# Influence of Community Involvement on Road and Canal Projects' Success in Slum Quality Improvement, Mediated by Satisfaction and Communication Quality in Tanjung Priok, North Jakarta

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**ABSTRACT**

*The issue of slum areas in North Jakarta poses a significant challenge that requires serious attention. The Community Implementation Project (CIP) program has emerged as a solution to improve the quality of slum settlements through active community involvement. It is believed that community participation can enhance the success of infrastructure development projects, particularly in terms of quality, sustainability, and long-term maintenance. This study aims to analyze the influence of community involvement on the success of infrastructure projects in slum areas of North Jakarta, with community satisfaction as a mediating variable and government support as a moderating variable. A quantitative research approach is employed, using a survey that involves respondents from six districts in North Jakarta that participate in the CIP program. Data collected through questionnaires will be analyzed using the Structural Equation Modeling–Partial Least Squares (SEM–PLS) method to identify the relationships between variables. The findings of this study are expected to demonstrate that community involvement contributes significantly to project success. Government support is anticipated to strengthen the relationship between community involvement and project outcomes, while community satisfaction may act as a mediator that enhances the effect of participation on project performance.*

| KEYWORDS | Community Involvement, Project Success, CIP Program, SEM–PLS, North Jakarta, Slum Areas |

## INTRODUCTION

Slums represent one of the most complex urban problems requiring integrated handling in Indonesia, particularly in North Jakarta (Meilasari-Sugiana et al., 2018; Putra, 2021). According to data from the Central Statistics Agency (*Badan Pusat Statistik*, BPS), in 2020, around 3.1 million people—or 10.6% of Jakarta's total population—lived in slums (BPS, 2021). These slums are characterized by limited access to clean water, poor sanitation facilities, high population density, and inadequate housing quality (UN-Habitat, 2016).

Slum conditions not only describe the physical degradation of the environment but also reflect the low quality of life among residents. People in slums often face challenges such as poverty, low education levels, poor health, and limited access to public services (Silas, 2000; Winarso & Firman, 2002). These multidimensional issues necessitate comprehensive intervention strategies that position communities as active participants rather than passive beneficiaries.

In 2018, Governor's Regulation Number 90 concerning Improvement of the Quality of Residential Areas in the Context of Structuring Integrated Residential Areas was issued, stipulating that settlement and community quality improvements occur through three stages: the *Rencana Aksi Kesadaran Masyarakat* (Community Action Plan), the *Program*

*Pelaksanaan Kolaboratif* (Collaborative Implementation Program), and monitoring and evaluation (Firman, 2019; Hudalah et al., 2020). This initiative falls under the Jakarta Public Housing and Settlement Areas Office, emphasizing community participation in settlement development (Rukmana, 2018; UN-Habitat, 2020). Here, participation ensures that development aligns with local needs and village characteristics by incorporating residents' aspirations, enabling them to contribute to decision-making and ensuring targeted improvements (Arnstein, 2019; Mansuri & Rao, 2018; Widianingsih & Morrell, 2020).

BPS data on Jakarta's slum areas divide them into slum *Rukun Warga* (RWs) distributed across sub-districts. In North Jakarta Administrative City, there are 80 slum RWs, with Koja District leading at 21 and Kelapa Gading at the bottom with only 6. To address slums, the Jakarta Provincial Government, via the North Jakarta Public Housing and Settlement Areas Department, launched the *Program Pelaksanaan Kolaboratif* (CIP) as part of the *Rencana Aksi Kesadaran Masyarakat* (CAP). The CIP aims to enhance settlement quality through road and canal infrastructure improvements, driven by active community participation (DKI Jakarta Provincial Public Housing and Settlement Area, 2019).

Tanjung Priok District in North Jakarta confronts serious slum arrangement challenges (Rukmana, 2018; Firman et al., 2020). Regional planning data for 2020–2025 highlight progress via two approaches: the CAP and direct slum handling (*penanganan kawasan kumuh*) (Hudalah et al., 2020; UN-Habitat, 2020). Interventions began limitedly in 2020 across 6 RWs, expanded significantly from 2021 to 2023 (arranging 66 RWs via physical and participatory methods), dipped slightly to 56 RWs in 2024, and further to 33 RWs in 2025 as targets neared completion (Widianingsih & Morrell, 2020; Kementerian PUPR, 2021). The government allocated IDR 15.26 billion to Tanjung Priok out of IDR 70.97 billion for six sub-districts, with Papanggo, Rawa Badak Utara, and Sunter Agung villages receiving the largest shares (BPS DKI Jakarta, 2023).

Budget variations across Tanjung Priok villages reflect differing physical needs and the local government's equitable resource strategy based on slum severity and priorities. Urban villages like South Tugu, North Tutum, and Sunter Jaya received smaller allocations but still gained support for key areas such as drainage, road access, and basic social facilities. This proportional approach prioritizes urgency and on-the-ground realities over equal distribution.

Despite CIP's contributions to slum quality improvements, challenges persist, including low community participation, ineffective communication, and suboptimal project outcomes. Existing literature on community participation in infrastructure largely examines direct links to project success (Bekele, 2019; Holcombe et al., 2018). Yet, gaps remain in understanding mediating mechanisms, particularly the underexplored roles of satisfaction and communication quality in slum programs.

Studies like Firlandy et al. (2020) and Kaotjil et al. (2024) show community-based management boosts infrastructure quality and sustainability. Similarly, Simarmata et al. (2024) and Laurent and Safari (2021) stress involvement in planning. However, they overlook satisfaction and communication quality as mediators between participation and performance.

Moreover, while Draçi (2023) and Di Maddaloni and Luca (2022) note local communities' marginalization in major projects, empirical work on Indonesian urban slums is scarce. This study fills that gap by probing not just whether community involvement affects project success but how and through what mechanisms.

