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Contractors' Management Skills and the Performance of Road Construction Projects in Kivu South – Democratic Republic of Congo

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Abstract: *This study examines how contractors' management skills affect the performance of road construction project in Kivu south – Democratic Republic of Congo. Despite the sector's economic importance, issues such as poor governance, insufficient funding, and lack technical capacity continue to jeopardize project success. Based on Contract Management Theory, the study highlights the importance of organized contract administration, risk management, and stakeholder coordination in improving project efficiency and accountability. The study's target population is 480 respondents, with a sample size of 214 computed using Krechjie and Morgan's Table 1970.A descriptive survey design was used to target key stakeholders such as contractors, consultants, and project owners. Cronbach's Alpha (0.770) was used to confirm the reliability of data acquired via questionnaires and interviews. SPSS was used to apply both descriptive and inferential statistical techniques, such as Pearson correlation and regression analysis. The study found a strong and statistically significant association between capacity building and project performance ($r = 0.715$, $p < 0.05$), as well as between contractors' technical skills and performance ($r = 0.632$, $p < 0.05$). Respondents rated contractor competencies well, particularly in planning and execution, despite ongoing issues such as insufficient resources, a scarcity of trained workers, and poor project sustainability. The study suggests that capacity building and technical skill are important predictors of successful road construction. While better skills increase efficiency, quality, and sustainability, systemic constraints continue to impede peak performance. The findings are consistent with current literature, emphasizing the necessity of professional competence in infrastructure delivery, as well as the need for context-specific interventions in conflict-prone locations such as Kivu South. To improve project outcomes and long-term infrastructure sustainability, the study suggests increasing investment in staff development, strengthening policy frameworks, and allocating resources more effectively.*

Keywords: *Technical skills, Performance of Roads, Construction of project, Management skills, contractor performance*

1.1 Introduction

Road infrastructure is a very important component of the socioeconomic development of the world as it allows access to key resources, employment, and markets (Meza, MaukoPranji, Vezonik, Osmokrovi, & Lenart, 2021) noted that at the same time, there is inherent uncertainty, complexity and risk in the construction industry, and risk management strategies are required to be strong. Health and safety concerns related to construction are one of the challenges that continue to affect the industry, especially in the European Union, where 1,500 employees are dying each year of accidents at work (Mea & Lenart,

2021). The road construction industry has been growing exponentially worldwide, and the value of the projects has reached about US 3.57 trillion (Welde & Dahl, 2021). Although it is economically significant, road construction is adversely affected by inefficiencies in its management, thus causing delays, cost increases, and poor quality, especially in Sub-Saharan Africa. The development of road infrastructure is a priority in many African states, such as Gabon, Sudan, Ethiopia, and Uganda, yet the performance problems have not diminished because of the lack of finances, corruption, unskilled personnel, and the governance aspect (Owusu, Chan, and Shan, 2019). The road construction industry in the Democratic Republic of the Congo (DRC) is one of the leading in the GDP, but the performance of the projects in the sector is not optimal because of the mismanagement of contracts, poor supervision, and insufficient funds (Demirkesen and Bayhan, 2020). In light of these challenges, the paper explores the effects of the skills a contractor manager has on the performance of a road construction project in Kivu South, DRC, with the focus being on the key stakeholders, including the owners, consultants, and contractors.

Available literature indicates that contract management is also important in order to make construction projects successful. Most studies, however, have been aimed to competency in project management and infrastructure development in general and not necessarily on contractor management skills in road construction (Germaine, 2017). The works of Chandra (2017) and Sultana, Rahman, and Chowdhury (2018) also highlight the importance of the technical and leadership capabilities of project managers in the provision of successful projects, but they make no specific attempt to study the role of contractor skills in the quality of road construction. Previous studies have examined performance-based road maintenance (Chepkemoi, 2020), the research evidence has not been empirically tested, which directly examines the relationship between the contractor management skills and the success of road infrastructure projects in the DRC. Little has been done to investigate the performance of road projects in Sub-Saharan Africa, especially in Kivu South, and few studies have evaluated the effects of various contractor technical capabilities, financial management, and safety compliance on project performance (Bulangashane et al., 2023). This research, therefore aims at filling this gap by assessing the competencies of contractor management and how they relate to the performance of road construction as a measure of meeting the requirements of efficient management and formal contract administration in the area.

