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RISK MANAGEMENT AND PERFORMANCE OF ROAD BUSANZA -MUYANGE CONSTRUCTION PROJECT IMPLEMENTED BY NYARUTARAMA PROPERTY DEVELOPER (NPD LTD) IN KICUKIRO DISTRICT

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Abstract

The study was conducted on Risk management and performance of Construction projects implemented by NPD Ltd, the study specifically will be conducted in NPD Ltd, the target population was 600 employes and sample size was undertaken to be 86 respondents Study used descriptive statistics and inferential statistics, both qualitative and quantitative were used to analyse the data with assistance of SPSS software program version 25.0 ,descriptive statistics and inferential statistics were used 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 to produce frequency tables, percentages and mean. Inferential statistics were used in order to give person correlation and multiple regression models to test and draw relationship between variables both for independent band dependent, the relationship between risk planning and performance of construction projects implemented by NPD Ltd in Kicukiro district. The overall means of results was 4.50, the relationship between risk analysis and performance of construction projects implemented by NPD Ltd in Kicukiro district was 4.50, the relationship between risk analysis and performance of construction projects implemented by NPD Ltd in Kicukiro district. The overall means of results was 4.60, the relationship between risk response and performance of construction projects implemented by NPD Ltd in Kicukiro district. The overall means of results was 4.49, to examine the relationship between risk mitigation and performance of construction projects implemented by NPD Ltd in Kicukiro district. The overall means of results was 4.27 and the data on performance of project was analyzed, the overall means of results was 4.52. Depending on the results, it presented that the performance of project was on good grades. It indicated that the relationship between risk management and performance of project on road construction between risk planning, risk analysis, risk response and risk mitigation and performance was 0.617, 0.855 ,0 .867and 0.827 respectively, and the results presented than the variables were statistically significant with p value=0.000b. The results present the variables of Risk management; Risk Planning, was not statistically significant with p value=0.479[b], the Risk Analysis was statistically significant with p value=0.010[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 MINFRA should mobilize Rwandans to be involved in construction activities in order to earn money as the sector engage many labors.

Keywords: Risk management, performance, Road construction project and implementation

1. Introduction

Construction is a very large sector, which constitutes 9 % of EU's gross domestic product (GDP) (European Commission 2016) and 13 % of the world's GDP (McKinsey & Company 2020). However, the construction industry involves large number of active physical construction operation works regardless of disruptions may occur, there are a lot of construction project going on around the world, and may include infrastructure construction, road construction, and other facilities being constructed. (Emeka. Onuzulike. Jude., 2016), claimed that the competence of a construction industry or its project team can be described by capability to meet or complete the project on or before deadline.

The construction industry is important in the revenues generation as gross income, for instance in terms of value output, the construction industry is the largest in United states of America economy and it is counting for.4.00% percent of the gross national product last year. The construction industry is a vital part of the U.S. economy. However, success in this industry naturally comes with a number of challenges, and the COVID-19 pandemic has only added to these. To find out more about the state of the U.S. construction market, here are some statistics about the industrious. construction put in place over 2021 is valued at $1.589 trillion. Approximately 7.5 million people are employed by the construction industry, as of January 2022, that's about 4.8% of the U.S. workforce. The construction industry accounts for roughly 4.3% of U.S. GDP. 1,337,800 new housing units were completed in 2021, a 4% increase from 2020. The market size of the U.S. construction industry was valued at around $1.36 trillion as of 2020.The construction industry's revenue has risen at an annualized rate of 2.7% from 2016 to 2021.The average annual turnover rate in the construction industry is 68%, as of 2020. This demonstrates the US to lead in the world as it indicates by statistics.

Africa Context for instance, Scott (2019) states that RM involves risk identification, risk assessment and prioritization, which is closely followed by a well-articulated, coordinated and efficient deployment of resources to countries like Nigeria is generally not very acquainted with risk management analysis (Olamiwale, I.O., 2014). In the Nigerian construction industry, risk management has been carried out with imitations and ineffectiveness, attributed to a lack of knowledge of the processes and methodologies and project risk events. Furthermore, a reductionist approach has been the predominant approach to RM, which has brought little or no performance improvement in construction projects (Adeleke.A., 2016).

