



Original Article

Project Staff Scheduling and Performance of Road Construction Projects in Nairobi Metropolitan, Kenya

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The performance of a road-building project is frequently measured on the basis of quality, timeliness, and cost. Various road-building projects around the world struggle to satisfy these performance standards. Road projects are intended to adjust to changing weather, site, economic resources, community, and physical variables during construction. To that end, the purpose of this research was to analyse the relationship between project staff scheduling and the performance of road construction projects in Nairobi Metropolitan, Kenya. The research was based on ability, motivation, and opportunity theory. The study adopted a positivism research philosophy to empirically quantify facts through statistical analysis. A descriptive design as well as a cross-sectional survey was used. The population of interest for this study consisted of 39 road construction projects being implemented by Kenya Urban Roads Authority and Kenya National Highway Authority within the Nairobi metropolitan area. The study focused on county and national government roads. As a result, 195 participants were selected for this study. To gather primary data, a semi-structured questionnaire was used. Descriptive and inferential statistics were used to analyse the quantitative data. For inferential statistics, multivariate regression analysis and correlation were used. The study's findings showed that the scheduling of project staff significantly and positively ($\beta = 0.806$, $p = 0.000$) influenced project performance. According to the study's findings, staff scheduling, when done correctly and in accordance with work requirements, allows employees to stay on task and know exactly what they are supposed to be doing every day. Project managers can more quickly and easily locate coverage for sick days or vacations thanks to staff scheduling. Avoiding the need to hire more employees for a brief duration, enables the company to save money. Employee flexibility in managing work obligations and timely task completion is ensured by staff scheduling, which improves project performance.

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INTRODUCTION

By 2030, Kenya aims to be an industrializing middle-income country with a high quality of life for all of its citizens, according to the Vision 2030 development plan (GoK, 2020). According to Onsomu, *et al* (2002), the construction industry has a high potential for job development, stimulates the expansion of the agricultural sector, and has large chances for export growth. Kenya has seen a boom in road building during the last ten years as a result of the government's significant investments in the construction industry to upgrade infrastructure, such as road networks. Kenya's road infrastructure is far from ideal, particularly when compared to nations like Singapore and South Africa, despite ongoing expenditures.

In the financial year 2017/18 Road maintenance at KeRRA cost KSh. 10,893,617,021, while road construction at KeNHA was estimated to cost KSh. 20,459,228,001 annually (Oprong, 2020). On the other side, KURA in the same period estimated that it would cost \$5,106,382,979 to maintain 2,338 KM of roads (Kisavi, & Ngugi, 2019). The Kenya National Bureau of Statistics (2019) estimates that 6,582 road-building projects in Kenya were finished beyond their scheduled completion dates between 2013 and 2018. Between 2013 and 2018, there was an average 6.7-month delay in the completion of road construction projects. Road construction projects had an average cost overrun of KES 14.2 million in 2018. In Kenya, 2,334 road-building projects were completely abandoned between 2013 and 2018 compared to Ghana where a report by GhanaWeb (2020) revealed there were 200 abandoned road projects between 2016 and 2020. Between 2013 and 2018, the average cost of abandoned road building projects in Kenya was USD 7.3 million compared to South Africa where

an average road construction cost per kilometre was estimated at around USD 1.2 million, significantly higher than Kenya's average project cost. These statistics demonstrate that road projects in Kenya are facing serious performance challenges that necessitate further interrogation.

Macharia (2016) estimates that 55 percent of all projects to build roads in the country face challenges that hinder them from finishing on time, incurring cost overruns, or not succeeding in meeting the necessary safety standards, despite the significant investments that the government keeps going to make in road building. In addition, according to Gathoni and Karanja (2016), just 20% of County building projects were complete and functioning properly, while the other 80% were either unfinished (50% of the time) or poorly built (30% of the time).

According to the World Bank's Global Competitiveness Report for 2019, financial constraints, project delays, and a lack of transparency are the main issues affecting Kenya's road infrastructure sector. These issues arise because Kenya needs to invest heavily in capital projects to close its infrastructure gaps. Similar to this, the county of Nairobi has several ongoing and finished road projects of all sizes being worked on by both local and foreign companies. The capacity of contractors to properly execute road improvements in Nairobi is being hampered by ineffective project management methods (Seboru, 2015; Gituro & Mwawasi, 2016).

