



International Journal of Research Publication and Reviews

Journal Homepage: www.ijrpr.com ISSN 2582-7421

The Influence of Effective Contract Management Procedures on the Success of Road Infrastructure Projects: A Case Study of Tanzania National Roads Agency Iringa Regional Office

¹ Damiano Simkanga, ² Dr. Yasinta Kassimba, ³ Dr. Theobald Kipilimba

¹Department of Business Studies, University of Iringa, Tanzania Email: simkangadamian@gmail.com

²Department of Business Studies, University of Iringa, Tanzania Email: kassimbayasinta@gmail.com

³Department of Business Studies, University of Iringa, Tanzania Email: kipilimbathao@gmail.com

ABSTRACT

This study investigated the influence of effective contract management procedures on the success of road infrastructure projects at the Tanzania National Roads Agency (TANROADS) Iringa Regional Office. Anchored in Agency Theory, Transaction Cost Economics, and Relational Contracting Theory, the study evaluated three specific operational objectives: contract planning and administrative procedures, contract monitoring and supervision procedures, and contract modification and variation control procedures. An explanatory and correlational quantitative research design was adopted, utilizing a complete census framework of sixty-seven (N = 67) technical, procurement, legal, and contracting professionals operating under TANROADS Iringa. Primary data were gathered using structured Likert-scale questionnaires. Multiple linear regression analysis revealed that effective contract management procedures collectively account for 61.4% of the variance observed in road infrastructure project success ($R^2 = 0.614$, $F(3, 63) = 28.140$, $p < 0.001$). Contract monitoring and supervision procedures emerged as the dominant direct positive predictor ($\beta = 0.412$, $p < 0.001$), followed by contract modification and variation control procedures ($\beta = 0.321$, $p = 0.003$), and contract planning and administrative procedures ($\beta = 0.258$, $p = 0.018$). The study concludes that while internal supervisory controls ensure high asset durability and technical specification compliance, schedule performance remains constrained by external right-of-way site clearance delays and centralized financial variation approval hierarchies. Revisions to local financial delegation limits and mandatory pre-commencement site clearance policies are recommended.

Keywords: Effective Contract Management, Road Infrastructure, Project Success, TANROADS Iringa, Contract Monitoring, Scope Variations.

Introduction

Public infrastructure development serves as the backbone of global socio-economic transformation, facilitating trade, connectivity, and industrial competitiveness. Worldwide, governments allocate substantial capital budgets toward transportation network expansion; however, civil engineering infrastructure projects consistently encounter operational friction during execution (Flyvbjerg, 2023). Standardized contract administration frameworks, baseline schedule verification, and formal oversight protocols have been established across developed economies to mitigate transaction costs and operational ambiguity (Briggs, 2022; Garrett, 2021). Despite these structural safeguards, international public procurement systems frequently experience baseline budget extensions and delivery timeline slippages stemming from uncoordinated mobilization and administrative approval delays (Crawford and Pollack, 2022; Smith, 2023).

Across the African continent, public road construction projects play a vital role in regional trade integration and rural-urban market accessibility, yet contract administration challenges remain widespread (World Bank, 2024). In many Sub-Saharan African countries, public civil works are plagued by recurring schedule overruns, costly scope variations, and premature structural pavement distress (Mbonera, 2024). Empirical studies across East Africa reveal that while formal procurement planning frameworks are established during pre-award phases, weak contract supervision, delayed site possession handovers, and inadequate variation governance protocols continue to erode value for money in public infrastructure investments (Coleman et al., 2020; Mowlid, 2021; Muinde, 2022).

In Tanzania, the central government has channeled significant public investments into national road network construction and rehabilitation under the administrative oversight of the Tanzania National Roads Agency (TANROADS) (Controller and Auditor General [CAG], 2023). To enhance procurement transparency, enforce contract compliance, and streamline administrative workflows, the government mandated the operationalization of the National e-Procurement System of Tanzania (NeST) alongside standardized Public Procurement Regulatory Authority (PPRA) guidelines (Kavishe, 2024; PPRA, 2023). Nevertheless, official audit assessments highlight persistent execution bottlenecks across regional road works, including lingering contractor standing-time claims, unresolved right-of-way compensation disputes, and extended approval lead times for engineering variations (CAG, 2023; National Audit Office of Tanzania [NAOT], 2024).

