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INFLUENCE OF CONTRACTORS' MANAGEMENT STRATEGIES ON CONSTRUCTION PROJECT PERFORMANCE IN DEVELOPING ECONOMIES

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ABSTRACT

Purpose: This study explores the influence of contractors' management strategies (CMS) on construction project performance in Ghana. Globally, including in Ghana, the construction industry faces persistent performance challenges, partly due to the adoption of ineffective management strategies.

Design/Methodology/Approach: The research employed a descriptive cross-sectional survey, gathering data from 375 site managers working in medium and large-sized construction companies. Statistical techniques, including principal component analysis, Pearson correlation, and regression analysis, were applied to analyse the data.

Findings: The study found that while contractor management strategies identified in the literature are only moderately applied, they lead to average project performance. Nevertheless, the findings also highlight that the active implementation of comprehensive project planning, robust monitoring and control systems, effective stakeholder collaboration, and the integration of digital technologies can significantly enhance project performance.

Research Limitation: The study was limited to medium and large-sized construction firms. Including data from smaller firms could improve the generalizability of the findings.

Practical Implication: For construction managers seeking to improve project outcomes, the findings highlight the importance of prioritising effective project planning, robust monitoring and control, strong stakeholder collaboration, and the integration of digital technology. Emphasising these strategies can lead to more efficient project execution, improved performance metrics, and overall project success.

Social Implication: Improved CMS can foster better working conditions, enhance safety, and increase client satisfaction, contributing to a more substantial reputation and economic growth for local contractors in developing economies like Ghana.

Originality/Value: This work uniquely explores the role of CMS within Ghana's construction sector and offers actionable recommendations that could be valuable for similar contexts in other developing nations.

Keywords: *Construction industry. contractors. management strategies. performance. project.*

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INTRODUCTION

The construction industry is a vital contributor to global infrastructure development and economic growth, with a 2020 output of $10 trillion, accounting for 13% of global GDP, and projections to reach $14 trillion by 2025 (Barbosa et al., 2020). Despite its significance, the industry faces challenges like rework, cost and time overruns, unsafe working conditions, and client dissatisfaction. In Ghana, public projects have seen average cost overruns of 75% and time overruns of 146%, with some exceeding 300% (Bentil et al., 2017). Safety issues are widespread (Osei-Asibey et al., 2021). Due to these challenges, large contracts are often awarded to foreign contractors (Ofori-Kuragu et al., 2016; GIPC, 2021). They also face growing demands to reduce their environmental impact (Acheamfour et al., 2020).

To meet client expectations, previous studies have highlighted the critical role of effective planning, robust monitoring and control mechanisms, stakeholder collaboration, and technology integration in achieving project outcomes in Ghana (Ackon et al., 2022; Kissi et al., 2019; Fummey, 2016; Ofori, 2013; Imbeah, 2012). Despite this, the specific effect of these strategies on overall project performance remains underexplored. This study addresses this gap by providing empirical evidence on the relationship between contractor management strategies (CMS) and project performance, identifying which strategies are most likely to improve project success.

LITERATURE REVIEW

Contractors' Management Strategy

A contractor management strategy refers to the approaches and actions taken by contractor firms to ensure successful project completion while meeting client expectations in a dynamic market (Powmya et al., 2023; Bamfo-Agyei et al., 2020). This study focuses on contractors' strategies during project management's construction phase. Table 1 summarises key contractor management strategies (CMS) for successful project delivery, as identified in the literature.

