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Factors Influencing Cost Overruns in Government Construction Projects in Southwest Papua

Johanis Anggawan[1*], Agustinus Purna Irawan[2], Mega Waty[3]
[1,3] Faculty of Engineering, Doctoral Program in Civil Engineering, Universitas Tarumanagara, Jl. Letjen S. Parman No. 1, Grogol Petamburan, West Jakarta, DKI Jakarta 11440. Indonesia
[2]School of STEM, Universitas Prasetiya Mulya, Jl. RA Kartini (TB Simatupang), Cilandak Barat, South Jakarta, DKI Jakarta 12430. Indonesia
Email: johanis.328211004@stu.untar.ac.id*[1], pascasarjana@prasetiyamulya.ac.id[2], mega@ft.untar.ac.id[3]

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ABSTRACT

Cost overruns remain one of the most persistent issues affecting the successful delivery of government construction projects, particularly in geographically challenging regions such as Southwest Papua, Indonesia. Limited accessibility, complex logistics, fluctuating material prices, and project uncertainties frequently increase construction costs beyond the planned budget. This study investigates how social factors, geographical conditions, and project risk contribute to cost overruns in government construction projects. Data were collected through a questionnaire survey involving 233 respondents representing contractors, consultants, and government agencies engaged in public infrastructure projects. The proposed conceptual model was analyzed using Structural Equation Modeling–Partial Least Squares (SEM-PLS). The findings demonstrate that all three independent variables significantly influence project cost overruns, with geographical factors showing the strongest positive effect among the examined determinants. The structural model also exhibits satisfactory predictive capability, indicating that the proposed framework adequately explains cost overrun behaviour in the study area. These findings provide practical insights for government agencies and construction practitioners in improving project planning, strengthening risk management, and developing more realistic cost estimation strategies for infrastructure projects located in remote regions.

Keywords: *cost overrun, government construction projects, SEM-PLS, Southwest Papua, project risk, geographical factors*

1. INTRODUCTION

The construction sector plays a fundamental role in supporting economic growth and improving the quality of public services through the development of essential infrastructure. Roads, bridges, public buildings, ports, and other government-funded facilities are expected to strengthen regional connectivity, stimulate economic activities, and enhance community welfare. Consequently, public infrastructure projects are required to achieve their intended objectives by meeting planned targets in terms of cost, time, and quality [1], [2], [3]. Failure to achieve these targets may reduce the effectiveness of public investment and limit the socioeconomic benefits expected from infrastructure development [4], [5], [6]. Among the challenges frequently encountered in construction projects, cost overrun remains one of the most significant. Cost overrun occurs when the actual expenditure required to complete a project exceeds the budget established during the planning stage. This issue has been reported in many countries and affects various types of infrastructure projects, resulting in financial losses, project delays, reduced contractor performance, and inefficient use of public resources. Previous studies have consistently shown that the magnitude and causes of cost overruns differ according to project characteristics, institutional arrangements, and local conditions [5], [7], [8], [9], [10], [11], [12].

Previous research has identified a wide range of factors that contribute to construction cost overruns. These factors generally include technical issues, managerial capability, contractual arrangements, economic conditions, and environmental influences. Design modifications, inaccurate cost estimation, delays in material procurement, low labor productivity, inadequate project supervision, and fluctuations in construction material prices are among the most frequently reported causes of budget escalation [13], [14], [15], [16].

Since these factors often interact throughout the project lifecycle, they increase uncertainty and make effective cost control more difficult [17], [18], [19], [20]. Although many studies have discussed the determinants of construction cost overruns, relatively few have considered the influence of regional characteristics and local social conditions. This issue is particularly important in Southwest Papua, where government construction projects are implemented under geographical conditions that differ substantially from many other regions in Indonesia. Remote project locations, limited transportation networks, dispersed islands, and dependence on construction materials supplied from outside the province frequently create logistical challenges. These conditions increase transportation costs, extend delivery times, and elevate the possibility of project delays that eventually contribute to higher construction costs [21], [22].