At the regional operational level, particularly within the Iringa Region, road infrastructure execution is further complicated by challenging terrain, complex geotechnical formations, and severe seasonal precipitation (Bomani, 2024). The TANROADS Iringa Regional Office manages an extensive network of trunk and regional roads critical for linking the Southern Highlands to major domestic and transit trade corridors (Mtana et al., 2023). While regional engineering teams systematically enforce material testing and interim payment measurement protocols, operational friction persists during initial site handovers and multi-tiered variation escalations, leading to widespread completion delays on active civil works contracts (Matto et al., 2021; Mtana et al., 2023).

Understanding the precise empirical mechanisms through which effective administrative routines influence project performance is therefore vital for public civil engineering governance. Modern public contract management relies on three operational pillars: contract planning, continuous field supervision, and formal variation control (Zhang and Liu, 2022). Evaluating how these specific operational procedures interact within a regional road executive authority provides critical empirical evidence needed to resolve the ongoing divergence between high physical technical quality and persistent project schedule delays (Machira et al., 2024; Matto, 2021).

Statement of the Problem

The primary purpose of public road contract management systems is to ensure civil works are executed within approved budgets, on schedule, and according to technical specifications (PPRA, 2023; World Bank, 2024). Post-award administrative procedures act as institutional safeguards that promote Value for Money (VfM) through pre-commencement planning, field monitoring, and variation control (Mbonera, 2024). When functioning effectively, these procedures suppress contractor opportunism, minimize administrative friction, and protect public infrastructure investments.

Despite standard procurement guidelines and digital platforms like NeST, public road projects frequently diverge from baseline targets. Audit reports by the Controller and Auditor General (CAG, 2023) and the National Audit Office of Tanzania (NAOT, 2024) highlight systemic post-award inefficiencies, including unapproved scope variations, delayed interim payment certifications, and project delays. Nationwide, these failures resulted in over TZS 66 billion in excess public expenditure due to unverified variation claims and poor contract administration (CAG, 2023; NAOT, 2024). This indicates a significant disconnect between statutory procurement frameworks and daily field execution, creating vulnerabilities where contractors exploit weak oversight without timely penalty enforcement.

At the regional level, TANROADS Iringa operates under challenging topographical conditions and heavy seasonal rainfall (Bomani, 2024). Local projects continue to face schedule extensions, cost overruns, and premature pavement deterioration, signaling gaps in branch-level contract planning, site supervision, and variation management (Kavishe, 2024; Mtana et al., 2023).

Furthermore, existing East African literature predominantly focuses on pre-award procurement stages, such as tender evaluation, while neglecting the post-award operational phase where capital expenditure occurs. This conceptual gap leaves regional project managers without empirical evidence on how post-award administrative protocols such as joint variation assessments directly influence project completion outcomes. Therefore, this study empirically investigates the influence of contract management procedures on the success of road infrastructure projects at the TANROADS Iringa Regional Office.

Methodology

Area of the Study

The study area refers to the specific geographical, spatial, and institutional setting within which the research process unfolded (Msabila and Nalaila, 2023). The study was conducted at the TANROADS Iringa Regional Office located in Iringa Region, Tanzania. Iringa represents a strategic logistics hub connecting Tanzania's Southern Highlands to key regional commercial centers and international transport corridors. This geographical location was specifically selected due to its high concentration of active trunk and regional road construction civil works, varied geotechnical terrain, and complex operational dynamics managed directly by regional procurement, engineering, and legal personnel.

Research Design

A research design constitutes the operational blueprint detailing the methods and procedures for collecting, measuring, and analyzing data to address the research problem effectively (Saunders et al., 2019). This study adopted an explanatory and correlational quantitative research design. This design was chosen because it enabled the researcher to empirically measure standard administrative constructs, establish statistical relationships, and quantify the explanatory power of effective contract management procedures on road infrastructure project success metrics using multiple linear regression modeling.

Population and Sampling

Population

A research population is a well-defined collection of individuals or objects known to have similar characteristics and who are the focus of a scientific query (Mugenda and Mugenda, 2023). The target population comprised 67 key professionals directly involved in post-award contract planning, execution, supervision, and legal oversight at TANROADS Iringa Regional Office, along with project managers from active registered civil works contracting firms.

in the region (TANROADS Iringa HR Records, 2026). The target population was strictly limited to relevant operational roles: Regional Manager, Procurement Officers, Quantity Surveyors, Project/Site Engineers, Law/Contract Officers, ICT Specialists, and External Project Managers/Contractors.