Today in Rwanda, Construction industry is keen and important sector that contribute about 144 billion of Rwandan Francs to Gross domestic product (GDP) , with this , it plays a paramount role in the socio economic development while directly providing employment opportunities to Rwandan (BNR., 2020).Even though there is tremendous in construction , also , there was still a loopholes in the industry , Rwanda's construction is still experiencing the problems of which include Inadequate planning expertise, Poor personal liaison of planners with others, Lack of proper communication, Inefficient allocation of construction planning resources, Inadequate contractual provisions for programming, Poor involvement of field personnel, Insufficient time and information for tender preparation, Leak in Contract administrator's programming expertise poor of management, low technical capacity, limited or non-access to credit facilities and minimal work opportunities (MININFRA., 2009).the industry gives contracts to the supplying entities and manufacture industries, induction of jobs and employ the Manship, professional technicians, causal workers with data from Rwanda development Board, more than 50% jobs were created by construction industry in Rwanda on the level unskilled labor market (RDB ,2012) and it becomes the first sector in the country which employ the largest proportion regardless the loopholes appear in this industry causing disruptions

2. Statement of the Problem

The major problem in construction is that of poor performance of construction projects due to poor risk management, this leads to delays, change of scope, and time override and quality issues of the projects. Rwanda has also been a victim of same effects, according to Details of the audit report for the year ended June 30, 2021, which auditor general has presented to Parliament, it highlights that at least 37 contracts worth Rwf201 billion in 28 public entities and projects were delayed for a period of up to six years, more to such cases were also reported by Auditor General of state Finance in his finance report of 2016 where construction projects of maternity ward at Rutare Health center that had delayed for 721 days (Byumba District), at RTDA, construction of access road to Rusizi III hydropower dam that had delayed for over 700 days and at EWSA, contract for construction of water supply system and reservoir had delayed for 496 days.

Numerous existing projects had failed as a result of poor risk management; therefore, the notion of risk management has become extremely popular (Christensen, C.M., Maynor .M McDonald, R., 2015) and risk management in construction industry is looked as complex at high level than other sector while making it as an effective vital risk management (Zeng, An. Smith.,2008), it is ought to reduce the risks from its sourcing to minimum degree of mere impacts in order to achieve success in implementation of every project. Uncertainties are taken as the trouble and difficulties to the success of the projects that are culminated by indispensable for every project handling to improve these un certainties, (Krane, H.P., Rolstadas, A. Olsson, N.O.E. , 2010).It is in this regard; a Researcher initiated a zeal to establish a study on Risk management and performance of construction projects in Kicukiro District. A case of NPD Ltd

3. Specific Objectives of the Study

i. To determine the relationship between risk planning and performance of construction projects implemented by NPD Ltd in Kicukiro district

ii. To assess relationship between risk analysis and performance of construction projects implemented by NPD Ltd in Kicukiro district

iii. To ascertain the relationship between risk response and performance of construction projects implemented by NPD Ltd in Kicukiro district

iv. To examine the relationship between risk mitigation and performance of construction projects implemented by NPD Ltd in Kicukiro district

4. Literature Review

(Gitau.,2015) conducted a study on the effects of risk management at project planning phase on performance of construction projects in Rwanda. The study targeted architects, engineers, project managers, quantity surveyors, contractors, and, regulatory authorities in operation in Rwanda and key clients with major investments in the construction industry. The study used both qualitative and quantitative methods of data collection. Literature review, physical and email delivered questionnaires and structured interviews was used to collect data. The research project indicated that most projects in Rwanda had some input from a qualified engineer and architect.

A study done by Fageha & Aibinu (2013) indicates that adequate front-end project planning with clear project scope definition can alleviate the potential for cost overrun, inadequate project planning and poor scope definition can lead to expensive changes, delays, rework, cost overruns, schedule overruns, and project failure. It adds that the purpose of project definition is to provide adequate information that is needed to identify the work to be performed in order to avoid major changes that may negatively affect project performance (Gibson.,2006).

