

Original Research Article

Performance Appraisal of Construction Project Managers in Accra, Ghana

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Abstract: This study examined the performance appraisal of Construction Project Managers (CPMs) in Accra, Ghana, focusing on four key factors: inadequate resource allocation, weak monitoring and evaluation (M&E) frameworks, the absence of standardized performance appraisal metrics, and low adoption of contemporary project management technologies. A quantitative, descriptive cross-sectional research design was employed, with structured survey questionnaires administered to 104 respondents comprising CPMs, clients, contractors, site engineers, and consultants. Descriptive statistics, Pearson correlation, simple linear regression, and multiple regression analysis were used to analyse the data using SPSS version 27. The Cronbach's Alpha reliability coefficient was 0.958, confirming exceptional instrument consistency. Results reveal that delayed fund disbursement ($M = 4.10$), reactive monitoring practices ($M = 3.86$), inadequate evaluator training ($M = 3.73$), and budgetary constraints on technology adoption ($M = 3.83$) are the most critical sub-factors undermining CPM performance. Regression analyses indicate that inadequate resource allocation explains 40.0% ($R^2 = .400$), weak M&E frameworks 57.8% ($R^2 = .578$), absence of standardized appraisal metrics 28.7% ($R^2 = .287$), and low technology adoption 61.0% ($R^2 = .610$) of the variance in performance outcomes. The combined multiple regression model yielded $R^2 = .740$, explaining 74.0% of total performance variance. The study recommends continuous professional development, structured M&E frameworks, standardized KPI-based appraisal systems, and targeted policy incentives for technology adoption to enhance CPM performance and improve project delivery outcomes in Ghana's construction sector.

Keywords: Performance Appraisal; Construction Project Managers; Resource Allocation; Monitoring And Evaluation; Technology Adoption; Ghana

1. INTRODUCTION

The construction sector is a pivotal driver of economic development, contributing substantially to national GDP through employment creation, infrastructure provision, and investment stimulus (Ofori, 2015). The performance of Construction Project Managers (CPMs) is central to project success, directly influencing “cost efficiency, schedule adherence, quality standards, safety compliance, and stakeholder satisfaction” (Alias et al., 2014). Performance appraisal systems for CPMs have evolved in advanced countries to incorporate advanced methodologies, including Agile project management, Lean Construction principles, and Building Information Modelling (BIM), enabling enhanced adaptability, stakeholder coordination, and measurable performance improvement (Azhar, 2011; Koskela et al., 2020).

In Ghana, particularly in Accra, rapid urbanization, major infrastructure investments, and expanding private real estate activity have driven significant construction sector growth (Ghana Statistical Service, 2022; World Bank, 2020). However, CPMs in Accra face persistent structural challenges, including resource constraints, inadequate training, fragmented stakeholder collaboration, and slow adoption of modern project management tools (Fugar & Agyakwah-Baah, 2010; Owusu-Manu et al., 2019). These constraints frequently contribute to “project delays, cost overruns, and quality deficiencies” (Frimpong et al., 2018). Existing performance appraisal frameworks applied in the Ghanaian context are often generic and fail to address locally specific factors such as political dynamics, supply chain volatility, and evolving regulatory requirements (Damoah & Boateng, 2020; Amoatey et al., 2015).

Studies on project management performance focus on a global perspective; there remains a significant empirical gap concerning CPM performance appraisal within Ghana's unique socio-economic and institutional context. This study addresses this gap by systematically evaluating how four key factors inadequate resource allocation, weak M&E frameworks, absence of standardized appraisal metrics, and low technology adoption influence CPM performance in Accra. The evidence-based findings of this study would help policymakers, industry stakeholders, and construction firms to improve managerial effectiveness and project delivery outcomes.

1.1 Research Objectives

The study pursued four specific objectives: (i) to investigate how inadequate resource allocation affects CPM performance; (ii) to evaluate how weak monitoring and evaluation frameworks affect CPM effectiveness; (iii) to examine how the absence of standardized performance appraisal metrics influences CPM assessment; and (iv) to determine how low adoption of modern management technologies affects CPM efficiency and decision-making.

