Cost Overruns and Structural Quality Outcomes in Philippine Government Infrastructure Projects

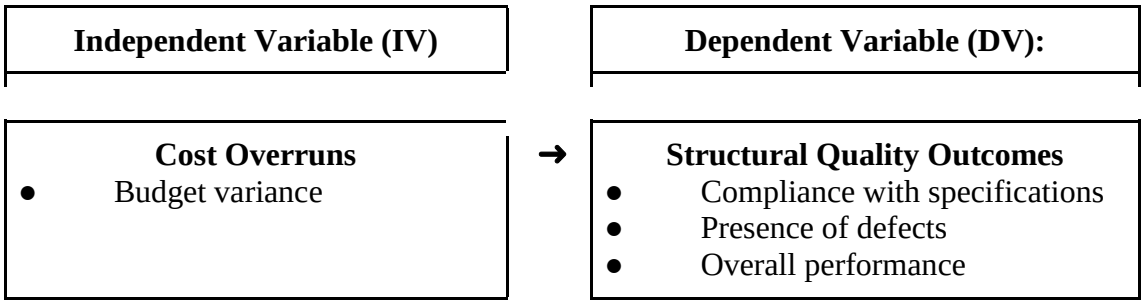

Figure 1. Conceptual Framework of the Study on the Relationship Between Cost Overruns and Structural Quality Outcomes of Farm-to-Market Roads in Selected Districts of the Philippines

Figure 1 shows the conceptual framework of the study on the relationship between cost overruns and structural quality outcomes of Farm-to-Market Roads in Selected Districts of the Philippines. The framework illustrates the relationship between the independent and dependent variables.

The independent variable in this study is cost overruns. It refers to the amount by which the actual project cost exceeded the original or contract cost. It is measured by budget variance from the original cost.

The dependent variable in this study is structural quality outcomes which is said to be directly affected by the independent variable, cost overruns. It is measured in terms of compliance with specifications, presence of defects, and overall performance of infrastructures.

The arrow in the framework indicates the direction of influence, highlighting that budget variance and increase in initial project cost can lead to variations in an infrastructure's structural quality outcomes.

Hypotheses of the Study

H_0: There is no significant relationship between cost overruns and structural quality outcomes.
H_1: There is a significant relationship between cost overruns and structural quality outcomes.

RESEARCH METHODOLOGY

This chapter presents the research methodology used in the study. It contains the research approach and design, population and sample, research instrument, data gathering procedure, and data processing and statistical treatment. The study used a quantitative approach using a correlational design to study the relationship between cost overruns and structural quality outcomes in government infrastructure projects specifically in Farm-to-Market Roads in Selected Districts of the Philippines.

It includes the population and sample, research instrument, data gathering procedure, and statistical treatment of data. The overall process involves the collection of data from selected government infrastructure projects through audit reports, the organization and analysis of data using the appropriate statistical tools, and the interpretation of results to fulfill the study purpose.

Methods and Techniques of the Study

The study used a quantitative approach using a non-experimental correlational research design since the study involves numerical data such as cost overruns and structural quality scores from audit reports. The data involved in the study were analyzed statistically.

The relationship between cost overruns and structural quality outcomes was determined by employing correlational design without manipulating the existing variables. The study is non-experimental in nature since the data used were from existing project records and audit reports.

Population and Sample of the Study

The population of this study consists of accomplished government infrastructure projects in the Philippines, specifically Farm-to-Market Roads (FMRs) funded and implemented by government agencies and local government units (LGUs) with cost and structural quality data available. The study focuses on projects that have both relevant and current data on cost performance and structural quality outcomes.

A purposive sampling method was used to select 20 FMRs projects with available audit reports from the Commission on Audit (COA) and implemented by the Department of Public Works and Highways (DPWH). The projects were selected based on the availability of complete and detailed contract and actual cost, post-construction inspection in compliance with established structural specifications, defects, and structural performance. Due to this, the study will only have verified and complete data enabling accurate analysis of the relationship between cost overruns and structural quality outcomes.

Research Instrument

The data for this research were gathered by reviewing documents and using structured data extraction forms. The main sources included publicly available audit reports, project accomplishment reports, and official government records from the COA and DPWH. An Excel-based template was utilized to systematically capture

important details such as project name, contract cost, actual cost, percentage cost overruns, structural quality indicators, and audit observations.

