Project Management Discipline and Performance of Road Construction Projects in Meru County, Kenya

Mutwiri Zablon Muthuri[1], Wacira Joshua Tumuti[2]

[1]Student, Department of Management Science, School of Business, Kenyatta University, P. O. Box 43844-00100, Nairobi, Kenya

[2]Lecturer, Department of Management Science, School of Business, Kenyatta University, P. O. Box 43844-00100, Nairobi, Kenya

Abstract: *Many countries across the world are investing heavily in road infrastructure projects performance as a way of boosting their both local economies. However, global statistics indicate that 66% of road construction projects perform poorly as they fail to meet their project budget and time quality. Studies further indicate that poor road construction project performance was linked to poor project management practices. Specifically, the study focused on project stakeholder and procurement management. Studies done on road construction projects in Meru revealed that all projects experienced costs overrun and 25% underwent project slippage. The specific objectives of this research were; to investigate the effect of stakeholders and procurement management on road construction projects performance in Meru County, Kenya. The study employed a descriptive survey study design. Stratified random sampling was employed in the selection of study respondents. A sample size of 44 respondents was drawn from a target population. Semi-structured questionnaires were presented to participants to collect data and later analyzed using SPSS for inferential and descriptive statistics. Regression and correlation analyses were conducted to determine and explain the degree of relationship that exists between the predictor and dependent variables. Diagnostic tests (normality and multicollinearity) were conducted to check for data distribution and the multicollinearity symptom. Qualitative data was analyzed using content analysis. Results were presented using tables, charts, and graphs with percentages. The analysis revealed that stakeholder and procurement management were significantly and positively correlated with the Meru County road construction project performance. Regression analysis established that stakeholder and procurement management had a statistical positive and significant effect on project performance although they were not fully practiced. The study recommended that the management of Meru County road construction projects should provide proper training, accept stakeholder' group representative and insist on involvement. Finally, the management should ensure appropriate procurement practices are well defined and followed.*

Keywords: Procurement, Stakeholder, Performance

1. Introduction

Across the world, many countries are investing heavily in road construction projects aiming to improve road networks to minimize traffic congestion and consequently boosting their local economies, for instance, Europe, India, and China as per [5], [6]. According to [15], the implementation of road construction projects stemmed from the fact that road transport was the driving force behind economic development in many countries, although many road construction projects were being canceled [9]. According to [15] at least 77% of road construction projects globally, experience cost overrun. As per [12], these problems arise from poor management of project procurement and involvement of project stakeholder which further result in poor performing projects.

Meanwhile, Sub-Saharan African countries, for instance, Sudan, Ethiopia, and Kenya, have focused on national development through the education and transport sector [16], [4]. According to [4], in the transport sector, road transport has played a major pivotal role in economic growth compared to other means of transport in many countries in Sub-Saharan Africa. However, many project stakeholders are not satisfied with how these road construction projects have been performing. [4] Reported that out of every successful road construction project, two are considered non-successful. [4] Further lamented that only a few researches have been conducted to examine the progress of these projects and the necessary actions to take for them to succeed.

Kenya is among top countries in Sub-Saharan Arica that is investing heavily on road project, however, numerous incidents of reported delays in completion and increased project costs for major public sector projects is rampant. [13] Lamented that the incidents cast major doubt on whether the government can guarantee value for money to the taxpayers. In Meru County, the county government is in front line working to achieve vision 2030 of creating employment opportunities and mass wealth creation via road transport. Road transport is the major mean of transport to the county [7]. However, road construction projects faced various challenges including financial, poor quality workmanship and premature termination. Despite the challenge, the county government saw the need to venture on road transport to achieve state and international standards. The county allocated heavy budget on road construction projects in their first Integration Plan 2013-2017. However, despite budget allocation, some projects experienced time delay and cost overrun [8]. Hence, raises a major concern to researchers, clients, project sponsors, contractors and other stakeholders [13].

