KAMPALA INTERNATIONAL UNIVERSITY
EXPLORING THE HEIGHTS

KIU
Journal of Science, Engineering and Technology

KJSET Research Article

IMPACT OF PROJECT PLANNING PRACTICES ON THE PERFORMANCE OF CONSTRUCTION FIRMS IN UGANDA: A CASE STUDY OF MASAKA CITY, UGANDA

Kasibante Alex and Kolawale Adisa Olonade*

Kampala International University

***Corresponding Author**: kaolonade@kiu.ac.ug

Paper history:

Received

Accepted in revised form:

Keywords

Construction planning practices, construction performance evaluation, performance criteria of firms

Abstract

Construction is a complex activity as it contains several inputs to achieve the desired objective. Efficient project plan practices have a significant impact on the performance of construction companies. Several companies engage in construction activity with little or no planning. This study investigated project planning practices among the construction firms in Masaka City, Uganda with a view to understanding their performances. Qualitative and quantitative techniques in a cross-sectional approach were used in this study. Data was collected from professionals working in 20 construction firms in the city making a total of 175 participants. Using questionnaires and interview guides. The data collected were analyzed using descriptive and inferential statistics with the aid of SPSS software. Three project planning practices were considered: Safety and Resource Planning (SRP), Equipment and Material Usage Planning (EMU) and Work Scheduled and Time Planning. The results showed that none of the companies has fully comply with the requirement planning practices, which led to material wastages and delay in project delivery. The regression model formulated has coefficient of determination of 77.45%, indicating that the model has capacity to predict about 78% of performances of the construction firms. The study concluded that the poor performance of the firms is influenced by the lack of planning practices. It is therefore recommended that strict conformance and enforcement of the project management principles throughout the lifecycle of the project should be given more attention.

1.0 Introduction

Making a plan for a construction project is a difficult task, especially if the project is vast. It is very feasible that the contractor working on a project won't even put the strategy in writing for smaller-scale projects. They might be able to envision the steps necessary to finish the project and then proceed with it. However, when projects get bigger and complex, more people, more materials, and more stages are needed to finish them (Hamilton and Gibson, 1996). A project plan must therefore be developed after it reaches a particular size in order to prevent unfavorable results that are frequently seen in construction projects, such as delays or cost overruns. Project managers look at the project's stated aim and then determine what it will take to get there in order to develop a thorough strategy for a building project.

Construction project efficacy is typically evaluated by elements of quality, timeline, and cost (PMI, 2018). Various initiatives, globally, strives to meet these quality objectives. The complexity of projects nowadays is likewise far higher than it has ever been. It requires a substantial financial investment, the incorporation of diverse fields, tighter timelines, geographically dispersed project partners, and high requirements for quality. This has significantly impacted project success by refocusing attention on recently established management techniques and the newest innovation, together with the swift evolution of ICT. The concept of creative project management is broad and ambiguous. Every action that needs to be taken must be carefully planned in order to determine its nature, any potential hazards, and the resources required to meet the organization's objectives (Alinaitwe, et al., 2007, Kairu, et. al. 2014).

Construction planning is the procedure used to identify the most efficient and cost-effective way to accomplish a project. The construction project plan serves as a guide that leads the undertaking from inception to completion. Project developers often worry about construction cost overruns and setbacks, and several studies have been conducted to identify the root reasons of inadequate planning that lead to these sorts of performance difficulties.

Mutai (2016) examined the connections between human resource practices, employee quit rates, and project success in the service industry. His results showed that businesses that place a high value on employee engagement in decision-making and teams, high skill levels, and incentives for human resources including high relative pay and employment stability have superior performance, lower quit rates, and sales growth. The study was limited to the service sector, where people are the primary assets, and therefore might not be applicable to other industries, like construction. Oyalo and Bwisa (2015) conducted research on the factors affecting labor productivity in project success. Employees of diverse projects were the focus of the study, which employed descriptive analysis. The study discovered a beneficial relationship between project performance and human resource planning.