Data Gathering Procedure

The researchers started collecting data by locating and utilizing publicly available secondary sources, especially from the Department of Public works and Highways (DPWH) and Commission on Audit (COA). As the date for the study consisted of publicly accessible government documents, no formal permission was needed; however, ethical standards for data usage and proper citation were carefully followed.

The researcher created a data extraction tool to systematically capture important details like contract cost, actual costs, and indicators of structural quality. To gather data, researcher conducted a comprehensive review of official audit documents and online government databases. Lastly, the collected data were carefully organized, verified, and entered into the data extraction tool, ready for statistical analysis.

Data Processing and Statistical Treatment

Microsoft Excel was used to process the collected data. The independent variable - cost overruns which is determined by budget variance was calculated as the difference between contract and actual cost, expressed in Philippine peso and percentage, of the public funded FMR projects in selected districts in the Philippines. On the other hand, for the dependent variable of this study - overall structural quality outcomes, the proponents calculated the average of the three (3) metrics with (1-5 scale) intended for compliance with specifications, presence of defects, and overall performance. Finally, Pearson correlation coefficient (r) was used to examine the goal of this study - relationship between cost overruns and structural quality outcomes. To visualize the results, tables , scattered plot, and descriptive statistics were used by the proponents.

Resentation, Analysis, and Interpretation of Data

This chapter presents the study's findings, including data analysis and result interpretation based on the statement of the problem. It contains the discussion and presentation of collected data using statistical methods and tools. Tables, charts, and figures are utilized to clearly organize and present the results. The discussion is structured according to the specific identified problems in the study, ensuring that the objectives, analysis, and interpretation of findings are aligned.

I. Extent of Cost Overruns in Government Infrastructure Projects

Extent of cost overruns of 20 public funded Farm-to-Market Road (FMR) projects across different districts in the Philippines are presented in this section. From being a set of raw data from reports and documentation of Commission on Audit, the proponents extracted and compared contract and actual cost to classify projects having cost overruns or savings. This section is significant for knowing the extent of cost overruns will lead to identification of areas that need financial overseeing improvement.

Cost overruns of each project were measured using the formula:

$$\text{Cost Overrun}\,(\%) = \frac{\text{Actual Cost} - \text{Contract Cost}}{\text{Contract Cost}} \times 100$$

ISSN No. 2454-6186 | DOI: 10.47772/IJRISS | Volume X Issue VI June 2026

Table 1

Summary of Contract Costs vs. Actual Costs

District Project	**Contract Cost (Php)**	**Actual Cost (Php)**	**Cost Variance (Php)**	**Variance %**	**Remarks**
Cagayan 3rd DEO – Cabbo-Balluag FMR	9448115.88	9949770.76	-501654.88	-5.31	Minor revisions; minor deficiencies noted
Cagayan 3rd DEO – Monte Alegre-Manalo-Magogod-Dadda FMR	19007660.33	19857356.51	-849696.18	-4.47	Minor cost overruns due to additional items
Cagayan 3rd DEO – Dassun-Malacabibi FMR	9451953	9949781.68	-497828.68	-5.27	Shoulder and minor workmanship issues
Iloilo 4th DEO – Brgy. Malublub, Leon	469567.61	469909.8	-342.19	-0.07	Minor discrepancies; technically compliant
Iloilo 4th DEO – Brgy. Igcadios, Leon	469567.61	469909.8	-342.19	-0.07	Minor deviations
Iloilo 4th DEO – Facomia Road, Brgy. Poblacion	979041.53	938696.48	40345.05	4.12	Some spalling and scaling; cost savings
Iloilo 4th DEO – SitioBugtong-Consolacion-Sitio Lanag	979041.53	938696.49	40345.04	4.12	Minor defects; corrective measures recommended
Iloilo 4th DEO – Brgys.Taban-Maguining-Sulong	1958844.49	1879025.79	79818.7	4.07	Savings from reduced materials; minor workmanship issues
Lanao del Norte 2nd DEO – Brgy. Upper Hinaplanon FMR	14779541.57	14779541.57	0	0	Project completed; minor defects corrected