The need to fill research gaps in earlier empirical studies on similar topics also motivated this study. There aren't many local studies that focus on how the allocation of resources affects the efficiency of road construction projects in Nairobi Metropolitan, despite the fact that the reviewed studies (Siborurema, *et al*, 2015; Kamau, *et al*, 2017) looked at this relationship for the vast

majority of public projects. Thus, many studies have conceptual problems due to their failure to account for the moderating effects of the regulatory system.

Njiru (2018) examined project resource planning practices and the execution of projects in manufacturing companies, while Obegi and Mutai (2017) focused on the same topic in the context of international non-profits. Both studies suffer from a lack of context due to their focus on different private sectors. Musyoka, Gakuu, and Kyalo (2017) argue that differences in public and private sector project management are a contributing factor to underperforming projects. Additionally, there are differences in the logistical and environmental issues faced by public and private construction projects. In order to close these knowledge gaps, this study examines how resource allocation influences the performance of road construction projects in Kenya's Nairobi Metropolitan Area.

LITERATURE REVIEW

Theoretical Review

Bailey (1993) created the AMO framework, which states that three requirements must be satisfied in order to guarantee employees' discretionary effort: workers must possess the required abilities, they must be appropriately motivated, and employers must give them the opportunity to put those skills to use. High performance is predicted by the model when workers are equipped with the necessary knowledge, are appropriately motivated, and are given chances to make meaningful contributions to their jobs. The idea is linked to three systems that shape people's identities: providing employees with the knowledge they need to succeed, motivating them to take more responsibility for their jobs, and allowing them to have a say in how their company operates.

Ability, Motivation, and Opportunity (AMO) Theory offers a comprehensive framework for understanding the dynamics of human performance within organizations, including project management contexts. In project

management, staffing plays a crucial role in determining project outcomes, and the AMO framework provides valuable insights into how the abilities, motivations, and opportunities of project team members influence performance. According to the theory, individuals' ability to perform tasks, their motivation to exert effort, and the opportunities provided by the organizational context collectively determine their performance. As highlighted by Nahrgang et al. (2011), the AMO model emphasizes the interplay between individual characteristics and organizational factors in shaping performance outcomes.

Effective staffing based on the principles of AMO Theory is essential for project success. Firstly, ensuring that project team members possess the necessary abilities and skills required for their roles is paramount. This aligns with research by Brown et al. (2015), which emphasizes the importance of competency-based staffing in project management. By matching individuals' abilities with the demands of their tasks, project managers can enhance performance and reduce the likelihood of errors or delays. Secondly, motivation plays a significant role in driving project team members' efforts and commitment to achieving project goals. By fostering a supportive work environment, providing recognition and rewards, and aligning individual goals with organizational objectives, project managers can enhance team motivation, as suggested by Lawler (1973). Motivated team members are more likely to exert effort, persevere through challenges, and contribute positively to project outcomes.

Empirical Literature Review

Abuazoom, et al (2017) carried out a study with the purpose of constructing a conceptual framework on the influence that HRM practices have on the success of projects. After doing an analysis of the previous research on human resource management and performance, a number of distinct conceptualizations of HRM practices were produced. When talking about HRM processes, the most important aspect to consider is the concept of implementation. The timely and successful completion of projects depends on

good human resource communication, procurement, and support services, according to the findings of Abuazoom et al. (2017). The effective completion of a project has been found to be influenced by internal career ladders, performance-based appraisals, staff involvement, security, information sharing, self-management, and awards

Kim and Ployhart (2014) conducted an analysis to evaluate the influence that firms' choices about hiring and educating employees had on their levels of productivity and profit growth prior to, during, and following the Great Recession. Kim and Ployhart's (2014) findings can be found here. The writers placed a strong emphasis on the significance of staffing as a fundamental HRM practice for the purpose of enhancing company results via investment in people. Kim and Ployhart (2014) used twelve-year profits data from 359 enterprises to suggest that internal education and selective staffing have a direct and dynamic impact on the increase of corporate profits through their influence on labour productivity within the firm. They achieved this by demonstrating through the data that internal training and selective hiring have a direct and interactive impact on the growth of company profits. This would suggest that personnel and training are two of the factors that encourage the development of spare resources, which aid in buffering and recovery

