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Determinants Of Project Performance In National Pride Projects Of Nepal: Evidence From Delayed Projects

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Abstract
Nepal's National Pride Projects (NPPs) face persistent delays and cost overruns, yet limited evidence exists on how managerial, technical, financial, and institutional determinants collectively shape outcomes. This study examined key predictors of project performance (PP_overall) using a cross-sectional survey of 80 stakeholders (clients, consultants, contractors) from irrigation, hydropower, transport, water supply, and corridor projects. Constructs included Lack of Adequate Planning (LAP), Managerial Quality (MQ), Resource Availability (RA), Financial Factors (FF), Bidding Adequacy (BA), Technical and Organizational Risks (TOR), Technology Adoption (TA), and Unrealistic Requirements (UR). All scales were reliable (α ≥ .70). Multiple linear regression modeled PP_overall as the dependent variable. The model demonstrated strong explanatory power ($R^2 = 0.617$; $F(7, 72) = 16.55$, $p < .001$). Significant positive predictors of PP_overall were MQ ($B = 0.6136$, $p < .001$), RA ($B = 0.4221$, $p < .001$), FF ($B = 0.3194$, $p = .005$), and BA ($B = 0.3221$, $p = .002$), while LAP ($B = –0.3533$, $p = .001$) and TOR ($B = –0.3571$, $p < .001$) negatively influenced outcomes. TA ($B = 0.1388$, $p = .124$) and UR ($B = –0.0583$, $p = .534$) were not significant. Results suggest that project success in NPPs hinges on Managerial quality, resource adequacy, financial stability, and effective procurement, while weak planning and unmanaged risks are major obstacles. Strengthening feasibility studies and risk assessments, enforcing Managerial quality standards, ensuring timely resource and fund mobilization, professionalizing procurement, and scaling digital tools (e-procurement, BIM, GIS) through institutional support are essential to improve project delivery.
Keywords: *Bidding Adequacy, Financial Factors, National Pride Projects, Project Performance, Resource Availability*

1. INTRODUCTION

Project performance, often synonymous with project success, is a multidimensional construct encompassing cost, time, quality, scope, safety, stakeholder satisfaction, and sustainability. Traditionally, performance was conceptualized through the Iron Triangle, which emphasizes the three primary constraints—time, cost, and quality—as central benchmarks of success (Atkinson, 1999). While this framework remains influential, it has been critiqued for its narrow scope, prompting scholars and practitioners to broaden the definition. The Project Management Institute (PMI, 2017) suggests that stakeholder satisfaction, sustainability, and long-term value delivery are equally critical for assessing success. In this broader sense, project performance is not limited to the efficient delivery of outputs but also reflects the ability to meet stakeholder expectations, achieve durability, and generate social benefits. Delayed completions, cost escalations, and stakeholder dissatisfaction are thus critical indicators of underperformance, undermining both short-term efficiency and long-term developmental objectives (Flyvbjerg, 2017).

The determinants of project performance refer to the range of organizational, technical, financial, institutional, and environmental factors that influence outcomes. These determinants may facilitate success or contribute to inefficiencies, delays, and overruns. For example, strong managerial capacity, adequate resource mobilization, and transparent procurement systems support timely completion, whereas inadequate planning, unrealistic demands, and financial instability often result in systemic failures (Chan, Scott, & Chan, 2004; Iyer & Jha, 2005; Pinto & Slevin, 1987). Importantly, determinants are highly context-specific, interacting with broader institutional, socio-political, and governance frameworks (North, 1990; Kerzner, 2017).

Inadequate planning is among the most frequently cited causes of project failure. Poor feasibility studies, weak scheduling, and unclear designs undermine efficiency and increase risks of time and cost overruns. Globally, planning deficiencies are estimated to account for nearly half of all construction delays (Doloi et al., 2012). In South Asia, inadequate feasibility assessments and overambitious timelines exacerbate project

inefficiencies (Iyer & Jha, 2005). In Nepal, Bhattarai (2023) found that poor planning and design changes were key contributors to delays in road projects, while Dhungana and Wagle (2019) reported similar findings in National Pride Projects such as the Melamchi Water Supply.

Overambitious objectives, politically driven deadlines, and unclear scopes often generate unrealistic requirements that constrain performance. Goal-Setting Theory (Locke & Latham, 1990) posits that unattainable goals demotivate stakeholders and lead to inefficiency. Empirical studies in India show that unrealistic deadlines imposed by political or bureaucratic actors often result in chronic overruns (Iyer & Jha, 2005). In Nepal, Paudel (2020) noted that politically motivated commitments in hydropower and road projects, such as the Kathmandu–Terai Expressway, imposed unrealistic requirements that ignored logistical and geographic complexities.

Technical risks—such as design flaws, unforeseen geological conditions, and inadequate technologies—combined with organizational risks like weak coordination, frequently undermine project delivery. Risk Management Theory argues that unmanaged risks introduce uncertainty, escalating costs and delays (Kerzner, 2017). For example, Flyvbjerg (2017) observed that megaprojects worldwide routinely fail due to underestimated risks. In Nepal, the Melamchi Water Supply and Upper Tamakoshi Hydropower projects experienced major delays from unforeseen geological conditions and coordination breakdowns (Dhungana & Wagle, 2019).

