

An Appraisal of Risk Treatment in the Nigerian Construction Industry: Contractors' and Project Managers' Perspectives.

OLALEKAN MUMUNI OGUNBAYO

ABSTRACT. The study focuses on risk treatment exercises carried out by the local contractors, foreign contractors and Project managers in the Nigerian construction industry. Realignment of the country's priority in terms of infrastructural development is crucial to the construction industry development and other stakeholder's investments. The construction industry has witnessed a high degree of project abandonment, waste of resources and quality disparagement that resulted from lack of risk treatment. However, the study confirmed the frequency of use of risk treatment techniques of identified risk during the planning stage of the projects as applicable to the construction industry. The questionnaires inferentially and relationally analysed to show laxity in the local contractors' response to risk a bias towards risk avoidance while the cases of foreign contractors and Project managers indicate an average use of all risk treatment exercises. The study proposes that a change in relation to risk treatment in the industry as accepted by all parties is crucial to the industry development. Accepting an input such as upgrading by training and legislation in the industry by all stakeholders is the most crucial to achieving project success. The local contractors need to synergize to be involved on a large scale in the industry and compete favourable with the foreign firms.

KEYWORDS: risk treatment, local contractors, foreign contractors, Project managers, construction industry

1. INTRODUCTION

RISK in the construction industry is a continuous issue as projects are becoming more complex than before and satisfying the numerous stakeholders has become indefinite, however, well articulated risk treatment makes the inherent risks manageable. (CIDB, 2004), explained that risk management is an entire section of good management practice, which is most effective if it becomes part of organisational values. (RICS, 2001), defines risk treatment "as the process of selecting and implementing measures to moderate risk, including risk transfer, risk avoidance, risk mitigation, and risk financing". The management determine on the form of risk response after analysis of causes and effects have been thoroughly considered and fully understood. (RICS, 2001), further analyzed the need to understand that big construction firms rarely fail in risk issues because they have the competency and financial capability to have legal advisers who prepare the contract to pass the risk to another party. However, the smaller firms frequently take large risks unaware of the consequences. (Azhar, Ginder, & Farooqui), posted that the medium and large construction firms mainly use all risk management treatment components in most projects while small size firms exhibit moderate and mixed response. Risks analysed is not enough, but the extent of effort put into risk execution, control and monitoring to avoid project failure. The achievement of this feat is the exclusive role of a project managers and the team based on the current development in most developed countries.

Author: Olalekan Mumuni Ogunbayo, A Senior Lecturer in Building Technology Department of Lagos State Polytechnic, Ikorodu Campus, Shagamu Road, Ikorodu, Lagos State. Nigeria. Email: olamee62@yahoo.com

The project manager' skill in risk management as in other project management processes is very crucial for proper interrelationship of all processes as risk management is an inherent component of project management.

(Kamane & Mahadik), claimed that the risk springs up throughout the project life cycle, as such risk management processes is a continuous exercise to be attended to by the Project manager and the project team members. It is an accepted fact that risk response is effective only if, the participants are aware of the need to identify, analyse and treat risk to the advantage of all stakeholders. However, the Nigerian construction industry over the years has faced many challenges on projects inadequacies, like shift in project duration, cost overrun and quality issues. The inadequacies in risk analysis, risk control and monitoring during the project execution has become so obvious that there is a need to confirm the extent of involvement of the local contractors, foreign contractor and Project managers. Furthermore, the project management practice is still green as long as there is no institution to regulate its activities, and this is the time the professionals in the industry need to know and appreciate research input to hasten their role and importance. Hence, the research work brings more enlightenment into the academia, the professionals and other stakeholders as at when due and relevant. The extent of involvement of the contractors and project managers are very crucial in upgrading the risk treatment techniques applicable to improve the construction industry. Therefore, the study seeks to investigate the extent of contractors' involvement and frequency of adopting of risk response treatment before the situation becomes tedious. Nonetheless, introduction of project management practice is now exposing the solutions to these inadequacies and the solution to those challenges are becoming a reality than ever before. Developmental

processes of any Nation are the sole responsibilities of all stakeholders either directly or indirectly by actively and proactively interested in finding solutions to the pending problems. While it is crucial to know that for every problem solved another one emerges, and that is generic in all aspects of the construction industry until the project is handed over to the client. Hence, it is mandatory to be strategic in finding solutions to risk analysis issues as they emerge and proffer lasting solution. Despite many researches that have gone into risk management, the industry continues to yearn for more, to take care of the speed of growth that is increasing every moment. The objectives of this study are to review existing literature; confirm the frequency of use of the risk treatment methods and ascertain the most effective risk treatment methods.