In another different studies (Guoli, 2010 and Kwatsima, 2015) where impact of financial planning on the performance of project was conducted. The studies opine that project's insufficient cash flow consequences are frequently linked to delays and significant additional expenditures because there is a significant risk that the project as a whole will temporarily be abandoned. These discoveries were similar to what Geraldi and Morris (2011), reported in their studies. Furthermore, material planning and usage is another factor that influence performance of a project depending on how it was it taken into the consideration at the conceptual stage of the project. Pearce

and Robinson (2013) investigated how material quality affected project success. A survey of construction firms was conducted for the study. Utilizing descriptive analysis, the study discovered that the majority of the cost benefits of JIT occurred when inflation increased, leading to significant increases in the cost of maintaining inventory. According to the report, businesses should be able to limit their planning to just the things they will require at what time. The study was unable to demonstrate clearly the connection between project performance and material utilization. Dyili et al. (2018) used a survey design of chosen construction businesses to investigate the influence of material planning on project performance.

In the recent past, the real estate sector in Uganda has seen significant expansion as a result of improved economy and architects' development of a variety of architectural as well as design concepts to appeal to and fit the needs of a broad range of consumers. The idea of gated community housing developments has been fully adopted by a broad variety of industry partners. Gated communities provide a wide variety of structures, including maisonettes, apartments, villas, and bungalows. Additional factors for assessing project performance include whether it was finished to the required standards, within the allocated budget, and before the deadline.

Land property developers and investors have been more prevalent in Masaka City's real estate market in recent years. Building managers are under additional pressure to finish projects on time, under budget, and in accordance with high quality standards as construction projects become more complicated. According to Musyoka (2017), the methods of project management employed in certain initiatives typically determine how effective these projects. However, ineffective project planning, resource scheduling, project communication, project monitoring, and project assessment have continuously contributed to the underperformance of construction projects in Masaka City. Multiple government construction projects, including those for roads and buildings, continue to perform poorly in contrast to the signs of good project management (Gacheru, 2015). Ochenge (2018) concurred that the success of road infrastructure projects is significantly influenced by project management practices. This research will look at how project planning affects the productivity of construction organizations in Masaka City.

2.0 Methods and Materials

2.1 The Study Area

The study used Masaka District as a case study. The District is bordered to the north-west by Bukomansimbi District, to the north by Kalungu District, to the east and south by Kalangala District, to the south-west by Rakai District, and to the west by Lwengo District. On the road leading to Mbarara, the town of Masaka, where the district headquarters are situated, is about 140 kilometers (87 mi) south-west of Kampala. The district is located at 00 30S, 31 45E. The total population of citizens in the district is 103,829. The district is located on average 1,115 meters (3,658 feet) above sea level. Fig. 1 shows geographical map illustrating this location. The information was obtained from construction companies handing civil infrastructural projects in Masaka city.

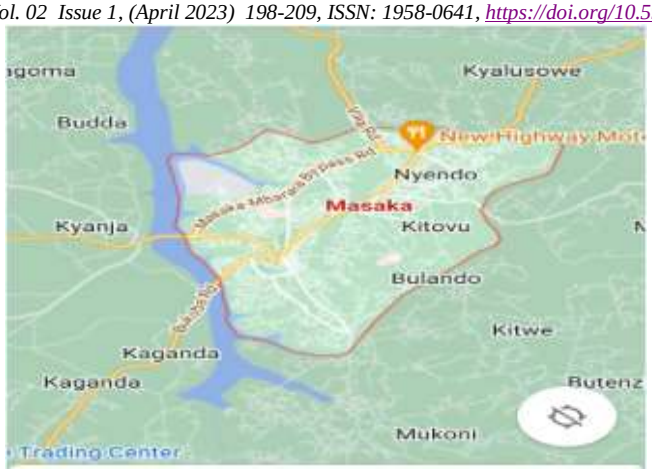

Fig. 1 Study Area Map

2.2 Research Design

Cross-sectional survey methodology was used in the study. The researcher used the cross-sectional design and combine qualitative and quantitative methods to gather comprehensive data similar to what Darusi and Makokha (2018) used in his study. The qualitative technique will assist in compiling narrative and descriptive facts, allowing for a deeper analysis of the impact of project planning on the performance of small construction enterprises in Masaka City. The quantitative approach will allow the researcher to quantify the study findings. It also enables the researcher to collect information from a sample of a larger population at a specific moment and utilize that information to draw conclusions about the larger population.