This study analyzes the influence of community involvement on road and canal projects' success in slum quality improvement, mediated by satisfaction and communication quality in Tanjung Priok, North Jakarta, within the CIP. Using Structural Equation Modeling (SEM-PLS), it targets Sunter Jaya, Sunter Agung, and Papanggo sub-districts. Contributions include: a model integrating mediators; empirical insights from Indonesian slums; and practical recommendations for participatory programs' effectiveness and sustainability.

## METHOD

This study used a quantitative approach with a survey method. The quantitative research design was chosen because it aims to measure the relationships between variables objectively and numerically, as well as analyze them through statistical techniques. This approach is based on a positivistic paradigm that views social phenomena as something that can be empirically measured and statistically tested. This research focuses on the relationship between community engagement, community satisfaction, communication quality, and the success of infrastructure projects in slum areas of North Jakarta.

The population in this study is people living in slum areas of Tanjung Priok District, North Jakarta, especially in Sunter Jaya, Sunter Agung, and Papanggo Villages, which are involved or affected by the City Improvement Program (CIP).

The sampling technique uses probability sampling with the random sampling method, so that each member of the population has the same chance of being selected. The number of samples was determined based on the needs of the SEM-PLS analysis, where the adequate sample size ranged from 100–200 respondents. The sample consists of residents of various ages, genders, and education levels relevant to the implementation of infrastructure projects.

Data was collected through structured questionnaires that were distributed online (Google Form) and offline (direct distribution) to respondents. The questionnaire uses a Likert scale of 1–5, ranging from "Strongly Disagree" to "Strongly Agree". The research instrument consists of several parts, namely:

1) Respondents' identities (age, gender, education, occupation, and length of stay).
2) Community involvement in project planning, implementation, and supervision.
3) Community satisfaction with the results and project processes.
4) Quality of communication between the community, government, and project implementers.
5) The success of the project in terms of timeliness and quality of work results. In addition to surveys, the researcher also conducts field observations and literature reviews to strengthen the empirical and theoretical context of the research.

The collected data was analyzed using descriptive and inferential statistical analysis. Descriptive analysis was used to describe the characteristics of respondents and the pattern of answers to each variable. Furthermore, Structural Equation Modeling–Partial Least Squares (SEM-PLS) was used to test the causal relationship between latent variables, namely community involvement (X), community satisfaction (Z1), communication quality (Z2), and project success from the aspects of punctuality (Y1) and quality quality (Y2).

The stages of analysis include:

1) Outer Model: tests convergent validity, discriminant validity, and construct reliability.
2) Inner Model: analyzes the structural relationships between variables through $R^2$ tests, path coefficients, effect size ($f^2$), and predictive relevance ($Q^2$).

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3) The Significance Test was carried out by bootstrapping method (5,000 times of resampling) to determine the strength and direction of the relationship between variables.

The results of this analysis are used to answer the research hypothesis and identify the factors that have the most influence on the success of infrastructure projects in slums.

## RESULT AND DISCUSSION
### SEM-PLS Data Analysis
### 1. Test Model Fit

The fit model test was carried out by looking at the estimated output results of SmartPLS version 4.0 compared to the criteria as explained in the following table:

**Table 1.Model Fit Test Results**

| Parameter | Rule of Thumb | Parameter Values | Information |
|---|---|---|---|
| SRMR | Less Than 0.10 | 0.083 | Fit |
| d-ULS | > 0.05 | 4,079 | Fit |
| D-G | > 0.05 | 0,935 | Fit |
| Chi Square | $x^2$ statistics $\geq x^2$ table | 1647.948$\geq$ 47.4 | Fit |
| NFI | Close to value 1 | 0.778 | Fit |
| GoF | **0.1** (small GOF), **0.25** (moderate GOF), **0.36** (strong GOF) | 0.579 | Fit |
| Q² Predictive Relevance | **Q² > 0:** Has predictive relevance **Q² < 0:** Lacks predictive relevance. **0.02** (Weak) **0.15** (Moderate) **0.35** (Strong) | Q2 Quality 0.716 > 0 Q2 on time 0.403 > 0 | Fit |

Based on the test table of the fit model that has been carried out in this study, it is obtained that this model can be used to analyze the relationship between latent variables with the belief that the model reflects the data accurately and has relevant predictive capabilities:

1) SRMR (Standardized Root Mean Square Residual): An SRMR value of 0.083, which is smaller than the maximum limit of 0.10, indicates that the model has a good match between the observed data and the hypothesized model. That is, the difference between the observed covariance matrix and the model covariance matrix is small, so the model is considered fit.

2) d-ULS (Unweighted Least Squares Discrepancy): A d-ULS value of 4.079, which is greater than the 0.05 limit, indicates that the model structure has no significant and acceptable deviations. This suggests that the model is close to the ideal relationship expected from the data.

3) d-G (Geodesic Discrepancy): A d-G value of 0.935, which is also greater than the 0.05 limit, indicates that the model has a good global fit, and the relationships in the model show no significant difference compared to the actual data.

4) Chi-Square: The Chi-Square statistical value of 1,647,948 is greater than the Chi-Square table value (47.4), which means that the model is declared fit. This shows that the model corresponds significantly to the sample data, and the structure of the model can explain the relationships between variables well.

5) NFI (Normed Fit Index): An NFI value of 0.778, which is close to the ideal value of 1, indicates that the model has a fairly good fit level although it is not optimal. This shows that the model is still acceptable to describe the data.

6) GoF (Goodness of Fit): A GoF value of 0.578, which is above the 0.36 limit, indicates that the model has an excellent global fit rate. This value places the model in a strong goodness of fit category, which means the model is well-suited to explaining the relationships between latent variables in the study.