Social conditions also play an important role in determining the performance of government construction projects in Southwest Papua. Community participation, stakeholder communication, public acceptance, land acquisition processes, and the availability of local labor can directly influence project implementation. Weak coordination among stakeholders or unresolved social issues may interrupt construction activities, require adjustments to project execution, and ultimately increase project expenditures. Consequently, social factors deserve greater attention when evaluating the causes of cost overruns in government infrastructure projects. Besides social and geographical aspects, project risk represents another important factor that may influence construction costs. Uncertainty associated with changes in project scope, site conditions, government regulations, weather, inflation, material prices, and payment delays can substantially increase the likelihood of budget overruns if appropriate mitigation strategies are not implemented [23], [24], [25], [26]. Risk management theory also emphasizes that projects exposed to greater uncertainty are more likely to experience deviations between planned and actual costs [27], [28], [29].

Despite the growing body of literature on construction cost overruns, empirical studies that simultaneously examine the influence of social factors, geographical conditions, and project risk within a single analytical framework remain limited, particularly in the context of government construction projects in Southwest Papua. Most previous studies have focused on only one or two categories of determinants, making it difficult to obtain a comprehensive understanding of how these factors interact in regions with distinctive geographical characteristics. In addition, the application of Structural Equation Modeling–Partial Least Squares (SEM-PLS) to investigate these relationships in Eastern Indonesia has received relatively little attention [30], [31], [32].

Accordingly, this study aims to analyze the effects of social factors, geographical factors, and project risk on cost overruns in government construction projects in Southwest Papua using the SEM-PLS approach. The findings are expected to enrich the existing literature by incorporating regional characteristics into the analysis of construction cost overruns while also providing practical recommendations for government agencies, contractors, consultants, and other stakeholders to improve project planning, strengthen risk management, and enhance cost performance in future infrastructure projects [33], [34].

2. METHOD

This research adopted a quantitative approach to investigate the factors influencing cost overruns in government construction projects in Southwest Papua. The study focused on three independent variables, namely Social Factors, Geographical Factors, and Project Risk, while Cost Overrun served as the dependent variable. These variables and their measurement indicators were developed based on established theories and findings reported in previous studies related to construction project performance and cost management [4], [7], [17], [18], [20], [35], [36], [37], [38], [39]. Primary data were obtained through a structured questionnaire distributed to 233 respondents consisting of contractors, supervising consultants, design consultants, and government officials who had direct experience in government construction projects in Southwest Papua. The questionnaire items were formulated from indicators identified in previous literature and subsequently adapted to reflect the characteristics of construction projects in the study area. Respondents assessed each statement using a five-point Likert scale ranging from strongly disagree to strongly agree.

The respondents were selected using purposive sampling. This approach was adopted because the study required participants who had direct knowledge and practical experience in government construction projects in Southwest Papua. The target respondents included contractors, supervising consultants, design consultants, and government officials who had been involved in the planning, supervision, management, or implementation of government-funded construction projects. To be eligible for participation, respondents were required to have direct involvement in at least one government construction project in Southwest Papua and sufficient experience to provide informed responses concerning project implementation and cost performance. Respondents who did not have direct experience with government construction projects in the study area were not included in the analysis.

These criteria were applied to ensure that the collected responses reflected the practical conditions encountered in the implementation of government construction projects in the region. A total of 233 valid responses were obtained and used for the subsequent analysis. The number of respondents was considered adequate for the SEM-PLS analysis because the study employed a variance-based structural equation modeling approach and the respondents met the specified experience and involvement criteria. The collected data were analyzed using Structural Equation Modeling–Partial Least Squares (SEM-PLS). This analytical technique was selected because it is suitable for evaluating complex relationships among latent variables while maintaining reliable predictive capability when applied to survey data with moderate sample sizes [31]. The analysis consisted of two sequential stages, namely the evaluation of the measurement model (outer model) followed by the assessment of the structural model (inner model).