Lanao del Norte 2nd DEO – Brgy. Kiwaian-Farm to Market Road	27490821.46	27490821.46	0	0	Fully compliant
Lanao del Norte 2nd DEO – Brgy. Salong-Baroy-Bato	27229304.92	27229304.92	0	0	Minor scaling and cracks
CARAGA RO XIII – Bitan-agan FMR, Brgy. Bitan-agan	14327101.9	14327101.9	0	0	Minor defects observed
CARAGA RO XIII – Purok 3, Matabao FMR, Buenavista	4884805.29	4884805.29	0	0	Minor cracks/spalling
Cavite 1st DEO – Sitio Taktak, Kaypaaba, Gen. Emilio Aguinaldo	2000000	1942190.63	57809.37	2.89	Project deficiency noted P59,791.83; corrective action recommended
Cavite 1st DEO – Muzon-Labac, Naic	1000000	971083.82	28916.18	2.89	Location differs from plan; minor cracks and spalling
Cavite 1st DEO – Langkaan Road Reblocking	999801.15	997978.35	1822.8	0.18	Completed beyond schedule; minor deficiencies
Cavite 1st DEO – Aliang Road Reblocking	1499768	1498386.4	1381.6	0.09	Completed as per contract
Cavite 1st DEO – Daang Kalabaw, Salinas I	9000000	8969173.76	30826.24	0.34	Minor deviations; corrective maintenance recommended
Cavite 1st DEO – Tubuan-Iba-Pajo Road	1000000	911149.38	88850.62	8.89	Paid without complete documentation; minor issues
Cavite 1st DEO – Kabulusan FMR	2500000	2465333.89	34666.11	1.39	Minor cracks/spalling; project completed

ISSN No. 2454-6186 | DOI: 10.47772/IJRISS | Volume X Issue VI June 2026

Table 1 Shows That out of the Twenty (20) Public Funded FMR Projects That Underwent the Cost Analysis, Five (5) Projects Experienced Cost Overruns, with -5.31% Being the Largest Overrun, Which are Brought up by Unforeseen Site Conditions, Program of Work Revision, and Even Implementation Delays. On the Other Hand, 10 Projects Were Completed Below the Budget, with +8.89%, Suggesting Proper Execution and Efficient Resource Management.

Table 1 Also Shows an Average Variance Which is Approximately Equal to 0.69% Which Suggests That in Terms of Financial Aspect, Everything Falls Within What is Specified in the Contract. Focusing on the Remarks Column, the Proponents Highlighted That Cost Overruns Come with Minor Deficiencies, Issues in Documentation, or Even Order/Item Variations. Meanwhile, Project Savings Come with Reduced Use of Materials or Small Differences Not Affecting the Project.

To Sum up, Table 1 Emphasizes That Amidst the 75% of the Projects That Have Achieved Budget Compliance, Enhanced Methods That Can Avoid Situations That Happened to the 25% Must be Required.

II. Structural Quality Outcomes of Completed Government Infrastructure Projects

The structural quality outcomes were evaluated using the three key indicators: adherence to specifications, occurrence of defect and overall operational performance.

Table 2

Metric for Structural Quality Outcomes

Score	Compliance	Defects	Performance
5	Fully compliant	No defects	Fully functional and safe
4	Mostly compliant	Minor defects	Functional, minor maintenance needed
3	Partially compliant	Moderate defects	Functional, corrective maintenance needed
2	Non-compliant	Severe defects	Partially functional
1	Non-functional	Critical defects	Unsafe / non-functional

Table 2 shows a numerical quality score (1–5) was assigned to each project based on three metrics:

1. Compliance with Specifications (width, thickness, shoulder)

2. Observed Defects (spalling, scaling, cracks, potholes)

3. Overall Performance (functionality, safety, operational status)

The overall quality score is the average of the three metrics.

Table 3

Quality Scores per Project

District / Project	Compliance (1-5)	Defects (1-5)	Performance (1-5)	Remarks	Overall Quality Score
Cagayan 3rd DEO – Cabbo-Balluag FMR	4	4	4	Minor revisions, minor workmanship issues	4
Cagayan 3rd DEO – Monte Alegre-Manalo-Magogod-Dadda FMR	4	4	4	Minor cost overruns, minor defects observed	4
Cagayan 3rd DEO – Dassun-Malacabibi FMR	4	4	4	Shoulder defects, minor spalling noted	4
Iloilo 4th DEO – Brgy. Malublub, Leon	5	4	5	Insufficient shoulder, minor erosion from rains	4.67
Iloilo 4th DEO – Brgy. Igcadios, Leon	5	4	5	Minor pavement spalling, mostly compliant	4.67
Iloilo 4th DEO – Facomia Road, Brgy. Poblacion	4	3	4	Spalling and scaling, corrective maintenance recommended	3.67
Iloilo 4th DEO – Sitio Bugtong-Consolacion-Sitio Lanag	4	3	4	Popouts and shallow spalling, minor defects	3.67
Iloilo 4th DEO – Brgys.Taban-Maguining-Sulong	4	3	4	Minor workmanship issues on road shoulders	3.67
Lanao del Norte 2nd DEO – Brgy. Upper Hinaplanon FMR	5	4	5	Minor defects, corrected after inspection	4.67