2.3 Target Population and Sample Size

A number of professionals in the construction sector selected from Project managers, project engineers, maintenance engineers, station engineers, and assistant station engineers will 20 construction companies in the study. The choice of this population was deliberate as they have experience to provide needed information for the study. The characteristics of the target population as well as the sample size is presented in Table 1.

Table 1: Target population, Sample size and the Selection Techniques

Department	Population	Sample Size	Sampling technique
Project managers (PM)	9	10	Purposive Sampling
Civil engineers	98	100	Purposive Sampling
Quality Control and Assurance (QC/QA)	26	30	Simple random Sampling
Quantity Surveyors (QS)	21	25	Simple random Sampling
Architects	13	15	Purposive Sampling
Surveyors	8	10	Simple random Sampling
Total	**175**	**190**	

2.4 Data Collection and Analysis

Qualitative and quantitative techniques in a cross-sectional approach were used in this study. Data was collected from 20 construction firms and in which 175 participants were sampled using Simple random and purposive. The data was collected using questionnaires and interview guides.

Information related to academic background, years of experience in the construction industries were some of the data that were collected which formed the demographic information of the respondents. Questions related to safety and resource planning (SRP) as they affect performance of construction firm were also asked, Other questions that populated the questionnaire were those related to Equipment and Material Usage planning (EMU) and Work Schedule and Time planning (WST) as they affect performanceThe five-point Liker scale was used to determine the ranking (1 = severely disagree, 2 = disagree, 3 = undecided, 4 = agree, and 5 = strongly agree). There after the data were analysed using descriptive statistics and inferential statistics. A regression model was then formulated based on the data collected. A regression model will be used for inferential statistics.

$$Y_i = \beta 0 + \beta 1X1 + \beta 2X2 + \beta 3X3 + Ɛ$$

Where:

Y = Project Performance

β0- Constant term

X1- Human Resource Planning

X2-Financial Resource Planning

X3- Material Usage Planning

β1, β2, and β3 are the independent variables' coefficients

Ɛ -Standard error term

3.0 Results and Discussion

3.1 Demographical Characteristics of the Respondents

The data obtained from the study area through purposive and random sampling techniques were utilized for the evaluation of the study objectives. The demographical characteristics of the respondents showing the frequency is presented in Table 2. The result were sorted according to their designation and occupations namely; civil engineer (civil Engr.) with a total of 98 respondents, project manager (PM) with 9 respondents, quality control and quality assurance (QC/QA) with 26 respondents, quantity surveyors (QS) with 21 respondents, architects with 13 respondents, and surveyors with 8 respondents so as to obtain their expert views. A total of 175 questionnaire responses were assessed for the study and the result showed 75.43% male and 24.57% female, which showed clearly that male genders participate more in construction activities than their female counterparts (Table 2). This may be attributed to the enormous physical and mental demands in construction projects in terms of multiple constraints involved from planning to execution stages. Respondents within the range of 0 – 10 years of experience constitute 47.43%, 11 – 20 years of experience had 40.57%, and 21 – 30 years of experience occupy 10.29%, while the remaining 1.71%. The import of this data is that information obtained would be considered reliable as they were provided by experienced professionals. This showed that professionals with years of experience greater than 21years were much busy with a greater number of them refusing to participate due to personal or official reasons. This may influence the outcome of the response feedback due to lack participation from more experienced professionals. The project type under consideration in this study are maintenance and services at 46.86%, building construction at 46.29% and road construction 6.86% as depicted in Table 2. The respondent's education qualification showed 64% had

bachelor, 18% had masters, 16% had HND, and 1.71% PhD (Table 2). It is also seen from the table that out of the 98 projects assessed, 43 of them are each of Private and Public-Private driven, representing about 44% each, while the rest are purely public project. These findings portrayed that the majority of construction projects under study were public-private sectors sector driven and are mostly executing maintenance and services and building construction project types.

