International Journal of Construction Engineering and Management 2020, 9(4): 107-118
DOI: 10.5923/j.ijcem.20200904.01

Moderating Influence of Risk Management Practices on the Relationship between Combined Stakeholder Participation in Project Life Cycle and Completion of Urban Roads Transport Infrastructure Projects

Johnson Matu*, Dorothy Ndunge Kyalo, John Mbugua

School of Open and Distance Learning, University of Nairobi, Nairobi City, Kenya

Abstract Studies indicate that there is a relationship between phases of a project life cycle and completion of road projects. The aspect of risk management is either studied separately or without encompassing all the phases of the project life cycle. The objective of the study was to establish the moderating influence of risk management practices on the relationship between combined stakeholder participation in project life cycle management and completion of urban road transport infrastructure projects in Kenya. Descriptive survey and correlation research designs were preferred for this study. The target population was 1593 drawn from Kenya Urban Roads Authority (KURA) project implementation team members (375), KURA project planners and directors (23), road contractor's project management teams (781), consultants, construction supervision teams (85), representatives of Project Affected Persons (213) and complimentary service providers (116). The sample size of the study was, 310 participants, computed using Yamane (1967) formula. Normality tests were conducted by use of Levene test and multicollinearity whereby the Variance Inflation Factor (VIF) were within the recommended range. Multiple and hierarchical regression were conducted and the findings revealed that when risk management was modelled in the second model through hierarchical regression, it was established that risk management had a huge influence on the relationship of stakeholder participation in project life cycle management and completion of urban roads transport infrastructure projects ($R2 = 0.863$, $R2\Delta = 0.142$, $F\ (5,208) = 106.341$, $p<0.001<0.05$). In conclusion, the combined stakeholder participation in project lifecycle management and completion of urban road transport infrastructure projects in Kenya depends on risk management practices. Thus the null hypothesis was rejected. This study plays a critical role in informing the contractors and road agencies bestowed with regulating authority to ensure that risk management is practiced in all stages of construction to ensure projects are completed within time, planned cost, quality specifications and also meeting stakeholder satisfaction. We recommend that risk matrix should be made available and strictly followed during construction of road projects across all parts of the Kenya.

Keywords Urban road transport, Project life cycle management, Risk management practices, Stakeholder participation

1. Introduction

Construction projects are subjected to risk. Risks range from human related to adverse weather in the construction sector. In comparison with other sectors, the construction sector is prone to more risks because of the unique features of construction projects, including taking long to complete, complex processes, vile environment, capital intensity and ever changing organization structures [1]. Therefore, considering effective risk management techniques to mitigate risks is deemed very imperative for the successful execution of a project. These risks can be attributed to poor risk management strategies. These included negative individual attitudes, poor disaster risk management procedures, poor planning activities, low levels of capital formation to manage recovery efforts and poor linkages with national agencies [2].

Public participation is important in the establishment of operative home-grown strategies to mitigate risk yet there has been little research on stakeholder engagement in the creation of infrastructure-project value, in the entire life cycle of a given project. Studies from different settings show that overlooking stakeholders can adversely affect the success of an infrastructure project [3] [4] [5]. In the UK these were attributed as the reason for the poor cost, time and quality performance in the construction sector [2].

In the developing countries, especially in Africa, risk

* Corresponding author:
matupec@gmail.com (Johnson Matu)
Received: April 24, 2020; Accepted: May 16, 2020; Published: August 31, 2020
Published online at http://journal.sapub.org/ijcem

management in the construction is faced with high level of risk. The African Development Bank (AfDB) maintained that transport infrastructure development in Sub-Saharan African countries had been an area of tremendous focus by most governments [6]. The deprived nature of the physical infrastructure such as roads and railways holds back the productivity of the economy in many developing countries. In fact, the African Development Bank in 2011 ranked African Infrastructure Development Index (AIDI) among the four worst performing sectors globally. Poor transport infrastructure does not only limit domestic productivity but also poses huge challenges to the success of regional integration within the least developed countries [7].

In developed countries, however, risk management has become a compulsory part of universal project management and an essential part of effective project management. Even as risk assessment has gained prominence, challenges persist. Apparently project managers are more sensitive to risk at the initial stages of the project compared to the execution stage especially for large infrastructural projects. Therefore, as a result of focusing on the execution phase, approaches for project assessment and on-going evaluation during initial phases are not adequately developed [8].

Stakeholders play a critical role in risk management practices at all the stages of the project cycle in Kenya. Matu, Kyalo, Mbugua and Mulwa [9] conducted a study that established that there was a positive influence of stakeholder participation in project initiation on completion of urban road transport infrastructure projects in Kenya. In another study on stakeholder engagement in the planning stage, Matu, Kyalo, Mbugua and Mulwa [10] concluded that stakeholder participation in project planning significantly influences completion of urban road transport-infrastructure projects in Kenya.

Notably, various studies have demonstrated the importance of risk assessment but have failed to measure the moderating influence of risk management practices [11] [12]. One such study is by Naeem, Khanzanda, Mubashir and Sohail [4] that has studied the "Impact of Project Planning on Project Success with Mediating Role of Risk Management". There is thus a need to use risk management as a moderator in the current study to assess its influence on the relationship between stakeholder participation and completion of urban roads transport infrastructure projects. The null hypothesis, risk management practices does not have a significant moderating influence of aforementioned relationship, was tested to satisfy the objective of the study.

2. Literature Review

This section will present literature on the concept of risk management, measuring project success and completion, stakeholder participation and the project life cycle, risk management and stakeholder involvement. The literature will also cover the agency theory that underpins this study. The literature will lay a foundation for the study.

2.1. Concept of Risk Management

Risk management is defined as the organized procedure of identifying, evaluating, and responding to risks. It comprises of exploiting the likelihood and outcomes of positive events and minimizing the likelihood and outcomes of events that are harmful to the attainment of project goals. The most effective projects exhibit capability to manage efficiently resulting to better outcomes [13]. Risk management is often seen as a chief success factor for all types of projects [14].

Risk management is an expanding field, which the literature has shown can be used not only to control against loss but also as a way to achieve greater rewards [15]. It is also significant as, analysing and assessing potential risks in the early stages of a project help to determine whether the project should be executed at all. The identification phase is considered to be the most important stage of risk management because once a risk has been identified, it can be managed [16]. Furthermore, the sooner the risks are identified, the more the cost and effort of mitigating them can be reduced.