2. LITERATURE REVIEW

2.1 Theoretical Framework

The theoretical foundations underpinnings of this study are grounded in three complementary theories. PMBOK Guide (PMI, 2021) provides the overarching framework for effective project delivery, encompassing integration, “scope, schedule, cost, quality, resources, communication, risk, procurement, and stakeholder management”. Transformational Leadership Theory (Bass, 1990) contextualizes the role of CPMs in inspiring team performance and driving innovation in construction environments. Competency Theory (Boyatzis, 1982) articulates the combination of technical skills, managerial expertise, and behavioural attributes necessary for optimal CPM performance. The Key Performance Indicator (KPI) framework (Chan & Chan, 2004) and the Balanced Scorecard (Kaplan & Norton, 1996) provide the performance evaluation instruments through which CPM effectiveness is measured and benchmarked.

2.2 Roles and Competencies of CPMs

CPMs are responsible for project delivery across the full project life cycle, from initiation through close-out. Their duties encompass planning and work breakdown structure development, scheduling and critical path management, cost estimation and financial accountability, quality assurance and regulatory compliance, and stakeholder communication management (PMI, 2021; Walker, 2015; Kerzner, 2017). Effective CPMs demonstrate a blend of “technical skills including knowledge of construction processes and contract management managerial skills such as resource allocation and risk management”, and interpersonal skills encompassing negotiation, conflict resolution, and cultural sensitivity (Boyatzis, 1982; Armstrong & Baron, 2005). The CPM's performance directly affects the “iron triangle of cost, time, and quality”, with additional influence on safety outcomes (Chan & Chan, 2004; Hinze, 2011).

2.3 Performance Appraisal in Construction Management

Performance appraisal in construction project management serves as a structured mechanism for assessing CPM effectiveness against pre-established criteria and organizational objectives (Aguinis, 2019). Common appraisal tools employed internationally include KPI frameworks measuring schedule adherence, cost variance, safety records, and client satisfaction; the Balanced Scorecard evaluating financial outcomes, customer feedback, internal processes, and learning and growth; and 360-degree feedback systems integrating evaluations from supervisors, peers, subordinates, and clients (Kaplan & Norton, 1996; Chan & Chan, 2004). In developed countries, performance appraisal frameworks integrate technology-driven monitoring systems, standardized KPI benchmarks, and continuous feedback mechanisms (PMI, 2021; Walker, 2015).

2.4 Challenges and Gaps in the Ghanaian Context

Empirical studies in Ghana (Fugar & Agyakwah-Baah, 2010; Ofori, 2012) and comparable African economies, including Nigeria (Oladinrin et al., 2013) and Kenya (Ngacho & Das, 2014), consistently identify inadequate resource allocation, weak

institutional monitoring systems, and low technology adoption as primary impediments to CPM performance. Subjectivity in evaluations, lack of standardized appraisal frameworks, and resistance to structured feedback mechanisms further undermine appraisal effectiveness (DeNisi & Williams, 2018; Longenecker & Fink, 2017). A critical gap exists in empirical research specifically addressing Accra's construction context, where rapid urbanization, distinct cultural dynamics, and significant infrastructural pressures interact to shape CPM performance in ways not fully captured by generic international outlines.

3. RESEARCH METHODOLOGY

3.1 Research Design

To rigorously assess CPM performance in Accra, Ghana, a quantitative, descriptive cross-sectional research approach was used. This approach makes it possible to measure performance metrics objectively, analyse patterns and associations statistically, and extrapolate results to the larger CPM population (Creswell & Creswell, 2018; Babbie, 2021). Quantitative methodology was selected for its capacity to provide empirical evidence through standardized measurement instruments, ensure precision and reliability, and generate statistically significant results supporting evidence-based recommendations.

3.2 Population, Sampling, and Sample Size

The population of this study comprised all practicing CPMs and related construction stakeholders in Accra engaged in residential, commercial, industrial, and infrastructure projects. Three stakeholder groups constituted the target population: Clients from the public and commercial sectors; contractors and site engineers who deal directly with CPMs; and CPMs registered with professional organisations such as the “Ghana Institution of Engineers (GhIE), Ghana Institution of Surveyors (GhIS), and the Project Management Institute (PMI)”. The reliability and generalisability of the results were improved by using “stratified random sampling to guarantee proportionate representation across all stakeholder groups” (Babbie, 2021).

