



Project Planning and Performance of Road Busanza - Gahanga Construction Project Implemented by NPD Ltd in Kicukiro District, Rwanda.

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Abstract: The general objective of this study focused on the project planning and performance of road Busanza -Gahanga construction project implemented by NPD Ltd in Kicukiro district, Rwanda. With specific objectives; to determine effect of project time planning on performance of road Busanza -Gahanga construction project, to determine the effect of project cost planning on performance of road Busanza -Gahanga construction project, and to determine the effect of project scope planning performance of road Busanza -Gahanga construction project. The researcher consulted theories including; Complexity Theory, Theory of Constraints and Resource Based View Theory. The research design was descriptive and correlational, the target population was 600 from NPD staff, the study sample size was 240 from NPD as respondents. Study employed descriptive statistics and inferential statistics, and data was analyzed with aid of SPSS software program version 25.0. It showed that the relationship between correlation between project time planning, project scope planning, project cost planning and performance of road Busanza -Gahanga construction project, was 0.966, 0.937 and 0.875 respectively. The results present the variables of project planning; project time planning was statistically significant with p value=0.000b, the project scope planning was statistically significant with p value=0.001b, and the project cost planning was statistically significant with p value=0.033b. The study concludes that there was a significant relationship between Project planning and performance of construction. The study recommended that Ministry of Infrastructure should engage Rwandan citizens to be part and be involved in construction industries and works to attain money personal economic improvement.

Keywords: Project Planning, Performance, Project Time Planning, Project Cost Planning and Project Scope Planning

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1. Introduction

Project planning is termed as situation and preliminaries activities that come before implementation of a project that usually include the activities that are undertaken to determine the project scope, defining targets and setting

the path of action required to attain the goals (PMI, 2019) The world construction industry was expected to see a growth of 3.1% up from 2019's 2.6% (Brown, 2020). However, in 2020 the forecast growth for the construction industry has been downgraded to 0.5% due to the COVID 19 crisis. Several challenges are

encountered, and the key challenges highlighted by Deloitte (2020) encompasses sustained cost pressures, ongoing labour shortages that affect productivity, and trends toward fixed-bid projects. Another concern highlighted by Deloitte (2020) is the low earnings before interest and tax from construction activities, which is on average, just 5.5 per cent of sales. Several construction projects are not completed within the planned budget, within the stipulated schedules and failing to meet the desired quality due to factors such as time inefficiency, inadequate funds, and lack of advance implementation equipment (Maina, 2016).

In the context of road construction specifically, delays often result from inadequate budgeting, land acquisition issues, and challenges with utility relocations, compounded by the limited capacity of local contractors to handle larger projects (Alzahrani & Emsley, 2013; Kenya Engineer, 2015). This mismanagement culminates in a detrimental impact on road quality, economic vibrancy, and living standards, while also increasing unemployment rates (Adaku & Asiedu, 2020). Moreover, unrealistic project schedules and the arbitrary assignment of completion times have further exacerbated these issues, leading to a frequent need for time extensions and underperformance throughout the project lifecycle (Haroon, 2017). Collectively, these complexities illustrate the urgent need for improved project management and planning practices in the construction sector.

These challenges have made life difficult for road users and slow the uptake of road construction projects. Failure of these construction projects was as a result of reduced supply of quality roads as well as a less vibrant economy which consequently contributes to a lower standard of living for residents as well as increased unemployment in the County (Alzahrani & Emsley, 2013). Studies undertaken in the construction sector show that road construction faces numerous challenges (Kenya Engineer, 2015). Many road contractors are not providing standard services, delays in completion of road projects which at times is attributed to reasons like delays in land acquisition, inadequate budgeting, delay by Kenya Power and Lighting company to remove or relocate their power lines to create room for road construction and also low capacity amongst local contractors to undertake big projects. Normally, the primary purpose of project management is to complete any project on time, on budget and within the scope of the project (Adaku and Asiedu 2020). The cost planning process starts with the creation of a rough estimate, followed by the establishment of cost objectives for each aspect. A cost plan is used in the construction industry to keep track of projected costs during the design and construction phases of a project (Mazur, Shapiro, Ol'derogge, Polkovnikov, 2019).