2.2. Measuring Project Successful Completion

Successful completion of urban road transport infrastructure projects is critical to national development and could be effectively measured within the realm of project management systems or processes. In project management practice, project completion is measured using the golden triangle of time, cost and scope or quality [17] [18] [19]. The three success components ought to meet stakeholder's satisfaction [10]. Boukanos [20] conducted research on project success criteria using both theoretical analysis and qualitative data taken from a specific working environment utilizing the balanced scorecard method. It became obvious that there is no consensus on project success definition. The study identified several success definitions from various authors proposing sets of criteria and frameworks for the evaluation of projects. This is due to a high frequency of studies using client satisfaction or stakeholders' satisfaction as a success criterion. The study concluded that the cost, time, quality or technical performance, customer satisfaction, and key stakeholders' satisfaction were the main criteria for measuring project success.

Additionally, Turner, Baccarini and Collins [21] asserted that project success may be perceived differently depending on stakeholder interest and over varying times.

Turner, Grude and Thurloway [22] allude that the stakeholders of the project are the persons who rightfully judge success on completion of the project following project closure. Shenhar and Dvir [23] go beyond that and identify five categories of project success including; efficiency, impact on the team, impact on the customer, business success, and preparing for the future.

Measurement of project completion is also critical for institutions implementing any kind of project since if success cannot be measured, it cannot be improved [24].

2.3. Project Life Cycle and Stakeholder Participation

Stakeholder participation in all stages of the project lifecycle management has been considered vital in contributing to the completion of development projects apparently because of the impact and interest various stakeholders have on the project. Stakeholder participation in projects can be termed as a range of practices in which organizations take a well-thought-out methodology to involve stakeholders [18]. Stakeholder participation has been used for a variety of organizational purposes: as a way for stakeholders to be acquainted with organizational accountability and responsibility, to obtain stakeholder contributions, control risk, construct an organizational image and accomplish managerial control.

Burton, Malone and Huq [25] studied stakeholder engagement approaches and noted that they vary from quite passive interactions, where the stakeholders give information, to "self-mobilization", where the stakeholders themselves instigate and design the process.

The project management life cycle has four phases: initiation, planning, execution, and closure. Project stakeholders' involvement in every phase of the project lifecycle is a critical component of project management literature. In the context of this study, stakeholder participation in project life cycle management would be defined as a deliberate involvement of the individuals or groups who may affect or be affected by the project content or outcome in the various stages or phases of the project management. In other words, it involves the process of engaging all persons or groups who have a defined interest in the initiation, planning, execution and project closure phases of a project. Dealing with individuals, institutions or groups who may affect or may be affected by the project processes, contents, or outcomes has been recognized as a problematic task within project management technique whereby SmartPLS Version 3.0 was used for analysis and testing the research model. The results of the moderating effect of the three risk mitigation strategies on the relationships between delay causes and project performance revealed that both project visibility and flexibility could reduce the negative effects of resource and coordination issues that directly affect project performance[26] [27].

2.4. Risk Management and Stakeholder Participation

The use of risk management practices has hardly been used in the construction industry as a moderator. However, [5] opine that risk is an important moderator for measuring success of projects across industries and countries. Zwikael, Pathak, Singh and Ahmed [28] studied the moderating effect of risk on the relationship between planning and success. The study by Zwikael et.al [28] investigated the effectiveness of planning by analysing 183 project managers. The findings of this study revealed that risk moderates the impact of planning on success. The findings further implied that managers have an obligation of planning in high risk project situations so that project efficiency is attained. In addition to this, steering committees need to be involved in approving low-risk projects to reap more benefits. It should be noted that project success and project completion are terms that are used interchangeably in project management [17] [18]. The terms are derived or make the traditionally known iron triangle of time, cost and quality.

Construction project risks are likely, as alluded by many researchers, to occur during planning and execution phases [29]. The moderating effect of project risk mitigation strategies on the relationship between planning and success of project was studied by [30]. The study used Partial Least Squares Structural Equation Modelling (PLS-SEM).

Urbański, Haque and Oino [31] investigated "The moderating role of risk management in project planning and project success: evidence from construction businesses of Pakistan and the UK." The objective of the study was to investigate the moderating effect of risk management on project planning and project success. The study, thus, established that risk management has a moderate influence on successful implementation of project planning that eventually leads to the success of a project.

Studies have shown that risk management practices have an effect on the relationship between stakeholder participation in project life cycle management and completion of infrastructure projects. As stated by PMI [18] in order to obtain project success, a project manager needs to facilitate the contribution of stakeholders in various project phases. Dissimilar stakeholders will have numerous expectations and requests therefore, even though a project may affect one group of stakeholders negatively, it can have positive effect on another group [28] [9] [10]. There is thus a need for a balanced and unbiased consideration of stakeholder demands. According to Watson, Kumar and Michaelson [32], there is need for a reasoned understanding among the major stakeholders for better outcomes.

Naeem, Khanzanda, Mubashir and Sohail [4] studied the "Impact of Project Planning on Project Success with Mediating Role of Risk Management and Moderating Role of Organizational Culture." The study was descriptive in the sense that it adopted questionnaires. A total of 120 questionnaires were circulated to a sample conveniently picked. Hence, the data collected was primary in nature. While their study used risk management as a mediator, the current study proposed the use of the same as a moderator to measure its influence on the combined stakeholder participation in project lifecycle management. Furthermore, besides planning as used by Naeem et al., [4] the current study has added three more predictor variables which include initiation, execution and project closure.

2.5. Agency Theory

The study was anchored on agency theory. The agency theory is based on a number of assumptions about the man. The most common belief is that Agency Theory is based on the economic model of man [33] [34]. According to Bonazzi and Islam [35], agency theory specifies mechanisms which decrease loss and grow benefits. This theory is significant in managing infrastructure projects and it indeed emphasizes on the need of taking the interest of the stakeholder in all management decision of infrastructure projects. The agency theory is therefore applicable in this study of stakeholder participation in project life cycle management, risk management practices and completion of urban transport infrastructure projects.

