EFFECT OF RISK MANAGEMENT ON THE PERFORMANCE OF CONSTRUCTION PROJECTS IN MUSANZE DISTRICT, RWANDA (PROJECT INES-BUSOGO, GS KAMPANGA ROAD): A CASE OF NEW PRODUCT DEVELOPER (NPD LTD)

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ABSTRACT

The research study was Effect of Risk Management on the Performance of Construction Projects in Musanze District, Rwanda. Project INES-Busogo, GS Kampanga Road. A Case of New Product Developer (NPD Ltd) and the target population was 600 employes and sample size was undertaken to be 86 respondents .Study employed descriptive statistics and inferential statistics, and data was analysed with aid of SPSS software program version 25.0 ,descriptive statistics and inferential statistics were employed to present frequencies tables, percentages, mean and standard deviation and Inferential analysis was used in order to use Pearson correlation and multiple regression model to test the relationship between the independent variables and dependent variable. Descriptive statistics used to produce frequency tables, percentages and mean and standard deviation. Inferential statistics were used in order to provide person correlation and multiple regression model to test and draw relationship between variables both for independent band dependent, the effect of risk planning on performance of concentration projects of New Product Developer (NPD LTD) in Musanze District. The overall means of results was 4.00, the effect of risk avoidance on the performance of construction projects of New Product Developer (NPD LTD) in Musanze District. The overall means of results was 4.60, the effect of risk response on performance of construction project of New Product Developer (NPD LTD) in Musanze District. The overall means of results was 4.49 to inspect risk mitigation measure application on performance of construction projects of New Product Developer (NPD LTD) in Musanze District. The overall means of results was 4.26, and the data on performance of project was analysed, the overall means of results was 4.50. depending on the results, it presented that the performance of project was on good grades. It showed that the relationship between risk management and performance of project on Project INES-Busogo, GS Kampanga Road construction between risk planning, risk avoidance, risk response and risk mitigation and performance was 0.661, 0.855 ,0 .867and 0.934 respectively, The results present the variables of risk management; risk planning not was statistically significant with p value=0.197[b], the Risk avoidance was statistically significant with p value=0.007[b], and the Risk response was statistically significant with p value=0.000[b] and the Risk mitigation was statistically significant with p value=0.000[b].It concluded that there was a significant relationship between risk management and performance of project. The study recommended that MININFRA should engage Rwandan citizens to be part and be involved in construction works to attain money due to the fact that informal works make earnings on daily basis, weekly monthly etc. thus personal economic improvement.

Keywords: Effect of risk management and performance of construction projects

1. Introduction

Risk management concepts were popularized in many players in such a way that many companies seldomly implement risk management in distinguished projects to ensure the production and profit increment with regard to the improvement of business performance (Aarthipriya, V; Chitra, G; Poomozhi, J., 2020). Also, planning and identifying the non-expected Matters ensures an increment in organizational performance (Osipova, E. Eriksson, P; 2011). Risk management is linked with the performance of construction projects. (Aarthipriya, V; Chitra, G., Poomozhi, J., 2020) presented that there is existence of impact between

risk identification and risk assessment on the project success, planned budget, schedule time, and complying with technical specifications as the risk management is multinational syndicate that is indicated by the uncertainty in collaborative manner in order to attain the performance with essence of enhancing rationale risks, problems management to gain successfulness in the construction projects with nature fundamental explanations, risk rationale management is showed by potential capture insufficient management approach (Aguinis, H., 2014)

International development projects become disreputable because of their failure rate concerned about concentration, and private construction projects run underperformance (Yornu, I. K., Ackah, D., 2019). The construction sector is of great importance while risk management depends on existing construction projects rather than the use of risk management standard methods with disregard the construction industry significance in developing countries (Yornu, I. K; Ackah, D., 2019). According to the studies (Tummala and Schoenher, R. V. M; Leung, H. M; Mok, C. K; Burchett, J. F; Leung, Y. H., 2011) pointed out that risk management fields were not confined to justifying and monitoring risks, nor target avoiding the identified risk. Conforming with (Fan., 2008)the risk management is considered as entire activities pitched towards detecting risky situations, along with evolving the approaches to reduce the possibility of incidence and bearings of risks

Rwanda context, there existed delays and cost overruns at different construction projects due to lack of risk management practices and include the national bank of Rwanda(BNR) branches of Huye District , Rwamagana district, Rusizi projects district and that of Musanze district were delayed time and cost overruns. (Gitau, L. M. , 2015) in terms of information by percentage to failed construction projects turned to 45.2%, and with the percentage of 35.7% failed under finance perspective due to the biased risk management, therefore it in this way that the researcher developed the idea to conduct a research on the Effect of risk management on the performance of construction projects in Musanze district, Rwanda. A case study of NPD Ltd.