Lanao del Norte 2nd DEO – Brgy. Kiwaian-Farm to Market Road	5	4	5	Minor spalling and cracks, fully functional	4.67
Lanao del Norte 2nd DEO – Brgy. Salong-Baroy-Bato	5	4	5	Scaling and small cracks observed	4.67
CARAGA RO XIII – Bitan-agan FMR, Brgy. Bitan-agan	4	3	4	Minor defects observed, mostly functional	3.67
CARAGA RO XIII – Purok 3, Matabao FMR, Buenavista	4	3	4	Cracks and spalling noted on site, minor maintenance	3.67
Cavite 1st DEO – Sitio Taktak, Kaypaaba, Gen. Emilio Aguinaldo	3	2	3	Project deficiency P59,791.83; POW deviations	2.67
Cavite 1st DEO – Muzon-Labac, Naic	3	2	3	Location differs from plan, transverse cracks observed	2.67
Cavite 1st DEO – Langkaan Road Reblocking	4	3	4	Completed beyond schedule, minor defects	3.67
Cavite 1st DEO – Aliang Road Reblocking	5	4	5	Completed as per contract, minor observations	4.67
Cavite 1st DEO – Daang Kalabaw, Salinas I	4	3	4	Minor deviations, some cracks; corrective maintenance needed	3.67
Cavite 1st DEO – Tubuan-Iba-Pajo Road	3	2	3	Incomplete documentation, minor cracks	2.67
Cavite 1st DEO – Kabulusan FMR	4	3	4	Transverse cracks and scaling; defects noted	3.67

The quality assessment reveals several key trends:

1. The average compliance score across all projects is 4.15. This suggests that most projects adhered reasonably well to technical specifications.

2. The average defects score is lower at 3.3, reflecting that many projects had visible deficiencies, including cracks, spalling, and minor deviations from the approved design.

3. Average performance is 4.15, indicating that most roads are functional and usable, though some required corrective maintenance to fully meet operational expectations.

The average score for Overall Structural Quality is 3.87. This indicates a generally satisfactory outcome but highlights the need for improvement in both reduction of defects and quality of construction. The FMR project in Cavite 1st DEO (Sitio Taktak, Kaypaaba, Gen. Emilio Aguinaldo) has the lowest overall score presenting both compliance deviation and structural deficiencies. On the other hand, the FMR project that obtained the highest overall score is the FMR project in Iloilo 4th DEO (Brgy. Malublub, Leon) suggesting minimal defects and high operational functionality.

From the quality rating table, even though most FMR projects meet the existing standards, there is still a need for strict compliance with technical specifications. The findings suggest continuous monitoring and application of corrective actions for future FMR projects to guarantee an economical yet high-quality infrastructure for the community.

Relationship Between Cost Overruns and Structural Quality Outcomes

To examine the relationship:

- Independent variable: Cost overrun (%)
- Dependent variable: Overall quality score

$$r = \frac{\sum(X_i - \bar{X})(Y_i - \bar{Y})}{\sqrt{\sum(X_i - \bar{X})^2 \sum(Y_i - \bar{Y})^2}}$$

Where X_i = cost variance, Y_i = quality score.

Table 4

Pearson Correlation Coefficient

Statistical Measure	Value
Pearson r	0.159
Significance (p-value)	0.502

Table 4 shows the computed value of r which is 0.159, a positive but very weak correlation. This value of r suggests that there is a small chance that higher cost overruns mean higher structural quality. Lastly, a p-value of 0.502 shows no significance at $\alpha = 0.05$ which suggests that no strong evidence is to prove a significant relationship between cost overruns and structural quality outcomes in the said 20 FMR projects.