High-quality managerial capacity is equally critical for ensuring efficiency, accountability, and project success. Effective leadership, rigorous planning, and robust monitoring represent organizational resources that provide a sustained advantage, consistent with the Resource-Based View (Barney, 1991). Empirical studies highlight that poor managerial quality—manifested in weak decision-making, lack of supervision, and inadequate monitoring—contributes directly to cost overruns and schedule delays. For instance, Iyer and Jha (2005) found that managerial ineffectiveness and poor coordination were among the most significant causes of underperformance in Indian construction projects. Similarly, Toor and Ogunlana (2009) reported that leadership deficiencies, communication gaps, and inadequate supervision were critical barriers to project success in developing countries. In the Nepalese context, Shrestha and Shrestha (2019) emphasized that weak managerial oversight in public construction projects led to recurrent time and cost overruns, while Dhungana and Wagle (2019) highlighted the role of poor supervision and contract management in delays across National Pride Projects.

Availability of skilled labor, machinery, and financial resources ensures workflow continuity and timely execution. The RBV emphasizes that adequate resources, when mobilized efficiently, provide sustainable performance advantages (Barney, 1991). Mainali, Shrestha, and Pokhrel (2023) found that resource adequacy significantly influenced job satisfaction and productivity among engineers in Nepal's private sector. In large infrastructure projects, resource shortages have consistently contributed to delays, especially in remote and challenging terrains (Koirala, 2024).

Financial stability, timely disbursements, and cash flow management are crucial for maintaining project progress. Agency Theory highlights how financial accountability enhances efficiency and reduces opportunism (Jensen & Meckling, 1976). Globally, financing gaps are recognized as leading causes of project underperformance (Odeyinka, Lowe, & Kaka, 2008). In Nepal, Pokhrel and Subedi (2023) found that financial adequacy significantly affected organizational efficiency, while Bhattarai (2018) identified budget shortfalls and delayed payments as root causes of road project failures.

Technology adoption is increasingly central to project success. Diffusion of Innovation Theory (Rogers, 2003) suggests that digital tools, such as BIM, GIS, and project monitoring systems, enhance productivity but require organizational readiness. Globally, technology adoption has been shown to improve efficiency, reduce errors, and enhance accountability (Marnewick, 2016). In Nepal, Paudel (2020) highlighted that while technology such as BIM and digital monitoring has been piloted, adoption remains low due to high costs and limited expertise.

Transparent and fair procurement practices are essential for performance. Public Procurement Theory emphasizes that competitive bidding reduces disputes and ensures accountability (Thai, 2001). In Nepal, Dhungana and Wagle (2019) and the Public Procurement Monitoring Office (PPMO, 2020) reported that weak bidding processes, delayed evaluations, and unbalanced rates significantly undermined National Pride

Projects. Adhikari and Gautam (2010) similarly observed that poor procurement contributed to delays in irrigation and road projects.

Stakeholder satisfaction is a critical but often overlooked determinant of project success. Bryde and Robinson (2005) argue that client and end-user satisfaction is as vital as technical efficiency. In Nepal, stakeholder dissatisfaction has been frequently observed in delayed projects, where unmet expectations, poor communication, and quality concerns reduce public trust (Giri, 2023).

Globally, project underperformance is pervasive. Flyvbjerg (2017) documents cost overruns and delays in megaprojects across sectors, noting that hydropower and transportation projects are particularly vulnerable. Bannerman and Yetton (2011) emphasize that variance in outcomes often reflects differences in organizational risk management. In South Asia, similar issues are magnified by institutional inefficiencies. Studies in India, Bangladesh, and Pakistan show that weak procurement, bureaucratic inefficiencies, and land acquisition disputes are persistent barriers (Iyer & Jha, 2005; Rahman & Kumaraswamy, 2008).

Nepal's National Pride Projects (NPPs), spanning irrigation, hydropower, transportation, water supply, and aviation, were designed to accelerate growth and integration. However, most face chronic delays, cost escalations, and disputes. For example, the Melamchi Water Supply Project was delayed for decades due to land acquisition disputes and contractor withdrawals (Paudel, 2020). The Kathmandu–Terai Expressway repeatedly missed deadlines because of poor planning and inadequate resource mobilization. Hydropower projects such as Upper Tamakoshi and Budhigandaki also suffered from financial instability and political interference (Dhungana & Wagle, 2019).

Project delays remain one of the most pervasive challenges in infrastructure delivery worldwide, particularly in developing countries. Delays not only escalate costs but also reduce the socio-economic benefits that projects are intended to generate. Flyvbjerg (2017) notes that globally, nine out of ten megaprojects experience schedule overruns, often by more than 50%. In South Asia, bureaucratic inefficiencies, land acquisition disputes, and weak contractual enforcement exacerbate time overruns (Iyer & Jha, 2005; Rahman & Kumaraswamy, 2008). Nepal mirrors these trends: National Pride Projects such as the Melamchi Water Supply and Kathmandu–Terai Expressway have faced chronic delays due to planning gaps, resource shortages, and institutional weaknesses (Paudel, 2020; Dhungana & Wagle, 2019). These persistent delays undermine economic returns, disrupt service delivery, and erode public trust in government-led development initiatives.

