

Work Breakdown Structure and Project Performance in Rwanda: A Case of Electricity Transmission Line Project in Bugesera District

^{1*} Angel Nabasa & ^{2*} Dr. Eugenia Nkechi Irechukwu (PhD)

^{1*}School of Business and Economics, Mount Kenya University, Kigali, Rwanda

^{2*}School of Business and Economics, Mount Kenya University, Kigali, Rwanda

DOI: 10.29322/IJSRP.12.10.2022.p13074
<http://dx.doi.org/10.29322/IJSRP.12.10.2022.p13074>

Paper Received Date: 23rd September 2022

Paper Acceptance Date: 24th October 2022

Paper Publication Date: 30th October 2022

Abstract- The general purposive objective of this research was to assess the role of work breakdown structure in enhancing performance of the project. The study was guided by three specific objectives which are to examine the effect of planning activities on performance of electricity transmission line project, to assess the effect of schedule development on performance of electricity transmission line project, to evaluate the relationship between activities monitoring and performance of electricity transmission line project in Bugesera District of Rwanda. A descriptive research design with a mixed approach was used to collect quantitative data by use of a questionnaire to 144 respondents and qualitative data by use of interview guide to 8 respondents from management team. Thus, it means that the sample size of the study is made by 152 respondents drawn from the target population of 250 people working in electricity transmission line project by use of Krejcie and Morgan (1967) table and census method and simple random sampling technique as sampling technique. Quantitative data was analyzed using descriptive and inferential statistics by the help of SPSS 22.0 version. The descriptive results of the first objective indicated an overall mean of 1.347 which implied that a big number of respondents asserted that planning activities play a significant role in performance of electricity transmission line project. The descriptive results of the second objective indicated an overall mean of 1.423 which implied that there is a big number of respondents confirmed that schedule development plays a significant role on performance of electricity transmission line project. The descriptive results of the third objective indicated an overall mean of 1.445 showing that there is a big number of respondents strongly agreed that monitoring of activities play a significant role on performance of electricity transmission line project. The correlation results supported the descriptive results by revealing a strong positive and significant relationship between planning activities and cost performance ($r=0.851$ and $sig=0.000$), between planning of activities and quality performance ($r=0.786$ and $sig=0.000$), between planning of activities and schedule performance ($r=0.837$ and $sig=0.000$), between schedule development and cost performance ($r=0.813$ and $sig=0.000$), between schedule development and quality performance ($r=0.513$ and $sig=0.000$), between schedule development and schedule performance ($r=0.799$ and $sig=0.000$), between monitoring of activities and cost performance ($r=0.911$ and $sig=0.000$), between monitoring of activities and quality performance ($r=0.656$ and $sig=0.000$), monitoring of activities and schedule performance ($r=0.899$ and $sig=0.000$) at 0.01 level of significance. Hence, this implies that work breakdown structure plays a significant and positive role on performance of electricity transmission line project. In conclusion, the results showed that planning of activities, monitoring of activities and schedule development play a significant role on performance of electricity transmission line project in Bugesera District, Rwanda. Therefore, based on the results of the study, the researcher would like to recommend to the management of projects to enhance work breakdown structure in the sense of planning of activities, monitoring of activities and schedule development to ensure project performance.

Index Terms- Work Breakdown Structure, Project Performance, Planning of Activities, Schedule development,, Monitoring of Activities

I. INTRODUCTION

The republic of Rwanda has established REG to primary enhance the national vision of ensuring that all Rwandan have access to sustainable and modern energy services. However, this sector still faces a number of challenges in the implementation of its projects due to poor formulation of work breakdown structure which lead to project delay,

misalignment and failure (MININFRA, 2016). Furthermore, considering the national target of transforming and scaling up access to electricity to all Rwandans from the estimate of 34.5% to 100% by 2024, the electricity transmission related projects need to apply work breakdown structure in order to achieve that much by 2024. However, the report of OAG (2013) highlighted that the country is still facing the issue of high cost power from thermal power plants yet a big number of hydropower plans produce low capacity compared to installed production capacity of the hydropower.

Studies, audits and reports keep showing that due to poor formulation of work breakdown structure, some of the energy related projects keep delaying and other failure to successful performance their projects in the budget finance, time and schedule. For instance, the REG project of Gishoma power project that was expected to be completed 30th May 2014 when it started on 27th February 2013, completed in 2017 without even providing the expected power capacity (Ayinkamiye, 2019). Though, government invested above 40 billion of Rwandan francs on Gishoma power project to produce 15 MW, it produced only 5.28 MW per hour and it keeps stopping working even until the time of the Auditor General's visit on 4th December 2018. Thus, this shows that even though government has tried to boost up this sector, seriousness is still required in terms of work breakdown structure to ensure accountability of assigned team in order to enhance performance of energy related projects.