2.0 LITERATURE REVIEW

Risk response depends on strategic policy of any organisation as the decision to take a particular risk is subject to information available, organisational culture and vision. The determination of risk responses is after identifying risk exposure and quantifying the potential impact. Then it is time to deploy well-known suitable risk treatment strategies such as risk avoidance, risk transfer, risk retention, and risk reduction (Walewski & G.E, 2003). (Bhandari & Gayakwad, 2014), defined Risk response "as response steps for opportunities and threats associated with risks." Hence, the risk can be monitored by using tools and techniques that the project manager and other stakeholders agree before the commencement of the project. (Khumpaisal, 2014), claimed that organisation's risk treatment policies should contain clearer and precise offer as some policies may be too technically arduous to carry out. Nonetheless, separate assumptions should occupy with managerial policies for risk treatment and risk control policies. (Berg, 2010)

Risk assessment is the procedure of making a decision on whether existing risks are tolerable and presented risk control measures are suitable, thus if not whether alternative risk control measures are justifiable. Risk assessment merges the risk analysis and risk evaluation phases, which escalate to risk response technique to use. (Raz, Shenhar, & Dvir, 2002), concluded that risk management is still green, and the awareness is crucial in which to make an impact is through risk application, training, tools development and research. (Raz, Shenhar, & Dvir, 2002), postulated that with today's rapid dynamic changing and increased competition it is not adequate to have a good project plan or even a popular monitoring and controlling system. The important thing for organisations is to prepare for project risks and ready to treat the risks. (Raz, Shenhar, & Dvir, 2002), concluded that cost overrun, time overrun and project abandonment can be attributed to lack of risk identification, analysis and management. Hence, it is important to confirm genuinely by act of omission or commission the missing link in project delivery. (Burtonshaw-Gunn, 2014), also have opinions that risk in projects is those that have an impact on one or more baseline elements like cost, time or quality as (Raz, Shenhar, & Dvir, 2002) concluded. Risk response planning is the procedure for evolving choices and making preference increases opportunities and decreasing threats to the projects objective (Burtonshaw-Gunn, 2014). The process guarantees the restitution of identified risks so that effectiveness of response planning ascertains if the risk becomes aggravated or decline for the project.

(KarimiAzari, Mousavi, Farid, & Hosseini, 2011), explained that risk analysis, which includes risk identification and risk assessment supply a thorough knowledge about sources of risks and capacitate the management to invent a remedial action. Currently, many project management teams' works on risk identification and risk assessment to choose from to enable Project managers to decide on the risks and how to ameliorate the risks. (KarimiAzari, Mousavi, Farid, & Hosseini, 2011), explained that project risk management is an

interrelated process that includes activities to identify project uncertainty, estimate the impact, analyse the interaction, control the risk during project execution.

The project manager, the project team and assigned stakeholders prepare for risk treatment by using qualitative and quantitative risk analyses during the planning stage. (Schatteman, Herroelen, Van de Vonder, & Boone, 2014), are in support of the risk response achievement after risk exposure, quantification of risk impact. The instruments and methods used by Project managers and project team to respond to risks are manifold, which are evaluated to determine the most appropriate risk response category. The risk response selected must be developed, refined, documented, and prepared for use, and if necessary secondary responses should be selected for each risk. (KarimiAzari, Mousavi, Farid, & Hosseini, 2011), suggest that the original aim of risk assessment is to appraise risk by identifying the undesirable event and outcome. It involves measures, directed qualitatively or quantitatively, to produce the appraisal of the important level of a particular risk factor to the project. Thus, the project manager can identify the risk and risk impact and adjust to mitigate the risks, so as to produce the estimation of the risk of the potential factor to project success.

Risk matrix is the output of risk analysis; it exposes the risks that the management can treat with the available resources. Planning for risk response involves options and actions, which focuses on how to reduce the possibility of risks affecting the project's objective contrarily and increase the probability of positive risk to the advantage of the project. The reaction to the identified risks must balance with the risk and time and money invested in risk. Thus, compensation for by the gains from reducing the risk's impact and probability is also achieved. (Panthi, Ahmed, & Azhar, 2007), concluded that risk response is an essential part of risk management, which is effective when properly managed. Risk matrix is an important tool to start the scheme preparation after risk identification exercise as this ensures better management of small and medium size construction firms (Panthi, Ahmed, & Azhar, 2007).

