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Risk Assessment in Building Construction Projects in Three Local Governments in Ondo State (Ilaje, Ese - Odo And Okitipupa Local Governments) As Case Study)

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ABSTRACT: *The purpose of this study is to identify and analyze various risk categories that are inherent in building construction projects in Ese-Odo, IIaje and Okitipupasouth senatorial district of Ondo State. The Questionnaire used for the collectionof risk information was based on relevant literatures reviewed.Seventy-seven (77) risk variables were identified and grouped into 10 risk groups' factors.Seventy-two (72) questionnaires wereadministered randomly distributed to seventy-two (72) participants (27 qualified local government professional staffs and 45 non-management employees). Completing the questionnaire, respondents were asked to use a five-point Likert scale ranging from: "not-important (1), important (2), average (3),very important (4), to highly important (5)". Responses were analyzed using the terms of the Relative Important Index (R.I.I).From the analysis,the higher the R.I.I scores the highly important the risk factor. Scores above 60% are regarded as highly important and influential risk factors while scores below 60% are regarded as less important.*

KEYWORDS: *Building construction risk, Risks identification,Risk Management, Risk communication, Risk Assessment.*

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I. INTRODUCTION

The word Riskcan be defined as unsafe and uncertainty. Risks in building construction projects are not only confined tounsafe buthazard, danger, threat, periland industrial unrest. *Boodmanet al. (1977)*and *Lifsonet al. (1982)* defined risk as losses, damages, neglect, down-side and up-side and opportunities (favorable and unfavorable).

For the purpose of this study, Risk is defined as unsafe,exposure and uncertainty. If a building construction projects is defined as uncertainty and isnot properly investigated and analyzedthe project may face challenges either immediately or on the long run.If risk is defined as insecure and uncertainty it means all risks related factors are associated with human problemsinthe organization of that company. Human and organizational challenges may be associated with performance of poor quality of construction materials, delay in supply of materials needed at the site, poor project budget implementation and cost control or the complexity of project procurement processes. Human and Organization related problems may as well threaten the project objectives. Figure1.0 showsthe process, Tools and Technique used in detecting the risks inherent in building construction contracts in Ese-Odo,Ilaje andOkitipupa Local governments of Ondo State as well as the types of risks identified (outcome). In line with building construction project managementrisk model,risks related to these three local governments were identified and analyzed. The purpose of the model is to assist contractor when bidding for building constructionprojects in these three local governments. The model can be useful to or can be adapted by all coaster local governments in Coastal areas in Nigeria.

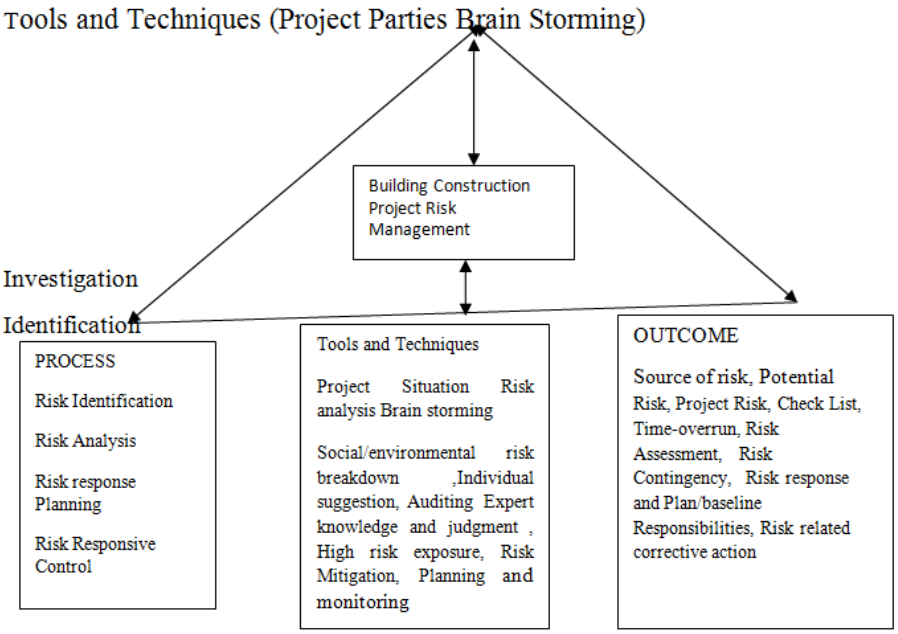


Figure 1: Building construction risk identification management channel 2018

(i) Project Parties:The figure showsthat project parties get the work done by actively co-operating with one another. Also experts outside party members were involved in brainstorming to identify risk areas. The project party members were engaged in an investigation, brainstorming and suggestions. That is all groups involved in the project depend upon one another and upon the type of risks identified and accepted. It indicates that all information exchanged during the investigation using Tools and Techniques application, intended to travel between contract parties and other participants. In this regard, the risk information gained will be shared to help the Contractor to identify both favorable and unfavorable risks pertainingto contract planning and operation.

(ii) The uncertainty of the event:if the contractor is able to define uncertainty to be concurrent risks that occur in the area where he or she intended to operate and he/she could downgrade the dangerembedded in the project planning and distribute it equally. The outcome of project operation will not affect the contractor's profit either favorable or unfavorable (gain or loss).

In this study, .Ilaje, Ese-Odo and Okitipupa local governments, in Ondostate are defined as employers because each local government provide funds for various infrastructures carried out in therespective local government area. Building construction projects in these three local government areas are always capital intensive compared to other local governmentin the State. Risks associated with building construction project as identified include: Militancy and Piracy (robbery and vandalism);Transportation problems;Non-availability of construction materials such as: granite chippings, cement, iron rods etc. (these materials are obtained from neighboring local governmentsinadequateand non availability of skilled workers; Insecurity; Difficulty in site clearing and setting-out of working drawings; Scarcity of petroleum products; Boat mishap which lead to loss of lives and properties.

However, contractors operating in these three local government areas must be knowledgeable in analyzing thecommon threatening risks such as social/environmental problems before accepting to execute contracts in these areas.

Furthermore, Building Construction project is regarded as a capital intensive, complexproject and involves more than one project stakeholders specifically professionals such as Quantity surveyor, Architects, Engineer; consultants, contractors and theclient. The relationship between them is seen as risk inherent in the project.Risk needs analysis is very crucial. Buildingconstruction project has different types of risks inherent in its profit structure especially in these three local government areas. Some of these are size of theproject; social environment; and complexityof the project. From projects initiation, planning, site investigation, design, execution, and handing-over, construction process and the complexity of the projects are characterized by different types of risks and uncertainties.Rarely do contractors in IIaje, Ese-Odo and Okitipupa local governments quantify uncertainties and analyze risks inherent in any construction projects contract they are handling. Many building construction projects failed to meet project deadlines, project costs and project quality because contractors have failed to address risks and challenges before the contract agreement was signed.. The

purpose of study is to suggest to contractors willing to bid for building construction contracts in these three local governments to identify, analyze and evaluatevarious risk problems inherent in the project contract.