2.6. Conceptual Framework

The conceptual framework adopted in this study presents the relationship between the independent and dependent variables and the moderating influence of risk management practices. Figure 1 illustrates this relationship in detail

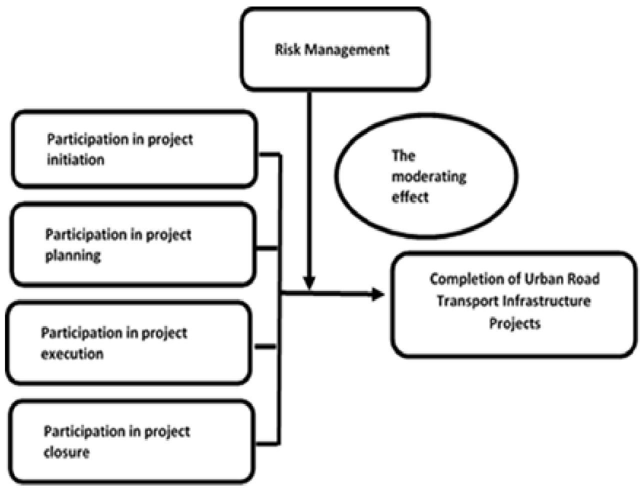

Figure 1. Conceptual Framework showing the relationship between study variables

Figure 1 shows the relationship between combined stakeholder participation in project life cycle management (independent variable), risk management practices (moderating variable) and completion of urban road transport infrastructure projects (dependent variable). The concept of independent variable is explained by these indicators: project initiation, project planning, project execution and project closure. The indicators for moderating variable, risk management practices, are risk identification, risk assessment, risk mitigation and risk control. The moderating influence on completion of urban road transport infrastructure projects is hoped to lead to the following specific benefits: projects completed within expected time, within required cost, meet quality specifications and eventually lead to stakeholder satisfaction.

3. Methodology

The study methodology is described in a five step flowchart.

Step 1: The research process commenced with conceptualization of the study in terms of the research problem, research objective and stating of the null hypothesis. This was followed by a review of related literature to ascertain the knowledge gap and a theory linked to the study.

Step 2: Identify the appropriate research design and research paradigm to guide the study: The philosophical underpinning for this study was pragmatism [36]. Thus the research design adopted was descriptive survey research and correlation research designs yielding to a mix method. Mixed research describes research phenomena in social and natural settings [36].

Step 3: Study population sample size and sampling procedure. Target population of this study was 1593 for population distribution within the 9 counties where there were ongoing projects and those already completed. It was made up of 375 KURA project implementation team members, 23 KURA project planners and department directors, 781 road contractors, 85 consultants, 213 representatives of Project Affected Persons PAPs (Matatu SACCOs, land owners and Kenya Alliance Resident Association), 116 complimentary service providers such as, KPLC, water and sewerage companies, National Land Commission and network providers. The sample size of the study was 310 participants computed using [37] formula. Stratified sampling was used to categorize the population into individual stratum. Purposive sampling was used to select the target population.

Step 4: Instrumentation: The main forms of data collection was self-administered questionnaires, Key Informant Interview (KIIs) and Focus Group Discussions (FDGs). This was necessary for triangulation [39]. The instruments were then piloted. The main purpose of the pilot was to reveal any weaknesses in the research instruments and techniques employed. Upon completion of the pilot study validity and reliability tests were performed as described by [39]. Cronbach alpha was used to calculate reliability whereby a coefficient of 0.852 was obtained. The Cronbach's alpha coefficient was greater than the average of 0.7 and within the threshold of acceptance.

Step 5: Data Collection and Analysis: Data was collected using the self-administered tool in all the study sites. The study then employed both descriptive and inferential statistics for the data analysis. To be able to show the relationship between the independent variable and the dependent variable Pearson correlation coefficient analysis was performed. To establish the strength of this relationship, multiple regression and hierarchical regression, for moderation, was performed [40]. The Statistical Package for Social Sciences (SPSS) version 23 was used in the analyses. To measure central tendency and dispersion, means and standard deviation were employed.

The methodology is summed up using a research flowchart. The flowchart will provide a simple structure towards easy understanding of the current works, methods and practices, [41] Figure 2.

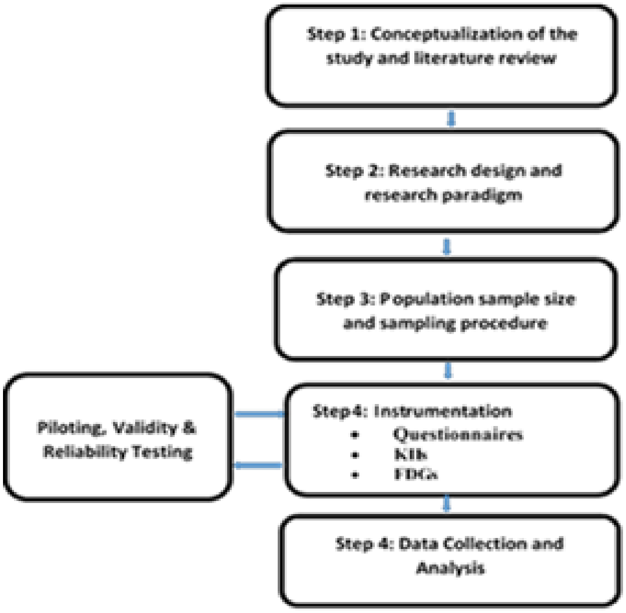

Figure 2

4. Results

The results of the study are presented in three parts, part one (4.1 to 4.4) is the normality test which included collinearity statistics and the Levene test as is necessary for regression analysis.

The second part (4.2 to 4.4) presents the descriptive analysis of performance of urban roads transport were four descriptive analysis results are presented (i) performance of urban roads transport infrastructure projects being the descriptive statistics for the dependent variable (ii) descriptive analysis of combined stakeholder participation in project life cycle management being the descriptive analysis for the independent variable (iv) the descriptive analysis of risk management practices which was the moderating variable.

The third part (4.5) presents the moderating influence of risk management practices on relationship between stakeholder participation in project lifecycle management and completion of urban road transport infrastructure projects.

It is noteworthy that the questionnaire response rate was 69.0% which was within the recommended response rate [39]. It was therefore, considered appropriate and enough.

4.1. Normality Tests

Tests for normality were conducted as a requirement for multiple regressions. The multicollinearity test (Table 1) revealed that the independent variables were uncorrelated.

The Variance Inflation Factor (VIF) values for the five variables were less than 10 whereas the tolerance values were greater than 0.1, indicating that there was no Multicollinearity.