7) $Q^2$ Predictive Relevance: A $Q^2$ value of 0.716 for the Performance variable indicates a very strong predictive ability, while a $Q^2$ value of 0.403 for the Work Motivation variable indicates a fairly strong predictive ability. This indicates that the model can relevantly predict latent variables based on their structural relationships.

## 2. Inner Model

The inner model in PLS-SEM describes the relationships between latent variables and is evaluated to see the strength and significance of these relationships. The evaluation includes three main aspects: Significance of the relationship (Hypothesis Testing), R Square and Effect Size

1) R-Square

R-Square in PLS-SEM measures how well latent independent variables in a model can explain the variability of latent dependent variables. The $R^2$ value indicates the overall predictive strength of the model. The value of $R^2$ ranges from 0 to 1, where a higher value indicates a better model at explaining the variance. Here are the R-Square values in this analysis.

**Table 2. R Square ($R^2$) Test Results**

| Variable | R-square | R-square adjusted |
|---|---|---|
| Timely Success | 0.567 | 0.56 |
| Success of Quality Quality | 0.543 | 0.536 |
| Community Satisfaction | 0.551 | 0.548 |
| Communication Quality | 0.495 | 0.491 |

The evaluation of the inner model in Partial Least Squares Structural Equation Modeling (PLS-SEM) was carried out by looking at the R-Square ($R^2$) and R-Square Adjusted values for each dependent variable. R-Square describes how much variation an independent variable can explain to a dependent variable. According to Haryono (2016) and Hair et al. (2017), the R-Square value of 0.75 is categorized as strong, 0.50 moderate, and 0.25 weak.

The results of the calculation show that the four dependent variables in this model have an R-Square value that is in the moderate category, as detailed below:

Overall, the R-Square results show that the constructed structural model is strong enough to explain the inter-construct influences in the context of the development project under review. R-Square adjusted as a form of adjustment to the number of constructs that affect dependent variables, remains at a level consistent with R-Square, which reinforces the validity of the model.
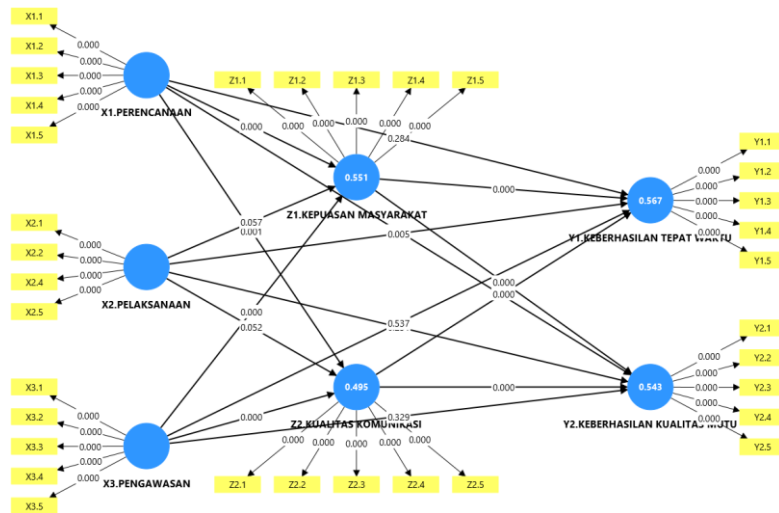
Gambar 1. output Model PLS SEM Algorithm

2) Significance Test

Relationship significance tests in PLS-SEM were performed to determine whether relationships between latent variables in the model could be considered statistically significant. This process usually uses the bootstrapping technique, where the data is resampled to calculate the path coefficient and its standard errors. The results are reported in the form of t-statistical or p-value. A relationship is considered significant if the p-value is smaller than the predetermined significance level (in this study a significance of 0.05). Significant path coefficients indicate that the relationship between independent and latent dependent variables has strong statistical support, so the proposed hypothesis is acceptable. The following are the results of bootstrapping of direct effect and indirect effect research models.

a. Direct Effect Direct Relationship

The results of direct effect bootstrapping can be seen in Table 3 as follows:

**Tabel 3. Hasil Path Coefficient Bootstrapping direct effect**

| Path Coefficients | Original sample (O) | Sample mean (M) | Standard deviation (STDEV) | T statistics ($|O/STDEV|$) | P values | Information |
|---|---|---|---|---|---|---|
| **X1. Planning -> Y1. Timely Success** | -0.071 | -0.072 | 0.067 | 1.07 | 0.284 | **Unproven** |
| **X1. Planning -> Y2. Success of Quality Quality** | 0.007 | 0.005 | 0.076 | 0.091 | 0.928 | **Unproven** |
| **X1. Planning -> Z1. Community Satisfaction** | 0.259 | 0.256 | 0.064 | 4.014 | 0 | Evident |
| **X1. Planning -> Z2. Communication Quality** | 0.224 | 0.221 | 0.07 | 3.184 | 0.001 | Evident |
| **X2. Implementation -> Y1. Timely Success** | 0.197 | 0.198 | 0.07 | 2.823 | 0.005 | Evident |
| **X2. Implementation -> Y2. Success of Quality Quality** | 0.071 | 0.075 | 0.062 | 1.149 | 0.251 | **Unproven** |
| **X2. Implementation -> Z1. Community Satisfaction** | 0.122 | 0.118 | 0.064 | 1.901 | 0.057 | **Unproven** |