2.2 AVOIDING THE RISK

(PMI, 2013), states that avoiding risk can be achieved in many ways, which is meaningful in the early part of the project when the outcome of change will have fewer consequences. Hence, the (PMI, 2013) also suggests four means of avoiding risks: changing the project plan to eradicate the risk and making clear project needs to refrain from discrepancies. The other two are: having extra project team members that have feel with the technology that the project deals with and using demonstrated procedures instead on a new approach. (Schatteman, Herroelen, Van de Vonder, & Boone, 2014), and (Bannerman, 2008), claimed that avoiding risk is executing an alternative process that does not comprise risk. Hence, this situation may increase the cost and duration of the project. (Berg, 2010), described avoiding the risk as not attempting the activity that is probably to initiates the risk as (Mahendra, Pitroda, & Bhavsar, 2013) suggested. Avoiding the risk (Panthi, Ahmed, & Azhar, 2007), suggest that when the probability and the impact of risk are high then it is better to avoid the risk. Risk avoidance according to (Kamane & Mahadik) is making a decision not to go into achieving fresh set objectives because of innate risk that is in the project. Furthermore, emphasis is placed on the review of overall project objectives, which result in the reassessment of the entire project (Kamane & Mahadik) and (Khumpaisal, 2014). (Kamane & Mahadik) Hence, risk avoidance is known to be extreme mitigation tactics as it means the project may terminate early. (Kamane & Mahadik), have the same opinion as (Berg, 2010), who claimed that risk avoidance is not attempting the activity that

probably activates the risk. This method of risk mitigation removes the cause of the risk and consequently the risk.

2.3 TRANSFERRING THE RISK

Transferring the risk is a process of reassigning the risk to a third party (Panthi, Ahmed, & Azhar, 2007). In addition, transferring risk usually cost a premium for the third party to own and manage the risk according to (Panthi, Ahmed, & Azhar, 2007), (Berg, 2010) and (Mahendra, Pitroda, & Bhavsar, 2013). Common examples according to (PMI, 2013), are insurance, Performance bonds, warranties, guarantees and fixed-price contracts. (Panthi, Ahmed, & Azhar, 2007), were of the opinion that contractors transfer risk when the impact is high, although the chances that such risk will occur is remote. The purpose is to transfer the burden to a third party that can own and manage it to the advantage of the contractor (Berg, 2010). (Schatteman, Herroelen, Van de Vonder, & Boone, 2014), are of the opinion that transferring risk to a third party may be achieved by outsourcing or activity group through insurance or producing a datum schedule that prevent identified risks. (Naphade & Bhangale, 2013), suggest that insurance is the most significant ways to transfer risk, as insurance is synonym for risk management in the industry and most companies in the industry depend on insurance policies for different risk situations. (Bhandari & Gayakwad, 2014), claimed that the best response to changes during project execution is by transferring the risk to insurance organisations. However, (Kamane & Mahadik) are of the opinion that achievement of risk transfer is usually through insurance and award of contract to a third party, which usually carry a premium (RICS, 2001). (Khumpaisal, 2014), proposed the four routes of risk transfer, which are: client to contractor or designer; contractor to the subcontractor; client, contractor, subcontractor or designer to insurer and contractor or subcontractor to surety. (Khumpaisal, 2014), further explained that the purpose for transferring risk is to ascertain that the client is made to realise that the responsibility for starting risk response depends on the client and it is to secure client's best interest on the project.

2.4 REDUCING THE RISK

Reducing the risk is an endeavour to trim the probability and impact of the identified risk in the project (Mahendra, Pitroda, & Bhavsar, 2013), which is achieved through logic before the risk happens. The process depends on cost and time effectiveness on reducing or eliminating the risk to the price of restoring the harm caused by the risk. Peradventure the risk happens; on the assumption that the price and impact of the risk will both be very low. The four risk mitigation exercises postulated by (PMI, 2009) are: 1. adding activities to the project to reduce the risk probability or impact and to simplify the process within the project. Others are completing more tests on the project work before implementation and developing prototypes, simulations, and limited release. (Panthi, Ahmed, & Azhar, 2007), (Bannerman, 2008) and (Berg, 2010) posit that when risk's impact and probability is high the risk response is to reduce the impact and probability. Although they suggested that the risk matrix is the determinant as mitigation is achieved either by reducing the probability of risk or by reducing the impact or both. (Berg, 2010), and (Kamane & Mahadik), described risk reduction as a technique of lessening the possible prospect to risk and their impact. This technique of risk reduction may need some investment at the beginning that reduces the possibility of the risk occurring. However, risk reduction is possible when the degree of risk is unsatisfactory, and other choices are beneficial (Kamane & Mahadik). Reducing the identified risks lead to increasing in direct project estimate and an equivalent greater reduction in risk allowance (RICS, 2001).