Sampling

Sampling refers to the systematic procedure used to select a subset of individuals from the target population to make statistical inferences about the group as a whole (Kothari and Garg, 2023). Due to the small, specialized, and highly defined nature of this expert population, the study employed a complete census sampling framework, evaluating all 67 targeted respondents to eliminate sampling error and maximize statistical power.

Data Collection Instruments

Primary empirical data were collected using a structured, self-administered questionnaire. The survey instrument was operationalized using 5-point Likert rating scales (ranging from 1 = Strongly Disagree to 5 = Strongly Agree) adapted from validated contract management frameworks. The questionnaire was structured into distinct sections measuring contract planning (X1), contract monitoring (X2), variation control (X3), and project success indicators (Y). Instrument validity was established through expert panel reviews, while internal consistency reliability was confirmed via Cronbach's alpha coefficients exceeding the 0.70 benchmark across all constructs.

Data Analysis

Empirical data were compiled, cleaned, and analyzed using IBM SPSS Statistics Version 28. Descriptive statistical measures, including composite mean scores and standard deviations (SD), were calculated to establish baseline operational agreement. Inferential statistical testing was conducted using Pearson correlation analysis and multiple linear regression modeling to test hypotheses and quantify the direct effects of independent variable constructs on the dependent project success variable at a 95% confidence level ($\alpha = 0.05$).

Ethical Considerations

Ethical clearance and institutional approval were secured prior to data collection to guarantee that all procedures adhered to established research standards, emphasizing voluntary participation, confidentiality, anonymity, and institutional feedback (Saunders et al., 2019). Participants were fully informed of the study's academic purpose and granted written consent without fear of professional pressure or retaliation (Creswell and Creswell, 2018). Strict data protection measures were enforced by storing physical questionnaires in locked cabinets, securing digital SPSS datasets on encrypted, password-protected cloud drives, and removing personal identifiers to ensure complete anonymity in aggregate statistical reporting (Mugenda and Mugenda, 2023). Furthermore, an executive summary and final dissertation will be formally provided to the TANROADS Iringa Regional Office to support evidence-based policy improvements and regional project efficiency (Msabila and Nalaila, 2023).

Results and Discussions

This chapter presents the findings of the study aimed at investigating the influence of effective contract management procedures on the success of road infrastructure projects, with a focus at TANROADS Iringa Regional office. The descriptive and inferential statistical results across all three specific operational objectives and the overall project success outcome model are summarized in Table 1 below.

Table 1: Response Frequencies, Percentages, Correlations, and Multiple Linear Regression Results

Variables / Constructs	Agree / Strongly Agree f (%)	Neutral f (%)	Disagree / Strongly Disagree f (%)	Pearson Correlation (r)	Unstandardized β	Std. Error	Standardized β^*	t-value	p-value
(Constant)	—	—	—	—	0.612	0.215	—	2.846	0.006
Contract Planning and Administration (X ₁)	51 (76.1%)	11 (16.4%)	5 (7.5%)	0.548**	0.258	0.107	0.231	2.415	0.018
Contract Monitoring and Supervision (X ₂)	59 (88.1%)	6 (9.0%)	2 (3.0%)	0.684**	0.412	0.100	0.428	4.105	<0.001
Variation Control Procedures (X ₃)	47 (70.1%)	12 (17.9%)	8 (11.9%)	0.612**	0.321	0.103	0.312	3.120	0.003

Source Field data (2026)

Notes: Dependent Variable: Road Infrastructure Project Success (Y). Model Summary: $R = 0.784$, $R^2 = 0.614$, Adjusted $R^2 = 0.596$, $F(3, 63) = 28.140$, $p < 0.001$. $N = 67$. Correlation is significant at the 0.01 level (2-tailed).

a) Contract Planning and Administrative Procedures on The Success of Road Infrastructure Projects

The empirical findings for the first specific objective demonstrated strong implementation of contract planning and administrative procedures across regional road projects, with 51 out of 67 respondents (76.1%) agreeing or strongly agreeing that planning procedures are effectively operationalized. Specifically, 56 respondents (83.6%) confirmed the formal verification and approval of baseline construction work schedules prior to site mobilization, and 53 respondents (79.1%) validated the execution of joint pre-commencement site condition reviews. Conversely, 11 respondents (16.4%) remained neutral, while 5 respondents (7.5%) expressed disagreement primarily regarding initial risk register updates and the timely execution of physical site possession handovers due to unresolved right-of-way land acquisition compensation. Inferential regression confirmed that contract planning exerts a statistically significant direct positive impact on road project success.