1.2 Objectives of the Study

This section contains general objective, specific objectives and Resaerch hypotheses that was undertaken in this dissertation

1.2.1 General Objective

The general objective of the study is to examine the effect of risk management on the performance of construction projects in Musanze District. A case study of New Product Developer (NPD LTD) in Musanze District

1.3. Specific Objectives

i. To examine the effect of risk planning on performance of concentration projects of New Product Developer (NPD LTD) in Musanze District

ii. To determine the effect of risk avoidance on the performance of construction projects of New Product Developer (NPD LTD) in Musanze District

iii. To ascertain the effect of risk response on performance of construction project of New Product Developer (NPD LTD) in Musanze District

iv. To inspect risk mitigation measure application on performance of construction projects of New Product Developer (NPD LTD) in Musanze District

1.4 Hypotheses of the Study

The study intends to test the validity of the following hypothesis:

H_{01}= There is no significant effect of risk planning and performance of concentration projects of New Product Developer (NPD LTD) in Musanze District projects in Musanze District

H_{02}= There is no significant effect of risk avoidance on the performance of construction projects of New Product Developer (NPD LTD) in Musanze District

H$_{o3}$= There is no significant effect of risk response on performance of construction project of New Product Developer (NPD LTD) in Musanze District

H$_{o4}$= There is no significant risk mitigation measure application on performance of construction projects of New Product Developer (NPD LTD) in Musanze District

2. Literature Review

This chapter consults the literature view in order to find out the weakness, gaps through reviewing theories related to this study and theoretical framework, and also this explains the concept review with variables and conceptual framework and the empirical review was developed and then the Research gap was found in order to get a reason for undertaking the research.

2.1 Conceptual Review

Conceptual reviews explain and examines the linkages between independent and depend variables that are related to background, foundation of theories on the study on effect of risk management on the performance of construction projects in Musanze District, Rwanda. A Case Study of NPD Ltd

2.1.1 Risk Management

Risk management is concepted derived from PMI (Kerzner; Williams, PMI., 2013). According to (Berg, H.-P.,2010) The portrayable and acceptable risk management is one that undergoes risk management encompassing the scenarios that fall under uncertainties including identification, assessment , comprehending and communication on the risk matters to ensure project target achievable (Banaitiene, N; Audrius, B., 2012) , With is regard , Project risk is termed as unfavourable conditions , uncertain happenings either in negativity or positivity that has effect on entire project in terms of cost , quality and time (Banyeenzaki, M., 2016).

Risk planning

Planning is a mandatory towards of being successful risk management outcomes, the Major deliverable of risk planning is to ensure risk management plan highlights the risk management methodology, function, tasks, cost and timeframe and considering the class of risks and probability applied in construction project and expected risk planning required in order to perform planning activities in every source of risk and ensuring risk management planning encounter the designated risk plan for the project (PMI., 2004)

Risk avoidance

It is not possible to avoid all the risks; however, some risks should be avoided before starting of the projects or recommending for changes or total elimination during the project plan (Larson, E.W; Gray, C.F. , 2011). According to (Jannadi., 2008)asserted that the risk aversion approach procedure is essential to ensure certain risks avoidance completion. According to (Flanagan, R; Jewel, C. , 2008). Risk avoidance reduces acceptance of all risks in projects due to the fact, the risks with highest acquaintance are to be eliminated to ensure possible avoidance that are unfavourable conditions by rejecting severe contracts as the mode of risk avoidance or much attentions must be paid on contracts while looking article by article ensure unfavourable clauses removed to be able reduce the consequences of risks.

Risk Response

Risk response emphasizes on measured project risk identification in order to eliminate the risk through risk avoidance straight from tackling root causes while calibrating to some extent accepting risk with respect of putting in place emergency plan towards risk transfer in reducing likelihood mitigation (Mousa, Musyoka, B. S., 2012).With this regard, the risk response approach should be directly be quantifiable and identifiable to ensure effective risk selection strategy attainable for designated projects (PMI., 2013).