| Path Coefficients | Original sample (O) | Sample mean (M) | Standard deviation (STDEV) | T statistics (\|O/STDEV\|) | P values | Information |
|---|---|---|---|---|---|---|
| X2. Implementation of -> Z2. Communication Quality | 0.137 | 0.133 | 0.07 | 1.948 | 0.052 | Unproven |
| X3. Supervision -> Y1. Timely Success | -0.04 | -0.039 | 0.064 | 0.617 | 0.537 | Unproven |
| X3. Supervision -> Y2. Success of Quality Quality | -0.068 | -0.065 | 0.07 | 0.977 | 0.329 | Unproven |
| X3. Supervision -> Z1. Community Satisfaction | 0.439 | 0.446 | 0.072 | 6.065 | 0 | Evident |
| X3. Supervision -> Z2. Communication Quality | 0.416 | 0.425 | 0.088 | 4.751 | 0 | Evident |
| Z1. Community Satisfaction -> Y1. Timely Success | 0.286 | 0.284 | 0.072 | 3.95 | 0 | Evident |
| Z1. Community Satisfaction -> Y2. Success of Quality Quality | 0.369 | 0.366 | 0.081 | 4.577 | 0 | Evident |
| Z2. Communication Quality -> Y1. Timely Success | 0.446 | 0.448 | 0.074 | 6.05 | 0 | Evident |
| Z2. Communication Quality -> Y2. Success of Quality Quality | 0.406 | 0.407 | 0.068 | 5.988 | 0 | Evident |

a) Effect of Planning on Timely Success: In this research model, planning (X1) is assumed to have an influence on project success in terms of timeliness of completion (Y1). Based on the results of the Partial Least Square (PLS) analysis with the two-tailed bootstrapping technique, the path coefficient value (original sample) was obtained of -0.071, with a T-statistic of 1.070, and a P-value of 0.284.

The value of the negative coefficient indicates that the direction of the relationship between the planning variable and timely success is negative. This means that numerically the increase in scores on the planning variable is actually associated with a decrease in the score on the timely success variable. However, because the p-value is greater than 0.05, this relationship is statistically insignificant at the 95% confidence level. This means that there is not enough statistical evidence to suggest that planning has a meaningful direct influence on the timeliness of project completion.

b) The Influence of Planning on the Success of Quality Quality: In the path of influence between the planning variable (X1) on the success of the project in terms of quality (Y2), the results of two-tailed bootstrapping were obtained in the form of a path coefficient value of 0.007, a T-statistical value of 0.091, and a P-value of 0.928. This value shows that statistically, there is no significant influence between planning and project quality success, because the P-value is well above the significance threshold of 0.05. Thus, the hypothesis that planning affects the quality of project quality is not empirically proven in this study. The very small coefficient value (close to zero) and the T-statistic far below the critical value (1.96 for a 95% confidence level) reinforce the conclusion that the direct contribution

of planning activities to the achievement of the quality of the final result of the project is very weak or even non-existent. This is certainly an interesting finding, especially when it is associated with the general premise in project management that has placed planning as the main foundation for the success of construction quality.

c) Effect of Planning on Community Satisfaction: The relationship between the planning variable (X1) and community satisfaction (Z1) showed significant and positive results. Based on the results of two-tailed bootstrapping, a path coefficient value of 0.259, a T-statistical value of 4.014, and a P-value of 0.000, which statistically shows that this relationship is significant at a confidence level of 99% ($\alpha < 0.01$).

d) Effect of Planning on Communication Quality: The relationship between the Planning variables (X1) and Communication Quality (Z2) showed statistically significant and conceptually relevant results. Based on the results of two-tailed bootstrapping the path coefficient value is 0.224, the T-statistics value is 3.184, and the P-value is 0.001. These results prove that the influence of planning on communication quality is significant at a confidence level of 99% ($\alpha < 0.01$), so it can be concluded that the better the planning process, the higher the quality of communication formed during the project implementation.

e) Effect of Execution on Timely Success: The relationship between the Execution variable (X2) and Timely Success (Y1) showed a significant direct relationship based on the results of the two-tailed bootstrapping test. The path coefficient value is 0.197, with a T-value of 2.823, and a P-value of 0.005, which means that this relationship is significant at a confidence level of 99% ($\alpha < 0.01$). Thus, it can be concluded that the better the process of implementing construction activities, the greater the chance of project success to be completed on time.

f) Effect of Implementation on Quality Success: The relationship between Implementation (X2) and Success of Quality Quality (Y2) showed no statistically significant influence. The bootstrapping results showed a path coefficient value of 0.071, with a T-statistical value of only 1.149, and a P-value of 0.251, which is far above the significance threshold of 0.05. This means that, statistically, the implementation does not have a strong direct influence on the success of quality quality in the context of this study.

g) Effect of Implementation (X2) on Community Satisfaction (Z1): The results of the path analysis between the variables of Implementation (X2) and Community Satisfaction (Z1) show that this relationship is not statistically significant, although it is at the threshold of significance. The resulting path coefficient was 0.122, with a T-statistical value of 1.901, and a P-value of 0.057 (slightly above the significance threshold of 0.05).

Practically, this value indicates that the implementation of construction projects has a tendency to affect public satisfaction, but the power of influence is not statistically strong enough to be said to be significant at the 95% confidence level. This means that community satisfaction does not depend entirely on how the project is implemented, but is also influenced by other, more complex factors.

h) Effect of Implementation (X2) on Communication Quality (Z2): The relationship between Implementation (X2) and Communication Quality (Z2) showed almost significant results, with a path coefficient value of 0.137, a T-statistic of 1.948, and a P-value of 0.052. Although slightly above the significance threshold of 0.05, this value still indicates a fairly

strong influence in practice, although it cannot be statistically significant at a 95% confidence level.