Changes often reflect the uncertainties that occur during the early stages of the project (Fageha, M.K., Aibinu, A.A., 2013). According to this study, changes are requested as a result of the different perspectives that each stakeholder has on the project. Therefore, having a well-defined project during the pre-project planning stage is crucial for successful project

execution and for achieving a satisfactory project outcome. And this cannot be done without involving all stakeholders in defining the project from early phases. It is irrational to get stakeholders' opinions about the project outcome after the completion, when their involvement is limited. Incomplete project definition can occur when the input of one or more stakeholder is intentionally or unintentionally omitted.

(Kangari, R., 2015) did a study on risk management perceptions and trends of U.S. construction. The study adopted survey research design. The study shows that in recent years, contractors have been more willing to assume risks that accompany contractual and legal problems in the form of risk sharing with the owner. Risks of this type include change-order negotiations, third-party delays, contract delay resolutions, and indemnification and hold harmless. The survey also found that contractors currently assume the risk associated with actual quantities of work, a notable difference from the findings of the ASCE survey. Hazard that can't be exchanged or maintained a strategic distance from, the best prearrangement is to acknowledge the hazard. For this condition the hazard must be controlled, keeping in mind the end goal to limit the event's effect. Perceiving that lingering will exist and reacting either effectively by allotting fitting possibility or inactively doing nothing aside from observing the status of the hazard can be named as hazard acknowledgment. Hazard acknowledgment would likewise imply that making no move on chance was a precisely thought-after choice.

(Ogal, W.O., 2015) looked at Influence of risk management in building projects in Kenya: A case of building projects in Westland's Sub – County. The study employed a descriptive survey design. The study's target population included clients, contractors and consultant in building projects within Westland's Sub - County in Nairobi. A sample size of 32 out of 107 respondents was sampled using stratified random sampling technique. Validity and reliability of the research instrument was measured using Cronbach's alpha and split-half method respectively. Cross tabulation was used to establish the relationship between independent and dependent variables. Chi-squire was used to establish the significance of the differences observed. Confidence level was set at 5%. Binary logistic regression was used to model the relationships established. The results were as follows: building projects in Westland County are procured via two contract type: design-bid-build (68%) and design build contracts (32%). The choice of contract options are determined by project duration/time, financial costs, legal issues and project actors. All the companies surveyed were exposed to a range of risks including risks associated with owners, contractors, political risks, financial risks and other risks. Projects procured via design-build contracts had a higher level of risks associated with designers. The various risks identified are under-mitigated while political risks are not mitigated. Effect of licensing procedures, laws and regulations and influence of policies on arbitrage was not significant for both design-build and design-bid-build. The local contractors and designers should be sensitized on risks mitigation strategies to improve the level of risks mitigation in the county.

(Kjellén, U. Albrechtsen, E.) analysed fatal accidents (N=60) to develop a safety performance indicator suitable for real-time management of major accident hazards in construction. He found that about 70% of the accidents belonged to three main categories: (1) fall from height, (2) driver or person outside the cabin fatally injured by moving construction machine/vehicle, and (3) person fatally injured by load or equipment during material handling. The three main categories were divided into subcategories and analysed to identify barriers to prevent adverse consequences It is challenging to compare the different studies and statistics since there are different variables and categories used for describing accidents, e.g. "deviations", "cause", "accident/injury types" and "central events".