II. LITERATURE BRIEF

2.0 Risks

Risks are prominent challenges inherent in building construction projects that should be firstly considered by clients and contractors to be able to achieve a common goal. In this context, it is highly essential for parties involved in the project to employan experienced project manager or engineer who had handled simpler project to analyze the risks, evaluate and determine theeffects onthe project program in question either to eliminate or reduce the risks query. Risk itself is a complex concept that has different dimension in different contexts. Risk refers to uncertainty, if it occurs in construction projects, will either have positive or negative effects on the projects. Teneyuca and Skitmore, (2001) showed that risk is a possible undesirable and unplanned event that are likely to occur during the construction phase of engineering projects. Risk as defined by Boodman, (1977), is the exposure to the chance of occurrence of events that may adversely affect projects objectives critical to the project variables,Time, Costs and Quality. In addition risk of delaying in supplying of construction materials to sites, affect project progress, time, budget and cost control that may equallythreatening the objectives of the projects. Furthermore, there is a need to introduce the appropriate risk identification methods by setting up a risk profile, avoidable and unavoidable risks, basic risk assessment and useful risk mitigation actions for projects management participants, particularly the Architects/ Civil Engineers or Project managers, Clients and Contractors to understand risks types inherent in building construction projects in these environment and how to manage them.

2.1Risk Management in Building Construction Projects

Risk management is the art and science of identifying, and evaluating risks that may have adverse affecton building construction projects. Risk is considered as a powerful tool recently considered to be affecting building construction project performance in Ondo State.If these challenges wereidentifiedat theplanning stage most of these challengeswould be minimized if not completely eliminated or shared. Roozbeh and Kangari, (2003) conducted a survey on 100 large construction companies in Australian and identified that contractors are more willing to accept construction risks than clients. Akintola and Malcolm, (1998) showed that 'Risks are inherent in all construction projects'. They went further to analyze how project managers/construction engineers used questionnaires to collect risk data. According to them, questionnaires were given to a number of general contractors and their responses were analyzed. They demonstrated that general contractors'responses were reasonably higher than other participants. The analysis had revealedto us that there is need to identify, evaluate andsharethreat to minimize losses in Ondo State.Thomas and Toakley, (2003) indicated that risk management was applied at conceptual phase of construction projects in Australian byadopting a questionnaire survey method to solicit data forthe study and indicated further that most respondents were not familiar with risk management; therefore, its application in the conceptual phase was relatively low.

This problem is not only applicable to Australian contractors, it is also applicable to contractor's worldwide, especially inOndo State and particularly in (IIaje/ Ese-Odoand Okitipupalocal governments) in South Senatorial District inOndo State.In these local governments risk factors can be grouped into two: internal and external. Internal risk is peculiar to construction projects associated with local, political, national and regulatory situations while external risk is peculiar to projects associated with State and Federal Government (national) situations.Mulholland and Christian, (1999) developed a systematic model to quantify uncertainty in construction projects. He went further to say that the model is more concerned with knowledge and experiences from past engineering projects. These authors believed that knowledge and experiences gained in previous projects can be adopted to analyze risks inherent in an on-going construction projects. Thomas and Toakley, (2003) investigated 80 contractors in order to identify how Indian construction firms evaluated risk allocation/sharing preference including factors influencing risk acceptance in engineering projects. They discovered that Indian contractors are willing to accept risks if the condition will not affect their profits or will be favorable. Wong and Chang, (2003) indicated that risk variables were generated fromquestionnaire distributed to building construction contractors in Hong Kong, these include: availability of cash, uncertainty in cost estimates, urgent need for work, past experience in similar projects and contracts sizes. They identified that large-size contractors are more concerned with uncertainty in cost estimates when there is upward adjustment of tender prices while the medium and small size contractors were concerned with past experiences.Shou and Mohammed, (2004) identified 28 riskfactors inherent in international construction projects in developing countries and categorized them into three hierarchy levels: country, market and project. 11 risks out of 28 were classified as Top 11 critical risks based on 7-degree rating system, namely: approval and permit, change in contract government policies, local partner's credit worthlessness, political instability, cost overrun, corruption, inflation and interest rates, government influence on disputes and termination of joint ventures. In addition, the

author identified risks at national level to be more critical than those at market level and those at market level to be more critical than those at project level. Therefore the author recommended that when comparing a specific risk, variables with higher response should be given a higher rating.

Bing and Tiong, (2005) distributed questionnaires to building contractors in the United Kingdom in order to determine preferences in risk allocation. From the analysis of the response data, they found that some risks should be retained in the construction projects while some should be shared among parties involved.Klement, (2006) classified project risks into: internal and external. He went further to indicate that internal risks are initiated inside the project while external risks originate from the project environments. BS 6079 (BS1- 1996) defines risk as uncertainty inherent in the planning and other events that can affect prospects of achieving project objectives and goals of projects.From the analysis, it shows that uncertainty is unpredictable as it attributes to environmental and organizational assessment of projects.Likewise, Carr, (2001) showed that risk in construction projects can be categorized into: likelihood or probability of something happening and the consequences as it happens.

Similarly, Latham, (2002) commented that 'no construction project is risk free'. In support of this, Lam, (2007) explained further that construction contractors need to identify risks and uncertainties in order to ascertain their consequences on construction projects.

2.3.1 RISK COMMUNICATION

Risk communication can be defined as an open two-way of exchange of information and opinion about risk, leading to better understanding and decision making. Also, it can bedescribed as an interactive process of exchange of information and opinions among respondents, often involving multiple messages about the nature of risk or expressing concern, opinions or reactions to risk messages while this study described risk communication as a common set of signs and symbols, moral understanding, experiences and values.

2.3.2 Strategies for Managing Risk

Strategy for Managing Riskwas formulated on the basis of nature and potential consequences of risks in building construction projects. The purpose was to categorize the objectives of strategies into two, **(i)** reduce as much as possible the potential impactand**(ii)**Increaseas much as possible the risk control.