The measurement model evaluation aimed to verify that every indicator appropriately represented its corresponding latent construct. Indicator reliability was initially assessed through factor loading values, where loadings greater than 0.70 were considered highly satisfactory. Indicators with loading values between 0.50 and 0.70 were retained when their presence did not reduce the validity or reliability of the construct. Convergent validity was then evaluated using the Average Variance Extracted (AVE), with values above 0.50 indicating that the construct explained more than half of the variance of its indicators. Discriminant validity was examined using the Heterotrait–Monotrait Ratio (HTMT). This procedure was employed to ensure that each latent construct measured a concept that was empirically different from the others. HTMT values below 0.90 were interpreted as evidence of satisfactory discriminant validity, indicating that the constructs maintained adequate conceptual distinction throughout the measurement model. After confirming the adequacy of the measurement model, the structural model was evaluated to determine the relationships among the latent variables.

The analysis focused on the estimated path coefficients together with the corresponding t-statistics and p-values obtained from the bootstrapping procedure. A structural relationship was considered statistically significant when the t-statistic exceeded 1.96, and the p-value was below 0.05. The explanatory capability of the structural model was assessed using the coefficient of determination (R^2), which indicates the proportion of variance in the endogenous variable explained by the proposed model. In addition, overall model adequacy was evaluated using the Standardized Root Mean Square Residual (SRMR). Following commonly accepted SEM-PLS recommendations, an SRMR value below 0.08 indicates a satisfactory model fit between the proposed model and the observed data.

3. RESULT AND ANALYSIS

Confirmatory Factor Analysis (CFA) was performed to evaluate whether the observed indicators adequately represented their respective latent constructs. Four constructs were included in the proposed model, namely Social Factors (X1), Geographical Factors (X2), Project Risk (X3), and Cost Overrun (Y). The Social Factors construct consisted of four indicators, the Geographical Factors construct contained four indicators, Project Risk was represented by sixteen indicators, while Cost Overrun was measured using three indicators. The CFA results were used to verify the validity and reliability of each construct before proceeding to the structural model evaluation. Figure 1 presents the conceptual path diagram illustrating the relationships among the latent variables and their corresponding measurement indicators.