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Table 1: CMSs Extracted from Literature

SN	**Contractors' Management Strategies**	**Authors**
1	Review of past construction projects	Ramanayaka (2013)
2	Design review for constructability	Voght & Epstein (2019)
3	Collaborative project planning	Ramanayaka (2013)
4	Definition of the tasks of team members	Ofori (2013); Cleland & Ireland (2006)
5	Clarity of project mission and goals to the team	Ofori (2013)
6	Use of alternative construction methodologies	Ramanayaka (2013)
7	Applying reasonable buffer (safety time)	Ramanayaka (2013); Kerzner (2013)
8	Top management commitment and support	(Ahmed, 2016; Gunduz & Almuajebh, 2020)
9	Use of competent team	(Hickson & Ellis, 2014; Kuwaiti et al., 2018)
10	Regular update of program of works	Chinn (2020)
11	Provision of quality assurance functions	(Kuwaiti et al., 2018)
12	Conduct of training workshop and site meetings	(Ramanayaka, 2013; Adik, 2014; Chinn, 2020)
13	Enclose construction site from public	Osei-Asibey et al. (2021)
14	Display of Health and safety posters on site	Osei-Asibey et al. (2021)
15	Review of construction activities	Mwangu & Iravo (2015); PMI (2017)
16	Prepare interim valuation and financial statement	Idoro (2012); Harris & McCaffer (2013);
17	Involvement of stakeholders in decision making	Fummey (2016); Bond-Barnard et al. (2018)
18	Clients' requirements as the basis for quality	Imbeah (2012); Love & Edwards (2004)
19	Involvement of stakeholders in project M&E	Magassouba et al. (2019); Mandala (2018)
20	Updates of project communicated to project team	Barbosa et al. (2017); Njogu (2016)
21	Warm working relationship with stakeholders	Magassouba et al. (2019); Buertey et al. (2016)
22	Use of computer software for project planning	Kissi et al. (2019), Kerzner (2013)
23	Use of 3D modelling software for visualization	Ramanayaka (2013)
24	Use of computer aided software for data processing	Adebayo et al. (2018); Chinn (2020); Barbosa et al. (2017); Kissi et al. (2019)
25	Use of ICT/digital tools for communication	Kissi et al. (2019)
26	Implement environmental protection policy	Acheamfour, Kissi, Adjei-Kumi, & Adinyira, (2020)
27	Provide health and safety manual to workers	Osei-Asibey et al. (2021)
28	Practice reward and incentive system	Powmya et al. (2023)
29	Establish clear organizational structure and delegate authority	(Gunduz & Yahya, 2015; Powmya et al., 2023)
30	Ensure site workers wear protective clothing	Osei-Asibey et al. (2021)
31	Implement logistic and supply chain management	Kuwaiti et al. (2018)
32	Implement IT system for site security	Fang et al. (2016); Powmya et al. (2023)

Effects of Contractor Management Strategies on Project Performance

Literature suggests that effective contractor management strategies (CMS), including robust planning, monitoring and control, stakeholder collaboration, and technology integration, significantly enhance construction project performance. For instance, Majumder et al. (2022) highlight that effective construction planning reduces stress, bolsters team confidence, boosts profitability and ensures deadlines are met. Naeem et al. (2018) further explore project planning strategies, demonstrating that effective planning positively influences project success.

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Monitoring and control strategies are critical for achieving project goals. Mwangu and Iravo (2015) argue that regular site visits by supervisors, progress meetings, and financial oversight are essential for successful project outcomes. Adebayo et al. (2018) highlight that techniques such as the Program Evaluation and Review Technique (PERT) and Earned Value Management (EVM) are instrumental in meeting project objectives. Additionally, the adoption of project management software has been shown to enhance project tracking and reduce inefficiencies (Osumanu et al., 2022; Kissi et al., 2019, 2022; Chinn, 2020).

Top management support is another vital factor in project success. Ahmed (2016) demonstrates that top management's effective leadership, authority, and provision of adequate resources positively impact project outcomes. Kuwaiti et al. (2018) and Gunduz and Almuajebh (2020) agree that employing competent personnel and providing management support enhances project success. Additionally, Ramanayaka (2013) and Voght and Epstein (2019) emphasise the value of reviewing past projects and conducting constructability reviews to reduce errors and delays.