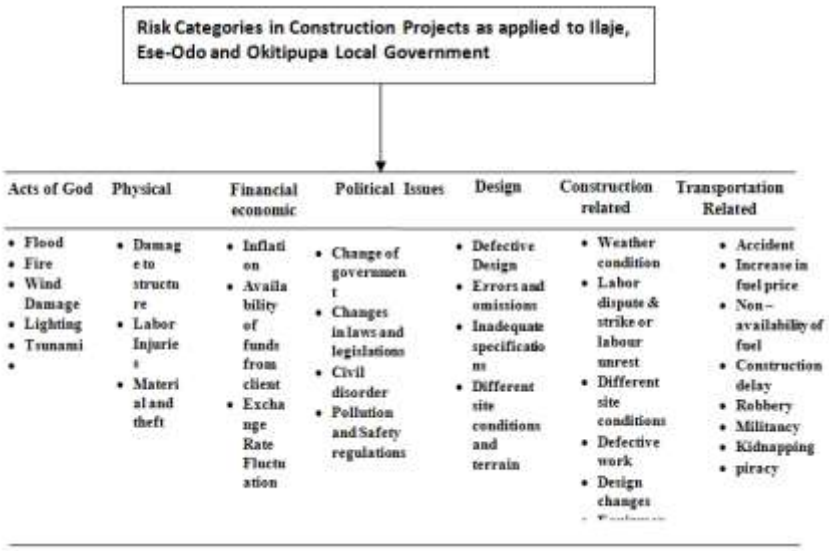
2.3.3 Risk Identification Process

Mason, (1986) defined risk identification as "investigation into all possible potential sources of risks that are associated with building construction projects and their potential consequences".Wideman, (1988) listed some important risks factors in building construction projects to include: **(i)** Delay in letting contract**(ii)** Obtaining appropriate approvals**(iii)** Poor tenders**(iv)** Construction material delays**(v)** Construction equipment delays**(vi)** Material quality and specifications. According to Williams, (1995), identification and assessment of project risk are the critical parameters for project success and also relevant in decision-making process. Critical Path Method; *Terano et al (1992*), Fault Tree Analysis and Huang, (2001); Event Tree Analysis. Failure Mode Effects and Critical Analysis, are the classical quantitative methods employed in the construction industry for risk assessment based on probability analysis applicable to construction projects in Ondo State.

2.3.4 Risk Assessment

There are five basicsteps approach to assessing building constructionproject risks. This includes: **(i)** Identify threats or risks**(ii)** Asses the vulnerability of key risk factors **(iii)** Determine the consequence of specific threats to the project**(iv)** Figure out ways to reduce risks **(v)**Prioritize the risk management procedure based on their importance. Table 1 shows the risk classification in Ilaje, Ese-Odo and Okitipupa Local Governments.

Table 1 Risk Classification in Ilaje, Ese-Odo and Okitipupa local government



Source: Research study 2018

2.3.5 Determination of Risk

Previous studies adoptedtwo different methods to determine risk and uncertainty in building construction projectsand this includes: qualitative and quantitative approaches. According to Huang,(2001), quantitative approach relies on statistical calculations and probability e.g. decision tree analysis while qualitative approach relies on judgments that use criteria to determine the outcomes. A common qualitative approach was the application of precedence diagramming method. However, this study uses Five pointLikert scale converted to Relative Importance Index (R.I.I.) *Kometa et al (1994)*. This approach is much relevant to construction Industry in Ondo State.

2.3.6 Risk Exposure

Wang, (2001) defined risk exposure to include:**(i) Size:** The larger the team, the higher the probability problemsarising. For example, communications can be more difficult as the number of participants increases. The more the number of interactions among people increases the more the challenges and the greater co-ordination.**(ii) History:** New project is riskier if similar type has not been previouslyconstructed. Availability of a similar project proto typeshows the likelihood of the project success.**(iii) Staff Expertise and Experiences:** If the staff lacks direct experience and knowledge of the project, the team will struggle to learn as they go along. In this case, project time will increase, and possibility of omission/error may also increase with increase inthe cost of the project. This is a common and unique problem across the three local governments selected for the study. **(iv) Complexity:** The more sophisticated the project, the greater the chance of making a mistake.**(v) Management Stability:**With good policy, decision, directions and commitment,the desired goals and objectives can be achieved.**(v) Time Compression:** If the projects' schedules are compressed, the risk is greater than having excess time. This means greater flexibility to prevent or mitigate the impact of error.**(vi) ResourceAvailability:** The greater the availability of resources, the greater the ability to respond to problems as they arise. For example, more money brings greater ability to secure equipment or mobility or people when needed which in turn provide for greater responses. The problem we have in this part of Ondo State is the risk exposure as mentioned earlier.. Nearly all the contractors executing projects in Ondo State cannot define risk, and those who can, do not talk about it or consider it because they might lose the job. The worst part of it is that the client would not release to competent bidder but to political party associates and party beneficiaries will resell the contract to just anybody interested in the contract and collect a certain percentage from the contractor who can pay. When this happens the quality of the job is at stake, it is either reduced or abandoned. This type of problem is common inOndo State including the three local governmentsselected for the study.

2.3.8 Types of Risk Factor

Flanagan and Norman, (2008) categorized types of risk factors inherent in construction projects to include:**i) Environmental Risk:** Environmental risk factor involves the environmental problems such as demanding illegal money from contractors, kidnapping and so on.

(ii) Social risk: Social risk factor involves the social and cultural effect drinking, misbehaving uncontrollable indigenes, demanding for what does not belong to them.**(iii) Economic Risk:** This is a financial

risk factor, poor fundingof project/ budget and implementation, and poor contingency. **(iv) Reserve risk:** Reserve risk can be described as an operational risk factor that addresses the extent of reserves and contingency considered in project estimates.**(v) Political Risk:** Political risk is a type of risk faced by investors, corporations, governments and contractors as a result of change of government and economic policy/ regulations. Acts of war, terrorism/militancy having a new president or state governor, Local government chairman and a change of the country's ruling party are good examples of political risk. These developments can have a big consequence on project environments.**(vi) Transportation risk:** This is the risk encountered while transporting construction materials from the of purchase site to the project sites. The longer the distancethe higher the risk, the transportation risk especially with the land and river, accident, police and militants' disturbance do occur in this part of Ondo State (Ese-Odo and IIaje local governments), Most of the construction materials are being purchased from neighboring states and local governments (Edo and Delta States).**(vii) Technical Risk:** This can occur when there are few personnel who are technically skilled and knowledgeable in the area which leads to poor workmanship.

2.4 Critical Sources of Risks identified in Construction Projects in Ilaje, Ese-Odo and Okitipupa Local Governments.

At the project management meetings held in the three local governments,brainstorming techniques and expert panel discussions were adopted to involve all stakeholders. The relatedRisks factors identified include:

(i) Misunderstanding of contract terms and conditions.**(ii)** Changes related to errors in project design.**(iii)** Poorly coordinated work.**(iv)**Underestimation of projects budget.**(v)** Poorly defined roles and responsibilities of stakeholders.**(vi)**Unskilledstaff.**(vii)** Natural hazards**(viii)** Political and legal problems.**(ix)** Environmental problem/ Terrain**, (x)**Social environmental problems**(xi)** Poor investigation

2.4.1 Risk Sharing in Ilaje, Ese-Odo and Okitipupa Local Governments

In building construction contract documents,risk was not mentioned or defined, therefore. Risk sharing by parties was not also mentioned.(Employer and the contractor).However, from literature review the studyidentified and adopted the following sharing routes to include:

(i) Employer to contractor or designer, **(ii)** Contractor to Sub-contractor.