Table 1. Collinearity Statistics

	Collinearity Statistics	
	Tolerance	VIF
Participation in project initiation	0.927	1.079
Participation in project planning	0.466	2.146
Participation in project execution	0.603	1.658
Participation in project closure	0.638	1.567
Risk management Practices	0.776	1.289

This test checks whether the variance of the dependent variable varies across the data (test of the assumption of equal variance). Levene test was used to check for heteroscedasticity where if P-value< 0.05 is an indication of presence of non-uniform variance. The test results were as shown in Table 2.

Table 2. Levene Test Results

	Levene Statistic	Df1	Df2	Sig.
Participation in project initiation	0.183	1	212	0.021
Participation in project planning	2.171	1	212	0.014
Participation in project execution	3.172	1	212	0.031
Participation in project closure	4.238	1	212	0.003
Risk management Practices	1.211	1	212	0.047
Completion of urban roads transport infrastructure projects	2.331	1	212	0.034

The p-value for all the variables were less than 0.05 (Table 2), hence the null hypotheses for equal variances was rejected. The data set presented had no heteroscedasticity and therefore it was suitable for modeling of regression equations.

4.2. Descriptive Analysis of Performance of Urban Roads Transport

Completion of road projects was measured based on four indicators: Time, Cost, and Quality and Stakeholder satisfaction (Table 3).

Table 3. Performance of Urban Roads Transport Infrastructure Projects

Variable Dimension/Indicator	Sub-Composite Mean (M)	Sub-composite Std. Dev.
Project Completion within Time	3.72	0.812
Project Completion within Cost	4.04	0.974
Project Completion within Specified Quality	4.23	0.837
Stakeholder Satisfaction	4.40	0.758
Composite Mean and standard deviation	**4.10**	**0.845**

Results (Table 3) indicate that the overall mean of performance of urban roads transport infrastructure projects was 4.10. The most dominant indicator was stakeholder satisfaction (m=4.40). This is to mean that the final product met the stakeholders' needs and would serve the intended purpose as had earlier been planned. The benefits associated with stakeholders' satisfaction included reduced travel time, commercial investments began sprouting in the vicinity within the constructed road, the land gained value and therefore some of the community members could afford to sell part of it to the outsiders and get some money for personal or socio-economic development and road safety for pedestrians had tremendously improved. On the contrary, the *'matatu'* (matutu refers to public transport) fares did not change much and this could be because of various factors not found within the contractors' powers but within *'matatu'* operators. The opinions on this dimension were converging because the sub composite standard deviation was 0.812 below the composite standard deviation of 0.845.

The second best dimension was project being completed within specified quality (M=4.23) whereby the study revealed that road surface was smooth and comfortable for riding on, flooding does not occur during heavy rains and the road sections could easily be maintained in the future. The study however noted that quality tests after completing the project were not performed within the required specifications and that minimum repair works on the completed roads were not well done or adequately carried out. Most of the opinions on this dimension were diverging since the sub composite standard deviation was 0.974 above the composite standard deviation of 0.845.

On the dimension, project completion within cost (M=4.04) was not adequately achieved because there was fluctuation of cost in fuel, materials used and the labour employed. The study also revealed that there was delay in payment of the contractors, variations in the scope of works, which caused an increase in cost of project and project managers failing to monitor project activities, which could have reduced cases of cost overruns. The study also noted that there were no design omissions to contribute to additional cost. This third dimension therefore does adversely influence road performance. Opinions on this dimension converged given the sub composite standard deviation was 0.837 below the composite standard deviation of 0.845.

Finally, project completion within time (M=3.72) was not met. This is because land acquisition process for building road could have taken more time hence affecting the timelines or there was no clear dialogue and understanding the sellers (community members) and the buyers (government) hence need to improve on this aspect. Others included: delay in relocation of existing service lines (power, water, sewer, data, telephone); and, evacuation of informal settlement which might have taken quite longer duration of time. Although there may have no many variation orders in the construction phase, the ultimate project implementation was not on schedule. In overall, this dimension adversely affected road performance. There was consistency of opinions on this dimension because the sub composite standard deviation was 0.758 below the composite standard deviation of 0.845.

4.3. Descriptive Analysis of Combined Stakeholder Participation in Project Life Cycle Management

Combined stakeholder participation in project life cycle management was considered in terms of Stakeholder Participation in project initiation, planning, execution and project closure (Table 4).

Table 4. Combined Stakeholder Participation in Project Life Cycle Management

Variable Dimension/Indicator	Mean (M)	Std. Dev.
Stakeholder Participation in project initiation	3.50	0.921
Stakeholder Participation in project planning	3.59	0.958
Stakeholder Participation in project execution	3.93	0.847
Stakeholder Participation in project closure	3.49	0.828
Composite mean and standard deviation	**3.63**	**0.889**

The composite mean (Table 4) was computed (M=3.63) and used to determine the whether the individual indicators of combined stakeholder participation in project life cycle were either influencing project completion positively or negatively. This was done by taking the line item mean of an indicator and comparing it with the composite mean. In the case where the mean of the indicator was higher than the composite then it implied that the indicator had a positive influence and vice versa. Thus, the dominant indicator stakeholder participation in project execution (M=3.93) positively influenced project completion of urban roads. The rest of the three indicators revealed a weak or negative influence on project completion.

4.4. Risk Management Practices and Completion of Urban Road Transport Infrastructure Projects

Risk management practices were measured by risk identification, risk assessment, risk mitigation and risk monitoring. The respondents were asked to indicate their level of agreement on various statements linked to risk management practices indicators. The questionnaire had a 5 point Likert scale ranging from 5 = strongly agree, 4 = agree, 3 = Neutral, 2 = disagree and 1= strongly disagree. The results were presented in Table 5.

Result (Table 6) show that a composite mean and standard deviation were computed whereby a line item mean and standard deviation were used for comparison. On one hand, where the line item was found to be lower than the composite mean, the statement or the item influenced the outcome negatively. On the other hand, a lower standard deviation to the composite standard deviation was an indication that the responses were convergent or consistent and vise-versa.

Statement R-01, the mean was 4.51 higher than the composite mean of 3.65, which implies that stakeholders identified land acquisition and relocation of utility service lines as risks. This had a positive influence on the completion of urban roads. The standard deviation on the statement was 0.655 lower than 0.966 the composite standard deviation indicating convergence of opinions.