In the research conducted by Haroon (2017), on Empirical Evidence of Extension of Time in Construction Projects, it was concluded that estimating realistic projects durations and schedules is extremely important for analyzing delays and tracking progress of construction projects. Reviewing the available resources for construction projects prior to preparation of realistic schedules is very important. Furthermore, it was found that construction planning and schedules are commonly not realistic and completion time for contracts is arbitrarily assigned. Moreover, construction schedules are not efficiently tracked and over watched during the project implementation, and this leads to the underperformance of the projects. It was concluded that the claims for time extension use to arise due to unrealistic schedules. It is in this regard, a researcher seeks to address the gap mentioned by conducting a study on project planning and performance of road Busanza -Gahanga construction project implemented by NPD Ltd in Kicukiro district, Rwanda.

The general objective of the study was to examine the effect project planning and performance of road Busanza -Gahanga construction project implemented by NPD Ltd in Kicukiro district, Rwanda

Specific Objectives:

1. To determine the relationship between project time planning and performance of road Busanza -Gahanga construction project implemented by NPD Ltd in Kicukiro district
2. To determine the relationship between project cost planning and performance of road Busanza -Gahanga construction project implemented by NPD Ltd in Kicukiro district
3. To determine the relationship between project scope planning and performance of Busanza - Gahanga construction project implemented by NPD Ltd in Kicukiro district

Research Hypotheses

H₀₁: There is no significant relationship between project time planning and performance of road Busanza - Gahanga construction project implemented by NPD Ltd in Kicukiro district,

H₀₂: There is no significant relationship between project cost planning and performance of road Busanza - Gahanga construction project implemented by NPD Ltd in Kicukiro district,

H₀₃: There is no significant relationship between project scope planning and performance of road Busanza - Gahanga construction project implemented by NPD Ltd in Kicukiro district,

2. Literature Review

2.1. Theoretical Review

The project planning and project performance drew from the theories with typical respective theories as they are summarized below:

2.1.1 Complexity Theory

This study is grounded on complexity theory. The complexity theory as discussed by Curlee & Gordon (2011) is based on the management belief that total order does not allow for enough flexibility to address every possible situation. The complexity exists in projects. The complexity theory acknowledges that projects by nature have parts that work together as a system. Because of this, even though some people would be unhappy with the changes; a lot of processes have to result from the changes. Certain impediments have to be removed, certain procedures that would be unproductive have to be changed or modified.

The researcher adopted this Theory for the reason of good orientation of the study on the Project planning and performance of road Busanza -Gahanga construction project implemented by NPD Ltd in Kicukiro district, Rwanda.

2.1.2 Theory of Constraints

Theory of Constraints (TOC) in Project Management
The primary challenge of project management is to achieve all of the project goals and objectives while honoring the preconceived project constraints, Lamb, Robert, Boyden (2002) observe that typical constraints are scope, time, and budget. The secondary and more ambitious challenge is to optimize the allocation and integration of inputs necessary to meet pre-defined objectives. Goldratt (1984) in his theory of constraints asserts that any manageable system is limited in achieving more of its goal by a very small number of constraints, and that there is always at least one constraint. Theory of Constraints is based on the premise that the rate of goal achievement is limited by at least one constraining process. Only by increasing flow through the constraint can overall throughput be increased (Cox, Jeff; Goldratt, Eliyahu, 1986).

The researcher adopted this Theory for the reason of good orientation of the study on the Project planning and performance of road Busanza -Gahanga construction project implemented by NPD Ltd in Kicukiro district, Rwanda.

2.1.3 Resource Based View Theory

The core premise of the resource-based view is that organizational resources and capabilities can vary significantly across firms, and that these differences can

be stable (Kiprono, P. and Daniel, W, 2016). Firms with higher competitive advantage tend to create a sense of confidence in stakeholders that their support, whether financial or otherwise, was valued and put into action. The resource-based view in outsourcing builds from a proposition that an organization that lacks important, uncommon, unique and organized resources and capabilities, shall seek for an external provider in order to overcome that weakness (Müller & Jugdev, 2012).