Risk Mitigation

Risk mitigation is all about controlling risks preferably through application of migration strategies encompassing reducing the likelihood of happening as an event and reducing impacts of projects risks as it is adopted that risk

management team should always consider in minimizing the likely risks that might occur on the project that more especially on project impact costs (Larson, E.W; Gray, C.F. , 2011).

Risk probability

Risk probability is an essential concept deals with concerned risk under the tendency of measuring of project impact to ensure probability rations matches to the number of likely subjunctive causes (Abujnah M, Eaton., 2010). In this perspective view, the risk probability involves in tossing the fair of denomination to ensure predetermined possible outcomes that encompassing construction cost estimations be more fuzzily determined (Abujnah M, Eaton., 2010).

2.1.2 Project performance

Project performance is measured in terms of deliverables, according to (Meng, X., 2012) explicated that performance is measurement of product and usage of project in terms of quality, time, budget and satisfaction, according to Low (Ogal, W.O., 2015) pointed out that the limitation, time, cost, performance resulted of managerial skills, risk management and human resource management   can be attained as the result of project performance.

Time

Time is an indicator in the project performance and it is an important to set deadline date that specifying the client construction project time frame (Wysocki R.K, 2009). According to (Turner J.R , 2014), time undergoes a series of dates against the milestone and expected outcomes of the project in terms of forecast and actual work.

Cost

The cost of work in the construction project is essential variable to be well-defined to ensure established budgeting meet construction project completion (Wysocki R.K, 2009) thus the consecution project serves its designated purposes whether commercial or for other customer servicing as it also quoted by (Wysocki R.K, 2009), the main attention comes in early stage in construction project in order to meet cost

estimation towards construction project preformation under expenditure control according to the estimate preparations in billing of quantities and cost control in construction project to resulting into performance measured according to baseline (Turner J.R , 2014).

Quality: There are numerous advantages to project performance that is high in quality is check on the customer satisfaction, when a customer is happy, it adds more value to the products produced and reducing expenses. Thus, Reduced costs lead to increased earnings. Thus, increases in productivity rather than reducing it and improved project performance and lower costs transfer and achieve higher competitiveness.

2.2 Theoretic framework

Theories are drawn from the theorical framework in order to support the study

Contingency Theory

Organization hypothesis is coordinated at the pervasive office relationship as indicated by (Floricel S; Lampel J. , 1998), in which one gathering delegates work to the operator, who plays out that work. In building ventures this relationship characterized by the customers and the contractual worker. Organization hypothesis is worried about settling two issues that happen in office connections. The first is the organization issue that emerges when (a) the wants or objectives of the essential and specialist strife and (b) it is the troublesome or costly for the foremost to check what the operator is really doing. The issue here is that the key can't confirm that the specialist has carried on fittingly prompting deficient yield. The second is the issue of the risk distribution that arises when the central and operator have distinctive states of mind towards chance. The question here is the key and the operator may incline toward various activities as a result of the diverse risk predispositions. Thus, perfect chief – operator connections ought to reflect effective association of data and the hazard – bearing expenses to best maintain a strategic distance from these issues.

As indicated by (Tummala, R. V. M; Leung, H. M; Mok, C. K; Burchett, J. F; Leung, Y. H.Schoenherr., 2011) in venture,

administrator office sorts of contentions might be maintained a strategic distance from by all around developed contracts which determine the legally binding connections between the undertaking proprietor and the essential contractual workers. Conduct – based contract and result based contracts are two non-specific sorts of legally binding connections which have been created to relieve the issues which emerge from the irreconcilable circumstance amongst important and operator.

Uncertain theory

Uncertain theory was introduced by (Liu, J; Low, S., 2009) due to generalization of domain of certainty. Uncertainty theory was also applied to uncertain logic by (Liu, J; Low, S., 2009) in which the truth value is defined as the uncertain measure that the proposition is true. Furthermore, uncertain entailment was proposed by Liu that is a methodology for calculating the truth value of an uncertain formula when the truth values of other uncertain formulas are given. Uncertainty is, of course, not a neglected concept in project management. Early development of activity network techniques in the 1950s, such as PERT (Program Evaluation and Review Technique), recognized the possibility of variation in task durations. These techniques were extended in the 1960s to incorporate probabilistic branching for instance Graphical Evaluation and Review Technique. Qualitative approaches, such as the Synergistic Contingency Evaluation and Review Technique, and Analysis of Potential Problems, were developed to guide project managers to prepare for uncertainty with risk prevention and contingency planning (Henriksen, Uhlenfeldt., 2006)