Empirical research in Nepal further underscores recurring determinants of underperformance: inadequate planning (Bhattarai, 2023), weak procurement (Dhungana & Wagle, 2019), shortages of labor and equipment (Koirala, 2024), delayed payments and poor communication (Giri, 2023). Yet, most studies are case-based or sector-specific, limiting generalizability. Few have quantitatively examined multiple determinants in a single framework across sectors.

This study addresses three critical gaps. First, it integrates multiple determinants—planning, requirements, risks, managerial quality, resources, finance, technology, bidding, and stakeholder satisfaction—into one empirical model. Second, it applies global theories (RBV, Iron Triangle, Diffusion of Innovation, Institutional Theory) to the Nepalese context, testing their relevance in a developing-country setting characterized by complex terrains, resource scarcity, and bureaucratic inefficiencies. Finally, it responds to urgent policy needs: Nepal's heavy investment in NPPs requires evidence-based insights into the root causes of delays and underperformance to improve accountability and ensure developmental returns. By employing multiple linear regression, this study quantifies the relative influence of key determinants on project performance across multiple sectors, bridging a significant knowledge gap in Nepalese project management literature.

2. METHODOLOGY

2.1 Research Approach and Design

This study adopted a quantitative research approach, as the primary objective was to examine the relationship between multiple independent variables and project performance in the context of Nepal's National Pride Projects (NPPs). Quantitative methods are widely regarded as suitable for testing hypotheses, measuring relationships, and providing objective, generalizable findings through the use of statistical tools (Creswell & Creswell, 2018).

The research was structured around a cross-sectional survey design, which involves collecting data from respondents at a single point in time. This design was selected because it allows for efficient data collection from a relatively large sample and provides a snapshot of stakeholder perceptions and experiences in relation to project performance. A structured questionnaire was developed based on established constructs from the project management and construction management literature. Items were measured on a five-point Likert scale, enabling respondents to indicate the degree of agreement or disagreement with statements related to planning, resources, risks, procurement, and other determinants of performance.

2.2 Study Area

In research, the study area refers to the geographical, institutional, or sectoral boundaries within which a study is conducted. For this research, the study area encompasses Nepal's National Pride Projects (NPPs), which are large-scale infrastructure initiatives prioritized by the Government of Nepal for their high economic, social, and strategic importance. These projects span multiple sectors including irrigation, hydropower, transportation, water supply, aviation, railways, tourism, and corridor development and represent the nation's effort to foster long-term growth, improve connectivity, and enhance service delivery. The selected projects are in Table 1.

Table 1: The list of selected national pride projects under study by sector

Sector	Projects
Irrigation	Sikta Irrigation Project; Babai Irrigation Project; Rani Jamara Kulariya Irrigation Project; Bheri Babai Diversion Multipurpose Project
Hydropower	Upper Tamakoshi Hydropower Project; Budhi Gandaki Hydropower Project; West Seti Hydropower Project
Aviation	Gautam Buddha International Airport; Pokhara Regional International Airport
Tourism/Heritage	Lumbini Area Development Project
Transportation	Pushpa Lal Mid-Hill Highway; North–South Koshi Highway Project; North–South Karnali Highway Project; Kathmandu–Terai Fast Track Project
Water Supply	Melamchi Water Supply Project

2.3 Target Population

In survey research, the target population refers to the entire group of individuals or entities that possess specific characteristics relevant to the study and to whom the findings are intended to generalize (Dillman, Smyth, & Christian, 2014). In this study, the target population consisted of the key stakeholders of Nepal's construction industry directly engaged in the implementation of National Pride Projects (NPPs). These stakeholders included clients, consultants, and contractors, or their representatives, who play critical roles in project planning, supervision, and execution.

As the total population of these groups is not precisely known. To ensure the credibility and relevance of the data, eligibility was limited to individuals with a minimum of five years of professional experience in managing, supervising, or executing large-scale infrastructure projects. This requirement was crucial, as respondents with substantial professional experience are better positioned to provide informed and reliable insights into the factors influencing project performance, drawing upon their accumulated knowledge of technical, financial, and organizational challenges.

Focusing on clients, consultants, and contractors ensured that the study incorporated the perspectives of the three primary actors whose interactions fundamentally shape project outcomes. Clients generally represent funding agencies and regulatory authorities, consultants provide design, advisory, and supervisory services, while contractors are responsible for on-site construction and delivery. Collectively, these groups represent the decision-making, oversight, and implementation dimensions of project execution in Nepal. Their inclusion as the target population therefore makes the study contextually robust and appropriate for examining the determinants of project performance in National Pride Projects.

2.4 Sample Size and Sample Selection

Table 2 summarizes the distribution of respondents included in the study. A total of 80 participants were surveyed, comprising 25 clients (31.3%), 25 consultants (31.3%), and 30 contractors (37.4%). This balanced representation across key stakeholder groups ensured that multiple perspectives on project performance were

captured. The inclusion of clients, consultants, and contractors reflects the tripartite structure of Nepal's construction industry, thereby enhancing the validity of the findings by incorporating viewpoints from both demand- and supply-side actors in National Pride Projects.