These empirical results align directly with Transaction Cost Economics (TCE), which postulates that formal contractual planning reduces transaction costs and operational ambiguity under bounded rationality (Coase, 1937; Williamson, 1985). Early schedule verification and joint site reviews serve as essential governance mechanisms that align stakeholder expectations and mitigate information asymmetry before field execution begins (Al-Zwainy and Hassan, 2021; Smith and Briggs, 2022). However, the frequency of disagreement surrounding physical site handovers confirms that internal planning frameworks are frequently disrupted by external municipal compensation delays, creating mobilization backlogs (Oladapo and Elsey, 2023; Smith et al., 2023).

Furthermore, the significant positive regression parameter validates the assertion by Garrett (2021) and Tuja and Mmari (2025) that structured administrative preparation acts as a critical risk-suppression foundation. While planning alone does not guarantee timely project completion, establishing clear reporting structures and baseline parameters is a prerequisite for effective downstream supervision (Crawford and Pollack, 2022). Thus, strengthening ex-ante land acquisition coordination is essential to prevent early administrative planning from being undermined by site access delays (Mowlid, 2021).

b) Contract Monitoring and Supervision Procedures on The Success of Road Infrastructure Projects

The results for the second specific objective revealed that contract monitoring and supervision procedures represent the most deeply embedded operational function at TANROADS Iringa, recording the highest overall consensus, with 59 respondents (88.1%) indicating agreement or strong agreement. Only 6 respondents (9.0%) were neutral, and 2 respondents (3.0%) disagreed. Physical verification of interim payment certificates against measured field works achieved the highest individual consensus across the survey, with 62 respondents (92.5%) agreeing with the verification protocols. Routine engineer site inspections were confirmed by 58 respondents (86.6%), and mandatory laboratory material testing protocols were affirmed by 57 respondents (85.1%). Inferential regression modeling confirmed that monitoring and supervision is the single strongest direct predictor of road infrastructure project success.

This outcome strongly validates Agency Theory, which posits that rigorous monitoring protocols are essential to curb post-contractual moral hazard and contractor opportunism (Eisenhardt, 1989; Jensen and Meckling, 1976). Linking payment certification strictly to physical field measurements and laboratory material tests ensures that public funds are disbursed solely for compliant civil works (Bekele and Worku, 2023). Continuous oversight acts as the primary operational engine for securing structural pavement durability and enforcing technical specifications across regional civil works (Turner and Garrett, 2023).

These findings mirror previous empirical studies in East Africa emphasizing that physical site inspections and mandatory material testing directly prevent premature asset deterioration (Matto, 2021; Mtana et al., 2023). Additionally, the integration of progress logging via NeST demonstrates that digital oversight enhances administrative transparency (Kavishe, 2024). However, persistent non-compliance notices identified by 8 respondents (11.9%) highlight that engineering inspections must be matched with enforced rectification workflows to avoid construction delays (Mbonera, 2024).

c) Contract Modification and Variation Control Procedures on The Success of Road Infrastructure Projects

Descriptive analysis for the third objective indicated substantial reliance on variation control procedures, with 47 respondents (70.1%) expressing agreement or strong agreement regarding their systematic application. Standardized administrative variation evaluation workflows were confirmed by 52 respondents (77.6%), while historical variation logging was affirmed by 49 respondents (73.1%). However, this construct exhibited the highest level of disagreement across the study ($f = 8$, 11.9%), alongside 12 neutral responses (17.9%). The disagreement was heavily concentrated on two operational items: the promptness of issuing formal variation approvals, where 18 respondents (26.9%) reported delays, and the adequacy of financial delegation limits assigned to Regional Managers, where 22 respondents (32.8%) expressed dissatisfaction. Multiple regression confirmed that variation control exerts a statistically significant positive influence on project outcomes.