(iii) Employer, contractor, sub-contractor or designer to insurer.**(iv)** Contractor or sub-contractor tocollateral.The purpose of risk transfer is to allow flexibility and responsibility among stakeholders. The employer takes the responsibility of initiating risk transfer to suite his/her own best interests and contractor takes responsibility increase profit margin.

III. RESEARCH METHODOLOGY

A questionnaire was selected as the means of data collection so that information could be analyzed faster and with less bias interviews. The time required to fill this questionnaire was a minimum of 12 minutes and a maximum of 20 minutes. It was anticipated that the time factor would be very important for a good response rate. All questionnaires have covering letters to assure respondents of the confidentiality of information provided.The questionnaire comprised 77 questions designed to determine the strength of the following risk factors: Financial risk, (1), Legal risk, (2), Management risk, (3), Market risk, (4), Policy/Political risk, (5), Technical risk, (6), Environmental risk, (7), Social risk, (8), Construction risk, (9) and Transportation risk, (10),

3.1 Research StudyArea: The old Ondo State was created from the former Western State on the third of February1976. Ekiti State was carved out of the Old Ondo State in the year1996 with its landmass covering 15,195.2 kilometer square. OndoState is one of the 36 States that is located in the South Western part of Nigeria. The State comprises 18 local governments includingIlaje and Ese-Odo local governments (reverineareas) and Okitipupa local government on land and these three local governments selected for the study aresituated in the southern senatorial district of the state. The management of Ilaje, Ese-Odo and Okitipupa Local governments, are referred to asemployers or clients, the people of these three local government are unique in culture, language and religion and they are noted for fishing and farming so the data collected over/in this areawas unique without bias. As a result, the data collection was limited to these three local governments because all the participants are exposed to the same environmental conditions and problems. Figure 3.1 represents the map of Ondo State in which the study locations are sited of the three local governments(IIaje, Ese-Odo and Okitipupa).

Figure 3.1 - Map of Ondo State (Source – Google).

.3.2 The Research Sample

The research study employs random probability cluster sampling techniques. In cluster sampling, the population is divided into segments from which samples are chosen. The advantage of a random sampling is that precision is not lost by observing less than the complete population. This saves labour, computing time and cost..Initially, building construction projects 16 contractors in these three local governments were contacted but only 12 contractors agreed to participate,while four declined. Also 27local government management employees were selected based on experience, department, position and involvement. .These include:Directors of Works (3), Civil Engineers (6), Directors of Finance/Supplies (3), Project Managers (Q/S) (6) and Directors of Legal/Environmental (9) while non-management employee groups(45) they are basically working on the project operations include: Design Team (Arch. /Civil Engineers) (12), Consultants 3). Also 30 sub-contractorswere selected from the three local government. Questionnairessamples were delivered to them with covering letters and forms to sign if they agreed to participate in the research study. However, only 12 contractors, 27 selected local government staffs and 45 non managementstaff agreed to participate in the research study.

A questionnaire was given to individual who signed the form by hand.. A follow up letter, telephone and face to face communication were also employed. Figure 3.2 shows the categories of participants and response rates. All these participants were selected from these three local governments.

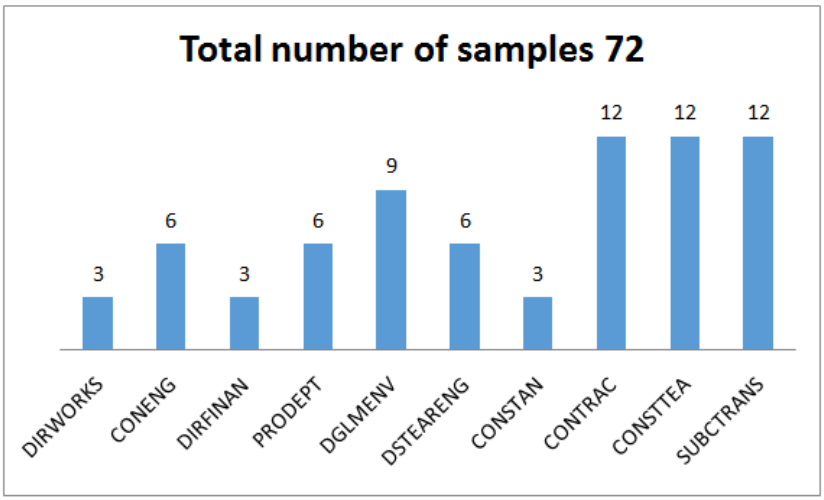


Figure 3.2: Total Sample for the Study (Source – Field survey,(2018)

i) Dirworks:Director of works ii) CONENG: Construction Engineers iii) DIRFINAN Director finance
iv) PRODEPT: Project department v) DGLMENV: Director legal matters/environment
vi) DSTEARENG: Design team Arch & Engineers vii) CONSTAN: Consultant viii) CONTRAC: Contractorsix) CONSTTEA: Construction team x) SUBCTRANS:Sub-contractor transportation

3.3 Measurement of Variables

In this study, variables were measured on the basis of five point Likert scales with responses ranging from 1- 5 representing 1 - Not Important, 2 - Important, 3- average, 4 - Very Important, 5- Highly Important. The Likert Scale was named after its author, RensisLikert, (1932). In the questionnaire, respondents were asked to indicate based on their local experience the level of importance of each of the identified 77 risk variables threatening building construction projects in these local government environmentswhich aligns with the given five point Likert scales. Each level on the scale is assigned a numeric value, usually starting at one (1) and incremented by one at each level: not- important (1), important (2), average (3), very important (4), highly important (5).

3.4 Method of Analysis

The respondents were asked to numerically indicate on Likert five point's scale ranging from 1 to 5. . A five-point Likert scale was used, on the basis of Relative Importance Index (R.I.I) *Kometa et al., (1994).* The higher the value of R.I.I indicates the more importance the risk factors inherent in building construction projects. The descriptive Statistics is expressed in terms of the Relative Important Index (R.I.I) formulated using the following statistical expression:

$$\text{Relative important index (R.I.I)} = \frac{\sum w}{A \times N} \quad (1)$$

$$\text{Relative important index (R.I.I)} = \frac{5n_5+4n_4+3n_3+2n_2+1n_1}{5N} \quad (2)$$

$$(0 \leq RII \leq 1)$$

Where: W = weight given to each factor by the respondents (ranging from 1 to 5), N = Total number of Respondents, n = Total number of Respondents, A = Highest weight (i.e. 5 in this case), n5 = Number of Respondent for Very important, n4 = Number of Respondent for Important. n3 = Number of Respondent for moderately Important, n2 = Number of Respondent for Not important, n1 = Number of respondent Not very Important.