1.1 Statement of the problem

Project performance is the key focus of any project. It is influenced by many factors such as project stakeholder and procurement management which play a major role in project objective achievement. Lack of incorporation of project management discipline becomes a common reason for project failure [1]. However, proper focus on the project management knowledge areas is essential in ensuring the

project is delivered both on time, and within the set budget [14].

According to [8], 25% of road construction projects in Meru County presented a delay in completion and all experienced cost overrun. Initially, projects were scheduled to be completed by September 2017 but that did not happen. The company (Intex Construction Company) that was awarded the construction tender requested for an extension to complete some of the unfinished projects. It was noted that the four road projects under study faced the financial challenge which led to delay in completion. According to [12], the poor performance of a project results from failure of acknowledgment of project management discipline which includes procurement and stakeholder management. In connection to that, the researcher saw the need to explore this unexplained phenomenon to determine the effect of project management discipline on the performance of road construction projects in Meru County, Kenya.

1.2 Objectives of the Study

The general objective of this study was to establish the effect of project management discipline on the performance of road construction projects in Meru County, Kenya.

1.2.1 Specific Objectives
1) To assess the effect of stakeholder management on the performance of road construction projects in Meru County, Kenya.
2) To examine the effect of procurement management on the performance of road construction projects in Meru County, Kenya.

1.3 Significance of the Study

Firstly, the study equipped the researcher with skills and knowledge to comprehend the project management discipline effect on the road construction projects' performance through participation in the research. Secondly, the study findings will have inferences on private sectors, institutions and governmental organizations project managers across the globe to support the appointment of project staff with project management discipline knowledge and skills. Publication of the study finding enables other researchers all over the world to have access to get more understanding of project management discipline.

2. Theoretical Review

The study was grounded on two theories, that is, System Theory and Theory of Constraints. System Theory recognizes the project as an open system that influences and be influenced by other variables in a particular environment thus forming a better pattern that is different from any of the parts. An exchange of project information with the external environment characterizes the project as an open system [10]. In connection, Meru County road construction projects are open systems and they regularly interact with external forces as well as project management disciplines which include stakeholder and procurement management. The open

system theory focused on the relationships among all external forces and project management branches of knowledge. Therefore, system theory guided the study in understanding how stakeholder and procurement management interrelated with one another and how the relationships influenced the performance of Meru County road construction projects.

On the other hand, the Theory of Constraints (TOC) guided on defining what should be changed and how to effect the change to continuously improve the performance of the project. As such, TOC provided a basis in the present study for understanding and recommending which area of project management discipline to change and how the change can be continuously adapted to improve the performance of Meru County road construction projects.

2.1 Conceptual Framework

The section presented the relationship between various variables of the study as conceptualized from the review of the empirical literature and theoretical works as depicted in Figure 2.1.
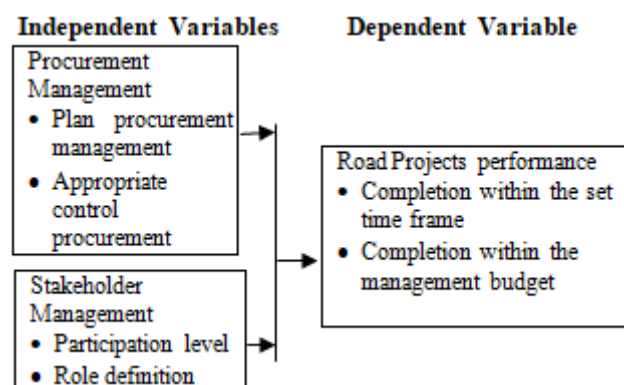

Figure 2.1: Conceptual Framework
Source: Researcher (2019)

3. Research Methodology

The study employed a descriptive survey research design. Descriptive survey research design is intended to provide a picture of a situation as it naturally happens, hence may be used to justify the current practice, make a reasonable judgment and develop theories [2]. The design uses multiple data collected at one specific time point. The main characteristic of this method of research is that the control of the study variables is beyond the researcher's capability. The researcher can only report on what is happening or has happened. A descriptive survey research design is recognized as a self-report in which quantifiable data is collected from a sample obtained from the target population [11]. Additionally, the survey was preferred in this study since it sought information on an existing phenomenon concerning stakeholder and procurement management on Meru County road construction projects performance.