This extensive literature on project planning has developed our understanding of scheduling tasks in complex and uncertain projects, describing such well -known techniques as the critical path method (CPM). There is also extensive knowledge on how to handle the relationships with the stakeholders, utilizing such tools as contract formalization and enforcement, responsibility charts, force field analysis, and conflict 16 management. Foreseen uncertainties are identified, but uncertain, influences in a project management. Uncertainty risk also affects how project

management should approach stakeholder management. The project team in one of our samples liked to utilize the phrase proactively occupy the white spaces in the contract. This meant that, through anticipating uncertainties, they could proactively write in the contingencies reflecting these uncertainties, possibly staking out a claim before other stakeholders had thought of it.

Thus, foreseen uncertainty requires disciplined risk management, the identification of potential risk that could affect the project followed by the planning of preventive measures to block adverse events and multiple contingent courses of action that are then triggered by the events. Progress tracking demands monitoring not only which activities have been completed, but also to the uncompleted project activities. The project manager must not only be able to trouble shoot, but also function as a reactive consolidator of what has been achieved up to a certain stage in the project. All risks the incidents in the environment, or certain outcomes of the project work) must be constantly monitored and communicated to project stakeholders.

2.3 Empirical Review

research conducted by (Petrovic, D., 2017) in Swedish construction industry where they use different methods to identify risk. The checklist was used together with the experience from former projects where the selected respondents around 88%, after comes brainstorming approximately 48% and interviews at 12%. Also found that the use of checklists and documentation was regular the initial stage of a project in terms of risk identification. The method of brainstorming also used by many so that they can contribute their experience even discusses the lesson learned from similar projects. Checklists is an important tool for identifying risk in the work atmosphere, mostly in work inventory with treats needed to measure basing in the surrounding legislation.

The study conducted by (Aimable, S. , 2015) in Rwanda, risk avoidance assisted RSSB in ensuring quality in multi-store constructions by 29 percent, while risk avoidance assisted them in managing resources by 41 percent, and risk

avoidance assisted them in ensuring project plan by 11 percent. Risk transfer is a mechanism for allocating the risk of a commercial contract's performance among contracting parties. Risk retention is a tactic that passes hazard from one party to another, with 44 percent of risk retention having an influence on multi-story constructions. The majority of respondent's regard avoidance at 62 percent, mitigation at 61 percent, and acceptance at 55 percent in Swedish construction projects, whilst transfer received a response rate of 36 percent