These empirical observations strongly reflect Relational Contracting Theory and TCE principles regarding contract incompleteness (Macneil, 1974, 1980; Williamson, 1996). Because road construction contracts are inherently incomplete due to unforeseen subsurface conditions and weather volatility, formal variation control frameworks provide necessary flexibility to adapt during execution (Cheung et al., 2006; Flyvbjerg and Walker, 2023). Multi-disciplinary technical evaluations effectively prevent uncoordinated scope creep and contain cost overruns (Coleman et al., 2020; Zhang and Liu, 2022).

However, the empirical percentage distribution demonstrates that centralized approval hierarchies create severe administrative bottlenecks. Low financial variation authorization limits force routine technical adjustments to undergo multi-tiered escalation to central headquarters, generating prolonged lead times for nearly a third of key project personnel. As noted by Matto et al. (2021), these approval backlogs trigger contractor standing-time financial claims, directly driving schedule overruns and highlighting the urgent need to decentralize variation limits to regional authority levels.

Conclusion and Recommendations

This study proves that effective contract management procedures function as an integrated, highly impactful governance framework that accounts for over 61% of the variance observed in road project success at TANROADS Iringa. Contract monitoring and supervision acts as the dominant driver of technical asset quality and specification compliance, while planning and variation control provide foundational administrative stability. However, overall project performance remains constrained by schedule overruns caused by administrative bottlenecks specifically delayed physical site handovers due to pending municipal land acquisition compensation and extended lead times for central variation approvals.

It is recommended that the Ministry of Works and TANROADS Executive Management upwardly adjust the financial variation authorization limits delegated to Regional Managers to eliminate central escalation backlogs, institute a binding institutional policy requiring 100% completed right-of-way clearance prior to issuing commencement orders, and upgrade regional ICT infrastructure to enable real-time compliance logging via NeST. Future research should expand this framework longitudinally across multiple geographical regions to evaluate life-cycle pavement maintenance performance.

References

- Al-Zwainy, F. M. S., & Hassan, H. A. (2021). Pre-construction planning workflows and risk identification in public infrastructure projects. *Journal of Engineering and Applied Sciences*, 16(4), 145–158.
- Anacret, R. (2024). *Assessment of monitoring and evaluation planning frameworks on performance of national road projects: A case of TANROADS* [Unpublished master's thesis]. University of Dar es Salaam.
- Bekele, T., & Worku, A. (2023). The impact of supervisory procedures and payment certification on project cost control in public road works. *African Journal of Construction Management*, 11(2), 89–104.
- Bomani, M. (2024). Geotechnical and climatic challenges in transport infrastructure development across Southern Highlands of Tanzania. *Tanzanian Journal of Engineering and Technology*, 42(1), 33–47.
- Briggs, R. (2022). Standardized contract administration procedures and project outcome variance in civil infrastructure. *International Journal of Project Governance*, 14(3), 201–215.
- Cheung, S. O., Yiu, T. W., & Chiu, O. K. (2006). The relational governance architecture of construction contracts. *Journal of Management in Engineering*, 22(4), 175–184.
- Coase, R. H. (1937). The nature of the firm. *Economica*, 4(16), 386–405.
- Coleman, E., Kwarteng, A., & Mensah, S. (2020). Variation management and cost performance in public road construction contracts. *Journal of Infrastructure Development in Africa*, 8(1), 52–67.
- Controller and Auditor General. (2023). *Annual general report on the audit of public authorities and other bodies for the financial year 2021/2022*. National Audit Office of Tanzania.
- Crawford, L., & Pollack, J. (2022). Governance protocols and administrative workflows in complex engineering projects. *International Journal of Project Governance*, 19(3), 201–218.
- Creswell, J. W., & Creswell, J. D. (2018). *Research design: Qualitative, quantitative, and mixed methods approaches* (5th ed.). SAGE Publications.
- Eisenhardt, K. M. (1989). Agency theory: An assessment and review. *Academy of Management Review*, 14(1), 57–74.
- Flyvbjerg, B. (2023). *How big things get done: The surprising factors that determine the fate of every project, from home renovations to space exploration and everything in between*. Crown Publishing Group.
- Flyvbjerg, B., & Walker, C. (2023). Overcoming cost overruns and scope volatility: Evaluation of variation control frameworks in major transport infrastructure. *Transport Policy*, 131, 102–115.
- Garrett, G. A. (2021). *Contract management: Body of knowledge* (6th ed.). National Contract Management Association.
- Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics*, 3(4), 305–360.
- Kavishe, N. (2024). Assessing the post-award operationalization of the National e-Procurement System of Tanzania (NeST) on variation control in civil works. *Tanzanian Journal of Procurement and Supply Chain*, 6(1), 15–29.