Therefore, even if these challenges related to the failure in terms of completing the project on time, within the budgeted finance and schedule, are there due to lack of work breakdown structure in most of electricity related project. There is no previous empirical research that assessed the role of work breakdown structure on project performance because even those who attempted such as the study of Uwimana (2015) has concentrated on work breakdown structure and project implementation in Rwanda while Tuyishime and Nyambane (2021) focused on planning and project performance. It is in this regard this research seeks to establish the effect of work breakdown structure on performance of electricity transmission line project in Bugesera District, Rwanda.

1.1 Research Objectives

- i. To assess the role of planning activities on performance of electricity transmission line project in Bugesera District of Rwanda.
- ii. To examine the role of schedule development of activities on performance of electricity transmission line project in Bugesera District of Rwanda.
- iii. To evaluate the role of monitoring of activities on the performance of electricity transmission line project in Bugesera District of Rwanda.

II. LITERATURE REVIEW

2.1 Review of Empirical Studies

The empirical study conducted on the role of project planning and project manager competencies in public sector project success by Irfan, et al., (2021) had a sample of 260 engineers from Balochistan. The results of the study revealed 0.566 coefficient of determination (R^2) implying that project success was explained by 56.6% in both project planning and project manager competencies. Since, the R^2 closer to 1 shows a high level of predictive accuracy, the 0.566 R^2 is considered moderate. The results also calculated the effect size (f^2) hence the results of the study indicated that project planning had a large effect with $f^2=0.351$, whereas project manager competencies had a medium effect with $f^2=0.142$. Hence, this implies that project planning explains the maximum variance in project success which indicates that planning and competency have a positive significant effect on public projects success.

The study conducted in Pakistan on the impact of project planning on project success with a mediating role of risk management and moderating role of culture by Shahzad, et al., (2018) used a sample size of 120 respondents selected using convenient sampling technique. The results of the study indicated $\beta=0.467$ and $p<0.001$ showing that project planning has significant and positive effect on project risk management. The results have also indicated $\beta=0.467$ and $p<0.001$ demonstrating that project planning has a significant and positive effect on project success. Hence, the researcher concluded that the results of the study indicated that project success has significant relationship with project planning, organization culture and project risk management.

The study carried out in Rwanda on the contribution of planning to the project performance in public institutions by Tuyishime and Nyambane (2021) used a causal research design with a sample of 106 respondents and simple random sampling as technique. The results of the study indicated that when the constant is hold on 0.00 the target and

key performance indicators, setting objectives, activities coordination and resource mobilization hold project performance at 0.45. The results also indicated that a unit increase on targets and key performance indicators, setting objectives increase project performance by a factor of 0.183 and the unit increase in resource mobilization increases project performance by a factor of 0.144. The researchers concluded that the metrics of planning confirmed a positive linear relationship to project performance. Hence, the project staffs entrusted with monitoring and evaluation has to have technical Planning of activities to help them to dedicate their function, responsibilities and roles to M&E practices and specify needs at the start of the projects.

The study carried out on the impact of schedule management planning on project management effectiveness by Suresh and Sivakumar (2019) distributed 208 close ended questionnaires to the respondents. The results of the study demonstrated that 0.596 and 0.588 of R2 and adjusted R2 shows 58.8% of variation in project management effective as explained by the indicators of schedule management plan. While, the p-value results were results that 0.05 level of significance which is 0.004, 0.000, 0.000 and 0.001 of proper allocation of schedule development, team incompetency, resource inventory, and raw data of monitoring of activities availability. Hence, it implies that schedule management has significant and positive effect on project management. The study recommended that management of the project should be effective in order to maintain coordination, planning, timely achievement of activities and attainment of project goals in an organization.

The empirical study conducted in Rwanda on the effect determinants of project scope on project performance by Uwanyirigira and Rusibana (2020) has used survey research design with approaches of qualitative and quantitative where 75 respondents from beneficiaries and employees of Huguka Dukore Akazi Kanoze project by applying simple purposive sampling technique. The results of the study revealed that 77.3 % of the respondents agreed that their project has meet deadline. The results on regression analysis has indicated that a unit increase in schedule led to increase in productivity limited by a factor of 0.021 which implies scheduled development affect positively the increase of productivity or performance in the project. Thus, generally the results indicated that there is significant and positive relationship between project scope determinants and project performance. The results geared the researchers to recommend that project managers have to involve beneficiaries in defining project scope to be able to know if the project is taking the right direction to satisfy their needs.

The empirical research conducted in Uganda on contractor monitoring and performance of road infrastructure projects by Byaruhanga and Basheka (2017) used purposive sampling technique to select 190 respondents with response rate of 90.5% since only 172 respondents participated in the study using interviews and closed ended questionnaire. The main results indicate R2 value indicated how much performance is explained by contractor monitoring, hence the adjusted R2 value of 0.841 implied that contractor monitoring predicts performance of road infrastructure projects. Since, performance of road infrastructure projects is dependent on contractor monitoring by 84.1% the researchers recommended procurement to allow best value contracting method and that contractors monitoring has to be done by qualified personnel with experience and competence related to road projects.