Collaborative project delivery and clearly defined team roles are essential for project success (Ramanayaka, 2013; Ofori, 2013; Magassouba et al., 2019). LetsBuild (2020) and Chinn (2020) stress the importance of cloud-based documentation and goal-setting for team efficiency. Adik (2014) underscores the impact of employee training, while Kuwaiti et al. (2018) advocate for quality assurance measures, including manuals and audits.

Stakeholder collaboration is also considered crucial in project delivery. Njogu (2016), Ondieki (2016), and Wamugu and Ogollah (2017) find that stakeholder involvement in project planning, monitoring, and decision-making significantly enhances project outcomes. Buertey et al. (2016) note that trust and responsiveness to stakeholder input are vital for success. Mandala (2018) and Magassouba et al. (2019) also affirm that strong stakeholder relationships promote shared ownership and improved project performance.

Finally, Waweru and Omwenga (2015) and Ramanayaka (2013) conclude that comprehensive strategies encompassing effective planning, monitoring and control, and stakeholder engagement are positively linked to improvements in project cost, time, quality, client satisfaction and overall project success.

Construction Project Performance

Performance measurement in construction varies based on project type, operating environment, and stakeholder interests (Yang et al., 2010). Willar (2012) suggests that every construction company should establish a comprehensive performance measurement system suited to its specific industry and country context, as no single set of performance indicators applies universally. In this study, the nine performance indicators identified by Ofori-Kuragu (2014) for Ghanaian contractors are used: client satisfaction, cost, time, quality, health and safety, productivity, team satisfaction, environmental impact, and business performance. However,

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this study focuses solely on project performance measures, excluding the business performance criterion.

Conceptual Framework

The conceptual framework comprises four independent variables: effective planning, monitoring and control, stakeholder collaboration, and technology integration. These variables influence the dependent variable, the overall construction project performance (CPP). The framework illustrates this relationship, where each strategy directly impacts project success.

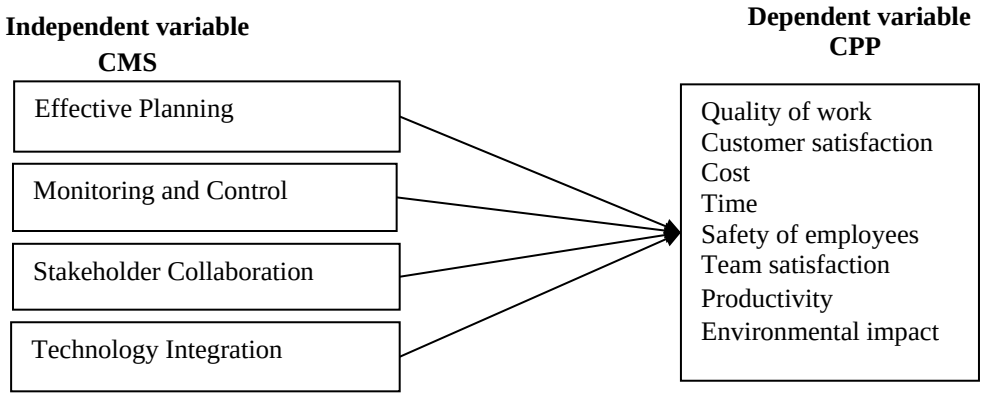

Figure 1: Conceptual framework

METHODOLOGY

Research Design

A descriptive cross-sectional survey design was utilised in this study to gather quantitative data. This approach was selected for its effectiveness in reaching many respondents and its appropriateness for a literate target population. To ensure the reliability and validity of the questionnaire, it underwent a review by two experts in construction management. A pilot test was conducted with four large-size and six medium-size construction firms in the Central Region of Ghana, involving 15 site managers and 40 gang leaders. Insights from the pilot test were used to minor modifications to the questionnaire, enhancing its clarity.