Table 2: Demographical Characteristics of the Respondents

		Frequency						
Variables	**Divisions**	**Civil Engr.**	**PM**	**QC/QA**	**QS**	**Architects**	**Surveyor**	**Total**
Sex	male	73	6	20	18	11	4	132
	female	25	3	6	3	2	4	43
	Total	**98**	**9**	**26**	**21**	**13**	**8**	**175**
Years of Experience	0-10years	81	0	2	0	0	0	83
	11-20years	16	3	23	17	8	4	71
	21-30years	1	4	1	4	4	4	18
	>30years	0	2	0	0	1	0	3
	Total	**98**	**9**	**26**	**21**	**13**	**8**	**175**
Project Type	Building Construction	59	5	7	4	6	0	81
	Maintenance and Services	33	4	17	15	6	7	82
	Road construction	6	0	2	2	1	1	12
	Total	**98**	**9**	**26**	**21**	**13**	**8**	**175**
Highest level of Education	HND	27	0	1	0	0	0	28
	BSc.	68	2	17	14	8	3	112
	MSc.	3	6	8	7	5	3	32
	PhD	0	1	0	0	0	2	3
	Total	**98**	**9**	**26**	**21**	**13**	**8**	**175**
Contract Types	Private	43	3	3	2	1	0	52
	Public-Private	43	2	18	15	9	5	92
	Public	12	4	5	4	3	3	31
	Total	**98**	**9**	**26**	**21**	**13**	**8**	**175**

3.2 Effects of Safety and Resource Planning on Construction Firm Performance

Survey results which presented the respondents' experiences, opinions and attributes through a quantitative structured analysis in a 5-point Likert scale are presented in Table 3. SRP1 to SRP8 were different questions that related to SRP as they affect performance of construction firms. The relative importance index (RII) is used to rank the discovered causes in terms of severity or impact based on the opinion of each respondent. The computed results indicate that respondents strongly agree that formulation, implementation and routine training of human resource in-line with overall goal factors (SRP2 and SRP5) as the most severe attributes with RII of 4.39 and 4.38 respectively while having specific, measurable, attainable, relevant and time-bound (SMART) project objectives to assist successful delivery of the projects factor (SRP8) were observed as the least severe attribute with RII of 3.8. The overall summary of the respondents' feedback on safety and resource planning factors in-respect to their various designation or occupation showed that surveyors, QS, and QC/QA strongly supported the factors with average RII of 4.23, 4.22 and 4.19 respectively while civil engineers and PM produced the lowest RII of 4.08 and 3.92 respectively.

The obtained results generally showed that majority of the respondents who are professionals in civil construction field are in agreement that the listed attributes significantly impact the safety and resource planning factors in respect to the project performance with average RII of 4.12. The details derived from the respondents' feedback showed the formulation and implementation of human resource training in line with overall project goal (SRP2) as the most vital attribute. The response can be attributed to the roles played by the professionals and the divergent views as it concerns application of safety and resource planning in civil construction projects.

Table 3: Evaluation of Respondents' Feedback on Safety and Resource Planning Factors

Factors	Civil Engr.		PM		QC/QA		QS		Architects		Surveyor		Total	
	WS	RII	WS	RII	WS	RII	WS	RII	WS	RII	WS	RII	WS	RII
SRP1	380	3.88	41	4.56	117	4.50	90	4.29	54	4.15	32	4.00	119	4.23
SRP2	433	4.42	34	3.78	115	4.42	94	4.48	60	4.62	37	4.63	128.8	4.39
SRP3	425	4.34	36	4.00	106	4.08	88	4.19	53	4.08	33	4.13	123.5	4.13
SRP4	377	3.85	37	4.11	105	4.04	81	3.86	49	3.77	35	4.38	114	4.00
SRP5	417	4.26	40	4.44	109	4.19	93	4.43	58	4.46	36	4.50	125.5	4.38
SRP6	400	4.08	33	3.67	112	4.31	86	4.10	51	3.92	32	4.00	119	4.01
SRP7	400	4.08	37	4.11	104	4.00	91	4.33	47	3.62	35	4.38	119	4.09
SRP8	370	3.78	24	2.67	104	4.00	86	4.10	57	4.38	31	3.88	112	3.80