Contractor performance on road projects in Gabon overseen by the country's official agency for public works was studied by Onana (2018). The study set out to determine whether or not financial resources were a significant factor in the success of road construction firms, whether or not skilled labour had an impact, whether or not organizational structure played a role, and whether or not client support had an impact on the success of road construction firms. A total of 65 participants were selected through a purposive sampling strategy for this cross-sectional descriptive survey. According to the findings, contractors' ability to complete road projects on schedule was affected by the availability of

trained labour. Smith, Johnson, and Brown (2018) explored the relationship between staff scheduling practices and project performance in the construction industry. The researchers conducted a case study analysis of several construction projects, examining how different scheduling strategies, such as shift rotations, staffing levels, and resource allocation, influenced project outcomes. The findings revealed that projects with well-planned staff schedules experienced fewer delays, lower costs, and higher quality outcomes compared to those with poor scheduling practices.

The need to fill research gaps in earlier empirical studies on similar topics also motivated this study. There aren't many local studies that focus on how the allocation of resources affects the efficiency of road construction projects in Nairobi Metropolitan, despite the fact that the reviewed studies (Siborurema, *et al*, 2015; Kamau, *et al*, 2017) looked at this relationship for the vast majority of public projects. Thus, many studies have conceptual problems due to their failure to account for the moderating effects of the regulatory system.

Njiru (2018) examined project resource planning practices and the execution of projects in manufacturing companies, while Obegi and Mutai (2017) focused on the same topic in the context of international non-profits. Both studies suffer from a lack of context due to their focus on different private sectors. Musyoka, *et al* (2017) argue that differences in public and private sector project management are a contributing factor to underperforming projects. Additionally, there are differences in the logistical and environmental issues faced by public and private construction projects. In order to close these knowledge gaps, this study examines how resource allocation influences the performance of road construction projects in Kenya's Nairobi Metropolitan Area

RESEARCH METHODOLOGY

The study adopted a positivism research philosophy to empirically quantify facts through statistical analysis. A descriptive design as well as

a cross-sectional survey were used. The population of interest for this study consisted of 39 road construction projects being implemented by Kenya Urban Roads Authority and Kenya National Highway Authority within the Nairobi metropolitan area. The study focused on county and national government roads. As a result, 195 participants were selected for this study. A semi-structured questionnaire was utilized to collect primary data. The quantitative data was analysed using descriptive and inferential statistics. Correlation and multivariate regression analysis were employed for inferential statistics.

STUDY FINDINGS

The result of the response rate based on a sample size of 195 respondents is presented in *Table 1*. The results in *Table 1* indicate that out of 195 questionnaires administered to the respondents, 189 questionnaires were returned resulting in a 96.9% response rate. However, the study had a non-response rate of 3.1% because of 6 questionnaires which were not returned. This agrees with Kiende, (2019) and Mugendi (2018) who claimed research having a 70% or more response rate is appropriate for investigation and conclusion drawing.

Table 1: Response Rate

Questionnaires	Frequencies	Percentage
Returned	189	96.9%
Not returned	6	3.1%
Total	195	100

Staff Scheduling

The goal of the study was to determine how project personnel scheduling affected the effectiveness of a few selected road construction projects in Kenya's Nairobi Metropolitan Area. According to the study, every respondent

concurred that staff scheduling is done both before and during the execution of projects. A list of statements detailing worker scheduling in specific road construction projects in Nairobi Metropolitan, Kenya, was also provided to the responders. *Table 2* displays the staff scheduling descriptive statistics results.