IV. RESULTS, ANALYSIS AND DISCUSSIONS

Also, risk variables on the questionnaire were divided into risk groups such as financial; legal; management; construction market; policy/political; technical; environmental; social; construction and transportation risk. However, in the questionnaire risk variables were listed under group A, B, C, D, E, F, G, H, I, and J. In Group A:**FINANCIALRISK**sixrelated Risks variables were identified; the scored and ranked (0.636-0.769 and ranked 7-33). In group B (**LEGAL RISK);**Five related risks variables were identified, scored(0.564-0.683) and ranked (23 – 40). In groupC (**MANAGEMENT RISKS);** Twelve risk related variables were identified scored (0.564-0.776) and ranked (4 – 40). In group D (**CONSTRUCTION MARKET RISK)**Three construction market related risk variables were identified Scored (0.586 -0.767)and ranked (8-, 38). In group E **(POLITICAL RISK)** three political related risks were identified, scored (0.722 – 0.767) and ranked 6-22) In group F (**TECHNICAL RISK**) thirteen technical related risk variables were identified, scored (0. 531 -0.786) and ranked (1- 43) In group G (**ENVIRONMENTAL RISK**) four environmental related risk variables were identified, scored (0.675 -0.764) and ranked (9-30). In group H (**SOCIAL RISK FACTOR**) Five Social risk related variables were indentified, scored (0.742 -0.781 and ranked (3-16). In groupI (**CONSTRUCTION RISK**) Nine construction related risk variables were identified, scored (0.572 -0.783) and the ranked (2- 40), and, In group J (**TRANSPORTATION RISK)**seven transports related risks variables were identified, scored (0.700-0.781) and ranked(3-25)on the general ranking lists.Table 2shows all identified Risk variable R.I.I Scores and Ranking including number of respondents.Figures 3-11 show the details of individual group scores and a general lists ranking.

Table 2 groups of identified Risk variables scores and ranking.

GROUP OF RISKS	RISK VARIABLES	N1	N2	N3	N4	N5	R.1.1	RANK	SUM TOTAL RESPONDENTS
A	Loss due to late payment	5	6	12	21	28	0.769	7	72
	Loss due to Inflation	6	7	16	20	23	0.731	19	72
	Loss due to interest rate	7	7	14	21	23	0.728	20	72
FINANCIAL RISK VARIABLES	Loss due to rise in fuel price	8	7	13	19	25	0.728	20	72
	Change due to bank regulations	8	13	16	15	20	0.672	31	72
	Insurance risk	12	10	19	15	16	0.636	33	72
B	Breach of contract	8	12	16	15	21	0.683	29	72

	by project partner								
LEGAL RISK VARIABLES	**Breach of contract by contractors**	**9**	**14**	**10**	**25**	**14**	**0.658**	**32**	**72**
	Improper verification of contract documents	**8**	**14**	**12**	**14**	**24**	**0.689**	**27**	**72**
	Lack of knowledge of arbitration	**8**	**10**	**12**	**14**	**28**	**0.722**	**22**	**72**
	Uncertainty and unfairness of court justice	**14**	**12**	**21**	**14**	**10**	**0.564**	**40**	**72**
C	**Change of Top management officials**	**14**	**14**	**12**	**14**	**18**	**0.622**	**35**	**72**
MANAGEMENT RISKS VARIABLES	**No past experience in similar projects**	**5**	**7**	**11**	**21**	**27**	**0753**	**12**	**72**
	Short tendering time	**5**	**7**	**12**	**21**	**27**	**0.761**	**10**	**72**
	Sub-contractor related problems	**7**	**8**	**12**	**21**	**24**	**0.731**	**19**	**72**
	Project feasibility study	**4**	**7**	**12**	**20**	**29**	**0.775**	**5**	**72**
	Terrain /topography	**5**	**7**	**12**	**23**	**25**	**0.776**	**4**	**72**
	Project planning and Budgeting	**8**	**13**	**14**	**15**	**22**	**0.685**	**28**	**72**
	Poor relation with government department	**15**	**15**	**20**	**12**	**10**	**0.564**	**40**	**72**
	Internal management problems(poor communication and disagreement	**14**	**12**	**15**	**16**	**15**	**0.617**	**36**	**72**
	Time constraint	**12**	**14**	**15**	**15**	**16**	**0.625**	**34**	**72**
	Wrong selection of design team	15	14	18	14	11	0.578	**38**	**72**
	Project delay	10	12	12	17	21	0.675	**30**	**72**
D	Construction equipment price	15	16	12	17	12	0.586	**37**	**72**
CONSTRUCTION MARKET RISK VARIABLES	**Change in price of Material**	**5**	**6**	**12**	**22**	**27**	**0.767**	**8**	**72**
	Material scarcity	**5**	**7**	**17**	**20**	**23**	**0.736**	**17**	**72**
E	**Increase in project cost due to change of government policy**	**4**	**4**	**17**	**20**	**27**	**0.772**	**6**	**72**
POLITICAL RISK	**Corruption and bribery**	**5**	**10**	**15**	**20**	**22**	**0.722**	**22**	**72**
	Late approval	**5**	**6**	**12**	**22**	**27**	**0.767**	**8**	**72**
F	**Technical compliances**	**7**	**6**	**12**	**21**	**26**	**0.747**	**14**	**72**
TECHNICAL RISK FACTOR	**Technical Complexities**	**5**	**7**	**12**	**22**	**26**	**0.758**	**11**	**72**
	Inability to track project progress	**7**	**8**	**16**	**18**	**23**	**0.717**	**23**	**72**
	Staffing problems	**6**	**8**	**15**	**18**	**25**	**0.733**	**18**	**72**
	No mutual trust among technical team members	**11**	**8**	**12**	**15**	**26**	**0.703**	**24**	**72**
	Inability to detect problems early	**5**	**7**	**10**	**16**	**34**	**0.786**	**1**	**72**
	Insufficient number of check points	**8**	**10**	**12**	**21**	**21**	**0.703**	**24**	**72**
	Priority shifts	**5**	**7**	**12**	**24**	**24**	**0.753**	**12**	**72**
	Unrealistic project plans	**8**	**10**	**12**	**16**	**26**	**0.717**	**23**	**72**
	Wrong	**15**	**23**	**15**	**10**	**9**	**0.531**	**41**	**72**