Yamane's (1967) “formula, $n = N / (1 + Ne^2)$ ”, was used to get the sample size. “N” = 120 is the entire eligible population from professional registries and contractor associations, and $e = 0.05$ is the 5% margin of error. This resulted in a final valid sample of $n = 104$, which was verified by complete-case analysis with no missing data.

3.3 Data Collection Instruments

A structured, closed-ended questionnaire was the primary data collection instrument, organized into thematic sections addressing: (i) demographic and professional background; (ii) influence of inadequate resource allocation (11 items); (iii) influence of weak monitoring frameworks (12 items); (iv) influence of absence of standardized appraisal metrics (12 items); (v) influence of low adoption of modern management technologies (12 items); and (vi) performance appraisal outcomes (15 items). All measurable items were scored on a “five-point Likert scale” (“1 = Strongly Disagree to 5 = Strongly Agree”). A pilot test with 10 respondents outside the final sample was conducted to assess instrument

clarity and reliability. The questionnaire was administered via email distribution, physical delivery to construction sites and offices, and Google Forms to maximize response rates.

3.4 Data Analysis

SPSS version 27 was used to handle and evaluate the data. Performance trends across variables were summed up using descriptive statistics (means, standard deviations, frequencies, and percentages). The direction and intensity of the correlations between the research variables were investigated using Pearson product-moment correlation analysis. Each independent variable's impact on CPM performance was evaluated using basic linear regression models. Multiple regression analysis determined the combined explanatory power of all four predictors. Regression assumption diagnostics, including normality of residuals (histogram and Normal P-P plots), linearity, error independence, and multicollinearity (Tolerance and VIF statistics), were conducted to validate model robustness. All inferential tests were evaluated at the 95% confidence level ($p < .05$) (Pallant, 2020; Field, 2018). "Cronbach's Alpha threshold of ≥ 0.70 was used to assess internal consistency of the questionnaire" (Taber, 2018). Ethical compliance was maintained through informed consent, anonymity, data confidentiality, and institutional ethical approval from Accra Technical University.

4. RESULTS

4.1 Demographic and Professional Background

104 respondents' demographic profiles are presented in Table 1. Males constituted 89.4% of participants, reflecting the persistent gender imbalance in Ghana's construction sector. The sample comprised CPMs (32.7%), consultants including architects, engineers, and quantity surveyors (30.8%), contractors and site engineers (23.1%), clients and owner representatives (10.6%), and other roles (2.9%). Regarding experience, 40.4% possessed more than 15 years in construction, and 80.7% had at least six years of industry experience. Additionally, 75.9% had worked with or observed CPMs for at least four years, with 31.7% reporting more than a decade of such exposure, lending significant credibility and depth to respondents' performance assessments.

Table 1. Demographic and Professional Background of Respondents

Demographics	Description	Frequency (N)	Percentage (%)
Gender	Male Female	93 11	89.4% 10.6%
Primary Role	CPM Client/Owner Contractor/Engineer Consultant Other	34 11 24 32 3	32.7% 10.6% 23.1% 30.8% 2.9%
Years of Experience	"< 2 years 2–5 years 6–10 years 11–15 years > 15 years"	1 19 25 17 42	1.0% 18.3% 24.0% 16.3% 40.4%

Years Observing CPMs	"< 1 year 1–3 years 4–6 years 6–10 years > 10 years"	5 20 23 23 33	4.8% 19.2% 22.1% 22.1% 31.7%
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Source: Field Survey (2025)

4.2 Reliability Analysis

"Cronbach's Alpha was used to assess internal consistency of the" 67-item questionnaire. A coefficient of $\alpha = .958$ (standardized: $\alpha = .959$) was obtained across 104 valid cases (Table 2), exceeding the $\geq .90$ threshold for exceptional internal consistency (George & Mallery, 2019). This confirms that all five thematic constructs—resource allocation, monitoring frameworks, appraisal metrics, technology adoption, and performance outcomes—were measured with high reliability.