The study carried out by Ntambara and Irechukwu (2021) in Rwanda at Busanza Housing Project has concentrated on examining the effects of M&E tools on project performance and employed approaches of qualitative and quantitative to collect data from 94 respondents. The results of the study demonstrated $r=0.348$ and $p=0.001$ showing that monitoring and evaluation plan are correlated with satisfaction of stakeholders, $r=0.750$ and $p=0.002$ showing that planning M&E for enabled is correlated to timely delivery and $r=0.148$ and $p=0.004$ demonstrating that planning M&E facilitated is correlated to delivery within budget. Thus, the researchers recommended project managers to emphasize M&E to promote project performance.

Wanjala, et al. (2017) conducted research on the effect of monitoring techniques on project performance of Kenyan state corporations using simple random sampling where 65 respondents were selected as sample size. Data were collected from the sample size using questionnaires with both open and closed questions. The data were analyzed using descriptive and inferential statistics as well as qualitative methods. Thus, the results revealed relationships between variables which are monitoring techniques and project performance ($r=0.720$ and $\text{sig}=0.00$). Findings also showed that Monitoring techniques ($\beta_3= 0.674$, $p<0.04$) has an effect on project performance.

2.2. Theoretical Framework

The study was guided by theory of change, theory of constraints and program theory.

The theory of change is taken as tool for thinking through the steps from the situation to the goal because it identifies the inter-relationship between project activities as decomposed in work breakdown structure and outcomes in the sense of project performance for the case of the current study. The theory of change has been raised from the

project theory and evaluation in order to effectively develop the thought that concern program philosophy and evaluation as the very vital method and technique to study thoughts that inspire project performance and innovation in socio-political change as a responsibility (Auriacombe, 2011). Therefore, the outcomes in theory of change must be accompanied by key performance indicators that facilitate measurement. Relating the theory of change to this current research, it can be said the idea to apply work breakdown structure is taken as an intervention/programme in the theory of change which must be achieved in a long period of time to ensure performance (Auriacombe, 2011).

Theory of Constraints was developed by Goldratt in 1984 in his novel well-known as *The Goal*, and this theory kept evolving but its structural foundation is based on the philosophical of management best practices as a management tool which emphasizes on the organization's WBS to enhance project performance (Clarizen, 2021). Thus, applying the theory of constraints to work breakdown structure in the sense where work breakdown structure is not only viewed as tool for managing the project rather for promoting effective scheduling, planning, management of Schedule development and risks as well as control without forgetting monitoring of activities. In this current research, this theory of constraints was only focused in project management in order to bring ideas that it encompasses that concern work breakdown structure and project performance as a key tool for management best practices in transforming management and project issues into results that can enhance project performance (Landau, 2021).

This program theory modes frequently used to symbolize the thinking of program recommend how everyday good judgment is used in an intervention to perform large projects. The concept lies in the physics of the thought of choice contrast field and improvement used. The utility of the supporters of these ideas were to trace its application theories to evaluation of Weiss over quite a few years. Uitto (2010) illustrates the benefits of the usage of a theory-based framework in monitoring of activities to promote performance of the project. Work breakdown structure is a necessary input when used very well for decomposing the large projects into small activities to enhance project performance. A theory of program shows a unique outcome on the factor that the project has reached, which helps to recognize if there is change toward a favored stage of performance. It would be from the will of the individual to have intention to prioritize a given conduct by the time to assess it in a positive way (Lin & Wu, 2016). The above theories enabled the researcher to establish the conceptual framework as follows:

2.3 Conceptual Framework

The conceptual framework is presented in Figure 1

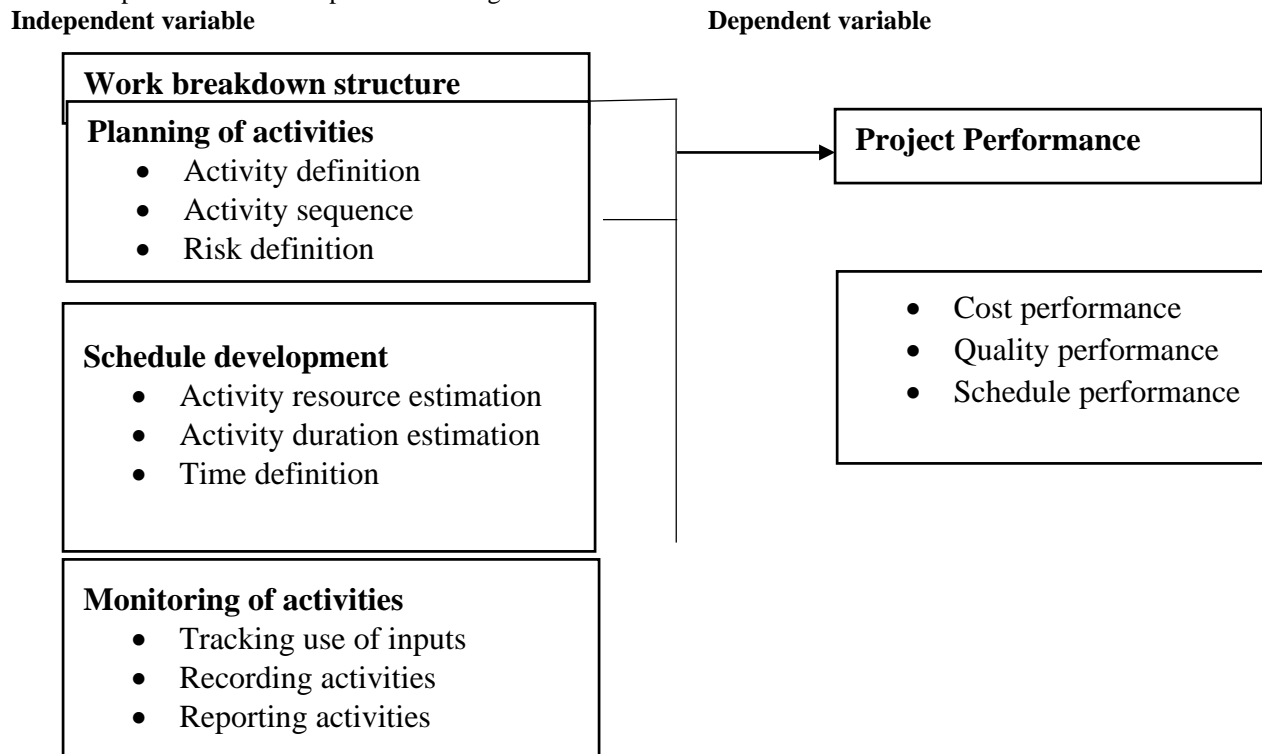


Figure 1 shows work breakdown structure as the independent variable measured with planning of activities which has metrics like activity definition, activity sequence and risk definition; schedule development which has metrics like activity resource estimation, activity duration estimation, and time definition; and monitoring of activities which has metrics like tracking use of inputs and recording activities; and project performance which is measured by cost performance, quality performance and schedule performance.

As shown the Figure 2.1 work break down is grouping the project oriented activities into deliverable within a determined project scope. Thus, it is the code and structure that relates and integrates all the work of the project that is used through lifecycle of a project in order to assign, identify, plan and track specific work scopes. This includes planning of activities is considered as continuous process in the delivery of the project and as an important part in project which yields project performance and success (Idoro, 2012). The most important part of planning project activities is the involvement of community in the project in order to provide local knowledge, information and expertise to set up, lead and encourage successful performance of the project (Ahmad, 2012).

Work breakdown structure as a tool to decompose the project into work package that are required to accomplish the task that are planned and designed in the project held consistent forms in planning activities and project schedule development which is all about the process that is always reviewed due to uncertainties that can occur at any stage of the project while endeavour is in progress (Brown, 2021). In other sense, monitoring of activities is a regular recording and observation of activities of the project which required routine gathering and scrutiny of information in all aspects of the project. To effectively monitor project activities a regular check on how activities are progressing is required as a systematic and purpose observation meant to promote performance of the project.

III. RESEARCH METHODOLOGY

The descriptive research design was used together with a mixed approach that collects quantitative and qualitative data which were collected from the field (Eyisi, 2016). Thus, thematic analysis was used to capture

qualitative data as the required detailed information regarding work breakdown structure and performance of electricity transmission line project in Bugesera District. The quantitative approach was used to collect data employing questionnaire and got analyzed into descriptive and inferential statistics by use of mean, standard deviation and both Pearson correlation and regression analysis.

The electricity transmission line project in Bugesera District has a target population of 250 employees. Since, the animals, objects or individuals involved in the study as target population are where the respondents of the study have to be drawn according to Mugenda and Mugenda, (2013); the 20 engineers, 8 people in management team, 100 technicians and 122 project team members make the target population of this study. The 250 employees of electricity transmission line project in Bugesera District was used to determine the sample size of 152 respondents as by the Table 3.1 of sample size classification.

To collect the primary data both questionnaire and interview were used. The collected quantitative data from the 144 respondents who were given questionnaire were coded, cleansed, and entered in SPSS 22.0 version for analysis to descriptive and inferential statistics analysis whereas thematic analysis was done to data from interview as qualitative data. The descriptive statistics used measure of central tendencies to find mean and standard deviation in a Likert scale of 5-point response data.