This result means that good project implementation has a positive correlation with the quality of communication that occurs in the context of the project, especially between implementers and stakeholders, including beneficiary communities, supervisory consultants, and the government. When implementation is carried out with good governance—timely, transparent, and open—it can create healthier, more open, and participatory communication channels.

i)  Effect of Supervision (X3) on Timely Success (Y1): Based on the results of the path analysis, the relationship between Supervision (X3) and Timely Success (Y1) showed a negative path coefficient of -0.040, with a T-statistical value of 0.617 and a P-value of 0.537. This value was statistically insignificant ($p > 0.05$), so it can be concluded that supervision did not have a statistically proven direct influence on the achievement of the right project implementation time.

j)  Effect of Supervision (X3) on Quality Success (Y2): The results of statistical testing on the direct relationship between Supervision (X3) and Quality Quality Success (Y2) showed a path coefficient value of -0.068, with a T-statistic of 0.977 and a P-value of 0.329. This value indicates that the relationship is not statistically significant because the p-value is greater than 0.05. Thus, it can be concluded that supervision has not been proven to directly affect the success of project quality in the context of this study.

k)  The Effect of Supervision (X3) on Community Satisfaction (Z1): The results of the path analysis on the direct relationship between Supervision (X3) and Community Satisfaction (Z1) showed a coefficient value of 0.439, with a T-statistic of 6.065, and a P-value of 0.000. These results suggest that the relationship is statistically significant, as the p-value is smaller than 0.05, as well as the t-value well above the threshold of 1.96 for the two-tailed test. Therefore, it can be concluded that supervision has a positive and significant influence on community satisfaction in residential quality improvement projects.

l)  The Effect of Supervision (X3) on Communication Quality (Z2): The results of the path test between the Supervision variable (X3) on Communication Quality (Z2) showed a path coefficient value of 0.416, a T-statistic of 4.751, and a P-value of 0.000. A T-value well above the minimum limit of 1.96 and a P-value of < 0.05 indicate that the relationship between these two variables is statistically significant at a 95% confidence level. This means that effective supervision has a positive and significant contribution to improving the quality of communication in project implementation.

m)  The Effect of Community Satisfaction (Z1) on Timely Success (Y1): The results of the analysis of the path between the variables of Community Satisfaction (Z1) and Timely Success (Y1) showed a coefficient value of 0.286, a T-statistic of 3,950, and a P-value of 0.000. With a statistical T-value exceeding the threshold of 1.96 and a P-value below 0.05, it can be concluded that this effect is statistically significant. This means that the higher the level of public satisfaction with the project being carried out, the more likely it is that the project can be completed on time.

n)  The Effect of Community Satisfaction (Z1) on Quality Success (Y2): The results of the analysis showed that the relationship between Community Satisfaction (Z1) and Quality Quality Success (Y2) had a path coefficient of 0.369, with a T-statistic of 4.577, and a P-

value of 0.000. This value indicates that the effect is statistically significant, as the T-value is statistically well above the threshold of 1.96 and the P value is well below 0.05. This means that the higher the community's satisfaction with the project process and results, the greater the success of the project in achieving the expected quality standards.

o) Effect of Communication Quality (Z2) on Timely Success (Y1): The results of statistical analysis showed that the relationship between Communication Quality (Z2) and Timely Success (Y1) had a path coefficient of 0.446, with a statistical T-value of 6.050 and a P-value of 0.000. This value shows a statistically significant influence on the 95% (two-tailed) confidence level, so it can be concluded that the hypothesis is proven.

p) Effect of Communication Quality (Z2) on Quality Success (Y2): The results of the analysis showed that the path between Communication Quality (Z2) and Quality Quality Success (Y2) had a coefficient value of 0.406, with a T-statistic of 5.988, and a P-value of 0.000. A P-value well below the significance limit of 0.05 indicates that this influence is statistically significant, so the hypothesis is proven.

b. Indirect Effects

**Table 4. Direct tidal relationship**

| Path Coefficients | Original sample (O) | Sample mean (M) | Standard deviation (STDEV) | T statistics (\|O/STDEV\|) | P values | Information |
|---|---|---|---|---|---|---|
| X3. Supervision -> Z1. Community Satisfaction -> Y2. Success of Quality Quality | 0.162 | 0.162 | 0.04 | 4 | 0 | Evident |
| X1. Planning -> Z2. Communication Quality -> Y1. Timely Success | 0.1 | 0.099 | 0.037 | 2.706 | 0.007 | Evident |
| X1. Planning -> Z1. Community Satisfaction -> Y1. Timely Success | 0.074 | 0.073 | 0.027 | 2.757 | 0.006 | Evident |
| X1. Planning -> Z2. Communication Quality -> Y2. Success of Quality Quality | 0.091 | 0.09 | 0.034 | 2.68 | 0.007 | Evident |
| X2. Implementation of -> Z2. Communication Quality -> Y1. Timely Success | 0.061 | 0.058 | 0.031 | 1.953 | 0.051 | Unproven |
| X1. Planning -> Z1. Community Satisfaction -> Y2. Success of Quality Quality | 0.096 | 0.095 | 0.034 | 2.771 | 0.006 | Evident |
| X2. Implementation -> Z1. Community Satisfaction -> Y1. Timely Success | 0.035 | 0.033 | 0.02 | 1.728 | 0.084 | Unproven |
| X2. Implementation of -> Z2. Communication Quality -> Y2. Success of Quality Quality | 0.056 | 0.053 | 0.029 | 1.912 | 0.056 | Unproven |

| Path Coefficients | Original sample (O) | Sample mean (M) | Standard deviation (STDEV) | T statistics (|O/STDEV|) | P values | Information |
|---|---|---|---|---|---|---|
| X3. Supervision -> Z2. Communication Quality -> Y1. Timely Success | 0.186 | 0.191 | 0.053 | 3.507 | 0 | Evident |
| X2. Implementation -> Z1. Community Satisfaction -> Y2. Success of Quality Quality | 0.045 | 0.043 | 0.025 | 1.805 | 0.071 | Unproven |
| X3. Supervision -> Z1. Community Satisfaction -> Y1. Timely Success | 0.125 | 0.126 | 0.038 | 3.268 | 0.001 | Evident |
| X3. Supervision -> Z2. Communication Quality -> Y2. Success of Quality Quality | 0.169 | 0.173 | 0.048 | 3.544 | 0 | Evident |

a)  X3. Supervision → Z1. Community Satisfaction → Y2. Success of Quality Quality

The results of the bootstrapping analysis showed that the Supervision variable (X3) had an indirect effect on the success of the Project in Quality Quality (Y2) through Community Satisfaction (Z1) with an original sample value of 0.162, a T-statistic value of 4,000, and a p-value of 0.000. Because the p-value < 0.05, this indirect pathway is proven to be statistically significant at a 95% confidence level.