	interpretation of working drawing								
	Disagreement between engineers/arch on technical procedure	12	12	15	18	15	0.633	33	72
	Disobey standard code	5	7	13	18	29	0.764	9	72
	Error in working drawing	6	9	16	18	21	0.692	26	72
G Environmental factor	Impact of climatic condition	7	10	12	17	26	0.725	21	72
	Environmental Working condition	6	8	15	14	29	0.744	15	72
	Health & safety	5	8	14	16	29	0.764	9	72
	Health centre	10	11	14	16	21	0.675	30	72
H SOCIAL RISK FACTOR	Community acceptance	5	7	14	15	31	0.767	8	72
	Militancy	5	8	10	15	34	0.781	3	72
	Kidnapping	5	8	10	15	34	0.781	3	72
	Theft	5	8	10	15	34	0.781	3	72
	Positive impact	7	9	13	12	31	0.742	16	72
I CONSTRUCTION VARIABLES/FACTOR	Poor quality of materials	6	8	12	15	31	0.758	11	72
	Wrong mix design	5	7	14	18	28	0.758	11	72
	Setting out mistakes	6	15	7	15	29	0.728	20	72
	Wrong reinforcement	7	9	10	14	32	0.753	12	72
	Poor quality of water/salt supply	5	9	14	15	29	0.750	13	72
	Delay in quality of water supply	5	10	15	15	27	0.736	17	72
	Shortage of skilled workers	15	14	18	16	9	0.572	39	72
	Wastage of materials	6	9	15	14	28	0.736	17	72
	Lack electricity	5	7	13	21	28	0.783	2	72
J TRANSPORTATION RISK FACTOR	Loss due accident	5	8	12	21	26	0.753	12	72
	Rise in Fuel price	5	7	12	14	34	0.781	3	72
	Fuel scarcity	5	7	14	15	31	0.767	8	72
	Increase in service delivery	5	7	12	19	29	0.767	8	72
	Project location	6	8	13	18	27	0.744	15	72
	Time constraint	7	14	11	16	24	0.700	25	72
	Poor communication system	5	6	14	16	31	0.772	6	72

Figure 3 shows Group A, six (6) Financial Risk Variables were identified, investigated, scored (0. 636 - 0.769) and ranked (7-33) according to individual variable scores.As can be seen all 6 risks variables identified were highly rated and considered to be highly important and influential inherent risk factors.

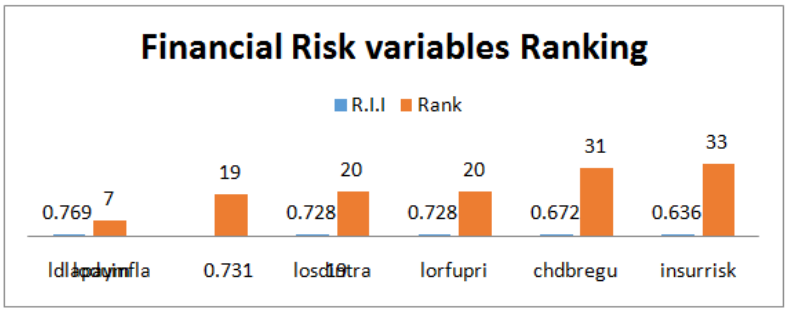


Figure 3 Financial risk variables

Ldlapaym: Loss due to late payment loduinfla: Loss due to Inflation losdintra: Loss due to interest rate
Lorfpri: Loss due to fuel rise in fuel price. Chdbregu: Change due to bank regulations.
Insurrisk: Insurance risk.

Figure 4 Group B shows Legal risk variables, R.I.I and General ranking list, 5 risk variableswere identified and investigated. R.I.I scores range from0.564 -0.722 and ranked from 23 - 40. All variables were considered to be very important except onewhich scored 0.564 below 60% was considered to be less important in all the three local governments.

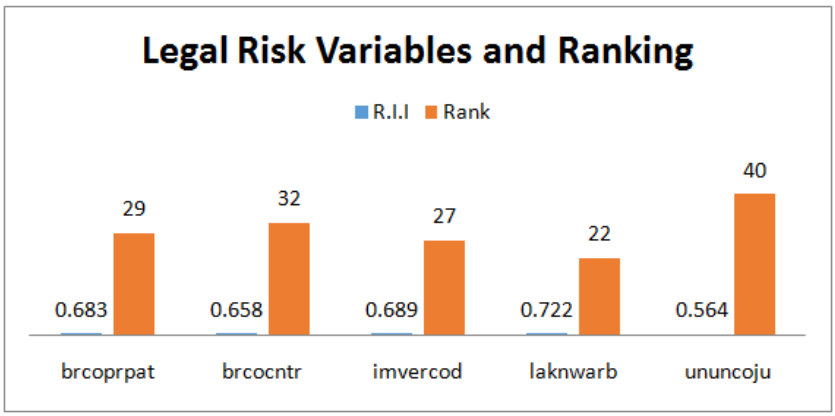


Figure4 Legal Risk variables

Brcoprpat: Breach of contract by project by project partner
Brcocntr: Breach of contract by contractors. Imvercod: Improper verification of contract documentation
Laknwarb: Lack of knowledge of arbitration. Ununcoju: Uncertainty and unfairness of court justice.

Figure 5 shows group C MANAGEMENTRISKS VARIABLES 12 risks variables were identified and investigated, 5 risk variableswere highly scored (0.753- 0.776) and highly ranked f (4-19). These 5 variables were considered to be highly important and critical while other five (5)were found to be very important scored (0.617-0.685) not critical and the last two risk factors scored below 60% (0.564 and 0.586), ranked 40 and 38, considered to be less important.However, ten risks variables identified in this group were very and highly important, must be taken into consideration before accepting any building construction project contract in these three local governments.

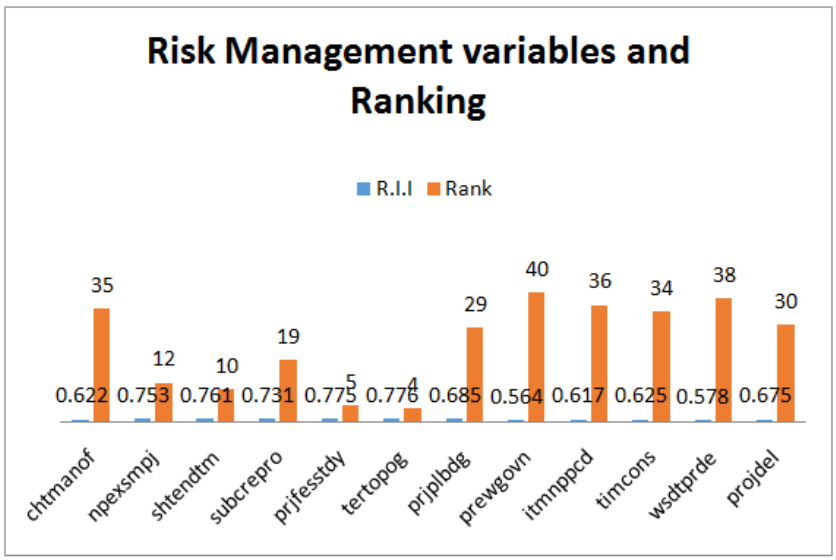


Figure 5 Management Risk variables

Chtman of: Change of Top management officials. Npexsmpj: No past experience in similar project.Shtenndtm: Short tendering time. Subcrepro: Sub-contractor related problems. Prjfsstdy: Project feasibility studyTerrtopog: Terrain/Topography. Prjplbdg: Project planning and budgeting. Prewgovn: Poor

relation with government department. Itmnppcd: Internal management problems (poor communication and disagreement). Timcons: Time constraint. Wsdtprde: Wrong selection of design Team. Projdel: Project delay
Figure 6: showsconstruction market risk variables. Three (3) risk variables were identified and investigated. Two risk variables were identified scored (0.736 and 0.736) and ranked 8 and 17 considered to be highly important and critical while the third one scored below 60% (0.586) ranked 38 considered to be less important.