Table 2: Distribution of sample respondents

Respondent Category	Frequency (n)	Percentage (%)
Clients	25	31.3
Consultants	25	31.3
Contractors	30	37.4
Total	**80**	**100.0**

Respondents were identified and recruited using non-random sampling techniques, specifically purposive, snowball, and convenience sampling. Purposive sampling was employed to target individuals with direct involvement in large-scale infrastructure projects, ensuring that respondents possessed the necessary expertise and experience. Snowball sampling facilitated access to additional participants through referrals, particularly in cases where experts were difficult to reach due to busy schedules or organizational gatekeeping. Convenience sampling was also applied to include respondents who were readily available and willing to participate during the data collection period.

Although non-random techniques may limit the generalizability of findings, they are widely recognized as appropriate in exploratory and applied research contexts where the objective is to obtain insights from knowledgeable practitioners (Etikan, Musa, & Alkassim, 2016). By combining these approaches, the study secured a diverse yet relevant pool of respondents, thereby strengthening the credibility and contextual relevance of the findings.

2.5 Preparation of Questionnaire and Data Collection

The questionnaire was developed through an extensive literature review and refined with feedback from experts involved in National Pride Projects and academicians in project management. This ensured that the items captured both theoretical and practical dimensions of project performance in Nepal. Responses were measured in 5-point liker scale from strongly disagree to strongly agree.

Table 3: Questionnaires with its source

SN	Construct	Items	Source
1	Time Performance (TP)	Met milestones on schedule; minimal slippages; rework delays controlled	Atkinson (1999); Kerzner (2017)
2	Cost Performance (CP)	Within budget; cost variations controlled; change orders limited	Atkinson (1999); Field (2018)
3	Quality Performance (QP)	Met technical specifications; low defects; minimal post-issues	PMBOK (PMI, 2017); Kerzner (2017)
4	Scope Performance (SP)	Planned outputs delivered; scope well managed; alignment with objectives	Atkinson (1999); Shrestha & Shrestha (2019)
5	Safety Performance (SaP)	Few incidents; protocols followed; safe supervision	Enshassi, Mohamed, & Abushaban (2009)
6	Stakeholder Satisfaction (SS)	Client satisfied; end users satisfied; effective communication	Bryde & Robinson (2005); Pokhrel & Subedi (2023)
7	Land Acquisition Problems (LAP)	Delays due to acquisition; disputes in compensation; timely process	Paudel (2020); Dhungana & Wagle (2019)
8	Utility Relocation (UR)	Utility relocation delayed work; effective coordination; timely shifting	Shrestha & Shrestha (2019)

9	Time Overrun Risks (TOR)	Design changes; scope creep; external disruptions	Frimpong, Oluwoye, & Crawford (2003); Kerzner (2017)
10	Managerial Quality (MQ)	Rigorous planning; strong monitoring; effective leadership	Kerzner (2017); Field (2018)
11	Resource Adequacy (RA)	Skilled labor sufficient; timely materials/equipment; shortages disrupted	Barney (1991)
12	Financial Flow (FF)	Payment delays; adequate cash flow; proactive risk management	Odeyinka, Lowe, & Kaka (2008); Bhattarai (2018)
13	Technology Adoption (TA)	Digital tools; innovative methods; monitoring data used	Rogers (2003); Paudel (2020)
14	Bidding Adequacy (BA)	Fair unit rates; site visits; timely evaluation	Thai (2001); Dhungana & Wagle (2019)

Data for this study were collected using both paper-based and online survey instruments. Initially, paper-based questionnaires were administered directly by the researcher to respondents who were accessible in person. This approach allowed for better engagement and clarification of items where necessary. However, because the targeted projects were geographically dispersed across different regions of Nepal, Google Forms was also employed to reach participants who could not be contacted physically. The use of both methods ensured wider coverage, minimized non-response, and enhanced the representativeness of the sample.

2.6 Validity and Reliability

The study carefully considered the validity and reliability of the research instrument to ensure methodological rigor. Validity refers to the extent to which an instrument accurately measures the intended constructs (Creswell & Creswell, 2018). Two forms of validity were emphasized:

- Content Validity: The questionnaire was designed following an extensive review of relevant literature on project management and construction performance, covering dimensions such as planning, resource availability, financial factors, risks, technology adoption, and procurement practices. To strengthen the content validity, the instrument was reviewed by subject-matter experts, including academics and practitioners in Nepal's construction sector, who verified that the items adequately represented the constructs under investigation.
- Face Validity: The instrument was also pre-tested with a small group of clients, consultants, and contractors involved in National Pride Projects. Respondents confirmed that the questions were clear, contextually relevant, and reflective of real project management practices, thus affirming the appropriateness of the instrument from a practical perspective.

Reliability was assessed using Cronbach's alpha (α), which measures the internal consistency of items within a construct. An alpha value above 0.70 is considered acceptable (Nunnally & Bernstein, 1994; Hair et al., 2019). In line with similar applications in Nepalese studies (Pokhrel & Subedi, 2023), all constructs in this study recorded α values above the threshold, confirming stable and consistent measurement (Table 4).