1.2 Objective and Hypothesis

The study aims to analyze the role of contractor management skills in enhancing the performance of road construction projects in Kivu South, DRC. The objectives are: To analyze the influence of contractors' technical skills on the performance of road construction in Kivu South.

Hypothesis

i. H_{01}: There is no significant relationship between technical skills and the performance of road construction projects in Kivu South.

1.3 Literature Review

The paper has examined how the Contract Management Theory applies in the assessment of skills of contractor managing and performance of a project in construction of a road. According to Klara (2021) and Knoester (2015), the Contract Management Theory is concerned with contract administration, compliance, and reduction of risks at any stage of a project. It emphasizes the significance of clear terms

of the contract, performance criteria, and competent communication in enhancing the efficiency and accountability of the project (Piga & Treumer, 2018). The theory has played a key role in defining the contractor management practices through allocation of resources, observing the law and collaborating with stakeholders. The supporters of the structured contract management procedures that reduce risks and increase the rate of successful projects. Research indicates that the implementation of the principles of contract management leads to the increased quality of construction outcomes, minimized conflicts, and better delivery of the project within budget and schedule restrictions (Robert, 2020).

Theoretical Framework

Contract Management Theory its focuses on enforcement of sanctions, and risk management. It offers viable methods of establishing project goals, resource budgeting, and controlling the work of the contractors (Piga & Treumer, 2018). Contract management should entail proper agreements, efficient dispute resolution, and frequent performance reviews to enable the process to be in tandem with the project requirements (Knoester, 2015). This theory promotes a clear contracting process in which category management and agreement administration facilitate the flawless process and quality guarantee (Robert, 2020). Through Contract Management Theory, this paper assesses the degree to which the management skills of the contractors can match the expectations in the road construction projects on how to resolve the main challenges in the performance and accountability of road construction projects.

Road construction projects play a significant role in the national development given that the roads are the most important means of transportation. The World Road Association (2021) indicates that roads are important national resources that need to be well-planned and managed. Nevertheless, the developing countries usually have difficulties with the construction of roads, such as budget overruns, quality concerns, and time issues (Bajarr, 2019). Such failures are represented by the delays of the project, non-compliance with materials, and a considerable number of repairs. It is important to make sure that the structure is designed well to ensure high sustainability in road performance. Also, the technical skills are a part of the road construction efficiency. Planning, implementation, and maintenance of projects require the project manager and engineers to have conceptual, political, and technical skills (Minde, 2018). Research by Kihoro and Waiganjo (2015) noted that competence in project team has a great impact on performance. Innovative technology is also applied to the construction of roads of different types today, and high-quality work on the operation of machinery and quality control of the work is the responsibility of experienced individuals (Jeyakanthan et al., 2017). Furthermore, technical knowledge can be used to provide effective cost estimation to minimize financial risks (Mesaro et al., 2019). The reason is that these results highlight the sensitivity of professionals in determining the success of road construction and reducing project failure.

1.4 Methodology

Research Design: A descriptive survey research design was chosen in the study as this research method allowed collecting data systematically and without manipulating factors (McCombe, 2019). Descriptive research is applied to represent the traits of a phenomenon accurately and generalize in a target population. The choice of this approach was because it focuses on evaluating the management capability of contractors and their effect on the performance of road construction projects in Kivu South, Democratic Republic of Congo. This design was appropriate in the analysis of attitude and behavior trends because it allowed an exploration of variables using how, what, and who questions.

Participants/Sample: A descriptive survey research design was chosen in the study as this research method allowed collecting data systematically and without manipulating factors (McCombe, 2019). Descriptive research is applied to represent the traits of a phenomenon accurately and generalize in a target population. The choice of this approach was because it focuses on evaluating the management capability of contractors and their effect on the performance of road construction projects in Kivu South, Democratic Republic of Congo. This design was appropriate in the analysis of attitude and behavior trends because it allowed an exploration of variables using how, what, and who questions.