2.5 ACCEPTING THE RISK

Accepting the risk is a process of holding the risks since no other action is practicable or the risks are regarded to be of little probability and impact that a formal response is not sanctioned according to (PMI, 2009), and (Mahendra, Pitroda, & Bhavsar, 2013). Risk accepted is taken care of by the contingency reserve, which is the amount set aside for known risks and managerial reserve meant to take care of unknown risks. (Panthi, Ahmed, & Azhar, 2007) and (Bannerman, 2008), suggest accepting the risk is passive when the impact is low as preceding plan is not required and active as the impact needs further reduction if it happens. That means the active acceptance suggest the need for a contingency plan by allocating enough time and resources. (Kamane & Mahadik), claimed that the risk retained are the risks remaining after exploring all response and mitigation exercises, and these are the risks in most cases that undergo quantitative techniques in order to determine the overall contingency level requirements. The purpose of Risk treatment according to (Berg, 2010), is to reduce the anticipated level of unwelcomed risk that is achieved by using a matrix. The matrix is to ascertain the effect and probability of the risk and identify the anticipated target risk level (Berg, 2010).

3.0 METHODOLOGY

Data were obtained through a survey distributed to local contractors and foreign contractors who have been involved in the construction of buildings and facilities in the country for over twenty years. The questionnaires were sent to 115 randomly selected company's executives of both indigenous and foreign construction firms. A total of 32 executives of the local firms returned their completed questionnaire while only 15 executives of the foreign firms' questionnaires were returned.

The third group is the consultant project managers, whose role has been mainly consultancy services on major projects. The project manager's response to the risk management requirements is crucial in the development of the practice in developing countries like Nigeria. As such there was consideration of project manager's independent judgement in the analysis to the contractors' response. Hundred questionnaires were sent to the Project managers, and only twenty-two were returned.

Relevant reviewed researches to the aim and objectives of the study were used to develop the questionnaires. The questionnaires were inferentially and relationally analysed to bring out the information supplied by the respondents to the general public and the learned environment. The questionnaires consist the different types of risk mitigation exercises carried out in each organization and the frequency of use of the risk treatment methods. The questions were arranged to be answered in Likert scale of one to five, in which the 1, represents never to 5, which is always.

Spearman rank correlation coefficient was used to decide the relationship between opinions of local contractors and foreign contractors on the issue of risk mitigation exercises undertaken by construction firms. Furthermore, the opinion of the project managers and that of the local and foreign contractors were also determined.

1. $r_s = 1 - 6 \sum d^2 / n(n^2 - 1)$
2. t-test at 95% confidence level of the null (H_0) and alternative (H_1) was used to test the rank correlation coefficient.
3. $t = r_s \sqrt{n - 2} / \sqrt{1 - r^2}$

The determinant was on whether the t calculated was greater or lesser than the critical value of t for (n-2) degree of freedom.

The hypotheses are

1. H₀: there is no statistically significant relationship between the opinion of local contractors and foreign contractors on risk response analysis exercises in the Nigerian construction industry.
2. H₀: there is no statistically significant relationship between the opinion of foreign contractors and Project managers on risk response analysis exercises in the Nigerian construction industry.
3. H₀: there is no statistically significant relationship between the opinion of local contractors and Project managers on risk response analysis exercises in the Nigerian construction industry.

The table below shows the numbers of contractors and project managers that were given the questionnaire and the number of returned questionnaires. The table shows that forty-three percent of the local contractors returned the questionnaires and thirty-eight percent of the foreign construction firms submitted the answered and completed questionnaire. The returned questionnaire of the Project managers is twenty percent of the questionnaire given out.

TABLE 1
.PERCENTAGE OF QUESTIONNAIRE RESPONSES

QUESTIONNAIRE RESPONSES	LOCAL CONTRACTORS	FOREIGN CONTRACTORS	PROJECT MANAGERS
Number of questionnaire sent out	75	40	100
Number of questionnaire returned	32	15	22
Percentage of questionnaire returned	43	38	22

4.0 RESULT OF FINDINGS

4.1 RESULTS OF RESPONDENTS ON RISK MITIGATION FACTORS

Risk response reflects the expected underlying factors of the contractors and the situation that permits them. The most prominent in the weighted average is that risk is transferred, which reflect more on the foreign contractors response and this borne out of many factors like detailed information about local environment; the end users of the project and effective participation of local input. On the part of the local contractors, this is the least as most projects undertaken by them are not significant enough or complex enough to transfer the risk so they cope with the contract situation. However, it is the third on the project manager's response as transferring risk is akin to transferring positive response of overcoming the risk. Second on the weighted average shows that contractors prefer to retain risk, which means that the effect of the risk analysis did not indicate too much of negative outcomes, however, the complexity of projects should determine the retention of risk after the analysis. The third on the weighted average is that contractors avoid risks as a result shows that foreign contractors and project managers do not favor risk avoidance as in the case of local contractors. The local contractors avoid risks base on their formation since most of them are one-man-business and investment wise it is not encouraging in third world countries as most of them rely on the genuine intention of the client. The forth is risk reduction on the weighted average, while it is the third on both local and foreign contractors, but second on the project managers response. This suggests that expertise in risk reduction process is not yet prominent in our construction process of risk analysis is to reduce the risk. Risk analysis will show the risk to be reduced, transferred, retained and avoid. The probability that the project does not take care of uncertainty may be a major factor.