WS = weighted score**; RII =** relative importance index
SRP1: Engagement of hazard identifications, control and safety practices
SRP2: The formulation and implementation of human resource training in line with overall goal
SRP3: Execution of projects in line with safety standards and policy
SRP4: Roles and resources are expertly allocated (qualified personnel and infrastructure)
SRP5: Routine training was done to project team members
SRP6: Project managers were involved in planning stage
SRP7: Clearly setting roles and responsibilities for the project team improves the performance of the project
SRP8: Having SMART project objectives to assist in the successful delivery of the project

3.3 Effects Equipment and Material Usage Planning on Construction Firm Performance

Material usage and planning has been observed to be a very essential factor influencing the quality, durability and efficacy of the project deliverables according to relevant literatures. From the computed results, the respondents strongly agreed that proper detailing of project equipment and materials during the planning phase and provision of appropriate materials (EMU1 and EMU2) factors as the most severe attributes with RII of 4.281 and 4.279 respectively while utilization of supply chain management and materials quality certification before usage factors (EMU6 and EMU4) produced the lowest sever attribute with RII of 4.025 and 4.112 respectively (Table 4). The obtained results could be as a result of inappropriate deployment of essential checks and balances in evaluation of equipment and materials specifications for civil construction purposes. The general summary of the respondents' feedback on equipment and materials usage planning factors showed that surveyors and QC/QA strongly supported the factors with average RII of 4.20 and 4.28 respectively while PM produced the lowest RII of 4.05. The obtained respondents' feedback showed that the surveyors who are responsible for cost estimation of the projects strongly agreed that material appropriation as the

most significant attributes in the material usage factors which affects project performance.

Table 4: Evaluation of Respondents' Feedback on Equipment and Material Usage Planning

	Civil Engr.		PM		QC/QA		QS		Architects		Surveyor		Total	
Factors	**WS**	**RII**	**WS**	**RII**	**WS**	**RII**	**WS**	**RII**	**WS**	**RII**	**WS**	**RII**	**WS**	**RII**
EMU1	422	4.31	37	4.11	115	4.42	91	4.33	57	4.38	33	4.13	125.8	4.281
EMU2	413	4.21	38	4.22	115	4.42	89	4.24	53	4.08	36	4.50	124	4.279
EMU3	404	4.12	39	4.33	112	4.31	89	4.24	56	4.31	28	3.50	121.3	4.135
EMU4	395	4.03	37	4.11	111	4.27	83	3.95	56	4.31	32	4.00	119	4.112
EMU5	415	4.23	36	4.00	112	4.31	85	4.05	57	4.38	33	4.13	123	4.183
EMU6	407	4.15	29	3.22	105	4.04	87	4.14	50	3.85	38	4.75	119.3	4.025
EMU7	400	4.08	39	4.33	109	4.19	87	4.14	50	3.85	35	4.38	120	4.162

WS = weighted score; RII = relative importance index
EMU1: Project materials and equipment were well detailed during planning phase by the quantity surveyors
EMU2: Appropriate material was provided
EMU3: All material resources were timely ordered and efficiently used
EMU4: Certification of the materials quality specifications before usage
EMU5: Utilization of supply chain management
EMU6: Routine checks and maintenance of construction equipment in line with standard specifications
EMU7: Proper allocation of project equipment facilitates smooth operations and successful project completion

The surveyors play a vital role in the project planning stage by balancing the cost and quality of materials required for specific tasks in construction projects. However, project managers whom are responsible for overseeing of general operations and smooth running of the activities were in agreement that the timely and efficient use of materials as the most severe material usage attributes that impacts construction project performance.