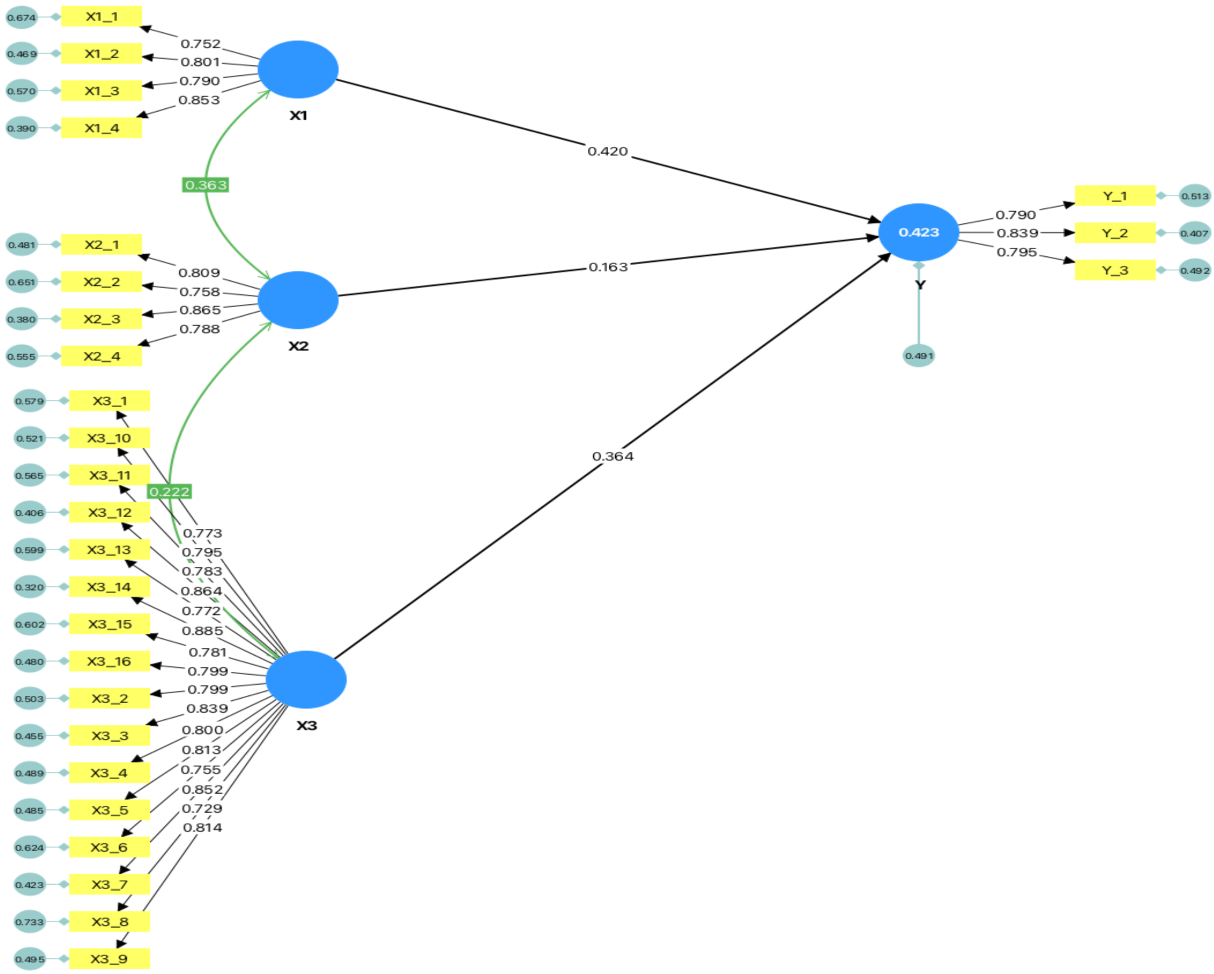

Figure 1. Path Diagram

Figure 1 presents the conceptual framework developed in this study, illustrating the relationships among the latent variables and their associated measurement indicators. The model includes three exogenous constructs, namely Social Factors (X1), Geographical Factors (X2), and Project Risk (X3), which are hypothesized to influence the endogenous construct, Cost Overrun (Y). Each construct is represented by a set of observed indicators derived from previous studies and adapted to the context of government construction projects in Southwest Papua. The proposed path diagram simultaneously represents the measurement model and the structural model. The measurement model describes the relationship between each latent construct and its observed indicators, whereas the structural model illustrates the hypothesized causal relationships among the latent variables.

This framework serves as the basis for evaluating the validity of the measurement model and examining the structural relationships tested in this research. Factor loadings were evaluated to determine the extent to which each indicator represented its corresponding latent construct. In SEM-PLS, loading values greater than 0.70 indicate that an indicator has a strong contribution to measuring the intended construct. Higher loading values reflect greater indicator reliability and demonstrate that the observed variables adequately capture the characteristics of the latent variables examined in this study.

Table 1. Loading Factor Variables

VARIABLES	LOADING FACTOR (STANDARDIZED)
X1_1 <- X1	0.752
X1_2 <- X1	0.801
X1_3 <- X1	0.790
X1_4 <- X1	0.853
X2_1 <- X2	0.809
X2_2 <- X2	0.758
X2_3 <- X2	0.865
X2_4 <- X2	0.788
X3_1 <- X3	0.773
X3_10 <- X3	0.795
X3_11 <- X3	0.783
X3_12 <- X3	0.864
X3_13 <- X3	0.772
X3_14 <- X3	0.885
X3_15 <- X3	0.781
X3_16 <- X3	0.799
X3_2 <- X3	0.799
X3_3 <- X3	0.839
X3_4 <- X3	0.800
X3_5 <- X3	0.813
X3_6 <- X3	0.755
X3_7 <- X3	0.852
X3_8 <- X3	0.729
X3_9 <- X3	0.814
Y_1 <- Y	0.790
Y_2 <- Y	0.839
Y_3 <- Y	0.795

The loading factor results presented in Table 1 indicate that all measurement indicators satisfy the recommended threshold for convergent validity. Every indicator demonstrates a loading value exceeding the minimum acceptable level, confirming that each observed variable contributes meaningfully to its corresponding latent construct. These findings indicate that the measurement instrument is capable of representing the dimensions of Social Factors, Geographical Factors, Project Risk, and Cost Overrun with an acceptable degree of accuracy. The consistency of the loading values also suggests that the indicators adapted from previous studies remain appropriate for evaluating government construction projects in Southwest Papua. Similar observations have been reported by [31], who emphasized that satisfactory loading values provide evidence that the selected indicators appropriately measure the underlying constructs.