TABLE 2
RISK MITIGATION TECHNIQUES

RISK REPOSESES	local contractors Mean Rank	Foreign contractors Mean Rank	Project Managers Mean Rank	Weighted Av. Mean Rank
Risk avoidance: this means looking other options when the risk analysis has shown that the project has negative consequence. This risk has weighty impact on the project. (Turner & Clarke, 2004)	0.988 1	0.413 4	0.827 4	0.822 3
Risk reduction: this is a process of choosing a suitable technique and management fundamental essence to extenuate proneness of occurrence or its consequences or both. (Turner & Clarke, 2004)	0.238 3	0.825 3	0.924 2	0.802 4
Risk transfer: this is a process of transferring the responsibility of carrying the risk to another party within or outside the organization. Examples are to another party through legislation, contract, insurance or other means. (Turner & Clarke, 2004)	0.219 4	0.988 1	0.880 3	0.862 1
Risk retention: this is a situation where the organization decided to carry the burden of the risk within the organization. (Turner & Clarke, 2004)	0.256 2	0.880 2	0.969 1	0.845 2

4.2 THE DISCUSSION OF FINDINGS ON AVOIDING RISKS

The risk mitigation exercise is crucial to all contractors and Project managers as most of them respond to their questionnaire as appropriate. The local contractors clarify project requirements to avoid discrepancies in their bid to avoid risk more than any other exercises, followed by changing the project plan to eliminate risks. The others are engaging additional project team members that have experience with the technology that the project deals with and using a proven procedure rather than a new attempt. The foreign construction firms change the project plan to eliminate risks more than they clarify project requirements to avoid discrepancies; using a proven methodology rather than a new approach and engaging additional team members that have practical wisdom with the technology that the project deals with. The project managers prefer to avoid risks by using a proven methodology rather than a new approach more than the three other methods. The weighted average suggest that changing the project plan to eliminate risk is the most frequently adopted method followed by clarifying project requirements to avoid discrepancies. Others are using a proven procedure rather than a new approach and engaging additional team member that have practical acquaintance with the technology that the project deal with. The weighted average and the foreign contractors' opinion are the same, and this suggests that the foreign firms have the wherewithal to cope with risks more than other respondents.

TABLE 3
AVOIDING RISKS

RISK TREATMENT AVOIDING RISK	LOCAL CONTRACTS MEAN RANK		FOREIGN CONTRACTOS MEAN RANK		PROJECT MANAGERS MEAN RANK		WEIGHTED AVERAGE MEAN RANK	
Changing the project plan to eliminate risk	0.906	2	0.440	1	0.382	3	0.672	2
Clarifying project requirements to avoid discrepancies	0.963	1	0.330	2	0.418	2	0.794	1
Hiring additional project team members that have experience with the technology that the project deals with.	0.706	3	0.267	4	0.364	4	0.525	3
Using a proven methodology rather than a new approach.	0.594	4	0.280	3	0.491	1	0.492	4

4.3 THE DISCUSSION OF FINDINGS ON RISKS TRANSFER

The local contractors transfer risk by warranties followed by guarantees, fixed-priced contracts, performance bond and insurance. The relative index result suggest the ineptness of the local contractors when transferring risks and its entire result on local contractors is 0.313, which is below average suggests that the local contractors are averse to transferring of risks. The foreign construction firms transfer most of the risks in their projects through fixed-price contracts, performance bond, and insurance in descending order, which relative index average is 0.956. The average relative index for warranty and guarantee is 0.387, which is below average meaning a very low in use. The project managers transfer most of the risk in their projects through fixed-price contracts followed by insurance, performance bond, warranties and guarantees and the relative index average is 0.774. The weighted average indicate that the mostly used method is fixed-priced contract 0.747, performance bond 0.678, insurance 0.678, warranties 0.463 and guarantees, and these reflect on the general situation on the industry.