Table 5. Risk Management Practices and Completion of Urban Road Transport Infrastructure Projects

	Statement	Mean	Std. Dev.
	Risk Identification		
R-01	Stakeholders identified land acquisition and relocation of utility service lines as risks	4.51	0.655
R-02	Fluctuation in the cost of fuel and construction materials was identified as a risk	4.17	0.830
R-03	Prolonged heavy rains was identified as a risk	4.02	1.075
R-04	Design changes arising from unforeseen underground geological condition were identified as a risk	3.98	0.911
R-05	Delayed payments is a common risk in road construction projects	4.11	1.120
	Risk Assessment		
R-06	All stakeholders involved in the assessment of the risks and uncertainties during the design phase of the projects	2.67	1.104
R-07	The probability and impact of the risks was assessed by key stakeholders	2.56	1.246
R-08	Delay in payments is a risk to the completion of the project.	4.43	0.884
R-09	There were adequate road designs to curb the risk of delayed completion of the project	3.62	0.994
R-10	Fluctuation in the cost of materials is not a risk to the project Risk Mitigation	2.33	1.073
R-11	Avoidance of land acquisition helped in reducing the risk of delay in completion of the project.	4.18	1.039
R-12	Sub-contracting the works, increasing human resources and construction equipment reduced the risk of delay in the project.	4.00	0.964
R-13	I Regular meetings held with stakeholders helped manage risks	3.98	1.007
R-14	Purchase of construction materials at the beginning of construction reduces the risk of fluctuation in prices and foreign exchange	4.02	1.070
R-15	Addition of 10% of the construction cost estimates as a contingency to cover risks associated with unforeseen risks helped in road projects completion	4.51	0.774
	Risk Monitoring and Controlling		
R-16	Monitoring and controlling of the road project's schedule and cost was observed	3.67	1.068
R-17	A risk matrix was used throughout the project life cycle	1.39	0.790
R-18	A material-laboratory on site was effectively used to monitor and control risks associated with poor quality of materials and workmanship.	4.08	0.877
R-19	Monthly progress meetings assisted in monitoring and controlling risks associated with community complaints and slow progress of works.	4.17	0.846
R-20	Dispute resolution board assisted in controlling construction risks associated with the project's costs through expeditious evaluation of contractors claims	2.65	1.004
	Composite mean and standard deviation	**3.65**	**0.966**

Statement R-02, the mean was 4.17 above the composite mean of 3.65, which shows that fluctuation in the cost of fuel and construction materials were identified as a risk to the final cost of the project leading to a positive influence on the road infrastructural completion. The standard deviation was 0.830 below the composite standard deviation, which was 0.966 showing that opinions converged.

Statement R-03, the item mean score was 4.02 higher than the composite mean of 3.65 implying that prolonged heavy rains was identified as a risk that could cause delay to the project hence a by identifying this risk in time, it impacted positively on the completion of the road. The standard deviation was 1.075 higher than the composite standard deviation of 0.966, indication that opinions diverged.

Statement R-04, the mean was 3.98 above the composite mean of 3.65 which implied that design changes arising from unforeseen underground geological condition were identified as a risk which could affect the cost of the road project leading thus this early identification led to a positive influence on the road project completion. The standard deviation obtained on the statement was 0.911 below the composite standard deviation of 0.966 yielding to convergence of the opinions.

Statement R-05, the mean of the statement was 4.11 higher than the composite mean of 3.65 implying that delayed payments is a common risk in construction or road projects. The standard deviation was 1.120 above the composite standard deviation of 0.966 which indicated that opinions diverged.

Statement R-06, the mean was 2.67 was lower than the composite mean of 3.65 implying that stakeholders were not all involved in the assessment of the risks and uncertainties during the design phase of the projects. This had a negative influence on the project considering that inability to involve all the stakeholders in risk assessment would mean some challenges encountered along the implementation phase presented a new scenario that the project team could not handle. This therefore needs to be factored in the future road project planning stages. The standard deviation was 1.104 above the composite standard deviation of 0.966, hence divergence of opinions.

Statement R-07, the mean was 2.56 below the composite mean of 3.65 thereby indicating that the probability and impact of the risks was not assessed by key stakeholders and hence did not help in controlling the project cost, time and quality, hence poor or late completion of the road projects in urban areas. Generated on this statement was a higher a standard deviation of 1.246 compared to the composite standard deviation of 0.966 implying that opinions diverged.

Statement R-08, the mean score was 4.43 higher than the composite mean of 3.65 which implied that delay in payments was properly assessed and ranked as the highest risk to the completion of the project. This also indicates this item has a significant influence on the completion of road projects. Opinions on this statement converged since the standard deviation was 0.884 lower than the sub-composite standard deviation of 0.966.

Statement R-09, the mean score was 3.62 lower than the composite mean of 3.65. Based on these results, it is clear that inadequate road design has a medium risk hence it does have some negative influence on completion of the road if not properly considered during implementation period. The standard deviation was 0.994 lower than the composite standard deviation of 0.966 suggesting that opinions were consistent.

Statement R-10, the mean was 2.33 lower than the composite mean of 3.65 implying that fluctuation in the cost of materials was perceived as a risk to the completion of road projects hence it did negatively influence the completion of road project. This could indicate that the roads were constructed when the market prices had stabilized hence delay in completion. The standard deviation of this statement was 1.073 higher than the composite standard deviation of 0.966 implying that opinions were not consistent.

Statement R-11, the mean was 4.18 above the composite mean of 3.65, which implied that avoidance of land acquisition helped in reducing the risk of delay in completion of the project and this positively influence the completion of road. The standard deviation was 1.039 above 0.966 the composite standard deviaton hence opinions diverged.

Statement R-12, the mean score was 4.00 higher than the composite mean of 3.65 implying that sub-contracting the works, having increased human resources and construction equipment positively reduced the risk of delay in the project. The line item thus did influence road completion positively. The standard deviation was 0.964 below the composite standard deviation of 0.966 which indicated convergence in opinions from the respondents.

Statement R-13, the mean score was 3.98 above 3.65 the composite mean implying that regular meetings were held with stakeholders to manage risks. This impacted positively on the completion of road. The standard deviation was 1.007 higher than the composite standard deviation of 0.966 indicating that opinions diverged.

Statement R-14, the mean was 4.02 above the composite mean of 3.65 which implied that purchase of construction materials at the beginning of construction reduced the risk of fluctuation in prices and foreign exchange and this would have much influence on the completion of road. The standard deviation on this statement was 1.070 above 0.966 of the composite standard deviation, hence opinions on the statement diverged.