ISSN No. 2454-6186 | DOI: 10.47772/IJRISS | Volume X Issue VI June 2026

Figure 1
Relationship Between Cost Overruns and Structural Quality of FMR Projects

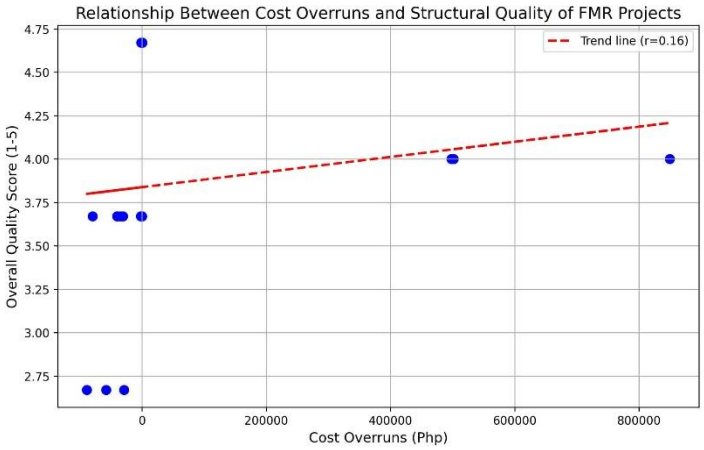

Figure 1 shows the scatter plot that represents cost overruns (independent variable) on the x-axis and overall quality score (dependent variable) on the y-axis. Each project is represented by a point while the red line tries to show the trend in the result of this study. Since most of the projects are near the zero cost variance, only a small amount of overruns and savings are usual. Additionally, no clear linear trend in a plot twist suggests that no trend is formed between higher spending and better quality. Thus, weak correlation suggests that projects with a hand of cost overruns are not consistent in achieving higher quality scores.

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

This chapter presents a summary of the findings from the analysis of Farm-to-Market Road projects, highlighting cost performance, structural quality outcomes, and their relationship. It discusses key insights, conclusions, and provides recommendations for the improvement of the planning, implementation, and quality of government infrastructure projects.

SUMMARY OF FINDINGS

Extent of Cost Overruns in Government Infrastructure Projects

From the 20 Farm-to-Market Road Projects from Selected Districts Across the Philippines, Most of the FMR Projects Were Completed Within or Slightly Under Budget. Five (5) Projects Presented Cost Overruns, with -5.31% Being the Largest Overrun, and +8.89% as the Largest Saving. The FMRs That Exceeded Initial Budget Experienced Deviations Due to Unforeseen Site Conditions, Revision in the Program of Work, and Additional Materials. On the Other Hand, Completed Projects Under Budget Showed Efficient Budget Allocation Through Proper Material Usage and Minor Adjustments That Did Not Compromise Quality. The Average Variance Across All Analyzed FMRs Was Approximately 0.69%. This Suggests That the Financial Performance of the Projects Was Generally in Line with Their Contracts.

II. Structural Quality Outcomes of Completed Government Infrastructure Projects

The structural quality of the farm-to-market road projects was evaluated using three criteria: Compliance with specifications, Defects, and Performance, each rated on a 1–5 scale. The average scores were:

- Compliance: 4.15
- Defects: 3.3
- Performance: 4.15

The average overall quality score was 3.87. This shows that most FMR projects provided safe, functional, and operational roads, with minor defects such as cracks, spalling, partially missing shoulders, and scaling. The

lowest overall score tallied in terms of structural deficiencies and specification deviations was the FMR project in Cavite (Sitio Taktak and Muzon-Labac). On the other hand, projects from Lanao del Norte and Iloilo recorded the highest, suggesting strong adherence to design standards and presenting minimal defects.

Relationship Between Cost Overruns and Structural Quality Outcomes

The Pearson Correlation analysis between cost overruns and structural quality outcomes showed a weak positive correlation of $r = 0.159$, $p = 0.502$. There is no clear linear trend from the scatter plot. This means that projects that spent beyond the contract costs did not regularly achieve higher quality scores. Thus, financial deviation is not a strong indicator of structural quality. Instead, the consistent adherence to established specifications, proper planning and management, and supervision throughout the whole construction process are more crucial indicators of functionality and performance of infrastructures.

CONCLUSIONS

1. In general, there must be a strong financial management among the Farm-to-Market Road (FMR) Projects since computed cost overruns are minimal and can be managed. Thus, overall project planning, monitoring, and execution were adequately performed.