This indicates that strengthening the supervisory function does not necessarily directly improve the quality of project results, but can significantly affect public perception and satisfaction, which in turn will encourage the success of project quality. In this context, people who feel satisfied with the involvement or transparency of supervision tend to support and participate more actively in social supervision, so that the quality of the final results is better.

Furthermore, based on previous results, the direct influence of the Supervision variable on the success of Quality Quality (Y2) was not significant (p = 0.329). Therefore, the mediation path by Community Satisfaction is stated as partial mediation, because although the direct path is insignificant, the indirect influence through the mediator proves to be significant.

b)  Path: X1. Planning → Z2. Communication Quality → Y1. Timely Success

The results of the bootstrapping analysis showed that the Planning variable (X1) had a significant indirect influence on the success of the Project in Timeliness (Y1) through the mediation of the Communication Quality variable (Z2), with an original sample value of 0.100, a T-statistic of 2.706, and a p-value of 0.007. Since the p-value < 0.05, this indirect influence is proven to be statistically significant.

These findings explain that good planning improves the quality of communication in the project, such as clarity of information, coordination between parties, and proper reporting. The improvement in the quality of communication directly contributes to the smooth and timely completion of the project.

However, based on the analysis of the direct path, the direct influence of X1 → Y1 (Planning on Punctuality) was not significant (p = 0.284). Therefore, the indirect relationship through the Z2 variable (Communication Quality) becomes a full mediation path. This means that planning can only affect timeliness through the role of intermediary of communication quality, not directly.

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c) Path: X1. Planning → Z1. Community Satisfaction → Y1. Timely Success

The bootstrapping results showed that the Planning variable (X1) had an indirect and significant effect on the Success of the Project in Timeliness (Y1) through Community Satisfaction (Z1) with an original sample value of 0.074, T-statistic of 2.757, and a p-value of 0.006. Since the p< value is 0.05, this influence is proven to be statistically significant.

This indicates that the quality of mature planning will create a positive impact on public perception and satisfaction (e.g., plan transparency, initial citizen engagement, and accommodation of local needs). In turn, high community satisfaction drives the achievement of project completion time targets through cooperation and reduction of social resistance.

In the direct path, the influence of X1 → Y1 (Planning for Punctuality) was not significant (p = 0.284), so this indirect relationship showed full mediation by the Z1 variable (Community Satisfaction). This means that the planning carried out does not have a direct influence on the timeliness of the project, but only through the satisfaction of the community.

d) Path: X1. Planning → Z2. Communication Quality → Y2. Success of Quality Quality

Based on the results of bootstrapping, it was found that the Planning variable (X1) had a significant indirect influence on Project Success in Quality Quality (Y2) through Communication Quality (Z2). The original sample value was 0.091, with a T-statistic of 2.680, and a p-value of 0.007, which means it was below the significance threshold of 0.05. Therefore, this relationship has proven to be statistically significant.

This means that good planning—such as detailed schedules, resource management, and clarity of roles and responsibilities—can promote the formation of effective project communication quality. This quality of good communication includes the delivery of clear and open information to implementers and stakeholders, as well as an efficient feedback system during the implementation of the project.

Thus, good planning contributes to improving the quality of project results, but not through direct channels, but through intermediaries in the form of improving the quality of communication. Because in the direct path X1 → Y2 (Planning to Quality) the results were not significant (p = 0.928), this relationship can be categorized as full mediation by the Z2 variable.

e) Path: X2. Implementation of → Z2. Communication Quality → Y1. Timely Success

In this indirect path, the bootstrapping results show that Project Implementation (X2) has an effect on Timely Success (Y1) through Communication Quality (Z2). The path coefficient (original sample) was 0.061, the T-statistic value was 1.953, and the p-value was 0.051.

A p-value that slightly exceeds the significance threshold of 0.05 indicates that this effect is almost significant, but statistically significant it cannot be stated in full. Therefore, this relationship is not proven to be significant at the 95% confidence level, but can be considered practically significant or significant at the 90% confidence level (α = 0.10).

Interpretation of these results suggests that the implementation of project activities (e.g., material procurement, activity scheduling, and field control) tends to improve the quality of communication, which in turn impacts the timeliness of project implementation. This means that even if this relationship is not statistically significant, it can substantively or practically indicate the direction of a positive relationship that is worth considering in project management.

Since the direct relationship between X2 → Y1 is proven to be directly significant (p = 0.005), while this indirect relationship is insignificant, this type of mediation in this relationship can be categorized as insignificant partial mediation.

f) Path: X1. Planning → Z1. Community Satisfaction → Y2. Success of Quality Quality

The results of the analysis on this indirect path show that the Project Planning variable (X1) has an influence on the success of the Project in terms of Quality Quality (Y2) through the mediation variable of Community Satisfaction (Z1). The path coefficient value is 0.096, T-statistic is 2.771, and p-value is 0.006. Since the p-value is below the significance threshold of 0.05, this relationship is shown to be statistically significant.