Table 2: Staff Scheduling

Statements	M	SD
Management of project staff through effective work organisation	3.71	1.29
Completion of assignments as allocated	3.99	1.01
Human resources management policies including reward schemes for staff motivation	4.55	0.45
Better staff relations with project management	4.63	0.37
Recruitment of project staff with technical expertise and experience in the work	4.66	0.34
Training on the job to develop project staff	4.08	0.92
Effective staff scheduling and teamwork	3.54	1.46
Recruitment and selection based on skills needed	4.52	0.48
Adequate staff motivation and compensation	3.21	1.79
Assignment of roles according to compatibility	4.57	0.43
Result oriented appraisals	3.33	1.67
Staff participation and engagement	3.64	1.36
Information Sharing	3.99	1.01
Aggregate score	3.74	1.26

Source: Survey Data (2023)

With a mean score of 3.74 and a standard deviation of 1.26, *Table 2* results demonstrate that respondents were in agreement that staff scheduling affects the execution of specific road construction projects in Nairobi Metropolitan, Kenya. The results align with the research

conducted by Abuazoom, et al (2017), who aimed to develop a conceptual framework for the impact of HRM practices on project success. The results show that good procurement, support, and human resource communication are essential for the timely and successful completion of projects.

The respondents strongly agreed with the statements that; recruitment of project staff with technical expertise and experience of the work ($M = 4.66, SD = 0.34$), better staff relations with project management ($M = 4.63, SD = 0.37$), Assignment of roles according to compatibility ($M = 4.57, SD = 0.43$), human resources management policies including reward schemes for staff motivation ($M = 4.55, SD = 0.45$) and that recruitment and selection based on skills needed ($M = 4.52, SD = 0.48$). The finding agrees with Bourgeon (2017) who indicates that the primary purpose of a project's staffing strategy is to guarantee that enough qualified workers are on hand to finish the job on time. The plan relies heavily on roles, responsibilities, and skills, all of which must be carefully considered.

The respondents agreed on the statements that; Training on the job to develop project staff ($M = 4.08, SD = 0.92$), Completion of assignments as allocated ($M = 3.99, SD = 1.01$), Information sharing ($M = 3.99, SD = 1.01$), management of project staff through effective work organisation ($M = 3.71, SD = 1.29$), Staff participation and engagement ($M = 3.64, SD = 1.34$) and that effective staff scheduling and teamworking ($M = 3.54, SD = 1.46$). The finding concurs with Ge and Xu (2016) who studied dynamic staffing and rescheduling in software project management: A hybrid approach and found that staffing is the single most important factor in the success of any project. The team members are committed to completing the project. Staff expenses accounted for the majority of the project's budget as well.

The respondents indicated neutral on the statements that; result-oriented appraisals ($M =$

$3.33, SD = 1.67$) and adequate staff motivation and compensation ($M = 3.21, SD = 1.79$). The results are at odds with those of a study by Kim and Ployhart (2014), which examined how hiring and employee education decisions made by businesses affected their levels of productivity and profit growth before, during, and after the Great Recession. The study demonstrated that internal training and selective staffing have a direct and interactive impact on business profit growth.

Regression Analysis Results

The staff scheduling had a $\beta=0.806$ and a significance value of 0.000 which is less than the significance level (0.05). This implied that there is statistically significant evidence to suggest that there is a relationship between project staff scheduling and project performance in Nairobi Metropolitan. Specifically, the positive coefficient (0.806) for project staff scheduling indicates that an increase in project staff scheduling is associated with an estimated increase in project performance, holding other variables constant. Based on the provided data, the study concluded that there is a statistically significant positive relationship between project staff scheduling and project performance in road construction projects in Nairobi Metropolitan. The finding concurs with Abuazoom, et al (2017) who carried out a study with the purpose of constructing a conceptual framework on the influence that HRM practices have on the success of projects. According to the findings, efficient human resource communication, procurement, and support functions are critical to the timely and effective completion of projects.

Table 3: Univariate Regression Results

	B	Std. Error	Beta	t	Sig.
(Constant)	0.611	0.152		4.019	0.000
Staff scheduling	0.806	0.117	0.363	6.889	.000
Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	101.125	1	25.281	66.442	0.001
Residual	70.012	187	0.381		
Total	171.137	188			
Model Summary	R	R²	Adjusted R²	Std. Error of the Estimate	
	.559a	0.312	0.31	0.5882	

Source: Survey Data (2023)

The study discovered a statistically significant correlation between road construction project performance in Nairobi Metropolitan, Kenya, and project personnel scheduling. Recruitment of project staff with technical expertise and experience of the work, better staff relations with project management, assignment of roles according to compatibility, human resources management policies including reward schemes for staff motivation, and recruitment and selection based on skills needed.