Table 4: Reliability of coefficient of variables under study

Variable	**Abbreviation**	**Cronbach's Alpha (α)**
Project Performance (Overall)	PP_overall	0.86
Lack of Adequate Planning	LAP	0.81
Unrealistic Requirements	UR	0.74
Technical and Organizational Risks	TOR	0.83
Managerial Quality	MQ	0.88
Resource Availability	RA	0.79
Financial Factors	FF	0.84
Technology Adoption	TA	0.76
Bidding Adequacy	BA	0.82

Together, the establishment of content and face validity and the demonstration of reliability ensured that the instrument was both methodologically sound and contextually appropriate for examining the determinants of project performance in Nepal's National Pride Projects.

2.7 Data Analysis

Project Performance (PP_overall) was measured as a composite score, derived from the mean of multiple indicators that assessed different dimensions of performance, including time performance (TP), cost performance (CP), quality performance (QP), safety performance (SP), satisfaction performance (SaP), and sustainability performance (SS). Each indicator was assessed using Likert-scale items, and the average of these items provided a single overall score for project performance. This composite approach ensured that PP_overall reflected a holistic measure of project success, rather than focusing on a single dimension such as cost or time. Data was analyzed using SPSS version 25.

After that, descriptive statistics, including mean and standard deviation, were used to summarize the central tendency and variability of responses across constructs. For inferential analysis, Multiple Linear Regression (MLR) was employed to examine the relationship between project performance and its predictors, namely Lack of Adequate Planning (LAP), Unrealistic Requirements (UR), Technical and Organizational Risks (TOR), Managerial Quality (MQ), Resource Availability (RA), Financial Factors (FF), Technology Adoption (TA), and Bidding Adequacy (BA). Model adequacy was assessed through goodness-of-fit tests, including the R2 value, to determine the proportion of variance in project performance explained by the (Subedi, Neupane, & Ojha, 2023). The regression results were further interpreted to identify the direction, magnitude, and statistical significance of each independent variable's contribution to project outcomes.

3. RESULTS AND DISCUSSION

3.1 Descriptive statistics of variables under study

The response on multiple Likert scale was summarized using mean and standard deviation of each variable under study.

Table 5: Descriptive statistics value of variables under study

Variable	Mean (M)	Standard Deviation (SD)
PP_overall	3.05	1.15
LAP	3.00	0.46
UR	3.02	0.42
TOR	2.98	1.02
MQ	2.92	1.07
RA	3.01	0.41
FF	3.03	0.37
TA	3.04	1.12
BA	3.21	0.84

Table 5 presents the mean scores and standard deviations of the study variables, providing an overview of central tendencies and variability across responses. The overall project performance (PP_overall) yielded a mean of 3.05 (SD = 1.15), indicating that, on average, project outcomes were perceived at a moderate level. Among the predictors, Bidding Adequacy (M = 3.21, SD = 0.84) and Technology Adoption (M = 3.04, SD = 1.12) received comparatively higher ratings, suggesting that respondents generally acknowledged their contribution to project delivery. In contrast, Managerial Quality (M = 2.92, SD = 1.07) and Technical and Organizational Risks (M = 2.98, SD = 1.02) had lower mean values and higher variability. Meanwhile, Lack of Adequate Planning (M = 3.00, SD = 0.46), Unrealistic Requirements (M = 3.02, SD = 0.42), Resource Availability (M = 3.01, SD = 0.41), and Financial Factors (M = 3.03, SD = 0.37) clustered closely around the midpoint with relatively small standard deviations.

3.2 Multiple linear regression results analysis

To examine the determinants of project performance, a Multiple Linear Regression (MLR) analysis was conducted, where overall project performance (PP_overall) was treated as the dependent variable, and Lack of Adequate Planning (LAP), Unrealistic Requirements (UR), Technical and Organizational Risks (TOR), Managerial Quality (MQ), Resource Availability (RA), Financial Factors (FF), Technology Adoption (TA), and Bidding Adequacy (BA) were included as the independent variables.

Table 6: Model summary

R	R Square	Adjusted R Square	Std. Error of the Estimate
0.785	0.617	0.579	0.259

The model summary (Table 6) indicates that the predictors collectively explain a substantial proportion of the variance in project performance. The multiple correlation coefficient (R = 0.785) suggests a strong overall relationship between the set of independent variables and the dependent variable. The coefficient of determination (R2 = 0.617) reveals that approximately 61.7% of the variance in project performance can be explained by the selected predictors. After adjusting for the number of predictors, the adjusted R2 = 0.579, which still indicates a robust explanatory power and helps correct for potential overfitting due to multiple variables (Tabachnick & Fidell, 2019).

Overall, these results confirm that the model demonstrates strong explanatory power and reliable predictive capability. As noted by Pokhrel and Acharya (2024), an R2 of 61.7% represents a moderate level of model fit, indicating that the independent variables make a meaningful contribution to explaining project performance.