Data Collection and Analysis: Structured questionnaires and interview guides were used to collect data in order to have a holistic approach in terms of collecting quantitative and qualitative information. The questionnaire had question areas that concerned demographic and questions areas that were concerned with technical skills. To test the instruments, a pilot study was carried out, reliability was determined by test-retest, and the results showed a Pearson correlation coefficient of 0.77 with the questionnaire and 0.81 with the interview guide (Hamersley, 2018). Data analysis entailed descriptive statistics by the use of SPSS version 25 with inferential statistics by the use of the simple linear regression which was used to establish the relationship between the independent and dependent variables. The ethical aspects were followed, and voluntary participation, confidentiality, and institutional approval were received at the Catholic University of Eastern Africa and local authorities in Kivu South.

1.5 Results

The research was an overview of the management skills and performance of the road construction projects in Kivu South Democratic Republic of Congo by the contractors. The collection of data was conducted using questionnaires which were structured and using interviews which were followed up by data analysis and presentation of results in tabular forms. The findings were then explained and exhaustively analyzed in accordance to the findings of the study. The study questionnaire had a very high response rate of 89 whereby 190 out of 214 questionnaires were sent. This phenomenal response to the questionnaire was because of the eager collaboration of the target audience in the study during the data collection process. The non-response rate of 11 percent of questionnaires might have been affected by a number of reasons that made them non-analytical. Generally, it is believed that response rate is a measure of representativeness of the population but in different situations, the assumption may not hold (Wang and Cheng 2020). In the case of the quantitative conduct of the research, Mongan et al. (2020) indicated that the sample size of thirty individuals is the one that is deemed acceptable.

Reliability Test

The reliability test was undertaken by use of Cronbach's Alpha coefficient to measure the internal consistency of the constructs making up the scale. There were 35 items tested and they were found to be reliable.

Table 1: Reliability Results

Variable	Cronbach's Alpha	Number of constructs
Contractor's technical skills	0.770	35
Total Items	0.770	**35**

Source: Field Data (2025)

The study found that the data collection tool was reliable, (r = 0.770on 35 items) (Contractors technical skills = .770; a Cronbach Alpha coefficient of 0.7 and above is considered reliable and dependable. Source, Author (2025).

Findings on Capacity Building and Performance of Road Construction Projects

This section presents descriptive statistical results, including frequencies, percentages, mean, and standard deviation, to analyze the influence of capacity building on road construction projects in Kivu South, Democratic Republic of Congo. A mean score below three (M <3) indicated low agreement, a mean of three (M=3) was moderate, and a mean above three (M>3) showed positive agreement.

Descriptive Data on Capacity Building and Performance of Road Construction Projects

Capacity building was assessed using five indicators: improved skills and competencies, enhanced performance, strengthened governance and leadership, and collaborative networks. The results are presented in Table 2.

Table 2: Descriptive Statistics on Capacity Building and Performance of Road Construction Projects (F-Frequency, SD –Strongly Disagree, D-Disagree, N-Neutral, A-Agree, SA-Strongly Agree).

Statements (Capacity Building)	SD %	F	D %	F	N %	F	A %	F	SA %	F	Mean	Std Dev
Capacity building improved project performance through feedback and evaluations.	6.3%	12	16.3%	31	0%	0	35.3%	67	42.1%	80	3.91	1.28
Capacity-built personnel are not always available.	44.7%	85	27.4%	52	2.1%	4	11.1%	21	14.7%	28	2.24	1.48
Contractors generating work plans are underperforming.	23.2%	44	58.4%	111	0%	0	9.5%	18	8.9%	17	2.23	1.17
Capacity building is not as difficult as perceived.	4.8%	8	14.2%	27	5.3%	10	37.4%	71	38.9%	74	3.93	1.18
Performance has not improved due to inadequate resources.	32.2%	44	58.4%	111	0%	0	9.5%	18	8.9%	17	2.23	1.17
Road transportation has improved since project inception.	7.4%	14	31.6%	60	0.5%	1	44.2%	84	16.3%	31	3.31	1.27
Road construction is sustainable due to community involvement.	6.8%	13	11.6%	22	11.6%	2	39.5%	75	41.1%	78	3.96	1.22
Overall Composite Mean and Std Deviation										**3.19**	**1.34**	