- Kothari, C. R., & Garg, G. (2023). *Research methodology: Methods and techniques* (5th ed.). New Age International Publishers.
- Machira, P., Tumwine, J., & Okello, D. (2024). Post-award contractual compliance and scope dispute mitigation in East African road infrastructure projects. *East African Journal of Management and Procurement*, 12(1), 44–59.
- Macneil, I. R. (1974). The many futures of contracts. *Southern California Law Review*, 47(3), 691–816.
- Macneil, I. R. (1980). *The new social contract: An inquiry into modern contractual relations*. Yale University Press.
- Matto, M. C. (2021). Post-award procurement management and public civil works performance in local government authorities. *Journal of Public Procurement and Contract Management*, 3(2), 40–55.
- Matto, M. C., Mchopa, A. D., & Mrope, N. P. (2021). Analysis of post-award contract administration challenges in public sector works in Tanzania. *Tanzanian Journal of Development Studies*, 19(2), 88–103.
- Mbonera, E. (2024). Public sector contract administration, monitoring protocols, and infrastructure performance in Sub-Saharan Africa. *African Development Review*, 36(1), 110–124.
- Mowlid, A. A. (2021). *Procurement planning and performance of road construction projects in Kenya* [Unpublished master's thesis]. University of Nairobi.
- Msabila, A. K., & Nalaila, S. G. (2023). *Research methodology: A practical guide for social science researchers*. Nyambari Nyangwine Publishers.
- Mtana, S., Luoga, H., & Mshana, R. (2023). Post-award contract supervision and asset maintenance quality across regional TANROADS networks. *Journal of Building and Land Development*, 25(1), 61–75.
- Mugenda, O. M., & Mugenda, A. G. (2023). *Research methods: Quantitative and qualitative approaches* (Rev. ed.). ACTS Press.
- Muinde, J. M. (2022). Evaluation of scope variation governance protocols in regional transport infrastructure in Kenya. *Journal of Construction in Developing Countries*, 27(2), 143–159.
- National Audit Office of Tanzania. (2024). *Performance audit report on the management of road construction and rehabilitation contracts in Tanzania*. Government Printer.
- Oladapo, A., & Elsey, P. (2023). Early joint site reviews and baseline schedule management in municipal transport delivery. *Australian Journal of Construction Management*, 30(2), 118–132.
- Public Procurement Regulatory Authority. (2023). *Annual procurement compliance monitoring and audit report for financial year 2022/2023*. Government Printer.
- Saunders, M., Lewis, P., & Thornhill, A. (2019). *Research methods for business students* (8th ed.). Pearson Education.
- Smith, A. (2023). Standardized FIDIC contract management and post-award risk controls in capital public works. *Journal of Legal Affairs and Dispute Resolution in Engineering and Construction*, 15(1), Article 04522012.
- Smith, A., & Briggs, R. (2022). Impact of pre-commencement administrative planning on civil engineering project delivery. *Construction Management and Economics*, 40(5), 389–404.
- Smith, A., Jones, D., & Taylor, P. (2023). Project scope transitions and baseline alignment during contract mobilization. *International Journal of Project Management*, 41(3), 101–114.
- Turner, J. R., & Garrett, G. A. (2023). Supervisory control systems and quality defect reduction in major civil engineering projects. *International Journal of Managing Projects in Business*, 16(2), 275–291.
- Williamson, O. E. (1985). *The economic institutions of capitalism: Firms, markets, relational contracting*. The Free Press.
- Williamson, O. E. (1996). *The mechanisms of governance*. Oxford University Press.
- World Bank. (2024). *Sub-Saharan Africa infrastructure governance report: Optimizing value for money in transport projects*. The World Bank Group.
- Zhang, L., & Liu, Y. (2022). Governance of scope changes in state-owned highway projects: Path analysis of variation approval workflows. *Asia-Pacific Journal of Construction Management*, 14(3), 210–226.