The study considered a target population of four road construction projects in Meru County which include Museum-Assembly, Meru-Mikinduri-Maua, KK-Njoune

links and Muriri-Micii-Mikuru with 60 constructors and 13 supervising engineers involved. Besides, the researcher was guided by the information provided by road construction projects' administrator.

Afterward, the researcher used a stratified sampling technique to select the study respondents. The technique was useful due to its ability to ensure the subdivision of the target population into homogeneous strata. A sample size of 10% (44) was drawn from the study population.

3.1. Data Collection Instrument

A semi-structured questionnaire was used to collect primary data. First-hand data was preferred due to the nearness to the truth and ease of control over errors. The adoption of this tool was also due to its freedom from the biases of the interviewer and adequate respondent time. The researcher used content validity to determine whether the questionnaire was logical and accurately to measure the study variables [11]. The researcher sourced the opinion of experts including the supervisor and peers to countercheck the validity of the questionnaire. More so, to ascertain the feasibility and pretest of the data collection instruments underlying this study, piloting exercise was done in a nearby county. Piloting helped in assessing the respondent's willingness to provide the needed information, assess whether the questionnaire was understandable and correctly answered by the respondents and also if the data collection instrument helped meet the research objective. Additionally, Cronbach's alpha test was run to examine the instrument reliability. The coefficient of 0.7 and above was acceptable [2], [11].

3.2. Data Analysis

With the help of SPSS, the researcher was able to run descriptive and inferential statistics. Content analysis was also useful in this study to evaluate qualitative data. All the analysis results were demonstrated using charts, tables and graphs with percentages, standard deviation and mean.
The descriptive statistics specifically helped in understanding the data distributional patterns as well as elaborating respondents' level of agreement towards the practice of project management discipline. Inferential statistics such as a correlation, regression, and ANOVA also helped in testing the variable association and influence among themselves. Before then, diagnostic tests such as normality test and multicollinearity were conducted to check for data distribution and the multicollinearity symptom. The study used a multi-regression model to test the relationship between the variables as shown below.

$$y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \varepsilon \quad \text{............................(1)}$$

Where,
Y = Performance of Meru road construction projects.
X_1 = Stakeholder management discipline.
X_2 = Procurement management discipline.
β_0 = Constant term.
β_1 and β_2 = Coefficients of predictor variables X_1 and X_2.
ε is the error term.

3.3 Ethical Consideration

Before the collection of data, the researcher provided participants with details of the study and information about their participation entailed. The participants were asked to confirm by signing a consent form that they have understood the purpose of participating. Participants were also informed of their right to continue or withdraw themselves from participation at any point during the exercise. To ensure anonymity, respondents were reminded not to write their names or any other information which could be used to identify them.

4. Research Findings

4.1. Response Rate

The analysis indicated that out of the 44 questionnaires administered to various categories of respondents who included constructors and supervising engineers involved in Meru County road construction projects, 42 were duly filled and returned which accounted for 95.5% while 2 were unreturned which accounted for 4.5%. According to [11], the response rate above 50% is reasonable to make analysis decisions in social science research. Hence, the response rate of 95.5% was outstanding for the analysis progression. The higher response rate was achievement because of the assurance made to the participants that the information collected will only be used for academic purposes and never be disclosed to anyone else for any other purpose. The respondents were highly convinced and thus provided the necessary information that the researcher needed for analysis to answer the research questions at hand.

4.2 Reliability Analysis

The instrument was examined for reliability by the use of survey items with the data collected from the piloted questionnaire. The instrument internal consistency was verified through Cronbach's alpha computation.