3.3 Effects Work Schedule and Time Planning on Construction Firm Performance

Work schedule and time planning are integral part of the project management triple constraints which influences the quality of the deliverables according to project management body of knowledge (PMBOK). From the presented results, clear budgetary allocation for the project activities in-respect to the specified time and well-defined specifications of project output or deliverables (WST1 and WST5) factors were observed to be the most severe attributes with RII of 4.564 and 4.344 respectively while well-defined work breakdown structure factor (WST3) produced the least severe attributes at RII of 3.955 (Table 5). The overall summary considering the responses in this performance factor showed QS, surveyors, and QC/QA strongly supported the factors with average RII of 4.25, 4.29 and 4.31 respectively while civil engineers and architects produced the lowest RII of 4.09 and 4.17 respectively. The derived responses show the need for proper enlightenment of the construction team players in planning and execution stages on essential details on schedule and time interrelationships and utilization work breakdown structure to achieve improved performance on the project deliverables and to avoid cost overruns. Building information modeling (BIM) can be essentially deployed in this regard to assist project managers by integrating various disciplines to improve communication, coordination and

collaboration in a project; also analyses the project system constructability, estimate cost and duration of projects using quantity take offs, draw and simulate virtual image of the projects using visualization.

Table 5. Evaluation of Respondents' Feedback on Work Schedule and Time Planning

	Civil Engr.		PM		QC/QA		QS		Architects		Surveyor		Total	
Factors	**WS**	**RII**	**WS**	**RII**	**WS**	**RII**	**WS**	**RII**	**WS**	**RII**	**WS**	**RII**	**WS**	**RII**
WST1	428	4.37	45	5.00	120	4.62	91	4.33	61	4.69	35	4.38	130.0	4.564
WST2	381	3.89	34	3.78	113	4.35	89	4.24	54	4.15	34	4.25	117.5	4.109
WST3	370	3.78	37	4.11	105	4.04	86	4.10	45	3.46	34	4.25	112.8	3.955
WST4	385	3.93	39	4.33	111	4.27	90	4.29	54	4.15	33	4.13	118.7	4.183
WST5	426	4.35	37	4.11	114	4.38	90	4.29	56	4.31	37	4.63	126.7	4.344
WST6	412	4.20	35	3.89	109	4.19	89	4.24	55	4.23	33	4.13	122.2	4.147

WS = weighed score; RII = relative importance index
WST1: Clear budgetary allocation for all project activities and required time
WST2: Utilization of network diagram with dependencies and sequence of activities
WST3: Well defined work breakdown structure
WST4: Project Scope was well specified
WST5: Specifications of Project output or deliverables well defined
WST6: Development and Control of Schedule Plan

3.4 Performance Criteria Evaluation

The performance evaluation is very important to critically assess the various limitations, unprofessional activities and shortcomings leading to cost overruns and poor-quality deliverables. From the computed results shown in Table 6, inability of project to meet the set out specifications in planning stage, performed work quality and clear definition of project scope in planning stage (P1, P2 and P4) factors were observed to be the most severe attributes with RII of 4.3, 4.2 and 4.2 respectively while late completion of projects, and appropriate development of project schedules factors (P8 and P5) were the lowest sever attributes with RII of 3.6 and 4.0 respectively. The general assessment of the professional's feedback indicate architects and QC/QA strongly supported the factors with average RII of 4.20 and 4.15 respectively while PM and QS produced the lowest RII of 3.85 and 4.07 respectively. The derived responses showed that the architects and quality control staffs agree with the outline factors while the project managers and surveyors are not in strong agreement with the factors' influence on the performance of construction firms. This can be attributed to the fact that architects typically manage integral administrative tasks and also ensure that the construction team adhere strictly to the design plans so as to attain desired quality. Furthermore, the performance factors were observed as a critical parameter responsible for success criteria of project deliverables.

Table 6. Evaluation of Respondents' Feedback on Performance Criteria of Construction Firms

	Civil Engr.		PM		QC/QA		QS		Architects		Surveyor		Total	
Factors	**WS**	**RII**	**WS**	**RII**	**WS**	**RII**	**WS**	**RII**	**WS**	**RII**	**WS**	**RII**	**WS**	**RII**
P1	425	4.34	37	4.11	114	4.38	85	4.05	59	4.54	35	4.38	125.8	4.3
P2	413	4.21	36	4.00	112	4.31	87	4.14	61	4.69	32	4.00	123.5	4.2
P3	401	4.09	28	3.11	114	4.38	88	4.19	57	4.38	36	4.50	120.7	4.1
P4	414	4.22	34	3.78	109	4.19	81	3.86	59	4.54	36	4.50	122.2	4.2
P5	420	4.29	38	4.22	98	3.77	87	4.14	50	3.85	31	3.88	120.7	4.0