Table 2. Reliability Analysis Results

Cronbach's Alpha	Cronbach's Alpha (Standardized)	Number of Items
0.958	0.959	67

Source: Field Survey (2025)

4.3 Descriptive Statistics: Inadequate Resource Allocation

Table 3 presents descriptive statistics for the 11 resource allocation factors. Delayed Fund Disbursement appeared as the most influential factor ("M = 4.10", "SD = 1.02"), followed by Budgetary Constraints ("M = 3.88", "SD = 1.06") and Poor Financial Planning ("M = 3.79", "SD" = 1.21). Weak Monitoring and Evaluation Systems (M = 3.74), Political Interference (M = 3.73), and Inflation and Price Fluctuations (M = 3.71) also recorded high mean scores. Lack of Skilled Labour Availability was rated lowest (M = 3.06, SD = 1.23), indicating that financial and managerial constraints are perceived as more critical than workforce shortages.

Table 3. Descriptive Statistics: Factors Influencing Inadequate Resource Allocation

Factor	N	Mean	SD	Rank
Delayed Fund Disbursement	104	4.10	1.019	1st
Budgetary Constraints	104	3.88	1.064	2nd
Poor Financial Planning	104	3.79	1.212	3rd
Weak Monitoring and Evaluation Systems	104	3.74	1.005	4th
Political Interference	104	3.73	1.225	5th
Inflation and Price Fluctuations	104	3.71	1.011	6th
Ineffective Procurement Processes	104	3.68	1.100	7th
Unforeseen Project Scope Changes	104	3.66	0.888	8th

Poor Stakeholder Coordination	104	3.64	0.923	9th
Inadequate Use of Technology	104	3.42	1.103	10th
Lack of Skilled Labour Availability	104	3.06	1.229	11th

Source: Field Survey (2025)

4.4 Descriptive Statistics: Weak Monitoring and Evaluation Frameworks

Table 4 presents 12 M&E framework factors. Reactive Rather than Proactive Monitoring was the highest-rated factor ($M = 3.86$, $SD = 0.93$), indicating that most monitoring interventions occur after problems materialize. Political or Organizational Interference ($M = 3.81$, $SD = 1.06$) and Budgetary Limitations for Monitoring Activities ($M = 3.75$, $SD = 0.97$) ranked second and third, respectively. Inadequate Data Collection Systems ($M = 3.50$) and Lack of Standardized Performance Indicators ($M = 3.53$) recorded the lowest ratings, though still reflecting moderate agreement across respondents.

Table 4. Descriptive Statistics: Factors Influencing Weak M&E Frameworks

Factor	N	Mean	SD	Rank
Reactive Rather than Proactive Monitoring	104	3.86	0.929	1st
Political or Organizational Interference	104	3.81	1.062	2nd
Budgetary Limitations for Monitoring Activities	104	3.75	0.973	3rd
Weak Communication Channels	104	3.70	1.096	4th
Delayed Feedback Mechanisms	104	3.68	0.884	5th
Irregular Site Inspections	104	3.66	1.103	6th
Absence of Independent Oversight	104	3.62	0.916	7th
Limited Use of Technology	104	3.62	1.017	8th
Poor Documentation Practices	104	3.58	1.077	9th
Insufficient Skilled Monitoring Personnel	104	3.57	1.012	10th
Lack of Standardized Performance Indicators	104	3.53	1.070	11th
Inadequate Data Collection Systems	104	3.50	1.033	12th

Source: Field Survey (2025)

4.5 Descriptive Statistics: Absence of Standardized Appraisal Metrics

Table 5 presents 12 factors contributing to the absence of standardized appraisal metrics. Training and Capacity of Evaluators ranked first ($M = 3.73$, $SD = 0.93$), indicating that deficient evaluator training is the primary driver of inconsistent performance assessments. Cost and Resource Implications ($M = 3.72$, $SD = 0.96$) and Use of Technology and Digital Tools ($M = 3.70$, $SD = 0.91$) followed closely. Availability of

Industry Benchmarks ($M = 3.35$) and Stakeholder Consensus ($M = 3.39$) were lowest-rated, though still reflecting moderate agreement.