IV. RESULTS AND DISCUSSION

4.1 The role of planning activities on performance of electricity transmission line project

Table 1 presents the views on the role of planning activities on performance of electricity transmission line project

Table 4. 1: Planning Activities

Statements concerning planning activities	Mean	SD
Activity definition enhances project performance	1.894	.970
Activity sequencing promotes project performance	1.223	.589
Project risk definition enhances project performance	1.203	.531
Project risk responses preparedness is required for project performance	1.210	.582
Training staff on project planning promotes project performance	1.197	.527
Financial analysis and budgeting enhance project performance	1.473	.597
Defining planning resources enhances project performance	1.230	.685
Overall Mean	1.347	

Key: 5 not sure, 4 to no extent, 3 to small extent, 2 to a great extent, 1 to a very great extent, SD= Standard Deviation

The results demonstrate the mean of 1.894 and SD of 0.970 shows that the respondents asserted that activity definition enhances project performance to a very great extent. The mean of 1.223 and 0.589 of SD shows that the respondents asserted that activity sequencing promotes project performance to a very great extent. The mean of 1.203 and 0.531 of SD shows that the respondents asserted that project risk definition enhances project performance to a very great extent. The mean of 1.210 and 0.582 of SD shows that the respondents stipulated that project risk responses preparedness is required for project performance to a very great extent.

The mean of 1.197 and SD of 0.527 show that a big number of respondents asserted that training staff on project planning promotes project performance to a very great extent. The mean of 1.473 and SD of 0.597 indicates that a big number of respondents asserted that financial analysis and budgeting enhance project performance. The mean of 1.230 and SD of 0.685 shows that a big number of respondents asserted that defining planning resources enhances project performance. Thus, since the overall mean is 1.347 it implies that a big number of respondents asserted that planning activities play a significant role on performance of electricity transmission line project in Bugesera District, Rwanda.

Table 4. 2: Assessment of project performance

Assessment of project performance	Mean	SD
Quality performance is achieved	1.085	.362
Schedule performance is achieved	1.078	.373
Cost performance is achieved	1.756	1.196
Overall Mean	1.266	

Key: 5 not sure, 4 to no extent, 3 to small extent, 2 to a great extent, 1 to a very great extent, SD= Standard Deviation

The results show a mean of 1.085 and standard deviation of 0.362 implying that a big number of respondents asserted that quality performance is achieved to a very great extent, a mean of 1.078 and standard deviation of 0.373 implying that a big number of respondents asserted that schedule performance is achieved to a very great extent, a mean of 1.756 and standard deviation of 1.196 implying that a big number respondents asserted that cost performance is achieved to a very great extent. Thus, the overall mean of 1.266 implies that a big number of respondents asserted that project performance was achieved to a very great extent in electricity transmission project in Bugesera District, Rwanda.

Table 4. 3: Correlation Analysis between Planning of Activities and Project Performance

		Cost performance	Quality performance	Schedule performance
	Pearson Correlation	.851**	.786**	.837**
Planning of activities	Sig. (2-tailed)	.000	.000	.000
	N	152	152	152

** . Correlation is significant at the 0.01 level (2-tailed).

Source: Field Data (2022)

The results show a strong positive and significant relationship between planning activities and cost performance ($r=0.851$ and $\text{sig}=0.000$), between planning of activities and quality performance ($r=0.786$ and $\text{sig}=0.000$), between planning of activities and schedule performance ($r=0.837$ and $\text{sig}=0.000$) at 0.01 level of significance. Thus, this implies that planning of activities play a strong significant and positive role on performance of electricity transmission project in Bugesera District, Rwanda.

4.2 The Role of Schedule Development of Activities on Performance of Electricity Transmission Line Project

Table 4 depicts views on the role of schedule development of activities on performance of electricity transmission line project.

Table 4. 4: Schedule Development of Activities

Statement regarding schedule development	Mean	SD
Activity resource estimation defines project schedule	1.506	1.016
Activity duration estimation promotes schedule performance	1.644	1.268
Defining project outputs schedule enhance project performance	1.585	.959
Delivery of activities on time promotes project performance	1.993	1.193
Defining time of project activities implementation promotes timely performance	1.684	.999
Overall Mean	1.423	

Key: 5 not sure, 4 to no extent, 3 to small extent, 2 to a great extent, 1 to a very great extent, SD= Standard Deviation

The results show a mean of 1.506 and standard deviation of 1.016 shows that a big number of respondents confirmed that activity resource estimation defines project schedule to a very great extent. The mean of 1.644 and standard deviation of 1.268 shows that a big number of respondents confirmed that activity duration estimation promotes schedule performance to a very great extent. The mean of 1.585 and standard deviation of 0.959 shows that a big number of respondents confirmed that defining project outputs schedule enhance project performance to a very great extent. The mean of 1.993 and standard deviation of 1.193 shows that a big number of respondents confirmed that delivery of activities on time promotes project performance to a very great extent. The mean of 1.684 and standard deviation of 0.999 show that a big number of respondents stipulated that defining time of project activities implementation promotes timely performance to a very great extent. Hence, since the overall mean is 1.423 it implies that a big number of respondents confirmed that schedule development plays a significant role on performance of electricity transmission line project in Bugesera District, Rwanda.