Study Population and Sample Size

The study targeted contractors registered with the Association of Building and Civil Engineering Contractors of Ghana (ABCECG), an organisation representing construction firms nationwide. Large-size and medium-size contractors were selected due to their expertise in the research areas (Tengan et al., 2014). According to the ABCECG database, there are 607 active contractors classified as D1K1 (large-size) and D2K2 (medium-size) across ten administrative

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regions in Ghana. Given that the population slightly exceeded 600, a census sampling approach was applied to include all eligible contractors. However, 43 firms declined participation, resulting in a final sample size of 564 medium and large-size contractors, as illustrated in Table 2.

Table 2: Selected Contractors

SN	Region	Population	Target Population	Respondents
1	Greater Accra	120	117	95
2	Ashanti	75	73	56
3	Volta	65	63	51
4	Central	55	52	43
5	Eastern	52	54	41
6	Brong Ahafo	50	48	35
7	Northern	38	38	22
8	Upper West	65	35	15
9	Upper East	57	55	10
10	Western	30	29	7
Total		**607**	**564**	**375**

Construction of the Questionnaire

The questionnaire comprised three sections: Section A captured the demographic and firm-specific characteristics of the respondents. Section B assessed the level of adoption of the construction management strategy (CMS) using a 1–5 Likert scale. Section C measured construction project performance. The level of adoption for each item was categorised using Saeed and Hasan's (2012) formula: (5−1)/5 = 0.80. Based on this formula, the scoring scale was defined as follows: 1–1.80 ("very low"), 1.81–2.60 ("low"), 2.61–3.40 ("moderate"), 3.41–4.20 ("high"), and 4.21–5 ("very high").

Data Collection and Analysis Methods

Data were collected through structured questionnaires administered to 564 contractors affiliated with the ABCECG. Senior site managers were identified as the primary respondents due to their extensive knowledge of their firms' operations and management practices. The questionnaires were distributed electronically via Google Forms and WhatsApp to facilitate ease of access and maximise participation. Out of the total sample, 375 valid responses were received, resulting in a response rate of 66.5%, which aligns with the typical range (30%–77%) for studies within Ghana's construction industry (Kheni, 2008).

The data were analysed using statistical techniques, including principal component analysis to identify key factors, Pearson correlation to examine relationships between variables, and regression analysis to assess predictive models.

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RESULTS AND DISCUSSION

Demographic Characteristics of Respondents

The gender distribution revealed that most respondents (96%) were males, with only a small proportion (4%) being females. Regarding educational qualifications, 75% of the respondents held a Bachelor's degree, 14% held a Higher National Diploma, and 11% had a Master's degree, indicating that most participants possess relevant qualifications for the construction industry. Experience within the organisation is crucial for understanding the work environment and employer expectations; 94% of respondents had at least five years of experience with their organisations, suggesting they are likely well-versed in their firms' cultures and practices, making their input valuable for this study.

Regarding business specialisation, the survey revealed that 69% of respondents reported focusing exclusively on building projects, while 14% indicated their firms specialising solely in civil works. Additionally, 17% said their firms engage in building and civil works. The involvement in both areas suggests firms' efforts to diversify and leverage opportunities across multiple sectors. Additionally, 92% of respondents indicated that their firms have been involved in construction for over 10 years, reflecting significant industry experience.

Principal component analysis of the CMS

The contractor management strategies (CMS) questionnaire items can be considered formative indicators in that they are elements that form the underlying construct. For formative indicators, principal components analysis is recommended as the appropriate data reduction method (Stock et al., 2007). Principal component analysis established the underlying interrelations among the 32 construction-phased strategies. The PCA also made it possible to reduce the variables to a more meaningful framework to support effective management decisions. The result of the PCA is shown in shown in Table 3.