A study conducted by (ALSaadi; Norhayatizakuan, N. , 2021) on risk management practices and construction project performance. The link was investigated using quantitative methods in this study. The assessment includes construction enterprises in Oman with grades ranging from exceptional to second. The findings demonstrated that risk management considerably improves the performance of construction projects. As a result of this finding, qualified project managers with significant knowledge of risk management and its key activities must be hired. The risk management plan establishes the strategy for controlling project risk and specifies the methods, procedures, means, and tools to be used. Risks are not trivial, and if they are not managed properly, they can have a significant influence on the project's goals. When an event occurs and its impact is felt, it can be a source of concern. The possibility, duration, schedule, scope, budget, and quality of the risk are all factors to consider. The main worry for treats and response activities stems from the level of risk exposure. Risk is factored into project decision-making, planning, and day-to-day activities. Certain hazards emanate from the outside, such as environmental activities and negative project and person acts. Inside elements, such as an acceptable assumption, incorrect design decisions, or an overly optimistic strategy, all
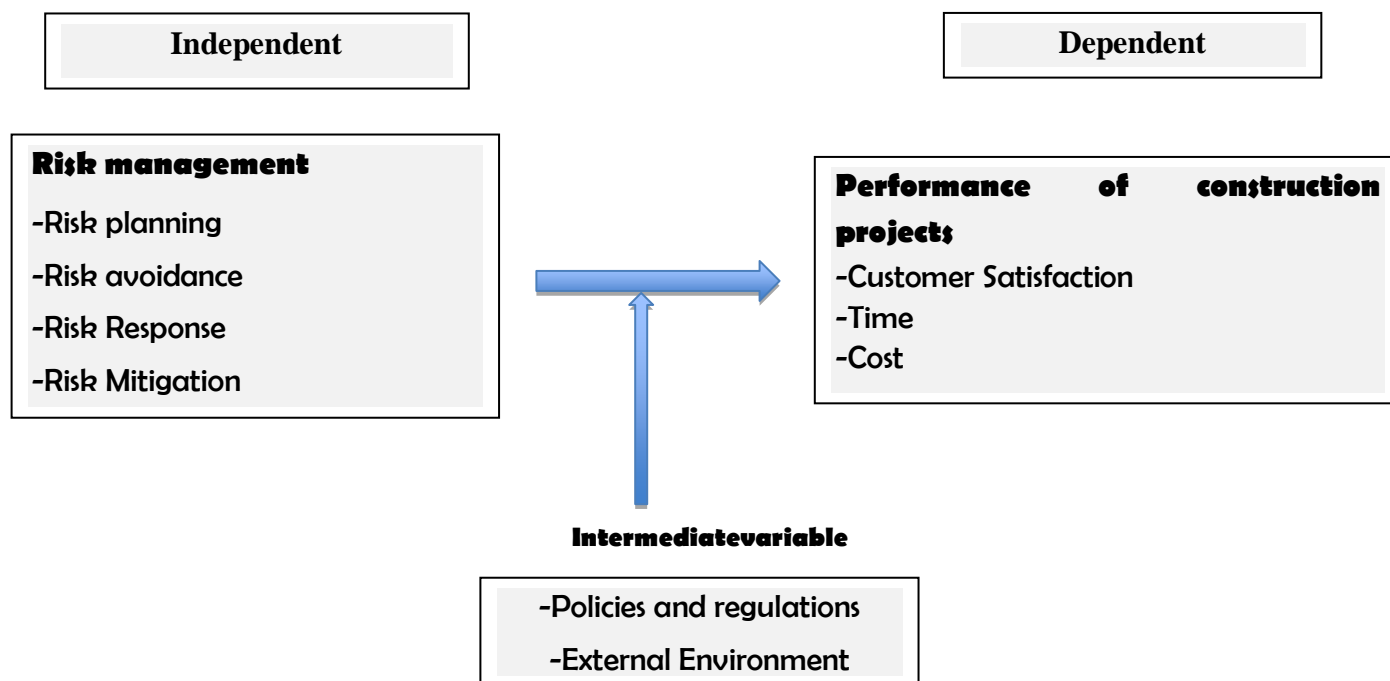
pose dangers. The strategy aims to identify and mitigate risk as early as possible in the procedure (EDR., 2011).

(Wabomba, K.W., 2015) did a study on influence of risk management strategies on project performance: a survey of selected international development organizations based in Nairobi city, Kenya. The investigation adopted a quantitative due to utilization of numerical data and also correlational/predictive design because of the nature of the research questions with an aim to explaining the relationship between the research variables identified, the dependent. Risk avoidance also exhibited positive correlation with project performance. On the other hand, utilization of the technique of risk transference as well showed a statistically significant relationship on project performance and when the correlation analysis was done it also showed a statistically significant correlation.

(Kangari, R, 2015) did a study on risk management perceptions and trends of U.S. construction. To establish the degree to which project risk management processes were used, a questionnaire survey was employed. The study noted that communication between venture head and administration is urgent to the fruitful execution of task. This is for the most part affected by the principal– specialist connection between the gatherings and the agreement sort picked. The investigation found that the models of instrumental and transformative interest and the way they impact stream and correspondence between venture administrator and different partners. Learning exchange, correspondence, and shared comprehension between venture partners are vital necessities to ventures. The capacity of the venture director to encourage correspondence among partners, make the coveted duty level and decrease vulnerability can help maintaining a strategic distance from the danger of task disappointment.

2.4 Conceptual framework

Figure 1: Conceptual framework of the study

Independent

Dependent

Risk management

-Risk planning

-Risk avoidance

-Risk Response

-Risk Mitigation

Performance of construction projects

-Customer Satisfaction

-Time

-Cost

Intermediatevariable

-Policies and regulations

-External Environment

Source: Researcher, 2024

3. Research Methodology

This section describes the methods that was employed in this study therefore it explained the different methods that was used to enable data collection, were to sourcing data and the sampling size and Sampling techniques and followed by data processing as well, the tools that were applied in research was also considered and the data analysis respectively. Also, discussion was paid on the methods while undertaking this research study, another method which was discussed, was the research design in which it also linked with a case study, the data collection procedures was also discussed in this chapter, and the validity and reliability was also discussed and then Data analysis was detailed in this chapter three.