Table 5. Descriptive Statistics: Factors Influencing Absence of Standardized Appraisal Metrics

Factor	N	Mean	SD	Rank
Training and Capacity of Evaluators	104	3.73	0.927	1st
Cost and Resource Implications	104	3.72	0.960	2nd
Use of Technology and Digital Tools	104	3.70	0.912	3rd
Organizational Culture	104	3.60	0.971	4th
Data Availability and Reliability	104	3.59	1.011	5th
International Best Practices	104	3.58	0.921	6th
Periodic Review and Updating of Metrics	104	3.54	0.985	7th
Adaptability to Project Types	104	3.52	0.881	8th
Regulatory and Policy Frameworks	104	3.48	1.005	9th
Clarity of Job Roles and Responsibilities	104	3.44	1.105	10th
Stakeholder Consensus	104	3.39	0.960	11th
Availability of Industry Benchmarks	104	3.35	1.095	12th

Source: Field Survey (2025)

4.6 Descriptive Statistics: Low Adoption of Modern Management Technologies

Table 6 presents 12 barriers to technology adoption. Budgetary Constraints ranked first ($M = 3.83$, $SD = 0.98$), followed by Lack of Management Support ($M = 3.82$, $SD = 0.92$) and Resistance to Change ($M = 3.73$, $SD = 1.09$). Limited Technical Skills ($M = 3.41$, $SD = 1.15$) ranked lowest, suggesting that financial and organizational barriers outweigh technical capacity deficits as impediments to technology adoption.

Table 6. Descriptive Statistics: Factors Influencing Low Adoption of Modern Management Technologies

Factor	N	Mean	SD	Rank
Budgetary Constraints	104	3.83	0.980	1st
Lack of Management Support	104	3.82	0.922	2nd
Resistance to Change	104	3.73	1.090	3rd
Inadequate Training Opportunities	104	3.68	1.036	4th
High Initial Implementation Costs	104	3.63	1.054	5th

Absence of Policy or Regulatory Incentives	104	3.60	0.961	6th
Short-Term Project Orientation	104	3.59	0.941	7th
Poor Internet and Infrastructure Reliability	104	3.54	1.088	8th
Data Security Concerns	104	3.52	0.965	9th
Fragmented Construction Industry Structure	104	3.51	0.945	10th
Limited Awareness of Available Tools	104	3.50	1.024	11th
Limited Technical Skills	104	3.41	1.154	12th

Source: Field Survey (2025)

4.7 Pearson Correlation Analysis

Table 7 presents the Pearson correlation matrix among study variables. All four independent variables demonstrated statistically significant positive correlations with CPM performance appraisal outcomes ($p < .01$). Low adoption of modern management technologies exhibited the strongest correlation ($r = .781$, $p < .01$), followed by weak monitoring frameworks ($r = .761$, $p < .01$), inadequate resource allocation ($r = .632$, $p < .01$), and absence of standardized appraisal metrics ($r = .536$, $p < .01$). Intercorrelations among independent variables ranged from .306 to .714, indicating moderate relationships that measure distinct performance dimensions. No serious multicollinearity concerns were identified.

Table 7. Pearson Correlation Matrix

Variable	IRA	WMF	LAMMT	ASAM	Performance
Inadequate Resource Allocation (IRA)	1	.652	.526	.306	.632
Weak Monitoring Framework (WMF)	.652	1	.714	.383	.761
Low Tech Adoption (LAMMT)	.526	.714	1	.470	.781
Absence of Std. Metrics (ASAM)	.306	.383	.470	1	.536
CPM Performance	.632	.761	.781	.536	1

$p < .01$ (2-tailed). IRA = Inadequate Resource Allocation; WMF = Weak Monitoring Framework; LAMMT = Low Adoption of Modern Management Technologies; ASAM = Absence of Standardized Appraisal Metrics. Source: Field Survey (2025)

4.8 Regression Analyses

Four simple linear regression models and one multiple regression model were estimated. Table 8 summarizes the model statistics for all regression analyses.

Table 8. Summary of Regression Model Statistics

Predictor(s)	R	R ²	Adj. R ²	SEE
Inadequate Resource Allocation	.632	.400	.394	.538
Weak Monitoring Framework	.761	.578	.574	.450
Absence of Standardized Metrics	.536	.287	.280	.586
Low Technology Adoption	.781	.610	.606	.434
Combined (All Four Predictors)	.860	.740	.730	.359

SEE = Standard Error of the Estimate. Source: Field Survey (2025)

Individual regression results show: inadequate resource allocation ($\beta = .632$, $t = 8.241$, $p < .001$; Performance = $1.355 + 0.623 \times \text{IRA}$); weak monitoring frameworks ($\beta = .761$, $t = 11.831$, $p < .001$; Performance = $0.770 + 0.786 \times \text{WMF}$); absence of standardized metrics ($\beta = .536$, $t = 6.405$, $p < .001$; Performance = $1.726 + 0.540 \times \text{ASAM}$); and low technology adoption ($\beta = .781$, $t = 12.618$, $p < .001$; Performance = $0.667 + 0.824 \times \text{LAMMT}$). All models were confirmed statistically significant by ANOVA (all F-values $p < .001$).