P6	397	4.05	38	4.22	111	4.27	88	4.19	52	4.00	32	4.00	119.7	4.1
P7	395	4.03	39	4.33	109	4.19	89	4.24	53	4.08	29	3.63	119.0	4.1
P8	349	3.56	27	3.00	96	3.69	79	3.76	46	3.54	33	4.13	105.0	3.6

WS = weighted score; RII = relative importance index; P = performance criteria

P1: The output/delivered product met the specifications in the planning stage
P2: Quality work was performed
P3: Project cost was well estimated
P4: The project scope was well specified during planning phase
P5: Schedules were well developed (prepared)
P6: Activity duration was well estimated
P7: The project was completed on the original(planned) schedule
P8: All projects were completed on the agreed time

3.5 Impact of Planning on performance

The derived survey results from the respondents were statistically assessed at confidence interval of 95% to evaluate the linear relationships between the computed relative importance index score of the factors which examined the impact of project planning on the performance of construction firms in Masaka City, Uganda. Correlation analysis, multiple linear regression (MLR) analysis and analysis of variance (ANOVA) were deployed for the statistical evaluation using Microsoft Excel and Minitab 18 software. The calculated correlation analysis results for the parameters which showed the linear inter-dependencies between the factors are depicted in Table 7. This means that the mean, mode and the median of the datasets are the same number to show the positive effects of the planning factors on performance.

Table 7: Correlation Analysis Result

	SRP	*EMU*	*WST*	*P*
SRP	1			
EMU	0.57	1		
WST	0.47	0.422	1	
P	0.62	0.221	0.5	1

3.6 Linear Regression analysis computation

Multiple linear regression was adopted to model the project planning factor variables which influences the performance of construction firms. The computed ANOVA results showed adjusted mean squared error, and the sum of squared error value of 0.05204 and 0.15613 respectively; and also, P-value and F-value results of 0.362 and 1.41 respectively, which indicated that there is a statistical significant between the construction planning factors in respect to the performance criteria with P-value greater than 0.05 (critical value). The computation results portray that planning factors impacts the performance of construction projects, and present the importance of planning to achieve desired quality in the project deliverables.

Equation 1 presents the generated regression model summary with a standard regression error of 0.19191 and a coefficient of determination of 77.45%, which indicates satisfactory performance as it represents the dissimilarity in the response explicated by the developed regression model coefficients.

$$P = 2.77 + 0.631SRP - 0.70EMU + 0.387\ WST \qquad (R^2 = 0.775) \qquad (1)$$

4.7 Performance Evaluation of Using Key Performance Indicators (KPI)

The interview section carried out to obtain expert details from civil engineers and project managers on the project management practices on the construction firms' performance in the study area. The information gotten from this process were essentially used to carry out the

assessments through the aid of key performance indicators (KPI).

The computed performance indicators using Microsoft project software were presented in Table 8 from the respondents' reports of some selected projects' performance. Meanwhile Cost Performance Index (CPI) was computed as the ratio of Earned Value (EV) and Planned Value (P), while Schedule Variance (SV) is the difference between the computed EV and PV. As used in this study, Cost Performance Index is the ratio of EV and Actual Value (AV) but Cost Variance is the difference between EV and AV. The results indicated overall that the selected projects were behind schedule with minimum negative schedule variance of -1, -1.5 and -1 calculated for agricultural commercial, and church building while the maximum negative variance of -5 and -3 and was obtained for school and residential buildings respectively. This can be attributed to several factors such as deployment of industrialized building system for industrial projects and lack of professionalism such as negotiation and chain supply management for residential buildings. However, the maximum value obtained for school projects may be attributed to poor management practices observed in school projects due to complex and ineffective procedures to manage essential project management constraints leading to cost overruns.

Table 8: Computation Performance Evaluation Results for the Selected Projects

Project Type	CPI	CV	SPI	SV
Residential building	0.735	-8143	0.571	-3.0
Commercial building	0.922	-4440	0.857	-1.5
Church building	0.873	-6284	0.889	-1.0
School building	0.866	-13173	0.750	-5.0
Industrial building	0.932	-4221	0.706	-2.5
Agricultural building	0.977	-884	0.833	-1.0

Furthermore, the cost performance of the projects showed computed cost performance index of less than 1 which implies non-efficient utilization of allocated resources which is as a result of poor planning, inflation and estimation of project expenditures. These challenges can be tackled effectively by efficient adherence to the principles of project management from the planning and conceptualization stages through to the execution stages.