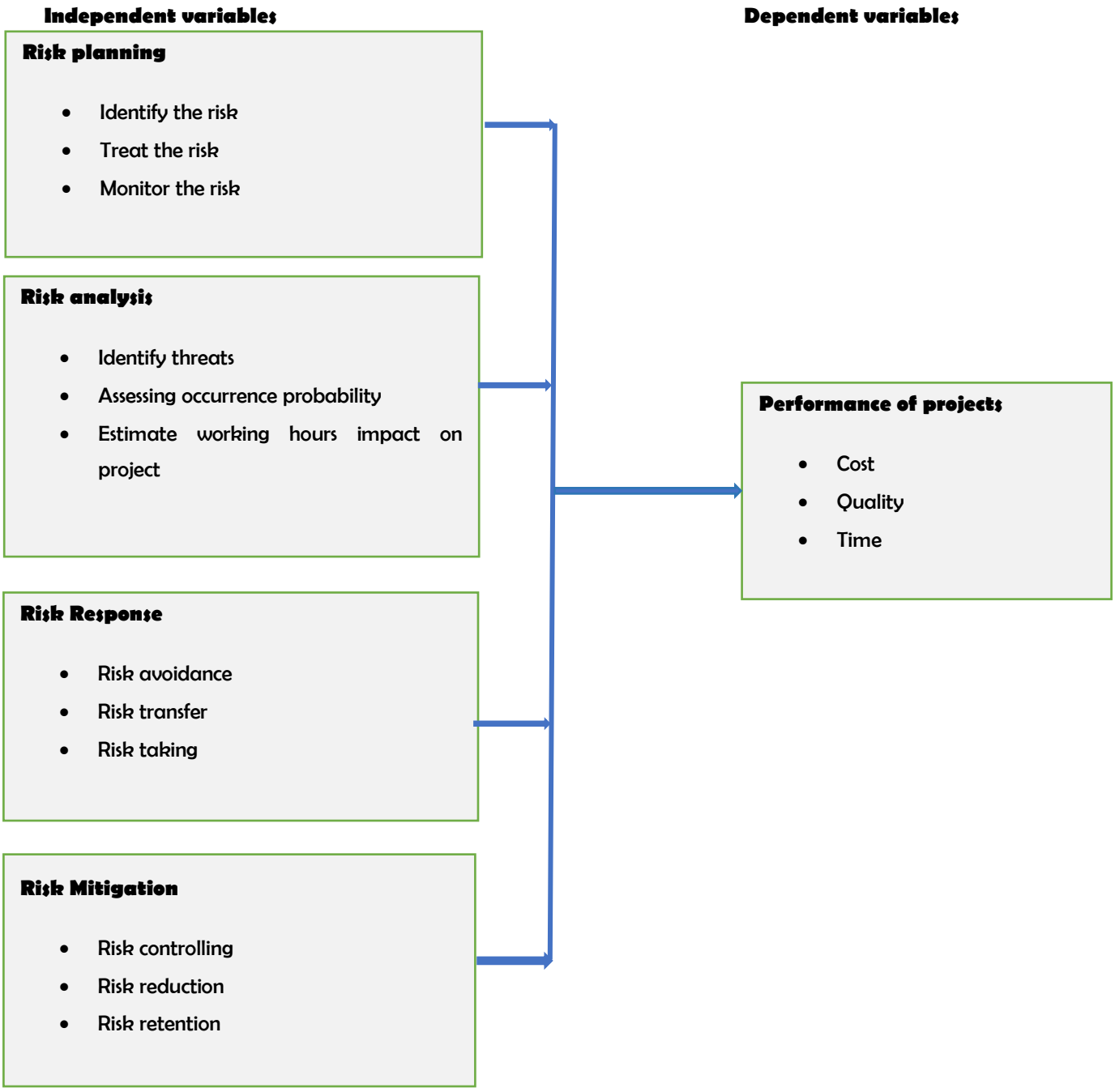
(Amemba.,2015) did a study on the effect of implementing risk management strategies on supply chain performance: a case of Kenya medical supplies agency. This study employed a descriptive research design using a case study. The research established that the level of implementation of risk management strategies in the KEMSA supply chain was medium and that risk identification, risk analysis and evaluation and risk control and monitoring strategies that

were implemented in the KEMSA supply affected the performance to a great extent. The level of undertaking hazard considered worthy in each task might be founded on government or corporate rules. Measures representing a possibly more serious hazard ought to be hailed and exclusively assessed to set up why they are more dangerous. Dangers that are considered to bring pick up as opposed to hurt are probably going to be acknowledged.