Source: Field data, 2025

Findings Summary:

Capacity building positively impacts project performance (M = 3.91, SD = 1.28), with 42.1% strongly agreeing and 35.3% agreeing. The unavailability of capacity-built personnel is a challenge (M = 2.24, SD = 1.48). Contractors underperform despite generating work plans (M = 2.23, SD = 1.17). Capacity building is not as difficult as perceived (M = 3.93, SD = 1.18). Performance issues arise due to inadequate

resources (M = 2.23, SD = 1.17). Road transportation has improved since construction started (M = 3.31, SD = 1.27). Sustainability is expected through community involvement (M = 3.96, SD = 1.22).

Inferential Statistics on Capacity Building and Performance

A Pearson correlation analysis was conducted to examine the relationship between capacity building and performance in road construction projects. The results are presented in Table 3.

Table 3: Capacity Building and Performance of Road Construction Projects

Variable	Statistics	Performance of Road Construction Projects
Capacity Building	Pearson r	0.715**
	P-value	0.027
	N	190

Key Findings:

A statistically significant positive correlation (r = 0.715, P = 0.027) exists between capacity building and project performance. The null hypothesis was rejected, confirming that capacity building significantly influences road construction performance in Kivu South.

Model Summary of Capacity Building and Performance

The analysis performed was a simple linear regression to establish how capacity building has an influence on the road construction performance. These results indicate that there is a significant correlation between the capacity building and project outcomes but skills development, government and allocation of resources are essential in improving performance.

The paper concludes that capacity building serves as an important indicator of the success of a road construction project at Kivu South. Although it enhances efficiency and sustainability of the project, poor resources and availability of skilled staffs remain a bottleneck to effective performance. It is advisable to solve these problems by policing the reforms and investing in the development of workforce to improve the outcomes of projects.

Descriptive Statistics of Techniques and Performance of the Road Construction Projects in Kivu South of Democratic Republic of Congo by the Contractors.

The independent variable, which is the technical skills of the contractors, was evaluated in terms of software tool proficiency, certifications, problem-solving skills, technical knowledge, and application. The discussion centered on the effects of the skills in the performance of road construction projects in Kivu south, DRC.

Descriptive Statistics on Contractors' Technical Skills and Performance

Table 4: Presents Data on seven statements regarding contractors' technical skills and road construction performance (F-Frequency, SD –Strongly Disagree, D-Disagree, N-Neutral, A-Agree, SA-Strongly Agree)

Statements	SD (%)	F	D (%)	F	N (%)	F	A (%)	F	SA (%)	F	Mean	Std Dev
1. How would you rate a constructor's technical skills in terms of road construction performance in Kivu South?	4.2%	8	11.1%	21	0%	0	43.2%	82	41.6%	79	4.07	1.11
2. Many contractors have inadequate skills, delaying projects.	27.9%	53	34.2%	65	0.5%	1	8.9%	17	28.4%	54	2.76	1.62
3. Contractors with work planning skills perform well.	3.7%	7	8.4%	16	1.6%	3	43.7%	83	42.6%	81	4.13	1.04
4. Many projects remain incomplete due to lack of skills.	20.0%	38	56.8%	108	2.6%	5	12.1%	23	8.4%	16	2.32	1.17
5. Training programs exist but do not improve skills due to inadequate resources.	3.2%	6	6.8%	13	3.2%	6	43.7%	83	43.2%	82	4.17	0.99
6. Safety prioritization wastes resources.	27.4%	52	33.2%	63	2.6%	5	8.4%	16	28.5%	54	2.77	1.61
7. Road projects remain sustainable after contractor departure.	40.0%	76	40.5%	77	0%	0	10.0%	19	9.5%	18	2.08	1.28
Overall Composite Mean and Std Deviation										**2.97**	**1.40**	