Research Design

The research study wasundertake descriptive that is qualitative and quantitative approach and this quantitative approach includes correctional design, From this perspective descriptive research explains the thing the way they look like depending on the knowledge and the case study appropriately use in order to assess the procedures in which activities are described. Research study wasused the qualitative and quantitative approaches in such a way that the qualitative addresses the interview and quantitative employs the descriptive statistics and correlational design method to enable variables considered when a researcher analyses the relevant information regarding to peoples' thoughts about the study on Effect of risk management on the Performance of construction projects in Musanze District, Rwanda. A Case of New Product Developer (NPD LTD), from this point of view, the research design required the plan of action that specifies the way things were done in orderly system and from the step to the step-in order to ensure clarity is inclusive ensuring the real focus is achieved in as fa as the research design is concerned ensure the phenomena understanding of true study area while enabling the performance in construction project attained from perspective view of the research.

Study Population

Research study reached the employees of NPD Ltd as it was started in 1996 as a construction company that focus on Engineering construction projects in various disciplines in Rwanda and abroad, 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 ass 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 mention 600 employees as population target to get sample size on the study on Effect of risk management on the Performance of construction projects in Musanze District, Rwanda. A Case of New Product Developer (NPD LTD),

Sampling size and sampling technique

Simple size used to ensure the determination of the number of the employees who participated in the research study as the respondents from NPD Ltd in order to reach the researcher intention, Therefore the sample size

determination undergone the (Slovin., 1980)Formulae quoted by (Kayiranga., 2015)and sample sizes' calculation includes the (90% confidence level and e(0.1) using the formulae above the questionnaires were distributed to the respondents in the employees of NPD Ltd in this way

$$n = \frac{N}{1 + N * (e^2)} = \frac{600}{1 + 600 * (0.1^2)} \approx 86$$

Therefore;

90% is the confidence interval level

Simple size, n =86 from NPD Ltd

Population, N=600 from NPD Ltd

Margin error = (10%or 0.1)

Table 1: Population distribution and simple size determination

No	Description	Target population	Sample size
1	Staff	120	17
	Technical staff	200	29
	Supporting staff	280	40
	Total	600	86

Data collection Procedures

The procedure for data collection started with the researcher obtaining the introductory letter from the University of Kigali for official submission to the new product developer (NPD Ltd) seeking acceptance to undertake independent research in the company in as well as conducting research study on the Effect of risk management on the Performance of construction projects in Musanze District, Rwanda. A Case of New Product Developer (NPD LTD), the application was acceptable, Researcher proceeded and approached the respondents with administered questionnaires in line with interview that wasfollow first exercise

Data analysis

Data analysis wasobtain through questionnaires that was coded, typed into SPSS Version 22.0) software and edited to ensure right data information. Analysis wasemploy Qualitative to undergo interviewing and Quantitative approach to employ descriptive statistics and inferential statistics. Descriptive statistics such as percentages, frequency tables and mean was computed to elucidate characteristics of the data.

Inferential analysis was done by using Multiple linear regression in order to assess the degree and character of the relationship between the variables that is independent variable and dependent variable.

Multiple Linear regression washelp a researcher to understand the direction and size of relationship between effect of risk management in respect to independent variables dependent variables. Regression is statistical technique that counts into determining linear relationship between two or more variable and it is principally used to estimate casual inferences, thus determination of statistical relationships applicability in between two or more variables:

Researcher presents the regression model as follow:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \varepsilon$$

Where: Y = Performance of construction projects

β_0 = constant; $\beta_1 \beta_2 \beta_3 \beta_4 \beta_5$ = regression

coefficients; X_1 = Risk planning; X_2 = Risk avoidance; X_3 = Risk Response; X_4 = Risk Mitigation; X5 = Risk probability; ε= error term.