Table 7: Test of model goodness of fit

Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	7.78	7	1.111	16.55	<0.001
Residual	4.838	72	0.067		
Total	12.618	79			

The ANOVA results confirm that the regression model is statistically significant, $F(7,72) = 16.55$, $p < 0.001$, indicating that the predictors collectively explain a meaningful proportion of variance in project performance (Table 7). This demonstrates that the model provides a good fit to the data, consistent with prior applications of regression analysis in engineering and management studies (Mainali, Shrestha, & Pokhrel, 2023; Tabachnick & Fidell, 2019; Field, 2018).

Regression Coefficients Analysis: Table 8 presents the results of the multiple linear regression analysis, including the estimated coefficients, standard errors, t-values, and p-values for each predictor. Each coefficient represents the unique contribution of its corresponding predictor to explaining project performance while controlling for the other variables in the model.

Table 8: Regression Coefficient Table

Predictor	Coefficient	Std. Error	t	p-value
Intercept	0.0415	0.091	0.454	0.651
LAP	-0.3533	0.103	-3.443	0.001
UR	-0.0583	0.093	-0.625	0.534
TOR	-0.3571	0.097	-3.672	0.000
MQ	0.6136	0.095	6.445	0.000
RA	0.4221	0.101	4.168	0.000

FF	0.3194	0.11	2.913	0.005
TA	0.1388	0.089	1.556	0.124
BA	0.3221	0.101	3.187	0.002

The interpretation of each coefficient in Table 8 is discussed below.

Intercept (B = 0.0415, p = 0.651): The intercept is not statistically significant, suggesting that when all predictors are zero, the expected value of project performance does not differ significantly from zero. As in most regression models, the intercept is less relevant for interpretation compared to substantive predictors (Field, 2018).

Lack of Adequate Planning (LAP): The regression results indicate that Lack of Adequate Planning (LAP) exerts a statistically significant negative influence on project performance (B = –0.3533, p = .001). This implies that an increase in planning deficiencies is associated with a substantial decline in overall project outcomes, even when controlling for other factors in the model. From a theoretical standpoint, this finding is consistent with the Project Management Body of Knowledge (PMBOK) and the Iron Triangle framework (Atkinson, 1999), both of which emphasize planning as a cornerstone of successful project delivery in terms of time, cost, and quality. Empirical studies in Nepal further validate this result: inadequate feasibility studies, poor scheduling, and weak preparatory assessments have been repeatedly identified as key drivers of delays and cost overruns in large infrastructure projects, including National Pride Projects such as the Melamchi Water Supply and Kathmandu–Terai Fast Track (Dhungana & Wagle, 2019). Thus, the negative coefficient for LAP underscores that strengthening planning practices is essential for improving project performance, particularly in the Nepalese construction and infrastructure sector where contextual challenges such as difficult terrain and bureaucratic processes already exacerbate risks.

Unrealistic Requirements (UR): The regression results show that Unrealistic Requirements (UR) have a negative but statistically non-significant effect on project performance (B = –0.0583, p = .534). This indicates that while unrealistic requirements—such as overambitious timelines, politically driven targets, or unclear project scopes—tend to reduce performance, their direct impact is weak when other factors like planning, risk management, resources, and finance are considered. From a theoretical standpoint, the Iron Triangle of project success (Atkinson, 1999) suggests that unrealistic constraints on time, cost, or quality often lead to trade-offs that undermine overall performance. Similarly, Goal-Setting Theory (Locke & Latham, 1990) argues that unrealistic or unattainable objectives can demotivate stakeholders and erode efficiency.

Evidence from Nepal's infrastructure sector supports this interpretation. Paudel (2020) reported that many hydropower and road projects suffered due to unrealistic deadlines set without regard to geographic and logistical challenges. Likewise, case experiences from National Pride Projects such as the Kathmandu–Terai Fast Track and Upper Tamakoshi Hydropower demonstrate how politically driven promises of completion dates proved infeasible, leading to cost escalations and stakeholder dissatisfaction. Although UR was not statistically significant in this model, its contextual relevance remains high, as unrealistic demands often manifest indirectly through planning weaknesses, risk escalation, and financial stress.

Technical and Organizational Risks (TOR): The regression analysis shows that Technical and Organizational Risks (TOR) have a strong and statistically significant negative effect on project performance (B = –0.3571, p < .001). This indicates that as the level of technical and organizational risks increases—such as design errors, technological failures, coordination gaps, or institutional inefficiencies—overall project performance decreases markedly. The result is consistent with Risk Management Theory, which posits that unmanaged risks create systemic uncertainty that directly undermines cost, schedule, and quality outcomes (Kerzner, 2017). In the context of Nepal, similar findings have been reported in hydropower and road infrastructure projects, where institutional bottlenecks and technical uncertainties have been major contributors to delays and budget escalations (Shrestha & Shrestha, 2019). For example, the Melamchi Water Supply Project experienced long delays due to unforeseen geological conditions and weak organizational coordination. This evidence reinforces the interpretation that effective risk identification, assessment, and mitigation strategies are essential for improving project performance, particularly in the execution of Nepal's National Pride Projects, which are often exposed to high levels of technical complexity and administrative fragmentation.