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Table 3: Principal Component Analysis of the CMS Strategies

Item	1	2	3	4
Planning related strategy				
Review of past construction projects	0.790			
Design review for constructability	0.782			
Collaborative project planning (involves relevant stakeholders in project planning)	0.773			
Definition of the tasks of team members	0.745			
Clarity of project mission and goals	0.718			
Use of alternative construction activities/methodologies	0.705			
Applying reasonable buffer (safety time)	0.658			
Monitoring and control related strategy				
Top management commitment and support		0.763		
Use of competent team		0.678		
Update of program of works		0.669		
Presence of quality assurance functions		0.667		
Conduct of training workshop		0.652		
Conduct of site meetings		0.645		
Health and safety posters are displayed on site		0.631		
Regular review of construction activities		0.517		
Preparation of interim valuation and financial statement		0.505		
Stakeholder collaboration related strategy				
Involvement of stakeholders in decision making			0.875	
Use of clients' requirements as the basis for quality			0.870	
Involvement of stakeholders in project monitoring and evaluation			0.823	
Effective stakeholders' communication (constant updates of project progress is communicated to the relevant parties)			0.805	
Maintaining a warm working relationship with stakeholders			0.689	
Digital Technology Integration related strategy				
Use of computer software for project planning				0.786
Use of 3D modelling software for visualization and constructability				0.762
Use of computer aided software for data processing				0.674
Use of ICT for communication (i.e. Email, WhatsApp, Zoom)				0.645
KMO = 0.835, **Bartlett's Test** = 3846.706, **Sig.** 0.000 **Cumulative % Variance**				

The overall contractor management strategies (CMS) analysis yielded a Kaiser-Meyer-Olkin (KMO) value of 0.835, indicating sampling adequacy and the Bartlett test of sphericity confirmed that the correlation matrix was statistically significant at the 0.01 level. Initially, five out of the 32 variables—sorting and recovering waste before disposal, providing project instructions to site workers, clear specifications for suppliers, involving gang leaders in planning, and ensuring site workers wear protective clothing, loaded onto two factors, resulting in unclear interpretation. These variables were removed, and the factor analysis was repeated. In the second iteration, two additional variables, material quality inspection and employee incentives for higher productivity, also loaded onto two factors and were subsequently

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excluded. After a third iteration, the final principal component analysis extracted four factors that collectively accounted for 75.29% of the total variance.

The first factor, with an eigenvalue of 6.433, accounted for 26.81% of the variance and was labelled as the "effective planning strategy" factor, as it included seven items related to project planning practices. The second factor, with an eigenvalue of 5.773, explained 24.05% of the variance and was labelled "monitoring and control strategy" based on the nine items associated with this function. The third factor, with an eigenvalue of 4.338, accounted for 18.07% of the variance and was labelled "stakeholder collaboration strategy" due to its five related items. The fourth factor, focusing on the use of technology, had an eigenvalue of 1.525 and explained 6.35% of the variance with four related items. All 25 items had loadings above 0.5, making them statistically significant (Hair et al., 2010).

Reliability of CMS and CPP Elements

Table 4 presents the reliability analysis for CMS and CPP elements. The overall Cronbach's alpha for the CMS variable was 0.801. The reliability coefficients for the individual strategies, effective planning, monitoring and control, stakeholder collaboration, and technology integration ranged from 0.774 to 0.824. The alpha value for the dependent variable (CPP) was 0.842. All the Cronbach's alpha values exceeded the acceptable threshold of 0.7 (Multon & Coleman, 2010), indicating that the measurements used had acceptable internal consistency.

Table 4: Reliability test of CMS and CPP elements

SN	CMSs	Number of Items	Cronbach alpha Scale Items Coefficient
1	Effective planning	7	0.824
2	Monitoring and control	9	0.805
3	Stakeholder collaboration	5	0.798
4	Technology integration	4	0.774
5	CMS	25	0.801
6	Performance	8	0.842

Level of CMS Integration in the Respondent Firms

The study assessed the integration of contractor management strategies (CMS) elements such as effective planning, monitoring and control, stakeholder collaboration, and technology integration in the surveyed firms. The integration scores ranged from 2.54 to 3.14 (Table 5). Specifically, the integration of planning strategies ranged from 2.44 to 3.67. High levels of implementation were observed in task definition for team members and in reviewing project drawings for constructability. However, strategies like alternative construction activities and providing adequate buffers were implemented at lower levels. Other planning strategies, such as collaborative project planning, reviewing past projects with similar scope, and defining the project mission and purpose for the team, showed moderate implementation overall.