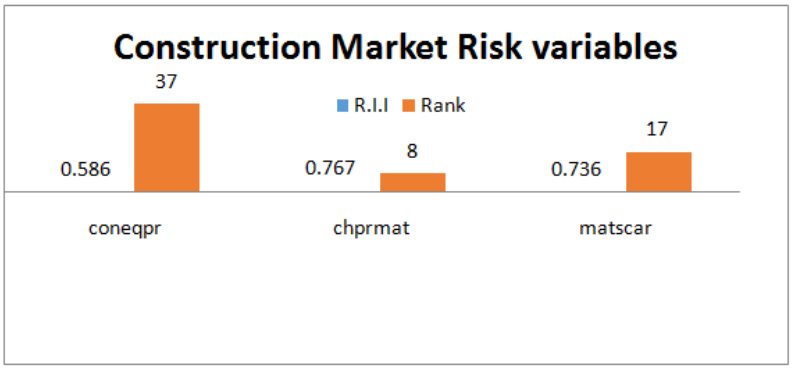


Figure 6 Construction market Risk Variables

Coneqpr: Construction equipment price of material. Chprimat: Change in price of material.
Matscar: Material Scarcity.

Figure 7 shows Group E, Political Related Risk variables investigated in the three local governments. Only three (3) related risk variables were identified, scored (0.722 -0.772) and, ranked (6 -22) on the general ranking lists. These three identified Risk variables were considered to be highly important and highly influenced. It is recommended that these risk factorsbe incorporated into the project planning.

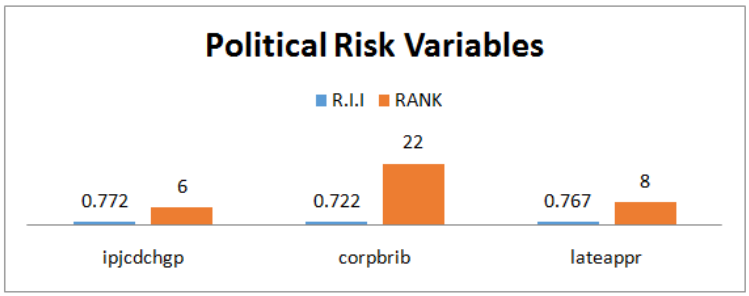


Figure 7 political Risk variables group

Ipjcdchgp: Increasein project cost due to change of government policy.Corpbrib: Corruption and Bribery.
Lateappr: Late Approval

Figure 8 shows the Technical Risk Factors,thirteen (13) related risk variables were identified, investigated, scored (0.531-0.781) and ranked (1-41). All these risk factors were considered highly important and influential except one (Wrong interpretation **of** working drawing) which scored(0.531) and ranked 41 on the general ranking lists. This variable falls below the standard 60% therefore it isconsidered less important.

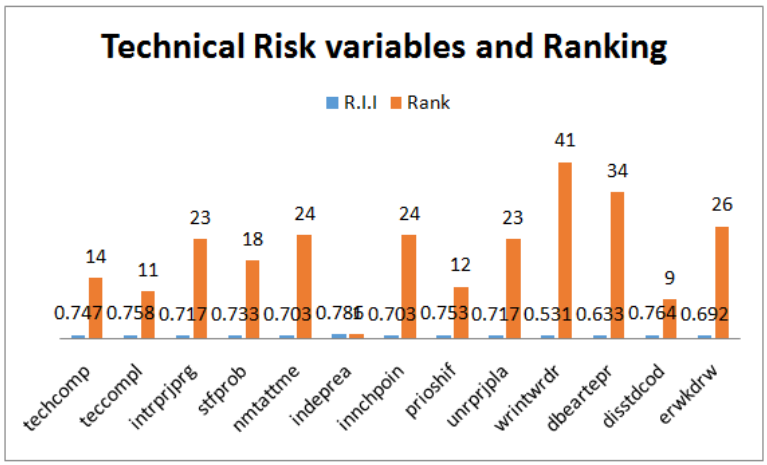


Figure 8: Technical Risk Variables

Techcomp: Technical compliances. Teccompl: Technical complexities. Intrprjprg: Inability to track project Progress.Stfprob: Staffing problems.
nmtattme: No mutual trust among technical team members. Indeprea: Inability to detect problems early. Innchpoin: Insuficient number of check points.
Prioshif: Priority Shifts. Unrprjpla: Unrealistic project plans. Wrintwrdr: Word interpretation of working drawing. dbeartepr: Disagreement between engineers/arch on technical procedure.
Disstdcod: Disobey Standard code. Erwkdrw: Error in working drawing

Figure 9shows Environmental risk variables, four (4) environmental risk factors variables were indentified, scored (0.675-0.764) and ranked (9- 30). It appears that all identified Environmental risk factors were highly important and critical. All project stakeholders are advised to consider these factors during the planning and execution of their projectsin these areas

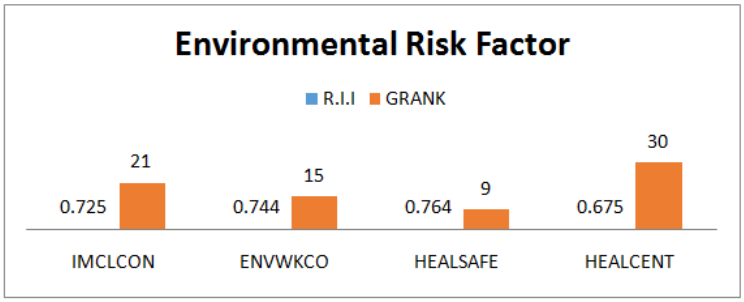


Figure 9: Environmental Risk Factors

imclcon: Impact of climatic condition. Envwkco: Environmental working condition. Healsafe: Health & Safety healcent: Health centre.

Figure 10 shows Social Risk variables five (5) risk factors were identified and investigated. It appears that all the 5 social risk factors are highly scored (0.742- 0.781) and ranked (3-16). They are rated very highly important and critical, need to be considered seriously before embarking on any building construction projects in these three Local governments.