(Schieg.,2014) found that risk management savings potentials can be realized in construction projects; for this reason, for project managers as well as real estate developers, a consideration of the risk management process is worthwhile. The risk management process comprises 6 process steps which are Identifying risks; Analyzing risks; Assessing risks; controlling risks; Monitoring risks and controlling goals. The integration of a risk management system in construction projects must be oriented to the progress of the project and permeate all areas, functions and processes of the project. In this, particular importance is attached to the risks in the personnel area, for, particularly for enterprises providing highly qualified services, specialized employees are essential for market success

5. Conceptual Framework

Figure I: Conceptual framework of the study



Source: Researcher, 2023

6. Research Methodology

The research study adopted descriptive and correlational qualitative and quantitative approaches. The researchers consider 600 employees in this study on Risk management and performance of construction projects implemented by NPD Ltd whereas 86 staffs were taken as sample. Researcher used questionnaire accompaniment of the interview activity towards respondents. Both primary and secondary data collection methods were used to ensure collection of firsthand information and second-hand information attained. Multiple correlation regression models was used to analyses the data with aid of SPSS version 22.0 computer software as a tool for analysis

7. 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 ANALYSIS	RISK RESPONSE	RISK MITIGATION	PERFORMANCE PROJECTS
RISK PLANNING	Pearson Correlation	1				
	Sig. (2-tailed)					
	N	85				
RISK ANALYSIS	Pearson Correlation	.693**	1			
	Sig. (2-tailed)	.000				
	N	85	86			
RISK RESPONSE	Pearson Correlation	.456**	.807**	1		
	Sig. (2-tailed)	.000	.000			
	N	85	85	86		
RISK MITIGATION	Pearson correlation	.695**\	.937**	.827**	1	
	Sign.(2-taile)	.000	.000	.000		
	N	85	86	86	86	
PERFORMANCE PROJECT	Pearson Correlation	.617**	.855**	.867**	.827**	1
	Sig. (2-tailed)	.000	.000	.000	.000	
	N	85	85	86	85	86

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

Source: Primary data, 2023

The results present the relationship between Risk management and performance of Road Busanza -Muyange construction project implemented by Nyarutarama property developer (NPD Ltd) in Kicukiro district, Risk Management factors are; Risk Mitigation, Risk Planning, Risk Response, Risk Analysis, 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 analysis, Risk response, Risk mitigation was 0.617, 0.855, 0 .867and 0.827 respectively, it presents that there was a significant relationship between project Risk management and performance of the project.

Regression Analysis

Table 2: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.952[a]	.907	.902	1.08497

A. Predictors: (Constant), Risk mitigation, Risk planning, Risk response, Risk analysis

Source: Primary data ,2023

The results present the Model Summary, the results present that the R Square=0.952, It was clear that 90.7% of all variables of performance f project can be explained by one's of all variables of the Risk management

Table 3: ANOVA[a] of Risk management and performance of project

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	918.250	4	229.562	195.012	.000[b]
	Residual	94.174	82	1.177		
	Total	1012.424	86			

A. Dependent Variable: Performance of Projects

B. Predictors: (Constant), Risk Mitigation, Risk Planning, Risk Response, Risk Analysis

Source: Primary data, 2023

The results indicate ANOVA[a], the results presented than the variables were statistically significant with F=195.012and p value=0.000b, it means that there was a significant relationship between Risk management and performance of project.

Table 4: Coefficients[a] of Risk management ad Performance of project

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	T	Sig.
1	(Constant)	19.927	2.566		7.766	.000
	RISK PLANNING	.078	.110	.036	.712	.479
	RISK ANALYSIS	-.388	.148	-.266	-2.624	.010
	RISK RESPONSE	.538	.103	.337	5.203	.000
	RISK MITIGATION	.754	.093	.879	8.104	.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, was not statistically significant with p value=0.479[b], the Risk Analysis was statistically significant with p value=0.010[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].

According to SPSS generation of table 4.5 in regard to the equation $Y= \beta + \beta X_1 + \beta X_2 + \beta X_3 + \beta X_4 + \varepsilon$ where by Y= Success of project then the Equation served as;

Y= 19.927+0.078X1+-0.388X2+0.538X3+0.754X4

It is in this regard that using the regression equation mentioned above in respect to the holding all constants (Risk Planning, Risk Analysis, Risk Response and Risk Mitigation) in line with the success project was at 19.927, This indicated that, this ensured performance of project, there was a need under the Risk management factors; Risk Planning, Risk Analysis, Risk Response and Risk Mitigation and ensure performance of project.