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The study further revealed that the integration levels of monitoring and control strategies ranged from 2.08 to 3.85. Top management commitment and support were applied at high levels, while quality assurance functions, site meetings, and employee training workshops were implemented at low levels. Moderate integration levels were observed for strategies such as competent team selection, regular program updates, construction activity reviews, interim financial valuations, and health and safety measures on-site.

The overall mean score for stakeholder-related strategies was 3.08, indicating moderate integration. Contractors and site managers moderately applied stakeholder collaboration strategies in their projects. High-level implementation was noted for using client requirements as a basis for quality, while stakeholder involvement in project monitoring and evaluation was low. Other strategies were moderately implemented, such as stakeholder involvement in decision-making, effective communication, and maintaining good working relationships.

The integration of technology-related strategies ranged from 2.42 to 2.62, with low levels of implementation observed in project planning software, 3D modelling for visualisation, and computer-aided software for data processing and documentation. However, ICT was used for communication at a moderate level.

Overall, the mean level of CMS integration was 2.97, indicating moderate utilisation. The relatively small standard deviations suggest that the data points were closely clustered around the mean, reflecting response consistency.

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Table 5: Level of integration of CMS in the respondents' firms

SN	Strategies	N	Mean	Std	LoI
Planning related strategy					
1	Definition of tasks of team members	375	3.67	0.42	High
2	Design review for constructability	375	3.52	0.35	High
3	Clarity of project mission and goals	375	3.38	0.56	Moderate
4	Review of past construction project	375	3.35	0.50	Moderate
5	Collaborative project planning	375	3.02	0.45	Moderate
6	Use of alternative const. activities	375	2.58	0.52	Low
7	Provision of reasonable buffer	375	2.44	0.45	Low
Overall		**375**	**3.14**	**0.46**	**Moderate**
Monitoring and Control Strategy					
8	Management commitment & Support	375	3.85	0.52	High
9	Use of competent team	375	3.56	0.50	Moderate
10	Frequent preparations of interim valuation / Financial statement	375	3.52	0.48	Moderate
11	Regular update of program of works	375	3.46	0.46	Moderate
12	Regular review of const. activities	375	3.40	0.45	Moderate
13	Display of H/Safety posters on site	375	2.86	0.50	Moderate
14	Conduct of site meetings	375	2.59	0.52	Low
15	Presence of quality assurance function	375	2.56	0.48	Low
16	Conduct of training workshops	375	2.08	0.55	Low
Overall		**375**	**3.10**	**0.50**	**Moderate**
Stakeholder Collaboration related strategy					
17	Client's requirements as basis for quality	375	3.75	0.52	High
18	Involvement of stakeholders in decision	375	3.35	0.48	Moderate
19	Effective stakeholder communication	375	2.87	0.56	Moderate
20	Warm working relation with stakeholders	375	2.85	0.50	Moderate
21	Involve stakeholders in project M&E	375	2.56	0.50	Low
Overall		**375**	**3.08**	**0.51**	**Moderate**
Technology Integration strategy					
22	Use of ICT for communication	375	2.62	0.50	Moderate
23	Use of software for project planning	375	2.58	0.46	Low
24	Use of Computer software for data processing	375	2.55	0.55	Low
25	Use of 3D modelling for visualisation	375	2.42	0.48	Low
Overall		**375**	**2.54**	**0.50**	**Low**

Construction project performance of the surveyed firms

The results indicated that the project performance of the surveyed firms ranged from 2.55 to 3.60 (see Table 6). The firms demonstrated high safety and quality performance but low performance in reducing operational costs. The overall mean project performance was 3.16,

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with a standard deviation of 0.52, suggesting that the firms generally achieved average project performance.