2. In terms of structural quality, most of the projects are completed with functionality and structural integrity. This is given by an average overall quality score of 3.87 (from a 1-5 scale) that was affected by observed manageable defects that do not affect the purpose of the road.

3. There must be a weak relationship between cost overruns and structural quality outcomes. This is given by an statistically insignificant Pearson correlation which suggests that spending beyond the contract cost doesn't affect the structural integrity and functionality of an infrastructure. Basically, overall structural quality outcomes are mostly dependent on other factors such as adherence to technical specifications, construction supervision, and good project management.

4. Projects varied depending on the district. Cavite, showing a lower overall quality score resulted from documented deficiencies in structural quality outcomes. This suggests the urgency for constant monitoring and corrective measures by letting the policy makers and administrators strengthen construction rules and regulations.

Recommendations

1. The Philippine government must enhance their monitoring and therefore implement more strict protocols when it comes to the supervision of projects. As abovementioned, overall quality outcomes depend on factors that occur on the actual construction and this must be taken note especially by the administrators and policy makers of districts with lower quality scores.

2. As such infrastructures are funded by the public, although this study shows minor cost overruns, respective agencies must still continue to do strict monitoring to the cost management practices of every construction project.

3. As structural quality outcomes do not solely depend on the cost of the project and thus depend more on the actual phases of implementation, there must be a standard and complete documentation in every phase of the project. Such documentation including post-construction evaluations will prevent negative structural quality such as defects that may have been rooted from deviations with plans.

4. Continuous professional development must be targeted by project engineers and contractors by undergoing training about construction management that includes discussion about efficiency in material usage and importance of quality control to improve overall quality outcomes of the projects.

5. Future researchers may tend to study this study's variables into more complex systems by identifying larger sample sizes and more broad performance of the infrastructure. Additionally, variables aside from cost overruns and structural quality outcomes may be used to integrate other factors such as contractor experience and different environmental conditions.

REFERENCES

1. AACE International. (2016). Cost Engineering Terminology. AACE International.
2. Aljohani, A., Ahiaga-Dagbui, D. D., & Moore, D. (2017). Construction Projects Cost Overruns: A Literature Review. *International Journal of Construction Management*, 17(3), 177–189.
3. Abdelalim, A., Al-Adwani, M., Salem, M., & Tantawy, M. (2024). An Analysis of Factors Contributing to Cost Overruns in the Global Construction Industry. *Buildings*, 15(1), 18. https://doi.org/10.3390/buildings15010018
4. Abdullah, A., Khan, M., Suhoo, S., & Ullah, K. (2017). Theoretical Framework of the Causes of Construction Time and Cost Overruns. *IOP Conference Series: Materials Science and Engineering*, (271). https://doi.org/10.1088/1757-899X/271/1/012032
5. Ahiaga-Dagbui, D., Aljohani, A., & Moore, D. (2017). Construction Projects Cost Overrun: What Does the Literature Tell Us? *International Journal of Innovation, Management and Technology*, 8(2). https://doi.org/10.18178/ijimt.2017.8.2.717
6. Atapattu, C., Domingo, N., & Sutrisna, M. (2022). Causes and Effects of Cost Overruns in Construction Projects. *Proceedings of the 45th AUBEA Conference*. 23–25 November 2022, Australia.
7. Baerenhold, H. (2023). Optimism Bias and Strategic Misrepresentation in Infrastructure Projects. *Infrastructure Policy Review*, 15(1), 45–60.
8. Bakeli, T. (2023). Positive Project Outcomes Through Constructability: A Comprehensive Analysis.
9. Bakry, R., Ibrahim, A., & Youssef, M. (2023). Technical Audit and Unethical Practices in the Construction Industry. *Civil Engineering Journal: Innovative Strategies in Civil Engineering Grand Challenges*, (9). http://dx.doi.org/10.28991/CEJ-SP2023-09-014
10. Buhl, S., Flyvbjerg, B., & Holm, M. (2002). Underestimating Costs in Public Works Projects: Error or Lie? *Journal of the American Planning Association*, 68(3), 279–295.
11. Cantarelli, C. C., Flyvbjerg, B., Molin, E. J. E., & van Wee, B. (2013). Cost Overruns in Large-Scale Transport Infrastructure Projects: Explanations and Implications. *Transport Reviews*, 32(5), 1–24.
12. Commission on Audit. (2023). *Annual Financial Audit Report*. Government of the Philippines.
13. Department of Agriculture. (2018). *Guidelines for Farm-to-Market Road Development Projects*. Government of the Philippines.
14. Department of Public Works and Highways. (2020). *Standard Specifications for Highways, Bridges, and Airports*. Government of the Philippines.
15. Flyvbjerg, B. (2017). Introduction: The Iron Law of Megaproject Management. *The Oxford Handbook of Megaproject Management*, 1–18.
16. Edwards, D., Irani, Z., Love, P., & Walter, D. (2019). Project Pathogens: The Anatomy of Omission Errors in Construction and Resource Engineering Project. *IEEE Transactions on Engineering Management*, 56(3), 425–435.
17. Eliasson, J. (2025). Cost Overruns of Infrastructure Projects: Distributions, Causes, and Remedies. *Transportation Research Part A*, (198), 104532. https://doi.org/10.1016/j.tra.2025.104532
18. Fang, W., Love, P., Matthews, J., Porter, S., & Sing, M. (2022). State of Science: Why Does Rework Occur in Construction? Where Are Its Consequences? and What Can be Done to Mitigate Its Occurrence? *Engineering*, (8), 246–258.
19. Fowler, F. J. (2014). *Survey Research Methods* (5th ed.). SAGE Publications.
20. Flyvbjerg, B. (2002). Underestimating Costs in Public Works Projects: Error or Lie? *Journal of the American Planning Association*, 68(3), 279–295.
21. Flyvbjerg, B. (2017). The Iron Law of Megaproject Management. *Oxford Review of Economic Policy*, 33(1), 1–25.