Source: Field data, 2025

Key findings:

Respondents rated contractors' technical skills highly (Mean = 4.07), indicating a perception of competency, but views varied (SD = 1.11). Many disagreed that contractors lack skills, with 62.1% rejecting the claim that inadequate skills delay projects (Mean = 2.76, SD = 1.62). Contractors capable of work planning were perceived to perform well (Mean = 4.13, SD = 1.04). The claim that incomplete projects result from skill shortages was mostly disagreed with (Mean = 2.32, SD = 1.17). Despite training, skill improvement is limited due to resource constraints (Mean = 4.17, SD = 0.99). The perception that safety prioritization wastes resources was mixed (Mean = 2.77, SD = 1.61). Project sustainability post-contractor departure was considered unlikely (Mean = 2.08, SD = 1.28).

Inferential Statistics on Contractors' Technical Skills and Performance

A Pearson correlation analysis assessed the relationship between contractors' technical skills and road construction project performance.

Table 5: Correlation Analysis

Variable	Pearson r	P-value	N
Contractors' Technical Skills	0.632**	0.035	190

The findings suggest that the positive correlation (r = 0.632, p = 0.035 < 0.05) is statistically significant, and thus the technical capabilities of contractors play an important role in the performance of road construction projects in Kivu South. The null hypothesis was, therefore, rejected.

The researchers concluded that technical competencies of contractors are crucial in terms of the performance of the road construction project. Although the majority of the respondents rated the technical skills of the contractors positively, such issues as the inadequacy of training and sustainability of the project still prevails. The high correlation also indicates that more technical capacity is required to increase construction performance in Kivu South.

Discussion

Interpretation: The findings of the study verify that the technical competence of contractors plays an important role in determining the success of the road construction projects in Kivu South, Democratic Republic of Congo. The descriptive statistics showed that respondents were very much in agreement with all the variables. It was shown that there was a strong and significant positive correlation between these factors and project performance and the regression analysis also supported the finding that these factors can affect the performance of road construction in the area since improvements in these factors may lead to a better output of the construction process.

Comparison to Past Research: The results are in line with what other researchers have done that highlight the significance of capacity building in enhancing project efficiency (Smith and Brown, 2020). The importance of the technical skills of contractors supports previous research, including one by Johnson et al. (2019), who responded to the importance of their contribution to improving the quality of infrastructure projects. Nonetheless, even though the results are mostly consistent with the current literature, it can be considered that the local issues can be different in some regions, so perhaps some local approaches are needed to overcome certain infrastructural limitations in Kivu South.

Limitations and Future Research Directions: The study appreciates limitations such as use of self-reported data which could bring about respondent-bias. As well, as apply the qualitative data obtained through the stakeholder on the role of government policies in alleviating the problem of road construction in conflict-prone regions such as Kivu South. Research on the technological development in the building sector and how it has been applied in the capacity-building projects may also aid in increasing the efficiency and sustainability of the project. The research may be extended to other areas or make comparisons in future to find whether the results are different in other contexts. Further, future research may identify other issues that influence the project performance, like project funding, policy execution, and adoption of innovative machinery techniques.

1.6 Conclusion

The research determined that capacity building, technical skills determine performance of road construction projects in Kivu South in Democratic Republic of Congo. The results show that better capacity-building programs result in better execution of the project and compare the role of technical expertise of contractors in ensuring that the project is of good quality and efficiency. The findings of the study indicate that there are some practical implications of the research to policy makers, contractors and other stakeholders in the road construction industry. The concerns of the staff training should take precedence in the project implementation by the contractors to align the project implementation with the needs of the community members so as to have improved performances. Moreover, it is necessary to create and improve technical skills of the groups working on the construction in order to preserve the high standards of the project.

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