Table 6: Descriptive statistics of project performance elements

SN	Project performance elements	N	Mean	Std	LoKPI
1	Safety of employees	375	3.60	0.62	High
2	Quality of work	375	3.48	0.58	High
3	Productivity	375	3.38	0.45	Average
4	Client satisfaction	375	3.36	0.50	Average
5	Team satisfaction	375	3.25	0.35	Average
6.	Environmental impact	375	2.95	0.42	Average
7.	Delivering of projects on time	375	2.72	0.68	Average
8.	Reduction in operational cost	375	2.55	0.55	Low
	Overall Project Performance	**375**	**3.16**	**0.52**	**Average**

Effects of CMS on Overall Construction Project Performance

To evaluate the effects of contractor management strategies (CMS) on overall construction project performance (CPP), four hypotheses were formulated, each addressing a specific project strategy: Planning (PS), Monitoring and Control (MCS), Stakeholder Collaboration (SCS), and Technology Integration (TS). Pearson correlation analysis explored the relationships between these CMS strategies (independent variables) and overall project performance (dependent variable). According to Cohen's (1988) guidelines, a correlation coefficient of 0.10 suggests a weak relationship, 0.30 indicates a moderate correlation and 0.50 or higher reflects a strong association.

The results indicated that all independent variables had correlation coefficients exceeding 0.50, signifying strong associations. Moreover, a significant relationship was observed between each CMS strategy and overall project performance, as summarised in Table 7.

Table 7: Association between CMS and overall project performance

CMS Variables	MCS	SCS	PS	TS	CMS
CPP	0.798**	0.682**	0.782**	0.655**	0.815**

Table 7 shows a strong positive correlation between overall construction project performance (CPP) and the monitoring and control strategy ($r = 0.798$, $p < 0.01$), planning strategy ($r = 0.782$, $p < 0.01$), stakeholder collaboration strategy ($r = 0.682$, $p < 0.01$), and technology strategy ($r = 0.655$, $p < 0.01$). Additionally, the combined CMS strategies had a significant positive association with overall CPP ($r = 0.815$, $p < 0.01$). While the correlations confirmed a relationship between CMS strategies and project performance, they did not specify the contribution of each variable. To address this, multiple regression analysis was conducted. The adjusted R^2 value was 0.764, indicating that the four CMS strategies (planning, monitoring and

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control, stakeholder collaboration, and technology integration) explained 76.4% of the variation in project performance among the surveyed firms, as summarised in Table 8.

Table 8: Summary of regression analysis between CMSs and CPP

Dependent Variable	R	R-Square	Adjusted R Square	Standard Error
Performance	0.815	0.776	0.764	1.216

Table 9: Analysis of Variance

Analysis of Variance	Sum of squares	Df	Mean Square	F	Significance
Regression	2966.172	4	741.543	501.798	0.000
Residual	548.254	371	1.478		
Total	3514.426	375			

Table 10: Standard Coefficients

Variables in Equation	Beta	T	Significance	Collinearity Statistics	
				Tolerance	**VIF**
PS	0.267	9.601	0.000	0.419	2.384
SCS	0.212	4.796	0.000	0.204	4.904
TS	0.125	1.680	0.000	0.281	3.555
MCS	0.395	10.215	0.005	0.277	3.613

The F-ratio of 501.798 ($p < 0.01$) indicates that the regression of project performance on the CMS variables is statistically significant, as shown by the adjusted R-squared in Table 9. The beta coefficient, representing the standardised regression coefficient, allows for a direct comparison of the relative impact of each variable on the dependent variable (Hair et al., 2010). The results showed that the monitoring and control strategy had the most potent effect on overall project performance, with a beta of 0.395 ($p < 0.01$). The planning strategy followed with a beta of 0.267 ($p < 0.01$), while the stakeholder collaboration strategy had a beta of 0.212 ($p < 0.01$). The technology strategy had the slightest impact, with a beta coefficient of 0.125 ($p < 0.01$), as seen in Table 10.

Discussion

This study's results align with the existing literature findings, reinforcing the importance of contractor management strategies (CMS) in enhancing construction project performance (CPP). Empirical evidence from this study supports prior research that highlights the significant impact of effective project planning, monitoring and control, stakeholder collaboration, and technology integration on CPP.