Statement R-15, the mean score was 4.51 higher than the composite mean of 3.65. This implied that it is a normal practice in the construction sector to add 10% of the construction cost estimate as a contingency to cover risks associated with unforeseen risks in road projects hence positively influencing completion of the road. The standard deviation was 0.774 lower than 0.966 the composite standard deviation implying that opinions were convergent.

Statement R-16, the mean was 3.67 higher than the composite mean of 3.65 implying that stakeholders were involved in the supervision of the project to monitor and control the project schedule and cost, which influenced completion of the road positively. The standard deviation was 1.068 greater than the composite standard deviation, 0.916, hence divergence in respondents' opinions.

Statement R-17, the mean was 1.39 below the composite mean of 3.65 implying that either a risk matrix was not there or if it was there then it was used sparingly across the project life cycle. This could have had a negative influence on completion of road projects. The standard deviation was 0.790 below the composite standard deviation, 0.966, suggesting convergence in opinions gathered.

Statement R-18, the mean score was 4.08 higher than the composite mean of 3.65. This implied that a material-laboratory on construction site was effectively used in monitoring and controlling risks associated with poor quality of materials and workmanship. This further implies that the statement positively influenced completion of road. The standard deviation of the statement was 0.877 below 0.966 the composite standard deviation, hence opinions were consistent.

Statement R-19, the mean was 4.17 higher than the composite mean of 3.65 implying that monthly progress meetings played key role in assisting in monitoring and controlling risks associated with community complaints and slowing progress of works. This exercise had a positive influence on the completion of road. Convergence of opinions on this statement was supported by a lower standard deviation of 0.846 compared to a sub-composite standard deviation of 0.966.

Statement R-20, the mean was score generated on this statement was 2.65 lower than the composite mean of 3.65 implying that dispute resolution board did not assist in controlling construction costs-related risks. This could have been affected by failure to expeditiously evaluate the contractors' claims. Eventually, this had a significant negative influence on completion of road projects. The standard deviation obtained was 1.004 higher than the composite standard deviation of 0.966 indicating that the opinions recorded from this statement were diverging.

4.5. Moderating Influence of Risk Management Practices on Relationship between Stakeholder Participation in Project Lifecycle Management and Completion of Urban Road Transport Infrastructure Projects

The hypothesis of the study stated, "Risk management practices does not have a significant moderating influence on the relationship between stakeholder participation in project lifecycle management and completion of urban road transport infrastructure projects in Kenya". Moderated influence in a regression model shows the influence of an independent variable on the dependent variable as a function of the third variable. The aim is to examine how the independent variables vary when a moderating variable is introduced in the model. The model was expressed as:

Completion of urban roads construction projects = f (Risk management practices +Participation in project initiation + Participation in project planning + Participation in project execution + Participation in project closure).

$$Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + \beta_6 X_1X_{2-}X_3X_4X_5 + e$$

Where:

Y= Completion of urban road transport infrastructure projects in Kenya

β_0= constant

$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6$ = Beta coefficients

$\mathbf{X_1}$ = Stakeholder participation in project initiation

$\mathbf{X_2}$ = Stakeholder participation in project planning

$\mathbf{X_3}$ = Stakeholder participation in project execution

$\mathbf{X_4}$ = Stakeholder participation in closure

$\mathbf{X_5}$ = Risk management practices

$(X_1X_2X_3X_4X_5)$ = Interaction term (Product of $X_1X_{2-}X_3X_4X_5$)

e = error term

The moderating influence of risk management practice on the relationship between stakeholder participation in project lifecycle management and completion of urban road transport infrastructure projects in Kenya, analysis was carried out in two steps:

Step one: Influence of Stakeholder participation in Project Lifecycle Management on Completion of Urban Road Transport Infrastructure Projects in Kenya

In step one, the independent variable stakeholder participation in project lifecycle management was regressed on completion of urban road transport infrastructure projects in Kenya. The results are presented in Table 6.

Step Two: Influence of Combined Stakeholder participation in project lifecycle management and Risk Management Practice on Completion of urban road transport infrastructure projects in Kenya

In step two the influence of the moderator (risk management practice) was introduced into the model between stakeholder participation in project lifecycle management and completion of urban road transport infrastructure projects in Kenya. The results are presented in Table 7.

The results (Table 7) show that after introduction of risk management practices into the relationship, and the interaction term in model 2 increased the R square by 0.142. This implies that the interaction between risk management practices and Combined Stakeholder participation in project lifecycle management explains 14.2% variations in completion of urban road transport infrastructure projects. F was at F (5,208) =106.341, p<0.001<0.05) and therefore the overall moderating influence was significant.

Table 6. Combined Stakeholder Participation in Project Lifecycle Management and Completion of Urban Road Transport Infrastructure Projects in Kenya

Model Summary						
Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error**	**F**	**p-value**
1	0.849	0.721	0.715	1.131	134.785	.000

ANOVA Tables						
Model		**Sum of Squares**	**Df**	**Mean Square**	**F**	**Sig**
1	Regression	921.983	4	230.496	134.785	.000[b]
	Residual	357.41	209	1.710		
	Total	1279.393	213			

Regression Coefficients						
Model		**Unstandardized Coefficients**		**Standardized Coefficients**	**T**	**Sig.**
		B	Std. Error	Beta		
1	(Constant)	1.267	0.182		6.962	.001
	Stakeholder participation in project initiation	0.889	0.143	0.859	6.217	.014
	Stakeholder participation in project planning	0.895	0.245	0.838	3.653	.013
	Stakeholder participation in project execution	0.802	0.212	0.796	3.783	.007
	Stakeholder participation in project closure	0.911	0.265	0.855	3.438	.016

Predictors: (constant), Stakeholder participation in project initiation, Stakeholder participation in project planning, Stakeholder participation in project execution, Stakeholder participation in project closure

Dependent Variable: Completion of urban road transport infrastructure projects

Table 7. Combined Stakeholder Participation in Project Lifecycle Management, Risk Management Practice and Completion of Urban Road Transport Infrastructure Projects in Kenya

Models Summary

Model	R	R Square	Adjusted R Square	Std. Error	F	p-value
1	.849	.721	0.715	1.131	134.785	.000
2	.929	.863	.860	.724	260.874	.000

Model		Sum of Squares	Df	Mean Square	F	Sig
1	Regression	921.983	4	230.496	134.785	.000^b
	Residual	357.41	209	1.710		
	Total	1279.393	213			