The SPSS Calculated the t-statistic as t-test increased on 7.766 and t-test turned on 0.712 and t-test decreased on-2.624 and t -test increased on 5.203 and then t-test increased on 8.104. The results present the variables of Risk management; Risk Planning, was not statistically significant with p value=0.479[b], the Risk Analysis was statistically significant with p value=0.010[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 4.5 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 which underwent series of dividing from B value and std error thus attainment of the t-test 19.927diveded by 2.566 resulted to 7.766 as constant, 0.078 divided by 0.110 resulted to 0.712 as Risk planning factor, -0.388 divided by 0.148 resulted to -2.624 as Risk analysis factor, 0.538 divided by 0.103 resulted to 5.203 as Risk response factor, .754 divided by0.093 resulted to 8.104 as value of Risk mitigation factor.

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: $\beta 0$) The study computed simple regression analysis to test the study hypothesis. For p-value<0.05, H0 was rejected; and H1 accepted

H_{01}=There is no significant relationship between risk planning and performance of construction projects implemented by NPD Ltd in Kicukiro district. As evident in Table 4.12, the Unstandardized beta value for risk planning and performance of construction projects implemented by NPD Ltd in Kicukiro was significantly greater than zero (β0.078, p-value=0.479<0.05, t= 0.712). Subsequently the null hypothesis was accepted because p-value=0.000 is greater than 5% level of significant, hence risk planning had a statistically insignificant relationship on performance of construction projects implemented by NPD Ltd in Kicukiro district

H_{02}= There is no significant relationship between risk analysis and performance of construction projects implemented by NPD Ltd in Kicukiro district. As evident in Table 4.12, the Unstandardized beta value for risk analysis and performance of construction projects implemented by NPD Ltd in Kicukiro district was significantly greater than zero (β-0.388, p-value=0.010<0.05, t= -2.624). Subsequently the null hypothesis was rejected because p-value=0.010 is less than 5% level of significant, hence risk analysis Human resource planning had a statistically significant relationship on performance of construction projects implemented by NPD Ltd in Kicukiro district

H_{03}=There is no significant relationship between risk response and performance of construction projects implemented by NPD Ltd in Kicukiro district. As evident in Table 4.12, the Unstandardized beta value for risk response and performance of construction projects implemented by NPD Ltd in Kicukiro district was significantly greater than zero (β0.538 p-value=0.000<0.05, t= 5.203). Subsequently the null hypothesis was rejected because p-value=0.010 is less than 5% level of significant, hence risk response had a statistically significant relationship on performance of construction projects implemented by NPD Ltd in Kicukiro district

H_{04}=There is no significant relationship between risk mitigation and performance of construction projects implemented by NPD Ltd in Kicukiro district. As evident in Table 4.12, the Unstandardized beta value for risk response and performance of construction projects implemented by NPD Ltd in Kicukiro district was significantly greater than zero (β0.754 p-value=0.000<0.05, t= 8.104). 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 relationship on performance of construction projects implemented by NPD Ltd in Kicukiro district.

8. Conclusions

Risk management is a highly valuable stake in any risk operations to ensure to the attainment of the performance success in Construction practices activities. Risk management 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 (**Bazin, N., 2017**). From this perspective 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 analysis, Risk response, Risk mitigation was **0.617, 0.855, 0 .867and 0.827** 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 and Performance of Road Busanza -Muyange Construction Project Implemented by Nyarutarama Property Developer (NPD Ltd) in Kicukiro District

9. Recommendations

The Investors in construction industry should consider the information taken in Risk management and performance of construction project to enable stability in the industry of construction and enhancement of constructed properties

The government (MINIFRA) should know that the outcomes of Risk management and Performance of Road

Construction Project must bring positive impact to Rwandan citizens and the Ministry with its associated Government 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 enhancement.

The MINIFRA should provide regular the publish guidelines to orient properly the construction companies and general public to be able implement Risk management rehearsals while endeavoring the performance of the project in general.

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