Table 4.1: Reliability analysis per variable

Variable	Number of items	Cronbach's Alpha
Stakeholder management	7	0.759
Procurement management	8	0.758
Project performance	7	0.753

Source: Survey Data (2019)

All study variables which included stakeholder and procurement management had a Cronbach alpha above the minimum set coefficient of 0.7. According to [2], [11], all advocate that a Cronbach coefficient of above 0.7 should be acceptable. Therefore, as per the reliability analysis results presented in Table 4.1 indicates that the instrument had a strong internal constituency.

4.2 Descriptive Analysis

The descriptive statistics specifically helps in understanding the data distributional patterns as well as elaborating respondents' level of agreement towards the practice of project management discipline.

The respondents' bio-data that was collected related to their age bracket, gender distribution, level of education, year (s) of experience in road construction project and role in their respective projects were analyzed as follows.
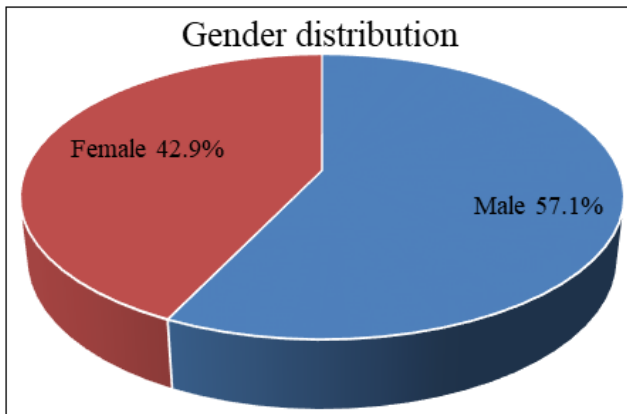

Figure 4.1: Respondents gender distribution
Source: Survey Data (2019)

As presented in figure 4.1, the majority of study participants were males with 57.1% while 42.9% were female. This implies that the majority who were involved in the road construction projects in Meru County were male. In African culture, it is believed that men are the best in this type of work compared to women, however, as per the analysis, there is a small percentage variation.
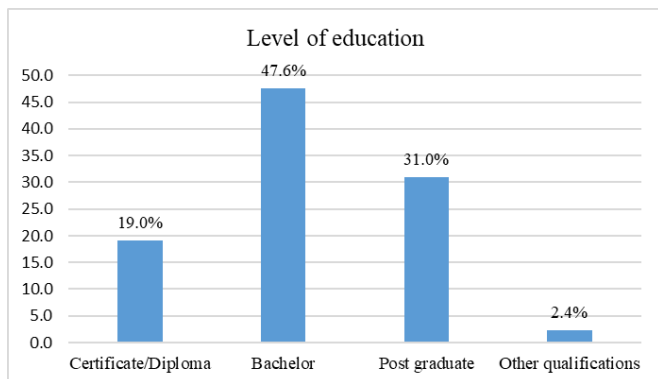

Figure 4.2: Respondents level of education
Source: Survey Data (2019)

As presented in figure 4.2, the majority of the study participants were bachelor and postgraduate degree holders with a representation of 47.6% and 31.0% respectively. Few respondents were certificate/diploma holders and with other qualifications (19.0% and 2.4% respectively). It is a good indication that the project staff has adequate skills to perform their assigned tasks. The study finding depicted that adequate skills enable employees to perform their jobs perfectly.
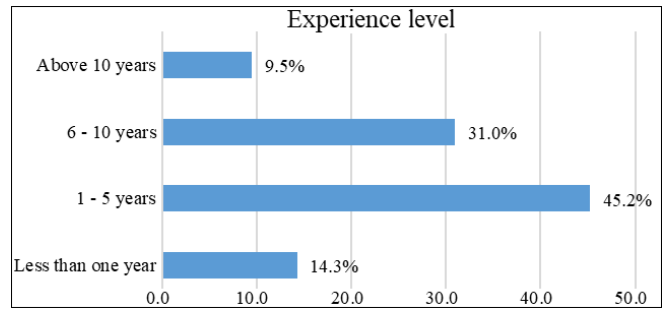