Based on the Confirmatory Factor Analysis (CFA) results, all indicators exhibit factor loading values greater than 0.70. indicating that each indicator adequately represents its corresponding latent construct. For the Social Factors construct, factor loadings range from 0.752 to 0.853, demonstrating that all four indicators make substantial contributions to explaining the social dimensions associated with project cost overruns. Similarly, the Geographical Factors construct shows factor loading values ranging from 0.758 to 0.865, indicating that the geographical indicators—including site conditions, accessibility, transportation distance, and regional characteristics—effectively represent the underlying geographical construct. These results confirm that the measurement model possesses strong indicator reliability and that the observed variables are appropriate measures of their respective latent constructs. The satisfactory loading values obtained for all indicators indicate that the measurement instrument adequately captures the dimensions underlying each latent construct.

The reliability and convergent validity assessment demonstrates that all latent constructs satisfy the recommended evaluation criteria. Composite Reliability values indicate satisfactory internal consistency, while the Average Variance Extracted (AVE) values confirm that each construct explains more than half of the variance of its indicators. These results provide evidence that the measurement model is both reliable and valid for subsequent structural analysis. Similar conclusions were reported stating that acceptable Composite Reliability together with AVE values above the recommended threshold indicate adequate construct quality within SEM-PLS analysis.

Table 2. Discriminant Analysis

VARIABLE	CRONBACH'S ALPHA (STANDARDIZED)	CRONBACH'S ALPHA (UNSTANDARDIZED)	COMPOSITE RELIABILITY (RHO_C)	AVERAGE VARIANCE EXTRACTED (AVE)
X1	0.875	0.874	0.875	0.639
X2	0.884	0.884	0.881	0.650
X3	0.967	0.967	0.967	0.647
Y	0.860	0.860	0.850	0.653

Table 2 presents the convergent validity assessment based on the Average Variance Extracted (AVE) values. The results indicate that all constructs have AVE values exceeding the recommended threshold of 0.50. confirming satisfactory convergent validity. The Social Factors construct achieved an AVE value of 0.639, indicating that its indicators explain 63.9% of the construct's variance. The Geographical Factors construct recorded an AVE value of 0.650. demonstrating that its indicators account for 65.0% of the construct's variance. Similarly, the Project Risk construct obtained an AVE value of 0.647, indicating that its indicators explain 64.7% of the variance in the latent construct. The Cost Overrun construct achieved the highest AVE value of 0.653, showing that its indicators explain 65.3% of the construct's variance. Overall, all constructs satisfy the recommended criterion for convergent validity, indicating that the indicators associated with each latent construct adequately represent and consistently measure the same underlying concept.

These findings demonstrate that each construct possesses satisfactory internal consistency and convergent validity, indicating that the observed variables consistently measure their respective latent variables. High composite reliability values further confirm that the measurement instrument is dependable for assessing the relationships among the constructs examined in this study. The results are consistent with previous studies that reported that AVE values exceeding 0.50, together with high composite reliability, indicate acceptable construct quality in SEM-PLS models. Therefore, the measurement model employed in this research fulfills the recommended statistical requirements and provides a reliable basis for subsequent structural model evaluation.