4.0 Conclusion

The impact of project planning factors such as safety and resource, equipment and material, work schedule and time planning on the project performance of construction firms in Masaka city of Uganda were evaluated in this study through survey report and from the investigation carried out, the following conclusion can be drawn:

i. Most projects executed were behind schedule, over budget and non-efficient use of resources. These challenges mostly lead to cost overruns and can be properly dealt with by conformance to the project management principles throughout the lifecycle of the project to obtain measurable quality deliverables.

ii. There was non-efficient utilization of allocated resources which is as a result of poor planning, inflation and estimation of project expenditures.

iii. The construction firms in Masaka are not compying with the project planning priciples which affect their performace.

iv. It is recommended that the principle of project planning should be enforced by the relevant authorities or limit the type of projects that a construction firms that do not comply with the planning principles can undertake.

References

Alinaitwe, H., Mwakali, J. and Hansson, B. 2007. Factors affecting the productivity of building craftsmen – Studies of Uganda. Journal of Civil Engineering and Management. XIII (3):169 – 176.

Darusi, D. M., & Makokha, E. N. (2018). Determinants of Public Participation on Sustainability of County Government Project in Uasin Gishu County. International Journal of Recent Research in Social Sciences and Humanities (IJRRSSH), 5(7), 285-293.

Dyili, N. F.; Ganiyu, I. O.; Mahlobelana, N.; Singh, S. & Naicker, A. (2018). The influence of supply risk in the procurement of construction materials. Journal of Contemporary Management, 15 (Special Edition 1), pp. 18-36.

Gacheru, E. N. (2015). An investigation into the national construction authority's challenges in regulating building contractors: The Case of Mombasa County (Doctoral dissertation, JKUAT).

Geraldi, J. and Morris, P. W. G. (2011). Managing the institutional context for projects. Project Management Journal, 42(6), 20-32. DOI: 10.1002/pmj.20271

Guoli, White, Diana and Fortune, Joyce (2010), "Current practice in project management – An empirical study", International Journal of Project Management, Vol.20, Issue 1, pp.1 – 11

Hamilton, M.R., Gibson, G. E (1996). Benchmarking pre-project planning effort. A journal of management Engineering, 12(2),25-33.

Kairu, P. N., & Ngugi, P. K. (2014). Factors Affecting Effective Implementation of Constituency Development Fund Projects in Machakos Town Constituency, Machakos County in Kenya. International Journal of Current Business and Social Sciences. International Journal of Current Business and Social Sciences, 1(2), 146-167.

Kwatsima, S. A. (2015). An Investigation into the Causes of Delay in Large Civil Engineering Projects in Kenya (Doctoral dissertation)

Musyoka, M. C. (2017). Project Environment, Macro Planning Process and Performance of Housing Construction Industry: A Case of Gated Community Projects in Nairobi County, Kenya(Doctoral Dissertation)

Mutahi N. (2016). Effect of human resource management practices on performance of public universities in Kenya. International Journal of Economics, Commerce and Management, 3(10), 696-736. http://www.academia.edu/17029636

Ochenge, M. D. (2018). Project Management Practices and Performance of Road Infrastructure Projects Done By Local Firms in the Lake Basin Region, Kenya (Doctoral dissertation, Kenyatta University).

Oyalo, N., & Bwisa, H., (2015). Factors that influence the completion of CDF funded projects in Kangundo Constituency, Strategic Journal of Business & Change management, 2, (49), 21-36

Pearce, J.A. and Robinson, R.B. (2013), Strategic Management: Planning for Domestic and Global Competition, 13th ed., McGraw-Hill Irwin, New York, NY

PMI (2018). Community Flood Resilience – Stories from Ciliwung, Citarum & Bengawan Solo River Banks in Indonesia, Palang Merah Indonesia, Jakarta, Indonesia.