Figure 1.3: Respondents age bracket
Source: Survey Data (2019)

From figure 4.3, the majority of the participants have 1-5 years (45.2%) and 6-10 years (31.0%) of experience with road construction projects. The analysis also indicated that there were few respondents with less than a year and above 10 years of experience (14.3% and 9.5% respectively). This implies that Meru County road construction projects staff have more experience to perform their assigned tasks. The study finding revealed that more experienced employee requires minimal training to carry out their assigned duties and responsibilities thus saving training cost.
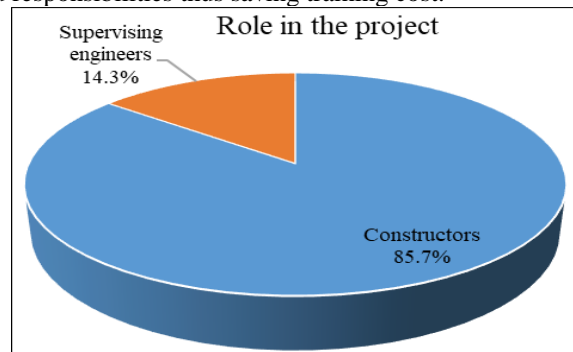

Figure 4.4: Respondents role in the project
Source: Survey Data (2019)

The result analysis as in figure 4.4 shows that 85.7% were constructors and 14.3% were supervising engineers involved in Meru County road construction projects. It implied that the study participants were not equally distributed. The study results depicted that equitable position distribution encourages proper coordination and flow of project information feedback.

Table 1.2: Meru County road construction projects' risks

Risks	Percent (%)	Cumulative Percent (%)
Traffic risk	16.7	16.7
Operational and maintenance risk	23.8	40.5
Utility risk	59.5	100
Total	100	

Source: Survey Data (2019)

The result in table 4.2 shows that 16.7% of the respondent revealed that Meru County road construction projects were associated with traffic risk. Twenty-three-point eight percent indicated that road projects were associated with operational and maintenance risk and finally, 59.5% reveals that road construction projects were highly influenced by utility risk. The analysis results concluded that every project undertaken is prone to certain risks.

4.3 Correlation Analysis

Pearson correction was used to determine the degree of bivariate correlation of relationship and association among independent and dependent variables. Table 4.3 illustrates the result of correlation in a matrix form.

Table 4.3: Correlation analysis matrix

	S$_2$M	PM	PP
S$_2$M	1	.625**	.800**
PM	.625**	1	.635**
PP	.800**	.635**	1

Key: Stakeholder Management (S$_2$M) and Procurement Management (PM), Project Performance (PP)
Source: Survey Data (2019)

The results in table 4.3, indicates that stakeholder management was significant and strong positively correlated with the performance of Meru County road construction projects with r = 0.800. The positive correlation between stakeholder management and project performance means an improvement in stakeholder management increases project performance. Additionally, the correlation was strong due to the agreement with the statements that clear stakeholder management increases project performance. This implied that stakeholder management plays a big role in project performance.

With r = 0.635 indicates that procurement management was significantly and positively correlated with Meru County road construction projects performance. The positive correlation means that when procurement management was improved, the performance of the project also increased. Procurement management was strongly correlated with project performance like the other practice identified earlier.

4.4 Multi-regression Analysis

Table 4.4: Multicollinearity Test

Model	t	Sig.	Collinearity Statistics	
			Tolerance	VIF
(Constant)	6.177	0.012		
Stakeholder Management	5.513	0.001	0.311	3.214
Procurement Management	1.304	0.02	0.582	1.719

Source: Survey Data (2019)