Table 3. Analysis of Heterotrait–Monotrait Ratio (HTMT)

RELATIONSHIPS CONSTRUCT	HTMT AMOUNT	REMARKS
X1 – X2	0.435	Accepted
X1 – X3	0.287	Accepted
X2 – X3	0.311	Accepted
X1 – Y	0.582	Accepted
X2 – Y	0.438	Accepted
X3 – Y	0.501	Accepted

Based on the Heterotrait–Monotrait Ratio (HTMT) analysis analysis presented in Table 3, all inter-construct HTMT values are below the recommended thresholds of 0.85 and 0.90. indicating satisfactory discriminant validity. The highest HTMT value was observed between Social Factors and Cost Overrun, with a value of 0.582, which remains well below the maximum acceptable threshold. These results demonstrate that each construct in the proposed model is empirically distinct from the others. In other words, Social Factors, Geographical Factors, Project Risk, and Cost Overrun represent conceptually and statistically separate constructs, indicating that there is no substantial overlap in the measurement of the latent variables.

The satisfactory discriminant validity also indicates that each latent construct measures a distinct conceptual dimension. Social factors, geographical factors, project risk, and cost overrun demonstrate sufficient conceptual separation, suggesting that each variable contributes unique explanatory information to the proposed research model. This finding strengthens the theoretical framework by confirming that the constructs do not substantially overlap and can independently explain variations in project cost overrun.

Table 4. Analysis of Model FIT

MODEL FIT INDEX	AMOUNT	STANDARDS	REMARKS
CHI-SQUARE	353.161	A small number is good	Good
DF	319	-	-
P-VALUE	0.091	> 0.05	Good
CHI-SQUARE/DF	1.107	< 3.00	Good
RMSEA	0.023	< 0.08	Very Good
GFI	0.892	≥ 0.90	Acceptable Fit
AGFI	0.872	≥ 0.90	Acceptable Fit
SRMR	**0.067**	**< 0.08**	**Good Fit**
NFI	0.918	> 0.90	Good
TLI	0.990	> 0.90	Very Good
CFI	0.991	> 0.90	Very Good

Table 4 presents the results of the model fit assessment. The model fit assessment indicates that the proposed model provides an adequate representation of the empirical data. Most of the goodness-of-fit indices meet the recommended criteria. The chi-square/df value of 1.107 is below the recommended threshold of 3.00, while the RMSEA value of 0.023 indicates a low level of approximation error. The NFI, TLI, and CFI values of 0.918, 0.990, and 0.991, respectively, also indicate satisfactory model fit. Although the GFI and AGFI values are slightly below 0.90, they remain close to the recommended threshold. In addition, the SRMR value obtained from the SEM-PLS analysis is 0.067, which is below the 0.08 criterion and therefore indicates an acceptable level of residual fit. Overall, the model fit results provide sufficient support for proceeding with the structural model evaluation and hypothesis testing.

Table 5. Coefficient of Determination

ENDOGENOUS VARIABLE	R^2	ADJUSTED R^2
COST OVERRUN	0.377	0.368

The coefficient of determination (R^2) was assessed to evaluate the explanatory capability of the structural model. As presented in Table 5, the R^2 value for Cost Overrun is 0.377, while the adjusted R^2 is 0.368. This indicates that Social Factors, Geographical Factors, and Project Risk jointly explain approximately 37.7% of the variance in Cost Overrun. The remaining 62.3% is associated with other factors that are not included in the proposed model. These results indicate that the proposed structural model provides a meaningful level of explanatory capability for understanding cost overruns in government construction projects in Southwest Papua.

4. DISCUSSION

Hypothesis testing was conducted to determine the significance of the effects of the independent variables on the dependent variable in the research model. In this study, hypothesis testing was performed using the Structural Equation Modeling–Partial Least Squares (SEM-PLS) approach through the bootstrapping procedure in SmartPLS. The purpose of hypothesis testing was to examine whether Social Factors (X1), Geographical Factors (X2), and Project Risk Factors (X3) have significant effects on Cost Overrun (Y) in construction projects in Southwest Papua. Hypothesis testing was conducted to determine the significance of the relationships between the independent and dependent variables using the bootstrapping procedure in SmartPLS. A hypothesis was considered to be supported when the t-statistic exceeded 1.96, and the corresponding p-value was lower than 0.05, indicating a statistically significant relationship between the variables. Among the three factors examined, geographical factors show the strongest influence on cost overruns, with a path coefficient of 0.211. This is followed by social factors with a coefficient of 0.163, while project risk has a coefficient of 0.067. These results indicate that the geographical characteristics of Southwest Papua play a more prominent role in explaining cost overruns than the social and project risk factors examined in this study.