The multiple regression model yielded the following equation:

$$\text{Performance} = -0.265 + 0.176(\text{IRA}) + 0.305(\text{WMF}) + 0.411(\text{LAMMT}) + 0.187(\text{ASAM})$$

Table 9 presents the standardized coefficients and collinearity statistics from the multiple regression model.

Table 9. Multiple Regression Coefficients and Collinearity Statistics

Predictor	B	SE	β	t	p	Tolerance	VIF
(Constant)	-0.265	0.243	—	-1.088	.279	—	—
IRA	0.176	0.067	.179	2.624	.010	0.566	1.766
WMF	0.305	0.086	.295	3.571	.001	0.383	2.609
LAMMT	0.411	0.081	.389	5.040	< .001	0.441	2.269
ASAM	0.187	0.059	.185	3.176	.002	0.773	1.294

Dependent Variable: CPM Performance Appraisal Outcome. All VIF < 5; Tolerance > 0.3, confirming no multicollinearity. Source: Field Survey (2025)

Low technology adoption was the strongest predictor ($\beta = .389$, $p < .001$), followed by weak monitoring frameworks ($\beta = .295$, $p = .001$), absence of standardized metrics ($\beta = .185$, $p = .002$), and inadequate resource allocation ($\beta = .179$, $p = .010$). The combined model explains 74.0% of variance in CPM performance ($R^2 = .740$, Adj. $R^2 = .730$).

4.9 Regression Assumption Diagnostics

Residual normality was assessed through a histogram of standardised residuals and a Normal P-P plot (Figures 1 and 2). The histogram displays a bell-shaped distribution centred near zero (Mean $\approx -5.79\text{E-}16$, SD = 0.980), confirming normality. The P-P plot demonstrates close alignment of data points along the diagonal reference line, with minor tail deviations within acceptable limits. All Tolerance values exceeded 0.3, and all VIF values were below 5.0 (range: 1.294–2.609), confirming the absence of multicollinearity. These diagnostics collectively validate the robustness and reliability of the regression model estimates.