Therefore, the researcher adopted this theory to undertake for betterment of running the study on the Project planning and performance of road Busanza - Gahanga construction project implemented by NPD Ltd in Kicukiro district, Rwanda.

2.2 Empirical Review

Akpan and Chizea (2012) studied the determinants of time planning systems in construction firms. A case study of failed projects in Nigeria were selected. The study found that time planning system necessitates the sensible evaluation of actual implementation with standards that are pre-established and if implementation is different from the conventional objectives/goals then the corrective action is enforced immediately. Conversely, execution of a project refers to the actualizing of a project plan and at the same time, tracking the plans effectiveness in the achievement of the set goals and this can be defined as project control in action. The study did not establish the effects of time planning on project performance.

Lloyd (2013) studied time planning functions effects on performance of the project. The study was a survey of construction projects. The study targeted projects not completed in time and the respondents were project managers and sponsors. The study found that function is defined as the prior planning of the project at any time based on present certainties as well as revised prospects. The study also found that this is reasonable since the constraints as well as even objectives of the project can change during the process of implementation. It is not easy and sometimes not possible at all to detect deviance from plans. It could be on this preface assertion that planning ought to be thorough to make control achievable, since it loses promptly its worth if nonconformity from it can't be revealed as well as amended promptly.

Telsang (2014) studied the effects of project plans on project performance. Descriptive research design was used. The respondents of the study were the owners of the selected construction companies in New Delhi, India. The study found that alternative components of project plans on time, and mitigation or preventing their negative effects prior to their occurrence in implementation stage of a project can be an improvement on the mechanism of control system. The study also found that monitoring is very important in a project therefore the chief aim of monitoring is to make sure that various targets of time as

well as cost are convened, and the network and its plans of operation formulated for projects implementation are followed. It might be too late to evade overruns of cost and time related to corrective action. The study failed to establish the level of correlation between the time plan and project performance.

Omondi (2017) posits that uncontrolled variations in a project's scope (scope creep) represents propensity of a program or project to incorporate a larger number of tasks or duties as compared to the initial planned tasks and duties which were specified, and this can frequently lead to higher project costs and addition of the project duration. Conceptually, scope creep is additional tasks and duties which were never planned for in the project thus likely to have an effect on the cost and time of the project (Osedo, 2017). As the project progresses, project team gains more knowledge, and this leads to scope changes. Jones, Snyder, Stackpole and Lambert (2011) add that scope change is common on projects, meaning that it is not harmful to make changes during the lifecycle of the project (Rugenyi, 2015)

According to Sikudi and Otieno (2017) project activities can be well controlled through an effective scope which is well planned and tracked. The scope control monitors the duties and tasks of the project to ensure they are achieved as per the scope management plan. Osedo (2017) found out that delivery of the project requires scope control, adequate project documentation, enhanced leadership with effective communication to ensure project deliverables are achieved. The project variances are due to lack of scope control in the projects (Nibyiza, 2015). The expected outputs of the scope controlling process can lead to changes of the request, updating of the project management plan, updates on the documentation of the project activities, updating of the asset's organizations process and work performance (Rugenyi, 2015).

Omondi (2017) examined triple constraints specifically project scope management and project completion, schedule management and cost management on project completion. A descriptive survey design was adopted in the study and involved quantitative methods. It was established that the relationship was significant between the scope, schedule and cost on project completion of the NGO projects based in Nakuru County, Kenya.

3. Methodology

This section discussed the method that was chosen in order to align and match with this study and the reason of its justification, then after, research design elaborates the methods that were employed in data collection in relation to case study selection.

3.1 Research Design

The study used descriptive research design. The aim of this research design is to generate information after cases have occurred. The research design aims to observe the reason why the situation looks like based on the appropriate case study knowledge undertaken for investigation process to be taken on the actions and exploring the substantial relationship. The descriptive approach was utilized in order to interpret and analyze data and this research design is the foundation of the study. Research design considered adopting descriptive research under qualitative approach and quantitative approach as Qualitative involves interviewing, then quantitative approach was employed, the study used correlational research design as it is found out the relationship between variables.