4. Research Findings

This part presents the findings from the inferential statistical test that encompassed correlation coefficient and multiple linear regression analysis between the variables that was independent variables and dependent variables for this study

Table 1. Correlation

		Risk planning	Risk avoidance	Risk response	Risk mitigation	Performance of projects
Risk Planning	Pearson Correlation	1				
	Sig. (2-tailed)					
	N	86				
Risk Avoidance	Pearson Correlation	.726**	1			
	Sig. (2-tailed)	0.000				
	N	86	86			
Risk Response	Pearson Correlation	.476**	.807**	1		
	Sig. (2-tailed)	0.000	0.000			
	N	86	86	86		
Risk Mitigation	Pearson Correlation	.735**	.937**	.827**	1	
	Sig. (2-tailed)	0.000	0.000	0.000		
	N	86	86	86	86	

Performance Of Projects	Pearson Correlation	.661**		.855**	.867**	.934**	1
	Sig. (2-tailed)	0.000		0.000	0.000	0.000	
	N	86		86	86	86	86

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

The results present the relationship between the Effect of Risk management on the performance of Construction projects in Musanze District, Rwanda. Project INES-Busogo, GS Kampanga Road. A Case of New Product Developer (NPD Ltd). Risk management factors taken are; Communication, resource scheduling and Human resource 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 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 Risk Planning, Risk Avoidance, Risk Response, Risk Mitigation and performance of project was, 0.661, 0.855, 0.867 and 0.934 respectively, it presents that there was a significant relationship between Risk management and performance of construction project.

Table 2 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.954a	.909	.905	1.07063

a. Predictors: (Constant), Risk mitigation, Risk Planning, Risk response, Risk avoidance

Source: Primary data, 2023

The results present the Model Summary, the researcher sought to know the Effect of Risk management on the performance of Construction projects in Musanze District, Rwanda. Project INES-Busogo, GS Kampanga Road. A Case of New Product Developer (NPD Ltd)., from the perspective, the researcher used regression analysis to measure on the effect of risk planning on performance of concentration projects of New Product Developer (NPD LTD) in Musanze District, effect of risk avoidance on the performance of construction projects of New Product Developer (NPD LTD) in Musanze District, the effect of risk response on performance of construction project of New Product Developer (NPD LTD) in Musanze District and to inspect risk mitigation measure application on performance of construction projects of New Product Developer (NPD LTD) in Musanze District ,Correlation coefficient (**R=0.954a**) demonstrated the relationship between Risk management on the performance of Construction projects in Musanze District, Rwanda. Project INES-Busogo, GS Kampanga Road. A Case of New Product Developer (NPD Ltd), therefore the results present the Model Summary, the results present that the R Square=0.909. It was statistically significant clear that 90.9% of all variables of project performance can be explained by one's of all variables of the risk management in project.

Table 3. ANOVAᵃ of project planning on the success of construction projects

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	930.456	4	232.614	202.934	.000ᵇ
	Residual	92.846	81	1.146		
	Total	1023.302	85			

a. Dependent Variable: PERFORMANCE OF PROJECTS

b. Predictors: (Constant), Risk mitigation, Risk planning, Risk response, Risk avoidance

Source: Primary data ,2023

The results indicate ANOVAᵃ, the results presented than the variables were statistically significant with F= 232.614 and p value=0.000b, it means that there was a significant relationship between Risk management and Performance of project.

Table 4. Coefficients of Risk management on performance of construction projects

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	18.722	2.679		6.987	.000
	Risk Planning	.157	.120	.070	1.301	.197
	Risk Avoidance	-.408	.146	-.279	-2.791	.007
	Risk Response	.564	.104	.354	5.429	.000
	Risk Mitigation	.730	.094	.851	7.765	.000

a. Dependent Variable: Performance Of Projects
Source: Primary data ,2023

The results present the constant of independent variables of Risk management. It is statistically significant since p value is less than 0.05. The results present the variables of risk management; risk planning not was statistically significant with p value=0.197ᵇ, the Risk avoidance was statistically significant with p value=0.007ᵇ, and the Risk response was statistically significant with p value=0.000ᵇ and the Risk mitigation was statistically significant with p value=0.000ᵇ

According to SPSS generation of table 4.14 in regard to the equation $Y= \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \varepsilon$ where by Y= Performance of project then the Equation served as;

Y= 18.722+0.157X1+-0.408X2+0.564X3+0.730X4,

It is in this regard that using the regression equation mentioned above in respect to the holding all constants (Risk planning, Risk avoidance, Risk response and Risk mitigation) in line with the performance of project was at 18.722, This indicated that, this ensured success of project, there was a need undergo Risk planning, Risk avoidance, Risk response and Risk mitigation to undertook and ensure performance of project.