Hipotesis 1: (Social → Cost Overrun)

The analysis demonstrates that Social Factors have a significant positive effect on Cost Overrun. This finding indicates that stakeholder communication, community participation, workforce availability, and social interaction surrounding project implementation contribute to project cost performance. In government construction projects located in Southwest Papua, effective coordination among project stakeholders and local communities is essential for minimizing disruptions that may increase project expenditure. This finding is consistent with previous studies indicating that stakeholder management and effective communication contribute substantially to project cost. The present study further highlights that social conditions become increasingly important in geographically remote regions where project implementation relies heavily on community support and stakeholder collaboration.

Hipotesis 2: (Geographical → Cost Overrun)

The results indicate that Geographical Factors have a positive and statistically significant effect on Cost Overrun, with the largest path coefficient among the three predictors ($\beta = 0.211$, $p = 0.017$). This result indicates that geographical conditions are not merely contextual characteristics but represent an important source of cost pressure in government construction projects in Southwest Papua. Difficult terrain, dispersed project locations, limited transportation infrastructure, and dependence on construction materials supplied from other regions can increase transportation requirements, extend delivery times, and reduce the efficiency of construction activities.

These conditions may also create greater uncertainty in mobilizing workers, equipment, and materials to project sites. The relatively stronger influence of geographical factors can be understood from the specific characteristics of the study area. When project locations are difficult to access, even relatively small disruptions in transportation or material delivery can affect the continuity of construction activities and subsequently increase project expenditure. Additional costs may arise from longer transportation routes, repeated mobilization, logistical delays, and the need to adjust construction activities to local site conditions.

Therefore, the geographical characteristics of Southwest Papua can amplify the financial consequences of operational difficulties during project implementation. This finding is consistent with previous studies reporting that geographical conditions and project accessibility are important factors affecting construction cost performance. However, the present study provides a more specific empirical perspective by demonstrating that geographical factors have the strongest effect when social factors and project risk are considered simultaneously in government construction projects in Southwest Papua. This result suggests that the influence of geographical conditions in remote construction environments should be considered from the early planning stage rather than treated only as an operational issue during project execution.

Hipotesis 3: (Project Risk → Cost Overrun)

The results indicate that Project Risk has a positive and statistically significant effect on Cost Overrun ($\beta = 0.067$, $p = 0.011$). Although its effect is statistically significant, the path coefficient is lower than those of Social Factors and Geographical Factors. This indicates that project-related uncertainties remain relevant to cost performance, but they are not the strongest determinant in the context of this study. Among the variables examined in this study, Project Risk demonstrates the strongest influence on Cost Overrun.

This result indicates that uncertainties related to project implementation remain the primary source of budget escalation in government construction projects. Risks associated with changes in project scope, fluctuating material prices, inflation, adverse weather conditions, payment delays, and regulatory adjustments increase the likelihood that actual construction costs will exceed the planned budget. The findings underline the importance of implementing systematic risk management throughout the project lifecycle. Early identification of potential risks, continuous monitoring, and timely mitigation measures are essential to minimize financial uncertainty and improve project cost performance.

Risks associated with changes in project scope, fluctuating material prices, inflation, adverse weather conditions, payment delays, and regulatory adjustments may increase the likelihood that actual construction costs exceed the planned budget. The finding supports the importance of systematic risk

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management throughout the project lifecycle, particularly through early risk identification, continuous monitoring, and timely mitigation measures. This interpretation is consistent with the risk management perspective of the Project Management Institute [27] and previous research indicating that ineffective risk management can contribute to cost overruns in infrastructure projects.