3.2 Study Population

Based on the information given by the Human Resource of NPD Ltd the company has the permanent employees equivalent to 600 and those they stipulated as follow Managers (people in the organization at any level above Technical staff Senior manager, Project managers) Technical staff (people at the first level in the organization who have responsibility over the work of others eg: Engineers, Technicians, officers) , Supporting staff (people who have no subordinates in the construction industry. Eg: Drivers, operators) and therefore the Researcher used the 600 employees as population target to get sample size on the study on Project planning and performance of road Busanza - Gahanga construction project implemented by NPD Ltd in Kicukiro district, Rwanda.

3.3 Sampling Size

size was used to determine the number of employees to be undertaken as respondents to ensure this study achieve the research intention, it is in this regard, to determine the sample size, the study used (Slovin, 1980) formula to calculate sample size of which include (95% confidence level and $\alpha = 0.05$) for questionnaires to be dispatched among the respondents.

$$n = \frac{N}{1 + N * (e^2)} = \frac{600}{1 + 600 * (0.05^2)} \approx 240$$

3.4 Data Collection and Instruments

A questionnaire was structured in written sequence set of question form which is typically closed ended five likert scale as measure of variables like the key performance indicators use the formula or scale in the research study; therefore, a research study was measured using a five - point Likert scale as follow; where by 5 = Strongly Agree, 4 = Agree, 3= Neutral 2 = Disagree and 1 = strongly disagree.

Documentary review method dealt with data collection instrument while picking information project planning towards performance of projects, checking and paying attention on correspondences and reports of the company related to the planned projects and performed performance, gathering documents include reports, Company meeting minutes, conference proceedings ,manual, Company policy , and her legal documents was consulted, researcher was review scholarly journal, publications, in order to gabion rich information gathered from reviewed such documents like weekly report, months report, quarterly reports and annually reports to ensure a researcher gain rich information from diverse areas to be able come up with quality research work on the Project planning and performance of road Busanza -Gahanga construction project implemented by NPD Ltd in Kicukiro district, Rwanda.

3.5 Data Analysis

Data analysis used descriptive research and inferential statistics, Descriptive statistics was used in order to obtain and produce tables, frequency, mean and standard deviation. Data captured from the fields for analysis produced frequency tables and means were presented for various characteristics for sets of data. Therefore, for finding out the importance of the study, the study employed inferential statistics for retrieving the relationship correlations between components on the effect of project planning on the success of the project (independent variable and dependent variable). Multiple regression model used to analyze the data; SPSS (Statistical Package for Social Sciences version 25.0) computer software was utilized as the tool for analysis.

The coefficient was to measure effect size r using the following regression equation:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \varepsilon$$

Where: Y = Project performance; β_0 = constant; $\beta_1, \beta_2, \beta_3$ = Coefficient of estimates; X_1 = Project time Planning; X_2 = Project cost planning; X_3 = Project scope planning; ε = error term.

3.6 Ethical Consideration

The researcher paid attention to respecting behavioral research procedures, starting by writing an introductory letter addressed to the respondents informing them of the forthcoming activities of the research study and requesting their contribution as the respondents fill out questionnaires. The researcher was careful in approaching the respondents for data collection and gave a commitment to treating well information from respondents and retrieving the information confidentially and anonymously and maintaining it well and using the information thoroughly only for the study.

4. Results and Discussion

The section explains the categories that a researcher took on collected data, and this chapter also clarified the relationships and patterns presented and discovered and then it gave a real meaningful conclusion. Inferential statistics that included the Correlation and Regression analysis with aid of Statistical Package for Social Sciences (SPSS 25.0). This study employed 240 Questionnaires, and all were distributed to the respondents, and they were filled and returned without missing responses, indeed the results were perfect with response rate of 100%.