ANOVA

Model		Sum of Squares	Df	Mean Square	F	Sig
2	Regression	909.918	5	181.984	260.874	.000^b
	Residual	145.099	208	0.698		
	Total	1055.017	213			

Regression Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig
		B	Std. Error	Beta		
2	(Constant)	1.278	0.191		6.691	.000
	Stakeholder participation in project initiation	0.817	0.311	0.718	2.627	.009
	Stakeholder participation in project planning	0.612	0.217	0.609	2.820	.005
	Stakeholder participation in project execution	0.599	0.278	0.489	2.155	.032
	Stakeholder participation in project closure	0.789	0.316	0.611	2.497	.013
	Risk management practice	0.576	0.104	0.459	5.538	.000

Predictors: (constant), Stakeholder participation in project initiation, Stakeholder participation in project planning, Stakeholder participation in project execution, Stakeholder participation in project closure, Risk Management practices

Dependent Variable: Completion of urban road transport infrastructure projects

The null hypothesis was therefore rejected and it was concluded that the significant relationship between Combined Stakeholder participation in project lifecycle management and completion of urban road transport infrastructure projects in Kenya depends on risk management practices.

5. Discussion

The findings show that risk management practices significantly moderate completion of urban roads transport infrastructure projects. This is similar to the findings of Naeem, et al. [4] although the risk management was used as a mediator. This shows that the variable can either way be used as moderator or a mediator. The study by Naeem, et al. [4] aimed at examining the impact of project planning on project success with the mediating role of risk management and moderating role of culture. Findings of the present study are also consistent with the previous literature which point out that better planning (risk management) in the project life cycle has positive impact on the ultimate project results [4] [44].

The current study found that by including risk management practices in the second model, there was a significant impact from 71.5% to 86.0% implying that the use of the moderator can improve performance in terms of completion of urban roads transport infrastructure projects by 14.5%. This is very much in line with Zwikael, et al. [28] and Zailani, et. al [30] that project risk moderates the impact of planning on success. The current findings further support Urbański, et al. [31] who found that risk management has a moderate influence on successful implementation of project planning, and that would eventually result to the project success.

The findings of the current study also show that project completion was not within scheduled time (Mean of 3.72). According to Mohamed [42], project's delays and cost overruns are directly related to risks of poor stakeholder-needs-identification. However, with risk management practices mechanism in place then stakeholder participation and completion of roads would positively be moderated thus improved completion of road transport projects. The current study further points out that risk management practices can significantly moderate risks within project life cycle. This is consistent with Goh and Hoffman [43] who opined that by having a robust risk management in the construction sector, the contractors should be able to achieve the objectives of the project in each stage of project life cycle.

The study is consistent with several studies that point to the importance of stakeholder participation is in the establishment of operative home-grown strategies to mitigate risk in the formation of infrastructure-project value, in the entire life cycle any given project. Studies from different [3] [4] [5].

6. Conclusions

Based on the findings it was concluded the relationship between combined stakeholder participation in project lifecycle management and completion of urban road transport infrastructure projects in Kenya is significantly influenced by risk management practices as a moderator. This implies that there a need for effective risk management matrix throughout the project life cycle. This will assist in monitoring and controlling risks associated with community complaints and slow progress of works. This will generally improve the overall completion of urban road transport infrastructure projects since the appropriate strategies would be formulated to mitigate these risks.

7. Recommendations

Based on the findings, we recommend the institutionalization of risk management within the construction industry to ensure completion of roads is successfully achieved through a participatory approach.

The study further recommends that dispute resolutions bodies should be empowered to effectively execute their mandate through capacity building on risk mitigation and stakeholder engagement.

The study also recommends that that project managers should identify project vulnerabilities to risk and their institutions capacity in terms of human, financial and other resources and close the gap since risks are almost inevitable.

The study also recommend that project managers must always look at a project stages collectively and involve stakeholders in risk mitigation in all stages of the project life cycle.

ACKNOWLEDGEMENTS

We wish to acknowledge the University of Nairobi for according the first author supervisory support during the Doctoral Studies from which this paper is extracted.

We thank KURA project implementation teams' members; KURA project planners and directors; road contractor's project management teams; consultants construction supervision teams; representatives of PAPs, and complimentary service providers; all those who have not been mentioned but played a role in my academic pursuit are most appreciated.

REFERENCES

[1] Fukayama, H., Fernandes, E. & Ebecken, N. F. F. (2009). Risk management in the aeronautical industry: Results of an application of two methods. WIT Transactions on Information and Communication Technologies, 39(1), 195-204.

[2] Wedawatta, G., Ingirige, B., Jones, K. & Proverbs, D. (2011), Extreme weather events andconstruction SMEs: Vulnerability, impacts, and strategies, Structural Survey, 29(2), 106 – 119, doi: http://dx.doi.org/10.1108/02630801111132795.

[3] Wojewnik-Filipkowska, A., Dziadkiewicz, A., Dryl, W., Dryl, T. and Bęben, R. (2019), "Obstacles and challenges in applying stakeholder analysis to infrastructure projects: Is there a gap between stakeholder theory and practice?" Journal of Property Investment & Finance, Vol. ahead-of-print No. ahead-of-print. https://doi.org/10.1108/JPIF-03-2019-0037.

[4] Naeem, S., Khanzanda, B., Mubashir, T & Sohail, H. (2018). Impact of Project Planning on Project Success with Mediating Role of Risk Management and Moderating Role of Organizational Culture. International Journal of Business and Social Science, 9(1), 88-98.

[5] Zwikael, O., Ahn, M. (2011). The Effectiveness of Risk Management: An Analysis of Project Risk Planning Across Industries and Countries. Risk Analysis: An International Journal. Vol. 31, Iss. 1; pp.25-37.

[6] African Development Bank (AfDB). (2014). Country Strategy Paper (2014 – 2018) for Kenya.

[7] Africa Competitiveness Report (2013). Engineering Education and Construction industry.

[8] Burcar Dunovic, B. I., Radujkovic, M. & Vukomanovic, M. (2016). Internal and external risk based assessment and evaluation for the large infrastructure projects. Journal of Civil Engineering and Management, 22(5), 673–682.

[9] Matu, J., Kyalo, D., Mbugua, J. and Mulwa, A. (2020a) Stakeholder Participation in Project Initiation: A Foundation to Completion of Urban Road Transport Infrastructure Projects, Kenya, Journal of Civil, Construction and Environmental Engineering. Vol. 5, No. 1, 2020, pp. 11-19. doi: 10.11648/j.jccee.20200501.12.