Effective Project Planning: The study revealed that effective project planning strategies, including task definition and design reviews for constructability, positively correlate with project performance. This is consistent with Majumder et al. (2021), who noted that effective project planning reduces team stress, enhances profitability, and supports timely project

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delivery. The moderate integration of these strategies observed among the surveyed firms suggests that while some planning efforts are implemented effectively, others, such as using alternative methodologies and providing safety buffers, require further attention to optimise project outcomes fully.

Monitoring and control: Monitoring and control emerged as the most significant CMS factor, corroborating the findings of Mwangu and Iravo (2015) and Gunduz and Almuajebh (2020), who emphasised the importance of monitoring and control for project success. For instance, Mwangu and Iravo (2015) found that the frequency of project supervisors' site visits, meetings, and preparation of interim valuations and financial statements are critical to project success. They also assert that regularly reviewing construction activities against the project's schedule, budget, and quality standards allows for early identification of potential issues, enabling corrective actions to keep the project on track. Gunduz and Almuajebh (2020) underscore the importance of a competent team and strong top management support in achieving project success. These practices are further supported by Adebayo et al. (2018), who demonstrated that tools like the Program Evaluation and Review Technique (PERT) and Earned Value Management (EVM) are integral to reinforcing effective monitoring and control mechanisms.

Stakeholder Collaboration: This study highlights the critical role of stakeholder collaboration in achieving project success. High levels of integration, particularly in aligning project outcomes with clients' requirements as a basis for quality, reinforce findings by Mandala (2018) and Magassouba et al. (2019). These studies emphasise that active stakeholder engagement fosters a sense of ownership among stakeholders, leading to enhanced project outcomes. Nonetheless, moderate engagement in project monitoring and evaluation points to a need for more comprehensive stakeholder participation, echoing the observations of Buertey et al. (2016), who argued for the importance of responsiveness and trust in stakeholder relationships.

Technology Integration: Although technology integration positively influenced CPP, it was found to be the least impactful among the CMS variables studied. This aligns with Kissi et al. (2019, 2022), who pointed out that while technology facilitates efficient project management and data analysis, the actual adoption rates of advanced tools like 3D modelling and specialised data processing software remain low in the construction industry. The findings suggest substantial potential for growth in the use of technology, particularly in developing economies, to harness the full benefits of digital project management solutions.

CONCLUSION AND RECOMMENDATION

This study underscored the critical importance of contractor management strategies (CMS) in enhancing construction project performance (CPP) in developing economies, with a specific focus on Ghana. The findings revealed that strategies involving effective project planning, robust monitoring and control, stakeholder collaboration, and technology integration significantly improve project outcomes. Among these, monitoring and control strategies were

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the most influential, driving timely and cost-effective project completion. Planning, stakeholder collaboration, and technology integration also played essential roles, albeit to varying extents. However, the moderate implementation levels observed across the surveyed firms indicate significant potential for further improvement to fully optimise project performance.

To maximise the positive impact of CMS on CPP, construction firms should adopt comprehensive practices that enhance monitoring and control, such as conducting regular site inspections, holding progress meetings, and ensuring thorough financial reviews. Emphasising stakeholder collaboration through inclusive decision-making, active participation in monitoring and evaluation, and maintaining effective communication can promote shared ownership and improve project results. Embracing advanced digital tools, including project management software and 3D modelling, is recommended to improve planning efficiency and data analysis capabilities. Firms are also advised to invest in staff training to bolster proficiency in modern project management techniques, aligning with research findings highlighting the importance of skilled human resources for successful CMS implementation.

With these strategic enhancements, construction firms can aim to elevate their project performance across cost, time, quality, and stakeholder satisfaction. The insights from this study reflect the broader literature, reinforcing that CMS when effectively integrated and continuously improved, serves as a powerful driver for achieving higher project performance standards in the construction industry.

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