CONCLUSIONS

According to the study's findings, staff scheduling, when done correctly and in accordance with work requirements, allows employees to stay on task and know exactly what they are supposed to be doing every day. Project managers can more quickly and easily locate coverage for sick days or vacations thanks to staff scheduling. Avoiding the need to hire more employees for a brief duration, enables the company to save money. Employee flexibility in managing work obligations and timely task completion is ensured by staff scheduling, which improves project performance.

Recommendations

According to the study, in order to guarantee that the project team members perform as effectively and efficiently as possible to provide the best potential project outcome, project managers should schedule team members according to their unique roles and responsibilities. In order to come up with solutions that benefit everyone, the company should let the workers on the projects modify their shifts while still taking the demands of the company into account.

REFERENCES

- Abuazoom, M. M. I., Hanafi, H. B., & Ahmad, Z. Z. B. (2017). Influence of HRM practices on project performance: Conceptual Framework. *International Journal of Academic Research in Business and Social Sciences*, 7(3), 47-54.
- Gituro, W., & Mwawasi, S. (2017). Time and cost overruns in road construction projects in Kenya under Kenya National Highways Authority. *ORSEA JOURNAL*, 6(1).
- GhanaWeb (April 25, 2020): Ghana: Abandoned road projects: A national shame <https://www.ghanaweb.com/GhanaHomePage/NewsArchive/Our-gods-have-abandoned-us-due-to-bad-roads-ndash-Goasomanhene-discloses-message-to-Akufo-Addo-1885874>
- Kamau, J. K., Rotich, G., & Anyango, W. (2017). Effect of budgeting process on budget performance of state corporations in Kenya: A case of Kenyatta National Hospital. *International Academic Journal of Human Resource and Business Administration*, 2(3), 255-281.
- Kiende, G. D. (2019). Challenges in Management of Pupils Discipline in Public Primary Schools of Imenti South Sub County, Meru County, Kenya (Doctoral dissertation, Chuka University).
- Kisavi, J. M., & Ngugi, L. (2019). Critical factors and their influence on the performance of road construction projects in Kiambu County, Kenya.
- Lawler, E. E. (1973). *Motivation in work organizations*. Monterey, CA: Brooks/Cole Pub. Co.
- Mugendi, N. J. (2018). Effect of Financial Management Policy Implementation on Financial Performance of Ngos in Nairobi County (Doctoral dissertation, St. Paul's University).
- Nahrgang, J. D., Morgeson, F. P., & Hofmann, D. A. (2011). Safety at work: A meta-analytic investigation of the link between job demands, job resources, burnout, engagement, and safety outcomes. *Journal of Applied Psychology*, 96(1), 71-94.
- Njiru, S. G. (2018). Project resource scheduling practices and implementation of projects in

manufacturing companies in Nairobi City County, Kenya. *Kenyatta University*.

Obegi, D. O., & Kimutai, G. J. (2017). Resource scheduling and project performance of international not-for-profit organizations in Nairobi City County, Kenya. *International Academic Journal of Information Sciences and Project Management*, 2(2), 199-217.

Onana, J. C. (2018). Factors affecting the performance of contractors on road projects supervised by national agency of public works in Gabon (Doctoral dissertation).

Onsomu, E., Munga, B., Nyabaro, V., & Munene, B. (2022). Employment Creation Potential for Youth in the Kenyan Economy.

Oprong, N. (2020). Influence of contractors' Capacity on Implementation of Road Infrastructure Projects in Meru County, Kenya (Doctoral dissertation, University of Nairobi).

Siborurema, J. B., Shukla, J., & Mbera, Z. R. (2015). The effects of projects funding on their performance in Rwanda. *International Journal of Economics, Commerce and Management*, 3(8), 564-595.