The SPSS Calculated the t-statistic as t-test increased on 1.301 and t-test decreased on -2.791 and t-test increased on 5.429 and t -test increased on 7.765 and. The results present the variables of Risk management; risk planning not was statistically significant with p value=0.197ᵇ, the Risk

avoidance was statistically significant with p value=0.007[b], and the Risk response was statistically significant with p value=0.000[b] and the Risk mitigation was statistically significant with p value=0.000[b]

From the table 4.14 Coefficients of Risk management and performance of project, Unstandardized Coefficients were used in order to attain the t-test used in explanation above by B values undergo series of dividing from B value and std error thus attainment of the t-test; 18.722 divided 2.679 resulted into constant with 6.987, then 0.157 divided 0.120 resulted into risk planning factor with 1.301,then -0.408 divided 0.146 resulted into Risk avoidance factor with -2.791, and then 0.564 divided 0.104 resulted into Risk response g factor with 5.429 and then 0.730 divided 0.094 resulted into Risk mitigation factor with 7.765 value .

Hypothesis 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 (HO: β0) The study computed simple regression analysis to test the study hypothesis. For p-value<0.05, H0 was rejected; and H1 accepted

H_{o1}= There is no significant effect of risk planning and performance of concentration projects of New Product Developer (NPD LTD) in Musanze District. As evident in Table 4.12, the Unstandardized beta value risk planning and performance of concentration projects of New Product Developer (NPD LTD) in Musanze District was significantly greater than zero (β 0.157 p-value=0.197<0.05, t= 1.301). Subsequently the null hypothesis was accepted because p-value=0.316 is greater than 5% level of significant, hence risk planning had a statistically insignificant effect on performance of construction project.

H_{o2}= There is no significant effect of risk avoidance on the performance of construction projects of New Product Developer (NPD LTD) in Musanze District. As evident in Table 4.12, the Unstandardized beta value of risk avoidance on the performance of construction projects of New Product Developer (NPD LTD) in Musanze District was significantly greater than zero (β -0.408 p-value=0.007<0.05, t= -2.791).

Subsequently the null hypothesis was rejected because p-value=0.007 is less than 5% level of significant, hence risk avoidance had a statistically significant effect on performance of construction projects.

H_{o3}= There is no significant risk mitigation measure application on performance of construction projects of New Product Developer (NPD LTD) in Musanze District. As evident in Table 4.12, the Unstandardized beta value of risk mitigation measure application on performance of construction projects of New Product Developer (NPD LTD) in Musanze District was significantly greater than zero (β0.564 p-value=0.000<0.05, t=4.788). Subsequently the null hypothesis was rejected because p-value=0.000 is less than 5% level of significant, hence risk response o had a statistically significant effect on performance of construction project.

H_{o4}= There is no significant risk mitigation measure application on performance of construction projects of New Product Developer (NPD LTD) in Musanze District. As evident in Table 4.12, the Unstandardized beta value of risk mitigation measure application on performance of construction projects of New Product Developer (NPD LTD) in Musanze District was significantly greater than zero (β0.730 p-value=0.000<0.05, t= 7.765). Subsequently the null hypothesis was rejected because p-value=0.010 is less than 5% level of significant, hence risk mitigation had a statistically significant effect on performance of construction projects.

5. Conclusions

Risk management is a highly valuable stake in any project operations in order to achieve the performance in Construction activities. Risk management gives out a crucial mechanism of how any construction project works and other related operative activities in which they can be measured and how it can help to the attainment of project objectives (Aimable, S. (2015). From this view in as far as the study is concerned, a researcher concluded while basing on the results obtained. According to the results, the relationship between; Risk Planning, Risk avoidance, Risk response, Risk mitigation

was **0.661, 0.855, 0.867**and **0.934** respectively, and the results presented than the variables were statistically significant with p value=0.000b, it concluded that there was a significant relationship between risk management on the performance of construction projects in Musanze district, Rwanda (Project INES-BUSOGO, GS KAMPANGA Road). A case of New product developer (NPD ltd).

6. Recommendations

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

-The Construction projects investors should consider the information taken on risk management and performance of construction project to enable sustainability of constructed properties.

-The government of Rwanda under Ministry of Infrastructure (MINIFRA) should know that the outcomes of effective risk management must bring positive result to Rwandan citizens and be as they fully involved in all activities of construction project and be able earn money thus self-economy enhancement.

-The study recommended that MININFRA should engage Rwandan citizens to be part and be involved in construction works to attain money due to the fact that informal works make earnings on daily basis, weekly monthly etc. thus personal economic improvement.

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