22. Flyvbjerg, B., & Holm, M. (2002). Underestimating Costs in Public Works Projects. *Journal of the American Planning Association*, 68(3), 279–295.
23. Gurumayum, S. (2025). Understanding the Causes of Project Delays and Cost Overruns in Construction: A Comprehensive Analysis Across Literature, Surveys, and Case Studies. *Journal of Civil Engineering*, 11(1), 74–94.
24. ISO. (2015). *ISO 9001:2015 Quality Management Systems—Requirements*. International Organization for Standardization.
25. Koskela, L. (2000). *An Exploration Towards a Production Theory and Its Application to Construction*. VTT Technical Research Centre of Finland.
26. Love, P. E. D., & Li, H. (2000). Quantifying the Causes and Costs of Rework in Construction. *Construction Management and Economics*, 18(4), 479–490.
27. Ljevo, Z., Vukomanovic, M., & Wawak, S. (2020). Understanding the Key Quality Factors in Construction Projects: A Systematic Literature Review. *Sustainability*, (12). https://doi.org/10.3390/su122410376
28. Nurdiana, A., & Susanti, R. (2020). Cost Overrun in Construction Projects in Indonesia. *IOP Conference Series: Earth Environmental Science*. https://doi.org/10.1088/1755-1315/506/1/012039
29. Odeck, J., & Wachs, M. (2004). Cost Overruns in Transportation Projects: A Theoretical Explanation. *Transportation Planning and Technology*, 27(1), 43–63.
30. Project Management Institute. (2021). *A Guide to the Project Management Body of Knowledge (PMBOK® Guide)* (7th ed.). PMI.
31. Sharma, D. (2025). Cost Overrun Analysis in Construction Projects. *International Journal of Engineering and Management Research*, 15(2), 112–120.
32. Simushi, S., & Wium, J. (2020). Time and Cost Overruns on Large Projects: Understanding the Root Cause. *Journal of Construction in Developing Countries*, 25(1), 129–146. https://doi.org/10.21315/jcdc2020.25.1.7
33. Sophie, E. (2025). *Quality Control in Construction: Strategies for Implementing Effective Quality Control Measures in Construction Projects.*
34. Turner, J. R. (2016). *Handbook of Project-Based Management* (4th ed.). McGraw-Hill.
35. Wawak, S., et al. (2020). Determinants of Construction Quality Performance. *Engineering, Construction and Architectural Management*, 27(8), 2100–2118.
36. World Bank. (2021). *Infrastructure Development Report*. World Bank Publications.
37. World Bank. (2020). *Public Investment Management and Infrastructure Efficiency*. World Bank Group.
38. Zhang, W. (2021). Study on Quality Control of Construction Structure Reconstruction and Reinforcement. *IOP Conference Series: Earth Environmental Science*. https://doi.org/10.1088/1755-1315/825/1/012027