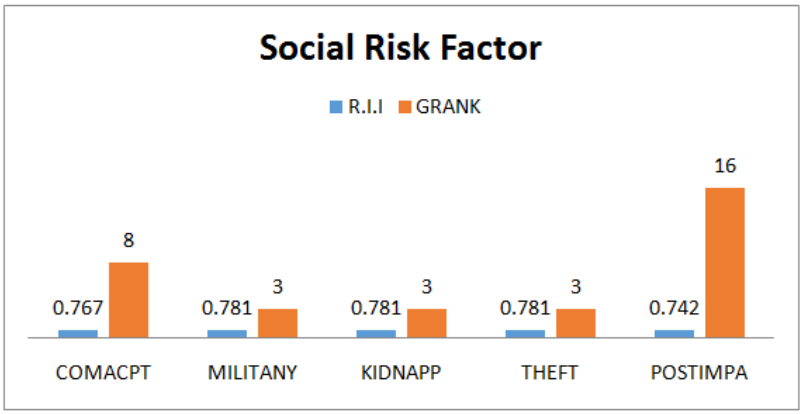


Figure 10: Social Risk Factor

Comacpt: Community acceptance.Militany: Militancy. Kidnap: Kidnapping. Theft: Theft
Postimpa: Positive impact

Figure 11 showsConstruction Risk variables/Factors. Nine(9) construction risk variables were indentified scored (0.572-0.783) and ranked (2-39). 8 Risk variables/factors were considered to be highly important and critical and the last one (1) risk variable/factor(shortage of skilled workers)which scored 0.572 and ranked 39, this particular factor scored below 60% therefore it is considered to be less important.

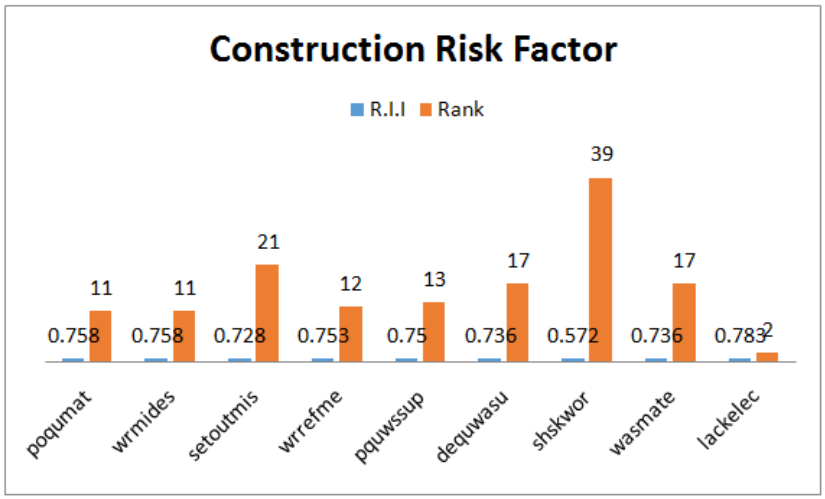


Figure 11 Construction Risk Factors

Poqumat: Poor quality of materials. wrmides: Wrong mix design. setoutmis:Setting out mistakes. Wrrefme: Wrong reinforcement.Pquwssup: Poor quality of water/salt supplyDequwasu: Delay in quality of water supply. Shskwor: Shortage of skilled workers.Wasmate: Wastage of materials. lackelec: Lack electricity

Figure 12 shows the Transportation Risk Factors/variablesSeven (7) transport risk variables/factors were identified, scored (0.700-0.781) and ranked (3- 25) . The figure indicates that all transport risk variable/factors scored above 60% that meansall Transport risk variables/factors factorsare considered to be highly important and critical, it is advised to consider themseriously before embarking on any project execution in this area.

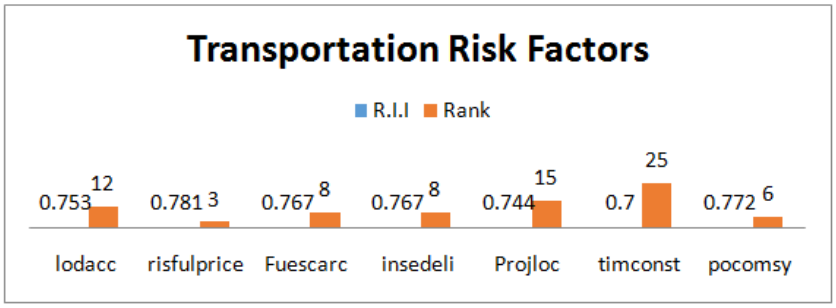


Figure 12 Transportation Risk Factors

Lodacc: Loss due to accident. Risfulprice: Rise in fuel price. Fuescarc: fuel scarcity
Insedeli : increase in service delivery. Projloc: Project location. Timconst: Time constraint
Pocomsy: Poor communication system

V. CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

The purpose of this study is to identifyand analyze the nature of risks factors inherent in building construction projects inIIaje, Ese-Odo and Okitipupa Local Government, also to ascertainwhy many construction projects are delayed or abandoned. The studyidentified the following risk factors: Financial; Legal; Management; Market; Policy/political; Social; Technical; Environmental; Construction and Transportation. These risk factors are criticallycategorized according to individual scores. Less than 60% is regarded as less important, above 60% is classified as very important and 70% above is regardedhighly important, critical andcould be threatening. The list ofscores and ranking were done usinga five-point Likertscale basedon Relative Importance Index (R.I.I) Kometa et al., (1994). The Relative Important Index (R.I.I) statistical expressions allows the breakdown risk inherent in building construction projects and determine the key critical risk factors causing building construction projects delay or abandonmentin these three local governments. The study holds on to higher the value of R.I.I the higherthe importance and critical the risk factorsinherent in building construction projects. Table 2 and Figures 3-12 showed individual risk variables scores and ranking.

5.2 Contribution and Recommendation

The study emphasized the importance of featuring risk factors inherent in planning building construction project budget and time estimates. As a result the outcome has created risks information awarenessto assist both clients and contractors including allprofessionals'stakeholders (Architects, Civil Engineers and Quantity Surveyors) participating or intending to participate in building construction project in Ese-Odo, Ilaje and Okitipupa local governments in Ondo State. The study has enlightenedallprofessionals'stakeholders (Architects, Civil Engineers and Quantity Surveyors) about risks' factors inherent in building construction project in the riverside. Italso has developed risk inherentinformation process method to assist both employers and contractors in the area.. Employers and Contractors are advised to identify all inherent risk factors from the planning stage to completion including sharing risk formula before embarkingon building construction projects in the area. Finally, the study recommends to consider the following identifiedinherentrisk factors (financial, legal, management, market, policy/political, social, environmental, construction and transportation) to be analyzed before any building construction project contract documents are signed before bidding for building construction projects in Ese-Odo, Ilaje and Okitipupa Local Governments.

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