This shows that the better the project planning is carried out, such as through community involvement from the beginning, the formulation of real needs, and the preparation of technical designs that are in accordance with aspirations, the higher the level of community satisfaction with the project. This high level of community satisfaction will make a significant contribution to improving the quality of project implementation, because the community tends to be more supportive, maintain the quality of results, and participate in the social supervision process.

In this context, the mediation that occurs is partial mediation, considering that the direct relationship between X1 → Y2 is not significant (p = 0.928) but the indirect relationship through Z1 is significant. Thus, the influence of X1 on Y2 is fully mediated by the Z1 variable, so it can also be called full mediation.

g) Path: X2. Implementation of → Z1. Community Satisfaction → Y1. Timely Success

In this path, the indirect influence of the Project Implementation variable (X2) on Timely Success (Y1) through Community Satisfaction (Z1) is shown by the path coefficient value of 0.035, T-statistic of 1.728, and p-value of 0.084. A p-value above the significance limit of 0.05 indicates that this relationship is not statistically significant.

Although theoretically good project execution—including implementation performance, implementation alignment with planning, and field coordination—can increase community satisfaction, and in turn affect the timeliness of project completion, these empirical results suggest that these influences are not strong enough to support the conclusion of a statistically significant indirect relationship.

Thus, on this path the hypothesis is not proven. Since the indirect relationship is insignificant and the direct relationship X2 → Y1 is significant (see in bootstrap earlier, p = 0.005), the mediation that occurs is insignificant and can be categorized as non-mediation. This means that the influence of project implementation on timely success occurs directly, not through community satisfaction.

h) Path: X2. Implementation of → Z2. Communication Quality → Y2. Success of Quality Quality

The indirect relationship of the Project Implementation variable (X2) to the Success of Quality Quality (Y2) through the mediation variable of Communication Quality (Z2) showed a path coefficient value of 0.056, with a T-statistic of 1.912 and a p-value of 0.056. This p-value is slightly above the significance threshold of 0.05, which means that statistically this relationship is not statistically significant at the 5% significance level, but is close to significant at the 10% level.

These findings signal that the quality of project implementation, including technical governance, work methods, and field control, has not been fully able to create a significant

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improvement in the quality of communication that has an impact on the final quality of the construction project. In the context of public projects or slum projects, complex communication challenges often arise from a lack of two-way feedback between implementers and communities, as well as a lack of optimal coordination with relevant stakeholders.

Thus, the hypothesis is not significantly proven at the level of 5%, and if it refers to the value of p, this relationship is not significant, although close. Because the direct relationship between X2 → Y2 was also insignificant (p = 0.251), and this indirect relationship was also insignificant, there was no non-mediation.

i)  X3. Supervision → Z2. Communication Quality → Y1. Timely Success

The results of the indirect line test from Supervision (X3) to Timely Success (Y1) through Communication Quality (Z2) showed a coefficient of 0.186, a T-statistic of 3.507, and a p-value of 0.000. This value confirms that this path is statistically significant at a significance level of 0.05, even at a level of 0.01.

These findings suggest that increasing the effectiveness of supervision in construction projects can encourage the formation of better, clearer, and structured communication between implementers, supervisors, and the community. This improved quality of communication ultimately has a positive impact on the timeliness of project implementation. This is particularly relevant in the context of slum project management, where limited information and coordination are often an obstacle to achieving target times.

In this case, a significant indirect influence suggests that Communication Quality (Z2) plays an effective mediator. When compared with the insignificant direct pathways X3 → Y1 (p = 0.537), it can be concluded that this relationship shows full mediation. This means that the influence of supervision on the success of project time can only occur through improving the quality of communication, not directly.

j)  Path: X2. Implementation of → Z1. Community Satisfaction → Y2. Success of Quality Quality

The results of the indirect path test from the Implementation (X2) to the Success of Quality Quality (Y2) through Community Satisfaction (Z1) showed a coefficient of 0.045, with a T-statistic of 1.805 and a p-value of 0.071. A p-value above the significance threshold of 0.05 indicates that this indirect relationship is not statistically significant, even though it is close to the limit of marginal significance.

These findings show that although the direction of the relationship between project implementation and quality through community satisfaction is positive, it is not statistically strong enough to support the existence of a significant mediation influence. This means that the increase in project implementation has not consistently resulted in an increase in community satisfaction which ultimately increases the success of project quality.

In the context of project management, these results indicate that the role of the community in linking implementation with quality results has not been optimally internalized. There may still be gaps in constructive community involvement or incompatibility between community expectations and the quality of project implementation in the field.

Thus, this relationship is stated to be statistically unproven, and the mediation by the Community Satisfaction variable (Z1) in this pathway cannot be said to be significant.

k)  Path: X3. Supervision → Z1. Community Satisfaction → Y1. Timely Success

The results of the indirect pathway test from Supervision (X3) to Timely Success (Y1) through Community Satisfaction (Z1) showed a coefficient of 0.125, with a T-statistic of 3.268 and a p-value of 0.001. A p-value well below 0.05 confirms that this indirect influence is statistically significant.

These findings confirm that community satisfaction mediates significantly the relationship between supervision of projects and successful project completion time. This means that the better the supervision process carried out, the more it will have an impact on increasing public satisfaction with the project being carried out. In turn, this satisfaction encourages the achievement of better implementation time targets.

In practice, this illustrates that the public tends to respond positively to projects that are closely supervised and transparent. When supervision is effective, quality control and project schedules will improve, which is reflected in public perception and satisfaction. This satisfaction can act as a social feedback loop that helps strengthen the performance of project organizers in completing work on time.