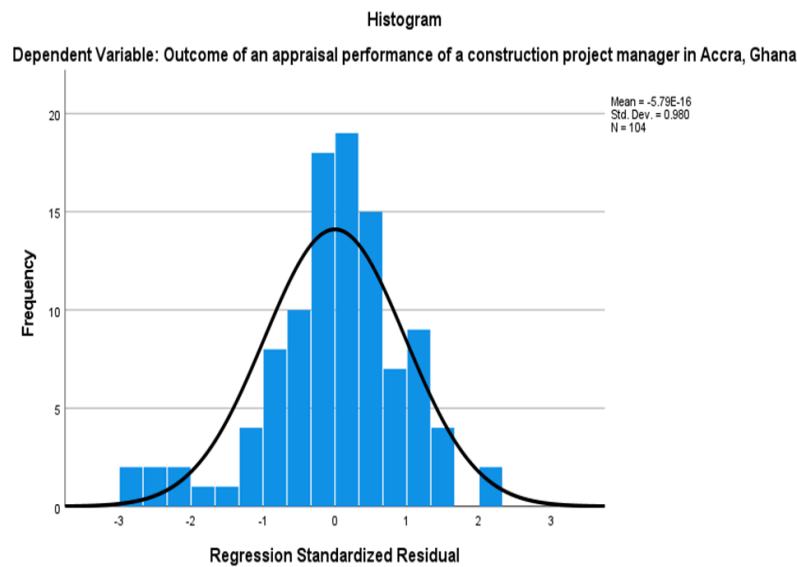


Figure 1. Histogram of Standardised Residuals

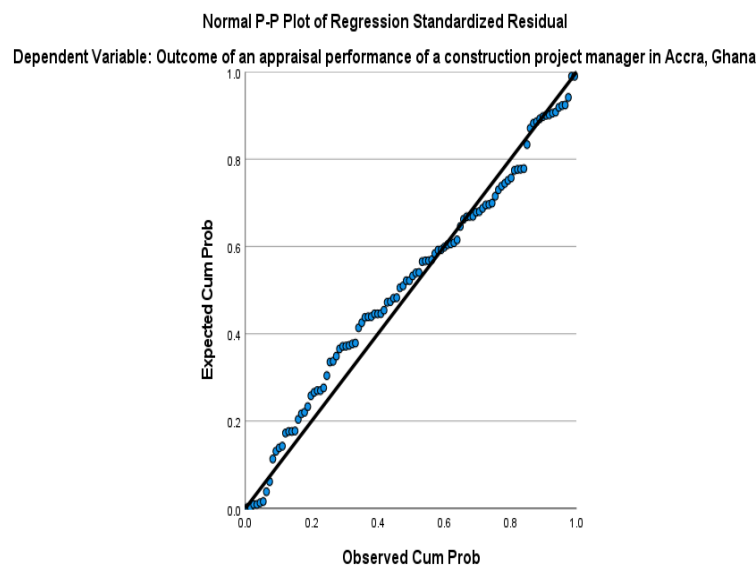


Figure 2. Normal P-P Plot of Regression Standardised Residuals

5. DISCUSSION

5.1 Effect of Inadequate Resource Allocation on CPM Performance

The finding that delayed fund disbursement ($M = 4.10$) is the dominant resource allocation constraint is consistent with Chadee et al. (2023), who linked payment delays to political instability and variation order delays, and with Njeru and Kirui (2022), who demonstrated the critical importance of timely fund release for on-schedule project completion. Budgetary constraints ($M = 3.88$) compel project managers into difficult scope-quality-time trade-offs, corroborating Shah et al. (2023), who found that cost overruns beyond initial estimates generate financial strain and stakeholder disputes. Poor financial planning ($M = 3.79$) aligns with Abdul-Rahman et al. (2009), who reported that inadequate financial management by contractors and clients produces impact coefficients of 0.645 and 0.646 on project delays. The regression result—that inadequate resource allocation explains 40.0% of performance variance ($\beta = .632, p < .001$)—underscores the substantial and statistically robust impact of financial management inefficiencies on CPM appraisal outcomes.

5.2 Effect of Weak M&E Frameworks on CPM Effectiveness

The predominance of reactive monitoring ($M = 3.86$) indicates a systemic failure in proactive risk management, as problem identification occurs after escalation rather than at formative stages. Political or organizational interference ($M = 3.81$) mirrors findings from Ogunbayo et al. (2024), who demonstrated that political influence compromises objective M&E in public construction projects across sub-Saharan Africa. Budgetary limitations for M&E ($M = 3.75$) replicate conclusions from Callistus and Clinton (2016, 2018), who identified inadequate M&E funding as a critical barrier in Ghana's construction sector. Weak communication channels ($M = 3.70$) align with Gamil and Abd Rahman (2021) and Shakeri and Khalilzadeh (2020), who confirmed that communication failures drive project cost escalation and delays. The finding that weak M&E frameworks explain 57.8% of performance variance ($\beta = .761, p < .001$) demonstrates that monitoring deficiencies exert a stronger influence on CPM performance than resource allocation failures alone.

5.3 Effect of Absence of Standardized Appraisal Metrics

Inadequate evaluator training ($M = 3.73$) as the primary driver of absent standardized metrics is corroborated by Woods (2023), who demonstrated that evaluator training on bias recognition—including halo effects and leniency bias—significantly improves appraisal accuracy in construction organizations. Cost and resource constraints ($M = 3.72$) reflect the findings of Qualityze (2025), indicating that organizations often misclassify appraisal system investments as costs rather than strategic investments in quality assurance. Limited digital tool integration ($M = 3.70$) is supported by Ibrahim et al. (2024), whose critical review demonstrated that computer vision and digital analytics tools substantially improve performance data collection accuracy and monitoring capability. The regression coefficient ($\beta = .536, R^2 = .287, p < .001$) confirms a statistically significant but comparatively moderate impact of appraisal standardization on performance outcomes.