TABLE 4
TRANSFERRING THE RISK

RISK TREATMENT TRANSFERRING THE RISK	Local contractors Mean Rank		Foreign contractors Mean Rank		Project managers Mean Rank		Weighted Average Mean Rank	
Insurance	0.250	5	0.920	3	0.864	2	0.814	2
Performance bonds	0.275	4	0.960	2	0.818	3	0.812	3
Warrantees	0.396	1	0.347	5	0.645	4	0.500	4
Guarantees	0.325	2	0.427	4	0.609	5	0.485	5
Fixed-priced contracts	0.319	3	0.987	1	0.936	1	0.871	1

4.4 DISCUSSION OF FINDINGS ON RISK REDUCTION.

The local contractors prefer to reduce risk mostly on their projects by increasing the project activities to reduce the risk probability or impact. The second on the ranking order is by simplifying more tests on the project work before implementation. Others are completing more tests on the project work before implementation and developing prototype, simulations, and limited releases. On an average the relative index is 0.280, which suggest that local contractors rarely reduce risks as this indicates low responses, which is the base on non-availability of skill personnel. The foreign construction firms reduce risk mostly by developing prototypes, simulation, and limited releases 0.907. Others are simplifying more tests on the project work before implementation 0.827; completing more tests on the project work before

implementation 0.693; increasing the project activities to reduce the risk probability or impact 0.320. The relative index average is 0.687, which is above average and indicate the frequency of involvement of foreign construction firms in project risk reduction. The project managers reduce risk mostly by developing prototypes, simulation, and limited releases followed by simplifying more tests on the project work before execution. Others are increasing project activities to reduce the risk probability or impact and completing more tests on the project work before execution. The average relative index is 0.834, which is well above average, and this indicates that project managers prefer to use the four methods on the average. The weighted average is well above average for the other three groups.

TABLE 5
. RISK REDUCTION

RISK TREATMENT RISK REDUCTION	Local contractors Mean Rank		Foreign contractors Mean Rank		Project managers Mean Rank		Weighted Average Mean Rank	
Adding activities to the project to reduce the risk probability or impact.	0.338	1	0.320	4	0.818	3	0.599	4
Simplifying more tests on the project work before implementation	0.300	2	0.693	3	0.845	2	0.698	2
Completing more tests on the project work before implementation	0.219	3	0.827	2	0.791	4	0.612	3
Developing prototypes, simulations, and limited releases	0.213	4	0.907	1	0.882	1	0.739	1

4.5 THE DISCUSSION OF FINDINGS ON RISK RETENTION

The local contractors frequently use contingency reserve more than management reserve whenever there is the intention to retain risks, which suggests that known risks are mostly of the risks analyzed and retained. The situation suggests that there is not much reason for the local contractors to take care of unknown risks. The frequency of use contingency reserve is 70%, while that of management reserve is 30%. The foreign contractors mostly use contingency reserve to solve most of the risks retained risks with a percentage of 76%, while the management reserve is 24%. The project manager's situation is different from that of the local and foreign construction firms in that the contingency reserve is 57%, while the management reserve is 43%. The result suggests that the projects the project managers undertake have both known and unknown risks. The weighted average shows that the contingency reserve is 67%, and management reserve is 33%. The findings indicate that most of the construction firms are engaged in projects where the known risks are mostly occurring thus stressing to the fact that complex projects are not many in the country like in the developed countries. However, the expected rate of development is within a short period, which needs to be prepared for by all stakeholders.

TABLE 6
RETAINING THE RISK.

RISK MITIGATION	Local contractors Mean Rank		Foreign contractors Mean Rank		Project managers Mean Rank		Weighted Average Mean Rank	
Contingency reserve	0.894	1	0.987	1	0.945	1	0.944	1
Management reserve	0.388	2	0.320	2	0.709	2	0.533	2

4.6 FINDINGS ON SPEARMAN CORRELATION COEFFICIENT ON ALL THE RISK TREATMENT METHODS

TABLE 7.
RISK TREATMENT RANKING OF ALL RELATIVE INDEXES.

RISK MITIGATION	Local contractors		Foreign contractors		Project managers		Weighted Average	
	RI	Rank	RI	Rank	RI	Rank	RI	Rank
AVOIDING RISK								
Changing the project plan to eliminate risk	0.906	2	0.440	8	0.382	14	0.672	9
Clarifying project requirements to avoid discrepancies	0.963	1	0.330	11	0.418	13	0.794	6
Hiring additional project team members that have experience with the technology that the project deals with.	0.706	4	0.267	15	0.364	15	0.525	12
Using a proven methodology rather than a new approach.	0.594	5	0.280	14	0.491	12	0.492	14
TRANSFERRING RISK								
Insurance	0.250	13	0.920	5	0.864	5	0.814	4
Performance bonds	0.275	12	0.960	3	0.818	6	0.812	5
Warrantees	0.396	6	0.347	10	0.645	10	0.500	13
Guarantees	0.325	9	0.427	9	0.609	11	0.485	15
Fixed-priced contracts	0.319	10	0.987	2	0.936	2	0.871	2
REDUCING RISK								
Adding activities to the project to reduce the risk probability or impact.	0.338	8	0.320	12	0.818	6	0.599	10
Simplifying more tests on the project work before implementation.	0.300	11	0.693	7	0.845	4	0.698	8
Completing more tests on the project work before implementation	0.219	14	0.827	6	0.791	8	0.739	7
Developing prototypes, simulations, and limited releases	0.213	15	0.907	4	0.882	3	0.823	3
ACCEPTING RISK								
Contingency reserve	0.894	3	0.987	1	0.945	1	0.944	1
Management reserve	0.388	7	0.320	13	0.709	9	0.533	11