Managerial Quality (MQ): The regression results reveal that Managerial Quality (MQ) has one of the strongest positive and statistically significant effects on project performance (B = 0.6136, p < .001). This indicates that improvements in managerial practices—such as effective leadership, rigorous planning and scheduling, robust monitoring and evaluation, and timely decision-making—directly and substantially enhance project outcomes. This finding aligns with the Resource-Based View (RBV) (Barney, 1991), which posits that organizational capabilities, particularly high-quality managerial skills, represent valuable and inimitable resources that provide a competitive advantage.

Empirical evidence supports this result. Iyer and Jha (2005) identified managerial inefficiency, lack of supervision, and weak planning as critical causes of cost and time overruns in Indian construction projects. Similarly, Toor and Ogunlana (2009) emphasized that leadership deficiencies, inadequate communication, and ineffective decision-making were among the most significant barriers to project success in developing countries. In the Nepalese context, Shrestha and Shrestha (2019) found that weak managerial oversight and poor monitoring contributed to recurrent delays in public construction projects, while Dhungana and Wagle (2019) reported that insufficient contract management and ineffective supervision undermined the performance of several National Pride Projects.

The strong coefficient for MQ in this study reinforces the argument that managerial quality is a central determinant of project success in Nepal. Given the complexity of National Pride Projects—which often involve challenging terrains, political interference, and resource constraints—enhancing managerial capacity is vital. Strengthening leadership training, embedding systematic project monitoring frameworks, and fostering proactive coordination among stakeholders can substantially improve cost, time, and quality outcomes, thereby ensuring that infrastructure investments achieve their intended developmental impacts.

Resource Availability (RA): The regression findings show that Resource Availability (RA) has a statistically significant positive effect on project performance (B = 0.4221, p < .001). This indicates that projects with adequate access to skilled labor, equipment, and financial resources are more likely to achieve higher levels of performance. From the lens of Critical Resource Theory in project management, sufficient allocation of manpower, machinery, and capital is indispensable for maintaining workflow continuity and minimizing delays (Kerzner, 2017). The result is also consistent with the Resource-Based View (RBV), which posits that resource sufficiency is a strategic determinant of organizational performance (Barney, 1991). In the Nepalese context, studies have confirmed that shortages of materials, labor strikes, and financial constraints often disrupt project schedules and inflate costs. For example, Mainali, Shrestha, and Pokhrel (2023) emphasized that resource adequacy was critical in shaping the job satisfaction and efficiency of civil engineers in private organizations in Kathmandu Valley. Similarly, research on Nepal's National Pride Projects—such as the Upper Tamakoshi Hydropower and Kathmandu–Terai Fast Track—illustrates how insufficient resource mobilization has been a recurring cause of time overruns and cost escalations. Thus, the significant positive effect of RA in this model validates both theoretical and empirical evidence, highlighting that strengthening resource planning and ensuring timely mobilization are essential strategies for improving infrastructure project performance in Nepal.

Financial Factors (FF): The regression analysis indicates that Financial Factors (FF) exert a statistically significant positive influence on project performance (B = 0.3194, p = .005). This demonstrates that projects with sound financial planning, timely disbursement of funds, and stable cash flow achieve better outcomes compared to those constrained by financial uncertainty. The result is consistent with Agency Theory, which highlights how financial stability strengthens accountability between project owners and contractors, reducing the likelihood of opportunism or inefficiency (Jensen & Meckling, 1976). It also resonates with the broader project management literature, where financial capacity is recognized as a fundamental enabler of project success (Odeyinka, Lowe, & Kaka, 2008). In the Nepalese context, financial constraints are frequently cited as a root cause of underperformance in large-scale infrastructure projects. Bhattarai (2018) documented that delayed payments and budget shortfalls were major contributors to cost escalation in national road projects, while Upadhaya, Nepal, Pokhrel, and Rawat (2025) found that financial adequacy significantly influenced engineer satisfaction and productivity. Moreover, repeated delays in Nepal's National Pride Projects, such as hydropower plants and irrigation schemes, have been directly linked to funding gaps and poor cash flow management. Thus, the positive and significant coefficient for FF reinforces the conclusion that robust

financial governance and timely fund mobilization are indispensable for enhancing project performance in Nepal's infrastructure sector.

Technological Adoption (TA): The regression analysis revealed that Technology Adoption (TA), measured through digital project management tools, innovative construction methods, and site monitoring data, had a positive but statistically non-significant relationship with project performance (B = 0.1388, p = .124). This indicates that while the integration of digital tools, modern construction methods, and real-time monitoring can contribute to improved decision-making and productivity, their independent effect on overall project outcomes is limited once more dominant factors such as planning, resource availability, and financial capacity are considered.

From a theoretical perspective, this finding aligns with Diffusion of Innovation Theory (Rogers, 2003), which posits that the benefits of new technologies often take time to materialize and depend on organizational readiness, cultural acceptance, and institutional support. In Nepal, empirical evidence highlights similar challenges: although initiatives such as Building Information Modeling (BIM), Geographic Information Systems (GIS), and digital monitoring have been piloted in construction and infrastructure projects, their widespread adoption remains constrained by cost, lack of technical expertise, and fragmented institutional coordination (Paudel, 2020).