[10] Matu, J., Kyalo, D., Mbugua, J. and Mulwa, A. (2020b) Stakeholder Participation in Project Planning: Prerequisite to Effective Completion of Urban Road Transport Infrastructure Projects in Kenya. Journal of Building Construction and Planning Research, 8, 73-91. doi: 10.4236/jbcpr.2020.81006.

[11] Chelishe, N., & Kikwasi, G. J. (2014). Critical Success Factors for Implementation of Risk Assessment and Management Practices within the Tanzanian Construction Industry. Engineering, Construction and Architectural Management, 21(3), 291-319.

[12] Aduma, L. K., & Kimutai, G. (2018). Project risk management strategies and project performance at the National Hospital Insurance Fund in Kenya. International Academic Journal of Information Sciences and Project Management, 3(2), 80-110.

[13] Greiman, V. A. (2013). Megaproject management: Lessons on risk and project management from the Big Dig. Hoboken: John Wiley & Sons.

[14] Grant, K. & Cashman, M.A. & Christensen, A. P. (2009). Large UK companies and derivatives. European Financial Management, 3(2), 191-208.

[15] Dey, P.K. (2010). Managing project risk using combined analytic hierarchy process and risk map. Applied Soft Computing, 10 (4), 990–1000.

[16] Haifang, C., Shimiao, J. & Danfeng, Z. (2010). 'Risk identification of public infrastructure projects based on VFPE'. The 2nd International Conference on Computer and Automation Engineering (ICCAE), Computer and Automation Engineering (ICCAE), 4(1), 173-175.

[17] Shariatfar, M., Beigi, H. & Mortaheb, M. M. (2019). Assessing Lifecycle Success of Petrochemical Projects–based on Client's Viewpoint. KSCE Journal of Civil Engineering, 23(1), 21-28.

[18] PMI. (2013). A Guide to Project Management Body of Knowledge, 5th Ed. Newtown Square: Project Management Institute.

[19] Abdou, O. A. (2012). Managing construction risks. Journal of Architectural Engineering, 2(1), 3-10.

[20] Boukanos, A.K. (2017). The Criteria of Project Success School of Business and Management of City University. Clerkenwell: The Press.

[21] Turner, A., Baccarini, S. & Collins, B. A. (2014). Demographic differences in organizations: Current research and future directions. New York: Lexington Books/Macmillan.

[22] Turner, J. R., Grude, K. V. & Thurloway, L. (Eds.). (2012). The project manager as change agent: leadership, influence and negotiation. London: McGraw-Hill.

[23] Shenhar, A. J. & Dvir, D. (2017). Reinventing Project Management: The diamond approach to successful growth and innovation. Boston: Harvard Business School Press.

[24] Scherer, T. (2019). The BIM impact on stakeholder management in airport construction projects. A Doctoral dissertation, École de technologie supérieure.

[25] Burton, I., Malone, E. & Huq, S. (2013). Adaptation Policy Frameworks for Climate Change: Developing Strategies, Policies and Measures. Cambridge: Cambridge University Press.

[26] Silva, F. P., Jerónimo, H. M. & Vieira, P. R. (2019). Leadership competencies revisited: A causal configuration analysis of success in the requirements phase of information systems projects. Journal of Business Research, 5(41), 159-4.

[27] Davis, K. (2014). Different stakeholder groups and their perceptions of project success. International Journal of Project Management. 32(2), 189-201.

[28] Zwikael, O., Pathak, R. D., Singh, G., & Ahmed, S. (2014). The moderating effect of risk on the relationship between planning and success. International Journal of Project Management, 32(3), 435-441.

[29] Smith, N.J., Merna, T. and P. Jobling. (2006). Managing Risk in Construction Projects. Oxford: Blackwell.

[30] Zailani, S., Ariffin, H. A. M., Iranmanesh, M.,and Moeinzadeh, S. (2016). The Moderating Effect of Project Risk Mitigation Strategies on the Relationship Between Delay Factors and Construction Project Performance. Journal of Science and Technology Policy Management, 7(3).

[31] Urbanski, M., Haque, A., & Oino, I. (2019). The Moderating Role of Risk Management in Project Planning and Project Success; Evidence from Construction Business of Pakistan and the UK. Engineering Management in Production Services, 11(1), 23-25.

[32] Watson, W.E., Kumar, K., & Michaelson, L.K. (2012). Cultural diversity's impact of interaction process and performance: comparing homogenous and diverse task groups'. Academy of Management Journal, 36(1), 590–602.

[33] Shapiro, S.P. (2015). Agency theory. Annual Review of Sociology, 31(2), 41-42.

[34] Asher, C.C., Mahoney, J.M. & Mahoney, J.T. (2015). Towards a property rights foundation for a stakeholder theory of the firm. Journal of Management and Governance, 9(1), 5-32.

[35] Bonazzi, L. & Islam, S. M. (2014). Agency theory and corporate governance: A study of the effectiveness of board in their monitoring of the CEO. Journal of Modelling in Management, 2(1), 7-23.

[36] Wambugu, L. N., Kyalo, N. D., Mbii, M. & Nyonje, R. O. (2015). Research Methods: Theory and Practice. Nairobi: Aura Publishers.

[37] Yamane, T. (1967). Statistics: An introductory analysis. New York: Harper & Row.

[38] Kothari, C. R. & Garg G. (2014), Research Methodology, Third Edition, New Age International Publishers, NewDelhi.

[39] Burns, R. (2009). Introduction to research method. (Ed.) reed. Melbourne: Longman.

[40] Baron, R.M. & Kenny, D.A. (1986). The moderator-mediator variable distinction in social Psychological research: Conceptual, Strategic, and Statistical Considerations. Journal of Personality and Social Psychology, 51(6), 1173-1182.

[41] Prasad, B. & Stand, N. (1993). A Flowchart-Based Methodology for Process Improvement. 53-73. DOI: 10.13140/RG.2.1.2559.4327.

[42] Mohammed, P. (2015). Evidence on the role of age in team performance. A comparative study in Peru and Spain. Employee Relations, 31(3), 264 – 275.

[43] Goh, K. & Hoffman, S. (2013). The Law and Business of International Project Finance. Ardsley: Kluwer Law International.

[44] Zhang, H. (2007). A redefinition of the project risk process: Using vulnerability to open up the event-consequence link. International journal of project management, 25(7), 694-.