As per the analysis results presented in table 4.4, the variance inflation factors (VIF) of the independent variables lie between 1 and 9.9 which is an indication that there is no multicollinearity symptom. Additionally, it means that there is no exact linear relationship among the predictor variables.
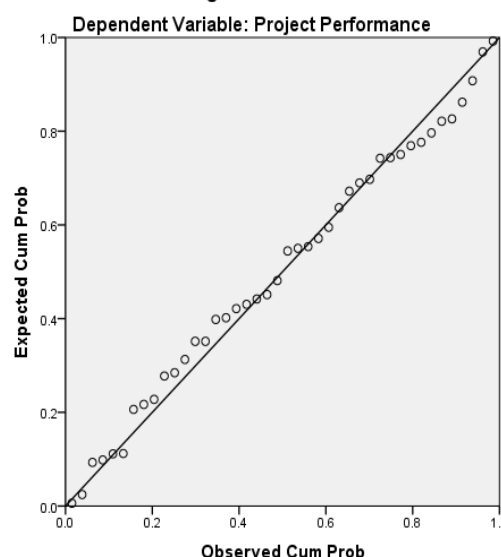

Figure 4.5: Normal distribution graph
Source: Survey Data (2019)

The results in figure 4.5 indicate that the scatter data points lie close to the line. According to Criswell (2014), data points that are close to the line of the goodness of fit with a clear pattern reveals that the data is normally distributed.

Table 4.5: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.925^a	.856	.841	.16054

a. Predictors: (Constant), Stakeholder Management, Procurement Management
Source: Survey Data (2019)

The overall correlation coefficient (R) between independent variable project management discipline and project performance was 0.925 as indicated in table 4.16. It implied that there was a strong positive relationship between the independent and dependent variables. More so, the analysis also depicted that 85.6% (R^2 = 0.856) of the project performance can be defined by stakeholder, and procurement management and 24.4% variation is explained by other factors that were not included in the model.

Table 4.6: ANOVA Analysis

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5.689	4	1.422	15.178	.000^b
	Residual	.954	37	.026		
	Total	6.642	41			

a. Predictors: (Constant), Stakeholder Management, Procurement Management
b. Dependent Variable: Project Performance
Source: Survey Data (2019)

As per the analysis presented in table 4.6, the overall significance of the model was 0.000 with an F value of 15.178. The level of significance was lower than α = 0.05 which means that project management discipline statistically affects project performance.

Table 2: Regression Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.748	.283		6.177	.012
	S$_2$M	.594	.103	.657	5.513	.001
	PM	.105	.081	.106	1.304	.020

a. Dependent Variable: Project Performance
Source: Survey Data (2019)

$$y = 1.748 + 0.594X_1 + 0.105X_2 + \varepsilon$$

Firstly, the researcher wanted to assess the effect of stakeholder management on the performance of road construction projects in Meru County using regression analysis. With $\beta_1 = 0.594$, t = 5.513, p = 0.001 and $\alpha = 0.05$, the analysis result indicates that stakeholder management had a significant effect on project performance. The β_1 value was positive indicating that stakeholder management had a positive effect on the performance of Meru County road construction projects. It implies that when stakeholder management is changed by one unit, project performance changes by 0.594 in the same direction. The finding advice that project stakeholder to be fully involved in the entire project cycle to avoid chaos during the project implementation.

The researcher also wanted to examine the effect of procurement management on the performance of road construction projects in Meru County, Kenya. The analysis result indicates that procurement management had positive and significant effect on project performance with $\beta_2 = 0.105$, t = 1.204, p = 0.020 and $\alpha = 0.05$. The value of β_2 was positive thus indicating that procurement management had a direct positive effect on the performance of Meru County road construction projects, and hence, when procurement management magnitude was changed by one unit, project performance changed by 0.105 units directly. The finding continues to reveal that procurement management requires proper procurement management and appropriate procurement measures to enable achievement of the project target goals. Meanwhile, Meru County road construction projects performance stands at 1.748 units when all independent variables constant are held constant.