In an interview conducted with one of the team managers at the project, she asserted in her own words that: *“all the activities you see here are scheduled so that even the supervisor know the activities we are supposed to be doing, it is these schedules the supervisor use to get the information regarding the progress of our activities. That is why for me I don’t consider alone schedule development as process of helping us perform better our activities rather also a tool that help us to monitoring the activities conducted in this project”*.

Table 4. 5: Correlation Analysis between Schedule Development and Project Performance

		Cost performance	Quality performance	Schedule performance
	Pearson Correlation	.813**	.513**	.799**
Schedule development	Sig. (2-tailed)	.000	.000	.000
	N	152	152	152

** . Correlation is significant at the 0.01 level (2-tailed).

The results show a strong positive and significant relationship between schedule development and cost performance ($r=0.813$ and $sig=0.000$), between schedule development and quality performance ($r=0.513$ and $sig=0.000$), between schedule development and schedule performance ($r=0.799$ and $sig=0.000$) at 0.01 level of significance. Thus, this implies that schedule development plays a positive and significant role in performance of electricity transmission line project in Bugesera District, Rwanda.

4.3 The Role of Monitoring Of Activities on the Performance of Electricity Transmission Line Project in Bugesera District of Rwanda

Table 3 illustrates the views on the role of monitoring of activities on the performance of electricity transmission line project in Bugesera District of Rwanda

Table 4. 6: Monitoring of Activities

Statement Regarding Monitoring of Activities	Mean	Std.
Tracking the use of inputs promotes project performance	1.322	0.646
Recording activities enhance budgetary performance	2.611	1.371
Tracking and reporting every single activities in the project enhance performance	1.065	0.274
Auditing project activities basing on monitoring enhance budgetary performance	1.046	0.239
Making project decision basing on monitoring promotes project performance	1.756	1.196
Overall Mean	1.445	

Key: 5 strongly disagree, 4 disagree, 3 not sure, 2 agree, 1 strongly agrees, SD= Standard Deviation

The results show a mean of 1.322 and standard deviation of 0.646 which implies that a big number of respondents strongly agreed that tracking the use of inputs promotes project performance. The mean of 2.611 and standard deviation of 1.371 shows that a big number of respondents strongly agreed that recording activities enhance budgetary performance. The mean of 1.065 and standard deviation of 0.274 shows that a big number of respondents strongly agreed that tracking and reporting simple activities in project enhances performance. The mean of 1.046 and standard deviation of 0.239 shows that a big number of respondents strongly agreed that auditing project activities basing on monitoring data enhance budgetary performance and the mean of 1.756 and standard deviation of 1.196 strongly agreed that making project decision basing on monitoring data promotes project performance. The overall mean of 1.445 shows that a big number of respondents strongly agreed that monitoring of activities play a significant role on performance of electricity transmission line project in Bugesera District, Rwanda.

Table 4. 7: Correlation Analysis between Monitoring of Activities and Project Performance

	Cost performance	Quality performance	Schedule performance
Pearson Correlation	.911**	.656**	.899**
Sig. (2-tailed)	.000	.000	.000
N	152	152	152

** . Correlation is significant at the 0.01 level (2-tailed).

The findings revealed that there is a strong positive and significant relationship between monitoring of activities and cost performance ($r=0.911$ and $\text{sig}=0.000$), between monitoring of activities and quality performance ($r=0.656$ and $\text{sig}=0.000$), monitoring of activities and schedule performance ($r=0.899$ and $\text{sig}=0.000$) at 0.01 level of significance. Thus, this implies that monitoring of activities play a significant and positive role on performance of electricity transmission line project in Bugesera District, Rwanda.

V. DISCUSSION OF THE RESEARCH FINDINGS

The descriptive results of this research concerning the first objective have revealed that planning activities play a significant role in performance of electricity transmission line project which is supported by the results of the study of Irfan, et al., (2021) revealed that project planning had a large effect with $f^2=0.351$, whereas project manager competencies had a medium effect with $f^2=0.142$. Hence, this implies that project planning explains the maximum variance in project success which indicates that planning and competency have a positive significant effect on public projects success. The correlation analysis results of the first objective have revealed that planning of activities play a strong significant and positive role on performance of electricity transmission project which is supported by the results of the research of Shahzad, et al., (2018) which showed $\beta=0.467$ and $p<0.001$ demonstrating that project planning has a significant and positive effect on project success. Thus, the researcher concluded that planning of activities play a significant role on project performance.”