4.1 Correlation Analysis

Table 1: Correlation

		Project Time Planning	Project Cost Planning	Project Scope Planning	Performance of Construction Projects
Project Time Planning	Pearson Correlation	1	.952**	.923**	.966**
	Sig. (2-tailed)		.000	.000	.000
	N	240	240	240	240
Project Cost Planning	Pearson Correlation	.952**	1	.864**	.937**
	Sig. (2-tailed)	.000		.000	.000
	N	240	240	240	240
Project Scope Planning	Pearson Correlation	.923**	.864**	1	.875**
	Sig. (2-tailed)	.000	.000		.000
	N	240	240	240	240
Performance Of Construction Projects	Pearson Correlation	.966**	.937**	.875**	1
	Sig. (2-tailed)	.000	.000	.000	
	N	240	240	240	240

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

Source: Field data,2024

The results present the relationship between Project planning and performance of Road Gahanga construction project implemented by (NPD Ltd) in Kicukiro district under Project planning factors are project time planning, project scope planning, project cost planning, it is in this regard, the statistical package for social science (SPSS) software version 25.0 was used to determine the Pearson coefficients. The Pearson coefficient correlation is between -1 and 1 where -1 to 0 presents negative correlation (-1 to -0.5 indicates high negative correlation and -0.5 to 0 indicates low negative correlation) and 0 to

1 presents a positive correlation (0 to 0.5 presents low positive correlation while 0.5 to 1 presents high positive correlation). According to the results, the correlation between project time planning, project scope planning, project cost planning was 0.966, 0.937 and 0.875 respectively, it presents that there was a significant relationship between project planning and performance of the project.

4.2 Regression Analysis

Table 2: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.968 ^a	.937	.936	.91915

a. Predictors: (Constant), Project Scope Planning , Project Cost Planning , Project Time Planning

Source: Field data 2024

The results present the Model Summary, the results present that the R Square=0.937, It was clear that 93.7% of all variables of performance of project can be

explained by predictor variable (Project planning dimensions)

Table 3: ANOVA of Project planning and performance of project

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	2968.551	3	989.517	1171.249	.000 ^b
	Residual	199.382	236	.845		
	Total	3167.933	239			

a. Dependent Variable: Performance of Construction Projects

b. Predictors: (Constant), Project Scope Planning , Project Cost Planning , Project Time Planning

Source Field data,2024

The results indicate ANOVA, the results presented than the variables were statistically significant with

F=1171.249 and p value=0.000b, it means that the model is fit to be used in predicting the study variables.

Table 4: Coefficients of Project planning and Performance of project

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	8.121	.642		12.656	.000
	Project time planning	.933	.074	.884	12.575	.000
	Project cost planning	.205	.063	.175	3.254	.001
	Project scope planning	-.079	.037	-.092	-2.139	.033

a. Dependent Variable: Performance of Construction Projects

Source: Field data 2024

The results present the constant of independent variables of project planning. It is statistically significant since p value is less than 0.05. The results present the variables of Project planning; project time planning was statistically significant with p value=0.000^b, the project scope planning was statistically significant with p value=0.001^b, and the project cost planning was statistically significant with p value=0.033^b.

According to SPSS generation of table 4 about the equation $Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \varepsilon$, where by Y= Performance of project then the Equation served as;

$$Y = 8.121 + 0.933X_1 + 0.205X_2 - 0.079X_3$$

It is in this regard that using the regression equation mentioned above in respect to the holding all constants (project time planning, project scope planning, project cost planning) in line with the success project was at 8.121, This indicated that, this ensured performance of project, there was a need under the Risk management factors; project time planning, project scope planning, project cost planning and ensure performance of project.

The SPSS Calculated the t-statistic as t-test increased on 12.575 and t-test turned on 3.254 and t-test decreased on -2.139. The results present the variables of Project planning; project time planning was statistically

significant with p value=0.000^b, the project scope planning was statistically significant with p value=0.001^b, and the project cost planning was statistically significant with p value=0.033^b.

From table 4 Coefficients of Project planning and performance of project, Unstandardized Coefficients were used in order to attain the t-test used in explanation above by B values which underwent series of dividing from B value and std error thus attainment of the t-test 8.121 divided by 0.642 resulted to 12.656 as constant, 0.933 divided by 0.074 resulted to 12.575 as project time planning, 0.205 divided by -0.079 resulted to -3.254 as project scope planning factor, -0.079 divided by 0.037 resulted to -2.139 as project cost planning factor.