Taken together, the three findings suggest that cost overruns in government construction projects in Southwest Papua are influenced by a combination of social, geographical, and project-related conditions. However, the magnitude of the path coefficients indicates that geographical factors have the strongest relative influence in the proposed model. This finding is important because it shows that the causes of cost overruns in remote construction areas cannot be understood only from conventional project management risks. The physical and logistical characteristics of the project location can shape the effectiveness of material supply, workforce mobilization, equipment deployment, and project coordination. Consequently, geographical considerations should be incorporated into project planning, cost estimation, procurement strategies, and implementation scheduling from the beginning of the project.

Table 6. Results of Hypothesis Measure

RELATIONSHIPS VARIABLES	ORIGINAL SAMPLE (O)	STANDARD DEVIATION (STDEV)	T-STATISTICS	P-VALUES	REMARKS
SOCIAL FACTORS (X1) → COST OVERRUN (Y)	0.163	0.083	1.969	0.049	Accepted
GEOGRAPHICAL FACTORS (X2) → COST OVERRUN (Y)	0.211	0.089	2,378	0.017	Accepted
RISK FACTORS (X3) → COST OVERRUN (Y)	0.067	0.026	2,537	0.011	Accepted

Table 6 presents the results of the hypothesis testing. The hypothesis testing results show that all three independent variables have positive and statistically significant effects on cost overruns. Among the three determinants, Geographical Factors have the largest path coefficient ($\beta = 0.211$, $p = 0.017$), followed by Social Factors ($\beta = 0.163$, $p = 0.049$) and Project Risk ($\beta = 0.067$, $p = 0.011$). These results indicate that geographical conditions have the strongest relative influence on construction cost overruns in government projects in Southwest Papua. The finding is understandable given the regional characteristics, where transportation accessibility, distance from major supply centres, site conditions, and logistical constraints can directly affect project implementation and expenditure. Social factors also have a meaningful influence, suggesting that stakeholder relationships, community conditions, and workforce-related issues may contribute to additional costs when they are not properly managed. Although Project Risk has the smallest path coefficient among the three variables, its statistically significant effect confirms that project-related uncertainties remain an important consideration in controlling construction costs.

Overall, the findings indicate that cost overruns in government construction projects in Southwest Papua are influenced by a combination of geographical, social, and project-related factors. However, the comparatively larger path coefficient of Geographical Factors indicates that regional conditions deserve particular attention in project planning and cost management. Therefore, cost control strategies should not focus solely on conventional project risk management but should also incorporate location-specific considerations, including accessibility, transportation, material supply, and site conditions.

5. CONCLUSION

Based on the overall assessment, the proposed model satisfies the requirements for both the measurement model and the structural model. All indicators achieved outer loading values greater than 0.70, confirming adequate convergent validity. Furthermore, all constructs exhibited Cronbach's Alpha, Composite Reliability (CR), and Average Variance Extracted (AVE) values exceeding the recommended thresholds, demonstrating satisfactory internal consistency and construct reliability. Discriminant validity was also established, as all Heterotrait–Monotrait Ratio (HTMT) values were below 0.85. Overall, these results indicate that the measurement and structural models provide adequate support for examining the relationships between the proposed factors and cost overrun in government construction projects in Southwest Papua.

The results show that geographical factors are the strongest predictor of cost overruns in government construction projects in Southwest Papua, with a path coefficient of 0.211, followed by social factors with a coefficient of 0.163 and project risk with a coefficient of 0.067. This finding highlights the importance of geographical conditions in determining construction cost performance in the region. The results also indicate that social conditions and project-related risks remain relevant factors, although their effects are lower than those of geographical factors. Therefore, greater attention to geographical characteristics should be incorporated into project planning, cost estimation, and implementation strategies for government construction projects in Southwest Papua.

Among the examined determinants, Geographical Factors represent the most influential predictor of cost overruns, highlighting the critical role of regional characteristics, project accessibility, transportation constraints, and site conditions in government construction projects in Southwest Papua. These findings indicate that project cost overruns are not solely driven by technical or operational risks but are also substantially affected by geographical and social conditions. Therefore, effective cost overrun mitigation requires a comprehensive project management approach that integrates location-specific planning, stakeholder engagement, and systematic risk management from the earliest stages of project development.

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