5. Recommendations

With a strong positive Pearson correlation between stakeholder management and Meru County road construction projects performance, the management of Meru County road construction should allow stakeholders to participate fully in the project. Project staff and the public among other stakeholders are very essential groups whose participation, contribution and effort towards the achievement of the project's set goals are priceless, thus need to be considered. Besides, their opinions need to be included in the decision-making process. The management should also provide training, accept stakeholders' group representative and insist on involvement to ensure a high level of interaction and participation. The management should also implement a policy to block political maneuvering which affects fully involvement of projects' stakeholder. The management

should also plan the project well to avoid cost overrun and schedule slippage which hinders fully involvement of the projects' stakeholder.

On the other hand, based on the study findings, there was a strong positive and significant relationship between procurement management and project performance. Therefore, the management of Meru County road construction projects should ensure proper procurement management and appropriate procurement practices are well defined and followed. Additionally, the management should regularly update their status, monitor and evaluate projects constantly to avoid project slippage.

5.1 Areas for Further Studies

The current study was carried to establish the effect of project management discipline on the performance of road construction projects in Meru County, Kenya. The findings of this study are only relevant to Meru County road construction projects. Therefore, the researcher suggests that a future study should be carried out in other counties and sectors such as education, finance, tourism, real estate, health manufacturing among others. Additionally, future study should look at other factors which were not captured in this study and relevant to other projects.

References

[1] Alexandrova, M. (2012). Critical success factors of project management: Empirical evidence from projects supported by EU programmes. *Systemic Economic Crisis: Current Issues and Perspectives*, 1-9. Sofia: ASECU.

[2] Criswell, J. W. (2014). Research design: Qualitative, quantitative, and mixed methods approach. Thousand Oaks, CA: Sage publications.

[3] Ketokivi, M., & Mahoney, J. T. (2016). Transaction Cost Economics as a Constructive Stakeholder Theory. Academy Of Management Learning & Education, 15(1), 123-138.

[4] Khair, K., Mohamed, Z., Mohammad, R., Farouk, H., & Ahmed, M. E. (2018). A Management Framework to Reduce Delays in Road Construction Projects in Sudan. Arabian Journal for Science and Engineering, 43(4), 1925-1940.

[5] Lehne, J., Shapiro, J. N., & Eynde, O. V. (2018). Building connections: Political corruption and road construction in India. Journal of Development Economics, 131, 62-78.

[6] Lingliang, Z. (2016). Conceptual analysis of China's belt and road initiative: a road towards a regional community of common destiny. Chinese Journal of International Law, 15(3), 517-541.

[7] Meru County Government (2013). Meru County Integrated Development Plan, 2013-2017

[8] Meru County Government (2018). Meru County Integrated Development Plan, 2018-2019

[9] Mishmish, M., & El-Sayegh, S. M. (2018). Causes of claims in road construction projects in the

UAE. International Journal of Construction Management, 18(1), 26-33.

[10] Moldogaziev, T. T., & Resh, W. G. (2016). A Systems Theory Approach to Innovation Implementation: Why Organizational Location Matters. Journal of Public Administration Research & Theory, 26(4), 677-692.

[11] Mugenda, O. M. & Mugenda, A. G. (2013). Research methods: Quantitative and Qualitative Approaches. Nairobi: African Centre for Technology Studies.

[12] Project Management Institute (2014). A Guide to the Project Management Body of Knowledge (PMBOK® Guide).

[13] Seboru, M. A. (2015). An investigation into factors causing delays in road construction projects in Kenya. American Journal of Civil Engineering, 3(3), 51-63.

[14] Stevenson, D., & Starkweather, J. A. (2017). IT Project Success: The Evaluation of 142 Success Factors by IT PM Professionals. International Journal of Information Technology Project Management (IJITPM), 8(3), 1-21.

[15] Vick, S. (2018). Automated Spatial Progress Monitoring for Asphalt Road Construction Projects (Doctoral dissertation, University of Cambridge).

[16] Wolhuter, C. C., & De Wet, N. C. (2017). Community colleges: a vehicle for the expansion of higher education opportunities in South Africa. Journal for New Generation Sciences, 15(2), 119-133.