The results of the current research revealed that schedule development plays a significant role on performance of electricity transmission line project which is supported by the findings of the research of Uwanyirigira and Rusibana (2020) who revealed that 77.3 of respondents agreed that their project meet deadlines due to schedule development and hence project performance. Both the results of descriptive and inferential statistics revealed that schedule development plays a positive and significant role in performance of electricity transmission line project which is supported by the results of the study of Sureh and Sivakumar (2019) who demonstrated that 0.596 and 0.588 of R^2 and adjusted R^2 shows 58.8% of variation in project management effective as explained by the indicators of schedule management plan. While, the p-value results were results that 0.05 level of significance which is 0.004, 0.000, 0.000 and 0.001 of proper allocation of schedule development, team incompetency, resource inventory, and raw data of monitoring of activities availability.

The descriptive results of the third objective revealed that monitoring of activities play a significant role on performance of electricity transmission line project which is supported by the results of the study of Byaruhana and

Basheka (2017) who indicate R^2 value indicated how much performance is explained by contractor monitoring, hence the adjusted R^2 value of 0.841 implied that contractor monitoring predicts performance of road infrastructure projects. The correlation results revealed that monitoring of activities play a significant and positive role on performance of electricity transmission line project which is supported by the findings of the research of Ntambara and Irechukwu (2021) who demonstrated $r=0.348$ and $p=0.001$ showing that monitoring and evaluation plan are correlated with satisfaction of stakeholders, $r=0.750$ and $p=0.002$ showing that planning M&E for enabled is correlated to timely delivery and $r=0.148$ and $p=0.004$ demonstrating that planning M&E facilitated is correlated to delivery within budget. The results of the research of Wanjala, et al., (2017) revealed relationships between variables which are monitoring techniques and project performance ($r=0.720$ and $\text{sig}=0.00$) which supports the same current research.

VI. CONCLUSION AND RECOMMENDATIONS

The descriptive results of the first objective concerned with the role of planning activities on performance of electricity transmission line project have revealed that a big number of respondents asserted that planning activities play a significant role in performance of electricity transmission line project. These descriptive results are supported by the correlation results which proved that planning of activities play a strong significant and positive relationship on performance of electricity transmission project in Bugesera District, Rwanda. The descriptive results of the second objective concerned with the role of schedule development on performance of electricity transmission line project indicated that there is a big number of respondents confirmed that schedule development plays a significant role on performance of electricity transmission line project. These descriptive results were also supported by correlation results which revealed that schedule development plays a positive and significant role in performance of electricity transmission line project in Bugesera District, Rwanda. The descriptive results of the third objective concerned with the role of monitoring of activities on the performance of electricity transmission line project showed that there is a big number of respondents strongly agreed that monitoring of activities play a significant role on performance of electricity transmission line project. These descriptive results are also supported by correlation results which revealed that monitoring of activities play a significant and positive role on performance of electricity transmission line project in Bugesera District, Rwanda. Hence, the final conclusion, is that work breakdown affects positively and significantly performance of electricity transmission line project in Bugesera District, Rwanda.

Basing on the findings of the study, the researcher would like to recommend to the management of projects to enhance work breakdown structure in the sense of planning of activities, monitoring of activities and schedule development to ensure project performance. The researcher would also like to recommend to the owners and leadership of the organizations which have numerous project to emphasize on recruiting the managers who are capable of doing work breakdown structure in order to enhance performance because the results of the study revealed that work breakdown structure plays a significant role on performance of electricity transmission line project in Bugesera District, Rwanda.

The researcher would like to recommend to the government and the staff of REG especially those under electricity transmission line project to keep improving their planning, monitoring and schedule development skills in order to keep the project performance on track in terms of cost performance, quality performance and schedule performance since the correlation results revealed that work breakdown structure and project performance have a positive and significant relationship.

Finally, the researcher would like to recommend to the future researcher to conduct further studies in this field of the study in order to assess the effect of project planning on schedule performance of electricity transmission line project; to examine the effect of project monitoring on project performance, to find out the role of work breakdown structure in promoting project success in Rwanda.

REFERENCES

- [1] Ahmad, M. S. (2012). Impact of organizational culture on performance management practices in Pakistan. *Business Intelligence Journal*, 5(1), 50-55
- [2] Auriacombe, C. (2011). Role of theories of change and programme logic models in policy evaluation. *African Journal of Public Affairs*, 4(2), 36–53.
- [3] Ayinkamiye, A. (2019). The role of project planning on the performance of government project in Rwanda: A case study of Gishoma power plant project. Unpublished Master's Thesis at University of Rwanda, Kigali, Rwanda.
- [4] Brown, L. (2021). Defining Sequence Activity in Project Management. Retrieved on 27th December 2021 at <https://www.invensislearning.com/blog/sequence-activity/>
- [5] Byaruhanga, A. and Basheka, B.C. (2017) Contractor Monitoring and Performance of Road Infrastructure Projects in Uganda: A Management Model. *Journal of Building Construction and Planning Research*, 5, 30-44. <https://doi.org/10.4236/jbcpr.2017.51003>
- [6] Clarizen, T. (2021). Work Breakdown Structure: The Basics and Best Practices. Retrieved on 20 January 2022 at <https://blog.planview.com/work-breakdown-structure-the-basics-best-practices/>