4.3 Hypotheses Testing

In order to test the study's four formulated hypothesis, the t statistic that tests whether a B value is significantly different from zero ($H_0: \beta=0$) The study computed simple regression analysis to test the study hypothesis. For p -value<0.05, H_0 was rejected; and H_1 , H_2 , H_3 also were rejected

H₀₁=There is no significant relationship between project time planning and performance of road Busanza -Gahanga construction project implemented by NPD Ltd in Kicukiro district. As evident in Table 4, the Unstandardized beta value for project time planning and performance of road Busanza-Gahanga construction project implemented by NPD Ltd in Kicukiro district was significantly greater than zero ($\beta_1=0.933$, p -value=0.000<0.05, $t=12.575$). Subsequently the null hypothesis was rejected because p -value=0.000 is less than 5% level of significant, hence project time planning had a statistically positive significant relationship on performance of road construction projects implemented by NPD Ltd in Kicukiro district

H₀₂= There is no significant relationship between project cost planning and performance of road Busanza -Gahanga construction project implemented by NPD Ltd in Kicukiro district. As evident in Table 4, the Unstandardized beta value for project cost planning and performance of road Busanza -Gahanga construction project implemented by NPD Ltd in Kicukiro district was significantly greater than zero ($\beta_2=0.205$, p -value=0.001<0.05, $t=3.254$). Subsequently the null hypothesis was rejected because p -value=0.010 is less than 5% of significant, hence project cost planning had a statistically positive significant relationship on performance of construction projects implemented by NPD Ltd in Kicukiro district

H₀₃=There is no significant relationship between project scope planning and performance of road Busanza -Gahanga construction project implemented by NPD Ltd in Kicukiro district. As evident in Table 4, the Unstandardized beta value for project scope planning and performance of road Busanza -Gahanga construction

project implemented by NPD Ltd in Kicukiro district, was significantly greater than zero ($\beta_3=-0.079$ p -value=0.000<0.05, $t=-2.139$). Subsequently the null hypothesis was rejected because p -value=0.010 is less than 5% level of significant, hence risk response had a statistically negative significant relationship on performance of road Busanza -Gahanga construction project implemented by NPD Ltd in Kicukiro district.

5. Conclusion and Recommendations

5.1 Conclusion

Project planning is a highly valuable stake in any planning operations to ensure the attainment of the performance success in Construction practices activities. Project planning provides a critical mechanism of how any construction project works and other related activities in which they can be measured and how it can help to the attainment of project objectives (Adaku and Asiedu 2020).). From this perspective view in as far as the study is concerned, the study concluded that while basing on the results obtained. According to the results, the relationship between project time planning, project scope planning, project cost planning and performance of road Busanza -Gahanga construction project was 0.966, 0.937 and 0.875 respectively, and the results presented than the variables were statistically significant with p value=0.000^b, it concluded that there was a significant relationship between the Project planning and performance of road Busanza -Gahanga construction project implemented by NPD Ltd in Kicukiro district, Rwanda.

5.2. Recommendations

According to the results of this study, the researcher provided the following recommendations:

1. The Investors in construction industry should consider the information taken in Project planning and performance of construction project to enable stability in the industry of construction and enhancement of constructed properties
2. The government (MINIFRA) should know that the outcomes of Project planning and Performance of Road Construction Project must bring positive impact to Rwandan citizens and the Ministry with its affiliated institutions responsible for construction should alerting the Rwandan citizens to be involved in construction activities so that they should be in order to earn money because informal sector normally earn money on daily basis, weekly monthly etc. thus self-economy improvement
3. The MINIFRA can revisit its respective regulations and the publish guidelines to act as

roadmap in order properly orient those are in the construction sector especially companies and general public to be able practice Project planning rehearsals while endeavoring the performance of the project in general.

5.3 Suggestions for Further Research

This study refers to assessing the Project Planning and Performance of Road Busanza -Gahanga Construction Project Implemented by Nyarutarama Property Developer (NPD Ltd) In Kicukiro District, Therefore, researcher suggests that the further researches should be: To determine relationship between project time planning and performance, to determine relationship between project cost planning and performance and to determine relationship between project scope planning and performance.

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