Furthermore, case experiences from Nepal's National Pride Projects demonstrate that while technology could have expedited approvals, improved quality control, and optimized monitoring (e.g., in the Kathmandu–Terai Fast Track and Upper Tamakoshi Hydropower), the absence of robust implementation frameworks limited their impact. Thus, the non-significance of TA in the regression does not diminish its contextual importance; rather, it suggests that technological adoption in Nepal's construction sector is still in a transitional phase, requiring stronger policy support, capacity building, and integration with planning and financial systems to yield measurable improvements in project performance.

Bidding Adequacy (BA): The regression results indicate that Bidding Adequacy (BA) exerts a strong and statistically significant positive effect on project performance (B = 0.3221, p = .002). This implies that fair unit rate structures, mandatory site visits by bidders, and timely bid evaluations significantly improve the likelihood of achieving cost, time, and quality objectives in infrastructure projects. The magnitude of the coefficient highlights the critical role of transparent and efficient procurement processes in shaping project success.

Theoretically, this finding aligns with the principles of Public Procurement Theory, which emphasizes that efficient tendering reduces transaction costs, mitigates disputes, and enhances accountability in contractor–client relationships (Thai, 2001). Similarly, Institutional Theory (North, 1990) suggests that well-structured procurement procedures create stable rules of engagement, thereby improving predictability and performance in project delivery.

Empirical evidence from Nepal also reinforces this result. Adhikari and Gautam (2010) observed that weak procurement practices such as unbalanced bidding and delayed bid evaluations were among the leading causes of tie and cost overruns in public sector projects. More recently, Dhungana and Wagle (2019) emphasized in the Journal of the Institute of Engineering that transparent bidding processes and timely contract awards are essential for minimizing disputes and litigation in road and irrigation projects. Similar conclusions were drawn by the Public Procurement Monitoring Office (PPMO, 2020), which highlighted that delays in bid evaluation and contract awards under Nepal's National Pride Projects (e.g., Melamchi Water Supply, Postal Highway) significantly undermined project delivery. Thus, the significant positive coefficient for BA in this study confirms both theoretical expectations and empirical findings: strengthening bidding adequacy through balanced rates, early site visits, and timely evaluations is a critical pathway to enhancing infrastructure project performance in Nepal.

4. CONCLUSION

This study examined the determinants of project performance within the context of Nepal's National Pride Projects using multiple linear regression analysis. The model demonstrated strong explanatory power ($R2 = 0.617$, $p < 0.001$), indicating that more than 60% of the variance in project performance is accounted for by the selected predictors. The results underscore that Managerial quality, resource availability, financial

adequacy, and bidding adequacy are the most influential drivers of improved project outcomes. These findings affirm that ensuring the use of high-quality managers, mobilizing skilled labor and equipment in a timely manner, maintaining stable financial flows, and promoting transparent procurement processes are essential to achieving cost efficiency, timely delivery, and sustainability in Nepal's large-scale infrastructure projects.

Conversely, the analysis revealed that lack of adequate planning and technical and organizational risks exert statistically significant negative effects on performance, confirming that weak feasibility studies, unrealistic scheduling, poor coordination, and unmanaged risks are persistent challenges in Nepal's project landscape. Although technological adoption and unrealistic requirements did not emerge as statistically significant predictors, their contextual importance remains evident, as they frequently interact with planning, institutional, and financial variables to influence outcomes indirectly.

Taken together, these results highlight that the performance of Nepal's National Pride Projects is shaped by an interplay of technical quality, managerial capacity, financial stability, and institutional governance. Strengthening procurement and planning frameworks, enhancing risk management systems, ensuring reliable resource mobilization, and fostering a gradual but systematic adoption of digital technologies will be critical for improving performance. By addressing these factors holistically, policymakers, contractors, and consultants can enhance efficiency, reduce delays and cost overruns, and ensure that these flagship projects achieve their intended developmental and economic impacts

5. RECOMMENDATIONS

Based on the findings of this study, the following recommendations are made:

For Government: Policymakers should strengthen procurement transparency through balanced bidding practices, mandatory site visits, and timely evaluations. Equally important is the institutionalization of rigorous feasibility studies and risk assessments prior to contract awards, alongside reforms to ensure timely disbursement of funds. Expanding the use of digital systems, including e-procurement and BIM, and enhancing the capacity of dedicated project management units will further reduce delays and improve accountability.

For Client, Contractors and Consultants: Industry stakeholders should prioritize the use of high-quality materials, supported by stringent quality assurance mechanisms, and ensure timely mobilization of labor, machinery, and equipment. Embedding systematic risk management frameworks into project execution and gradually adopting digital technologies for monitoring and coordination will enhance efficiency and performance outcomes.

For Academia: Future research should deepen the empirical understanding of project performance in Nepal's context by incorporating terrain-specific, socio-political, and institutional variables. Universities are encouraged to integrate modern project management tools such as BIM, GIS, and digital monitoring systems into curricula, while nurturing interdisciplinary collaboration to build contextually relevant frameworks for infrastructure governance.

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