- [7] Eyisi, D. (2016). The Usefulness of Qualitative and Quantitative Approaches and Methods in Researching Problem-Solving Ability in Science Education Curriculum. *Journal of Education and Practice*, 7(15), 91-100
- [8] Goldratt in 1984 Leadership competencies of project managers: An empirical study of emotional, intellectual, and managerial dimensions. *Journal of Economic Development, Management, IT, Finance, and Marketing*, 6(1), 35-42.
- [9] Idoro, G. (2012). Evaluating levels of project planning and their effects on performance in the Nigerian construction industry. *Journal of Construction Economics and Building*, 9(2), 39-50.
- [10] Irfan, M.; Khan, S.Z.; Hassan, N.; Hassan, M.; Habib, M.; Khan, S.; Khan, H.H. (2021). Role of Project Planning and Project Manager Competencies on Public Sector Project Success. *Journal of Sustainability*, 13(2), 1421-1440. <https://doi.org/10.3390/su13031421>
- [11] Landau, P. (2012). *Theory of Constraints: A Guide for Project Managers*. Retrieved on 20 January 2022 at <https://www.projectmanager.com/blog/theory-of-constraints>.
- [12] Lin, S. & Wu, M. (2016). Applying Program Theory-Driven Approach to Design and Evaluate a Teacher Professional Development Program. *Journal of Education and Practice*, 7 (24), 138-143.
- [13] Ministry of Finance and Economic Planning. (2014). *Budget Framework Paper 2014/2015- 2016/2017*. Kigali, Rwanda. Retrieved on 12 January 2022 at <Http://www.minecofin.gov.rw>.
- [14] Mugenda, A. & Mugenda, O. (2013). *Research methods: Quantitative and qualitative approaches*. ACTS Press. Nairobi, Kenya.
- [15] Ntambara, A. & Irechukwu, N.E (2021). Monitoring & Evaluation Tools and Project Performance in Rwanda. A Case Study of Busanza Housing Project Kicukiro District. *IOSR Journal of Business and Management*, 23 (6), 2319-7668. DOI: 10.9790/487X-2306083241
- [16] Office of the Auditor General of State Finances. (2014). *Report of the Auditor General of State Finances for the year ended 30th June 2014*. AOG, Kigali, Rwanda. Retrieved on 12 January 2022 at www.oag.gov.rw
- [17] Shahzad, N., Khanzada, B. & Talha, M.H. (2018). Impact of Project Planning on Project Success with Mediating Role of Risk Management and Moderating Role of Organizational Culture. *International Journal of Business and Social Science*, 9(1), 88-95.
- [18] Suresh, D. & Sivakumar, A. (2019). Impact of Schedule Management Plan on Project Management Effectiveness, *International Journal of Engineering and Advanced Technology* 9(1), 3350-3355, Doi: 10.35940/ijeat.a1515.109119
- [19] Tuyishime, A. C., & Nyambane, D. (2021). Planning and project performance in public institutions in Rwanda. A case of establishment of a Frequency Spectrum Management and monitoring system project in Rwanda. *The Strategic Journal of Business & Change Management*, 8 (1), 780 – 790.
- [20] Uitto, J. A. (2010). Multi-country co-operation around shared waters: Role of Monitoring and Evaluation. *International Journal of Global Environmental Change*, 14(1): 5 – 14
- [21] Uwanyirigira, V. & Rusibana, C. (2020). Determinants of Project Scope and Project Performance: A Case of Huguka Dukore Akazi Kanoze Project. *International Journal of Scientific and Research Publications*, 10(11), 1098-1114. doi: 10.29322/ijsrp.10.11.2020.p107104
- [22] Uwimana, P. (2015). *Work breakdown structure and project implementation in Rwanda. A case study of the commercial construction project in HYGEBAT*. Unpublished Masters' research project at Mount Kenya University, Rwanda, Kigali.
- [23] Wanjala, M.J., Iravo, A.M., Odhiambo, R., & Shalle, N.S (2017). Effect of Monitoring Techniques on Project Performance of Kenyan State Corporations. *European Scientific Journal*, 13(19), 1857 – 7881, doi: 10.19044/esj.2017.v13n19p264.

AUTHORS

First Author – Angel Nabasa, School of Business and Economics, Mount Kenya University, Kigali, Rwanda

Second Author – Dr. Eugenia Nkechi Irechukwu (PhD), School of Business and Economics, Mount Kenya University Kigali, Rwanda