5.4 Effect of Low Technology Adoption on Efficiency and Decision-Making

Budgetary constraints as the primary technology adoption barrier ($M = 3.83$) is consistent with Khudzari et al. (2023), who identified capital investment and implementation costs as dominant impediments to emerging technology adoption in construction. Pittri et al. (2025), examining Ghana's construction sector specifically, confirmed that high implementation costs and funding shortfalls are the most critical barriers for small and medium-sized firms. Lack of management support ($M = 3.82$) aligns with Sepasgozar and Davis (2018), who found that top management commitment is the most critical organizational enabler of smart technology adoption. Resistance to change ($M = 3.73$) mirrors Hatoum et al.'s (2024) observations using the Technology-Organization-Environment framework that construction sectors often prioritize established practices over digital transformation. Low technology adoption was the strongest predictor of CPM performance in both simple ($\beta = .781$, $R^2 = .610$) and multiple regression ($\beta = .389$) analyses, confirming that digital transformation represents a fundamental performance requirement rather than a discretionary enhancement.

5.5 Combined Effects and Theoretical Implications

The multiple regression model ($R^2 = .740$) demonstrates that the four factors collectively explain three-quarters of CPM performance variance, providing strong evidence that performance outcomes are determined by a complex interplay of institutional, organizational, financial, and technological factors rather than isolated variables. The dominance of low technology adoption ($\beta = .389$) in the multivariate model, even after controlling for the other predictors, underscores the transformative potential of digital tools in construction management. The persistence of monitoring framework effects ($\beta = .295$) confirms that systematic oversight functions as a critical organizational control mechanism. The lower but still significant coefficients for standardized metrics ($\beta = .185$) and resource allocation ($\beta = .179$) suggest that financial and evaluation system reforms, while necessary, are insufficient without corresponding improvements in technological infrastructure and monitoring systems. These findings extend the theoretical framework of Chan and Chan (2004), Kaplan and Norton (1996), and PMI (2021) by demonstrating that in developing economy contexts, standard performance measurement frameworks must be adapted to account for institutional constraints, political interference, and technological access barriers.

6. CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

This study provides empirical evidence that four key factors—inadequate resource allocation, weak M&E frameworks, absence of standardized appraisal metrics, and low technology adoption—significantly and collectively determine CPM performance appraisal outcomes in Accra, Ghana. Low technology adoption ($R^2 = .610$) and weak M&E frameworks ($R^2 = .578$) exert the most substantial individual effects, while the combined model ($R^2 = .740$) confirms the multidimensional nature of CPM performance

determinants. Delayed fund disbursement, reactive monitoring practices, inadequate evaluator training, and budgetary technology barriers are the most critical sub-factors identified. These findings demonstrate that performance appraisal systems in Ghana's construction sector must be comprehensively redesigned to address financial, institutional, technological, and evaluative dimensions simultaneously.

6.2 Recommendations

For Construction Project Managers: Continuous professional development in leadership, financial management, and modern project management technologies is essential to improve individual performance competencies and adaptability.

For Construction Firms: Adoption of proactive M&E frameworks with consistent site inspection protocols and early warning systems, coupled with sustained investment in evaluator training and digital project management tools, will improve performance monitoring and appraisal reliability.

For Policymakers and Regulators: Policy interventions should prioritize timely fund disbursement mechanisms, financial incentives for technology adoption, the establishment of standardized national KPI-based appraisal frameworks for CPMs and strengthened regulatory oversight that insulates technical monitoring processes from political interference. The development of standardized performance appraisal systems grounded in clear key performance indicators (KPIs) and Balanced Scorecard principles is particularly recommended to ensure consistency, fairness, and transparency across Ghana's construction sector.

6.3 Limitations and Future Research Directions

This study employed a cross-sectional design limited to Accra, constraining temporal and geographic generalizability. Future research should pursue longitudinal designs to track performance evolution over time, comparative analyses between public and private sector construction projects, and qualitative investigations into how cultural norms shape performance appraisal implementation in Ghanaian construction firms. Exploration of the specific roles of BIM, project analytics platforms, and other digital management technologies as enablers of CPM performance improvement represents a particularly valuable avenue for future inquiry.

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