Thus, this indirect relationship is proven to be significant and shows the existence of partial mediation, considering that the variables X3 → Y1 are directly insignificant, but indirectly through Z1 show a significant influence.

l)  Path: X3. Supervision → Z2. Communication Quality → Y2. Success of Quality Quality

The results of the indirect path test between the Supervision variable (X3) to the Success of Quality Quality (Y2) through Communication Quality (Z2) showed a coefficient value of 0.169, with a T-statistic of 3.544 and a p-value of 0.000. This p-value is well below the significance threshold of 0.05, so this indirect influence is statistically significant.

Substantively, these findings provide an understanding that communication quality is an important mediating element in bridging the influence of supervision on the quality of project results. In other words, supervision that is carried out consistently and professionally will increase the effectiveness of communication between project implementers, supervisors, and other stakeholders. This improved quality of communication will then have an impact on improving the quality of project implementation.

From a project management perspective, the role of communication is crucial in maintaining clarity of technical information, task distribution, reporting, and quality risk mitigation during the construction process. Supervision that is not only administrative but also communicative can lead the project team to understand the expected quality standards appropriately.

Overall, this relationship proved to be statistically significant and fell into the category of full mediation, as the previous direct path X3 → Y2 was not significant, but the indirect path through Z2 was significant. This indicates that the quality of project quality is greatly influenced by supervision, but through good communication mechanisms.

After conducting the analysis above, the main discussion was carried out on the results of the analysis as below:

**Key Research Findings**

Based on the results of data analysis obtained through the Partial Least Square Structural Equation Modeling (PLS-SEM) approach, there are a number of important findings that are the main highlights in answering the formulation of the problem and the objectives of this research.

This study examines the influence of community involvement on the success of road and canal projects in the Slum Quality Improvement Program (CIP) in Tanjung Priok District, and evaluates the mediating role of community satisfaction variables and communication quality.

a.  Community Involvement in Supervision Has a Significant Direct Impact

One of the most striking findings of the study is that community involvement in the monitoring stage shows a significant direct influence on the success of the project, both in terms of timeliness and quality. The path coefficient value and statistical significance of the bootstrapping results showed that community involvement in supervision made a significant contribution to the achievement of effective and efficient project outputs. These findings confirm the importance of social control mechanisms in supporting the implementation of government projects, where citizen participation can encourage accountability and quality of work in the field

b.  Planning and Implementation Have No Significant Direct Effect, But Relevant in the Mediation Pathway

Community involvement in the planning and implementation stages did not show a significant direct influence on the success of the project based on hypothesis testing. However, both show significant indirect influence through the mediating role of community satisfaction and communication quality. This means that even if direct contributions are not proven to be strong, engagement in the early stages of the project remains important to build trust, create two-way communication, and increase community ownership of the project being implemented.

c.  The Role of Mediation Proves to Be Significant and Relevant

Another important finding is the mediating role of community satisfaction and communication quality which has proven to be significant in bridging the relationship between community engagement and project success. In particular, partial mediation occurs in some relationships, suggesting that such mediation variables not only complement the direct influence, but also strengthen the existing causal relationships. This makes it clear that the success of a project is not only determined by technical aspects, but also by perceptions, social relationships, and the quality of interaction between actors.

d.  Communication Quality Emerges as a Strategic Factor

The quality of communication is a strategic factor that not only mediates the relationship between community involvement and project success, but also has a strong influence on other variables, including community satisfaction. This indicates that effective communication—both in terms of frequency, openness, and clarity of information—can be key in strengthening collaboration between the community and project implementers. In the context of the CIP program, the quality of communication serves as the foundation for productive and sustainable participation.

e.  Validity and Reliability of Instruments Supporting Findings

All constructs and indicators in the research model have undergone adequate validity and reliability testing, including cross-loading, AVE, composite reliability, and discriminant validity tests. This provides a strong justification for the main findings produced and shows that the measurement instruments used are reliable and statistically valid.

The results of this study show that community involvement in project planning, implementation, and supervision has a significant influence on satisfaction and quality of

communication, which leads to project success in terms of timeliness and quality. These findings are in line with various previous studies, such as Bekele (2019), Johar (2017), and Simarmata et al. (2024), which affirm the importance of community participation in strengthening a sense of belonging, resource efficiency, and improving environmental quality. In addition, research by Firlandy et al. (2020) and Kaotjil et al. (2024) also shows that community-based management is able to improve the quality and sustainability of infrastructure projects. However, most previous research still emphasized the direct relationship between participation and project outcomes, without considering mediating factors such as community satisfaction and communication quality.

This research has novelty in three main aspects: conceptual, contextual, and methodological. Conceptually, the study developed a model that not only assesses the direct influence of participation on project success, but also introduces two mediating variables—community satisfaction and communication quality—to explain the mechanisms of such influences. In terms of context, this study focuses on slum areas in Tanjung Priok District, North Jakarta, which have distinctive social and economic characteristics that have not been widely researched. Methodologically, this study uses the Structural Equation Modeling–Partial Least Squares (SEM-PLS) approach to comprehensively test the direct, indirect, and model suitability. Thus, this study not only enriches the academic literature related to community participation and infrastructure project management, but also provides practical recommendations for local governments in increasing the effectiveness of slum restructuring programs based on community participation.

## CONCLUSION

This study, employing descriptive analysis and Structural Equation Modeling–Partial Least Squares (SEM-PLS), reveals that community involvement significantly boosts slum infrastructure project success, particularly in timeliness and quality dimensions. Implementation and supervision stages exert stronger positive effects than planning, with supervision emerging as the dominant driver—enhanced through mediating roles of community satisfaction and communication quality. These mediators synergize: effective communication elevates satisfaction, fostering active community support for timely, high-quality outcomes. For future research, investigators could longitudinally track these dynamics across diverse Indonesian regions or incorporate additional mediators like trust or governance to refine participatory models in slum upgrading.

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