1. SPEARMAN CORRELATION COEFFICIENT CONSIDERATION ON LOCAL CONTRACTORS AND FOREIGN CONTRACTORS ON RISK TREATMENT.

$$Rho = 1 - 6 \sum d^2 / n(n^2 - 1)$$

= -0.5 suggest a moderate negative correlation. It shows that the local contractors and foreign construction firms' opinions on the use of risk treatment exercises in most of their construction projects are related.

H₀: there is no statistically significant relationship between the opinion of local contractors and foreign contractors on the use of risk treatment exercise in the Nigerian construction industry. Student's t distribution with degree of freedom n-2 was used t =

rs√n-2/1-r²
T-Calculated is -2.08, which is lower than t-tabulated 2.16. The observation suggests that there is statistically significant relationship between local contractors' opinion and that of foreign contractors. Therefore we fail to accept H₀ the null hypothesis.

2. SPEARMAN CORRELATION COEFFICIENT CONSIDERATION ON FOREIGN CONTRACTORS AND PROJECT MANAGERS ON RISK TREATMENT.

$$Rho = 1 - 6 \sum d^2 / n(n^2 - 1)$$

= 0.716 suggest a strong positive correlation as it is above average. It shows that the foreign construction firms' opinions and that of project managers on the use of risk treatment exercise in most of their construction projects are related. H₀: there is no statistically significant relationship between the opinion of foreign contractors and project managers on the use of risk treatment exercise in the Nigerian construction industry. Student's t distribution with degree of freedom n-2 were used t =

rs√n-2/1-r²
T-Calculated is 3.70, which is higher than t-tabulated 2.16. The observation suggests that there be statistically significant relationship between foreign contractors' opinion and project managers. Therefore we fail to accept H₀ the null hypothesis

3. SPEARMAN CORRELATION COEFFICIENT CONSIDERATION ON LOCAL CONTRACTORS AND PROJECT MANAGERS ON RISK TREATMENT.

$$Rho = \rho = 1 - 6 \sum d^2 / n(n^2 - 1)$$

= -0.6 suggest a negative correlation that shows that the local construction firms' opinions and that of project managers on the use of risk treatment exercise in most of their construction projects are related.

H₀: there is no statistically significant difference between the opinion of local contractors and project managers on the use of risk response exercise in the Nigerian construction industry. Student's t distribution with degree of freedom n-2 was used t =

rs√n-2/1-r²
T-Calculated is -2.70, which is higher than t-tabulated 2.16. The observation suggests statistically significant relationship between local contractors' opinion and that of project managers. Therefore, H₀ the null hypothesis is rejected.

TABLE 8.
RESULT ON HYPOTHESIS TESTED

parameters	r _s	t-cal	t-tab	p-value	Reject H ₀
Local contractors and foreign contractors	(0.50)	(2.08)	3.74	0.05	Yes
Foreign contractors and project managers	0.716	3.70	5.61	0.05	No
Local contractors and project managers	(0.60)	(2.70)	3.33	0.05	No

6. CONCLUSION

The study carried out detail information available on risk responses of the local and foreign contractors and Project managers. It was obvious that risk management responses play a major role on deciding what the contractors perceived to be risks and adequate response to these risks.

The findings demonstrate that risk responses practised by both local and foreign constructors in about 50 percent of the projects, while the Project managers have introduced risk responses in most of their projects. The characteristics of the industry best determine the response to the risk treatment as the development of infrastructures is mainly in the hands of the foreign construction firms. The foreign firms are big and financially strong to manage risks while the local contractors are upcoming in coping with risk treatment.

The risk response exercise is the essential treatment of risk in the construction industry as most of the contractors both foreign and local have confirmed in their contributions. However, the local contractors seldom retain, transfer and reduce risk, but the awareness is improving. In conclusion, the study reveals that most contractors are not conversant with the risk treatment exercises, which is as a result of lack of knowledge and professionalism. However, the Project managers are aware of the importance of risk treatment and the standardizing the industry in this area of development is solely Project manager's responsibility.

5. RECOMMENDATIONS

The study proposes that stakeholders should accept developmental changes in relation to risk treatment in the industry best as such upgrade the industry is the most crucial to achieving success. Clients that are investment-conscious should endeavour to engage the services of Project managers in projects so that incidence of time overrun, cost overrun, quality disparagement and project abandonment is reduced to the barest minimum. Merger of local construction firms should be encouraged so that they can synergize to have bigger projects and compete with the foreign firms and be able to carry out risk management exercises. Professionalism is crucial in the construction industry as updating on latest industry code of conduct; secondly, developmental training is critical in project management practice with risk management as the main focus. There is an urgent need of legislation to guide the construction industry as this will allow the professionals involvement unequivocal in the industry.

REFERENCES

- Azhar, S., Ginder, W., & Farooqui, R. (n.d.). An Assessment of Risk Management Practice in the Alabama Building Construction Industry.
- Bannerman, P. L. (2008). Risk and Risk Management in Software Projects: A Reassessment. *Journal of Systems and Software* 81 , 2118-2133.
- Barima, O. (2003). The Management of Risks within the Virtual Construction Project Environment. *International Conference* (pp. 1-10). Hong Kong: CIB TG 23.
- Berg, H.-P. (2010). Risk Management: Procedures, Methods and Experiences. *RT&A #2(17)* , 79-95.
- Bhandari, M. G., & Gayakwad, D. (2014). Management of Risk in Construction Projects in Maharashtra. *International Journal of Engineering Science Invention* , 14-17.
- Bhandari, M., & Gayakwad, P. (2014). Management of Risk in Construction Projects in Maharashtra. *International Journal of Engineering Science Invention*. Vol. 3. Issue 1 , 14-17.
- Burtonshaw-Gunn, S. (2014). *Risk and Financial Management in Construction*. Gower.
- CIDB. (2004, March). Managing Construction Procurement Risks. *Construction Industry Development Board* , pp. 1-8.
- Kamane, S., & Mahadik, S. (n.d.). Risk Management in Construction Industry. *Journal of Mechanical and Civil Engineering* , 59-65.
- KarimiAzari, A., Mousavi, N., Farid, M. S., & Hosseini, S. (2011). Risk Assessment Model Selection in Construction Industry. *Expert Systems with Applications* 38 , 9105-9111.
- Khumpaisal, S. (2014). Risks in the Construction Project Procurement Process and Mitigation Methods. *Academic Articles on Housing and Real Estate Development* , 135-145.
- Mahendra, P., Pitroda, J. R., & Bhavsar, J. (2013). A Study of Risk Management Techniques for Construction Projects in Developing Countries. *International Journal of Innovative Technology and Exploring Engineering*. Vol3, Issue 5 , 139-142.
- Naphade, P., & Bhangale, P. (2013). To Study on the Risk Management, Risk Treatment Strategies and Insurance in Construction Industries. *International Journal of Inovative Technology and Exploring Engineering Vol.3, Issue 4* , 68-74.
- Panthen, k., Ahmed, S. M., & Azhar, S. (2007). *Risk Matix as a Guide to Develop Risk Response Strategies*. Retrieved August 7, 2014, from Risk Matix as a Guide to Develop Risk Response Strategies: ascproO.ascweb.org/archives/cd/2007/paper/CPRT145002007.pdf
- PMI. (2013). *A Guide to the Project Management Body of Knowledge (PMBOK) Fifth Edition*. Newtown Square: Project Management Institute, Inc.
- PMI. (2009). *Practice Standard for Project Risk Management*. Newtown Square: Project Management Institute, Inc.
- Raz, T., Shenhar, A. J., & Dvir, D. (2002). Risk Management, Project success, and Technology uncertainty. *R & D Management* 32. 2 , 101-109.
- RICS. (2001). The Management of Risk-Yours Mine and Ours. In RICS, *Project Management Memorandum of Agreement and Conditions of Engagement with Guidian Note*. third edition (pp. 1-39). London: RICS.
- Schatteman, D., Herroelen, W., Van de Vonder, S., & Boone, A. (2014). *A Methodology for Integrated Risk Management and Proactive Scheduling of Construction Projects*. Leuven: Catholieke Universiteit.
- Turner, K., & Clarke, N. (2004, february). *Facility Management Guidelines of Managing Risk*. Retrieved December 16, 2013, from Facility Management Association of Australia Limited: <http://www.facilitymanagementofaustralialimited.org>
- Walewski, J., & G.E, G. (2003). International Project Risk Assessment: methods, Procedures, and Critical Factors. *Construction Industry Institute Project Team 181, International Project Risk Assessment* , 1-28.
- WSDOT. (2013, October). *Project Risk Management Guidance for WSDOT*. Retrieved April 11, 2014, from Project Risk Management : www.wsdot.wa.gov/publications/manuals