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Research Paper

Causes, Effects and Solutions Associated with Risk Management In An Indigenous Construction Industry In Nigeria

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ABSTRACT: *The primary goal of the research is to identify the causes, effects, and solutions to risk management in an indigenous construction industry in Nigeria. Most of the indigenous construction industry has been affected by risk and uncertainty more than other business activities due to its dynamic, time-consuming activities and complexity. Risk management is critical for adding value to a project and improving its quality, time, and cost performance.Risk management is one of the most important management tools for dealing with project risks and uncertainties because it predicts the unpredictable. A well-designed and structured questionnaire that was randomly distributed to the population in the southwestern states of Nigeria was used to collect the study's data. The studies identify financial risk is the most significant causes of the major risks associated with construction industry (66.8%), construction design caused risk, managerial risk, and contracting and administration risk. The results of the effects of important risks associated with the construction industry arepoorly written contracts, delay in job completion, and poor project management, unexpected increases in material costs and payment disputes. However, identifiable solutions of main risk management associated with the indigenous construction industry includes improving decision making, planning and prioritization is the most significant relief of the vital risks associated with construction industry (68.3%), material management of construction industry risk (66.7%), and adequate and proper communication (66.2%). To improve efficiency and profitability, construction workers should be trained and retrained in the critical path method (CPM) and project management techniques.Furthermore, project managers must educate clients on the importance of risk analysis in construction projects.*

KEYWORDS: *financial risk,payment disputes, indigenous, delay, construction*

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I. INTRODUCTION

A risk is explained as an event that has the potential to cause harm or loss, or to impair one's ability to achieve one's goals, it is a probability of a threat, the asset's vulnerability to that threat, and the impact if the threat occurs and risky situation is one that exposes construction worker to danger, harm, or loss. Risk can only be controlled when everyone understands its meanings and effects on projects. One of the most important factors to be investigated in terms of risk management application and barriers in Nigeria is a better understanding of the risk management process and practice in the construction industry. Construction is one of the most difficult and dynamic industries in Nigeria. Indigenous building industry distinguishes itself from other business due to its distinct and complex characteristics and most of these differences are caused by factors of project duration, type of contracts and work, size, diversity, players, and location of the site of the projects,

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which is why the construction industry faces so many risks. It will also aid in identifying long-term risk factors and their proclivity in Nigerian construction projects. Despite widespread research, there is no universal definition of risk. In other words, the definition of risk is still flawed. According to [1] (Peixoto et al., 2014**),** risk is given as the possibility of an unfavourable occurrence in a project, and organizations are keen on project risk management. Smith et al. [2, 3] define risk as an unforeseen event that occurs during the construction process. According to research, the construction industry faces the most risks and uncertainties of any industry [4]. In general, risk is defined as a past event that has the potential to negatively impact the project's outcome in terms of quality, cost, other relevant performance criteria and time [5]. According to construction management community, is an any event, whether internally or externally motivated, can be considered a project risk., that, if it occurs, will have a negative impact on the project's cost objectives, time, performance, and functionality. Finally, risk is a threat and impediment to project success. According to Renuka et al. [6]**,** the adaptive of construction objects is fraught with dangers. Risks can arise from a variety of sources, such as a temporary project team made up of representatives from various companies, a construction site, and so on. Furthermore, as construction objects grow in size and complexity, so do the risks. This is in addition to the social, economic, and political circumstances in which the work will be carried out. An object risk is an unforeseeable event or condition that, if it occurs, has a positive or negative impact on at least one project objective, such as quality, cost, or time. A hazard is a situation that could endanger someone's life or endanger the environment, property, or personal integrity. A hazard on a construction site is a problem that endangers people's lives or causes physical harm to them. Hazardous situations are those that have the potential to escalate into incidents or disasters, uncertainty is the likelihood of an event occurring with imperfect or limited information. An uncertainty has multiple possible outcomes that are likely to occur while a risk is the outcome of an event that can be predicted statistically [7, 8, 9]. Failure is highly predictable when it comes to risks. A risk is any high-probability event that has the potential to impede project progress, quality, or cost. Uncertainties and hazards are situations to be wary of, but they are not considered risks. Risk management is one of the most important management tools for determining project risks and uncertainties because it predicts the unexpected. Risk management is critical for adding value to a project while also improving timelessness, improving quality performance, and it is reducing the costs [10].

II. LITERATURE REVIEW

Construction industries in Nigeria face a number of risks, including design, contractual risks, and financial, all of which can have an immediate impact on their ability to meet their objectives. Risk management is a proactive decision-making process that aims to reduce effectively and efficiently, lower, and control risks [3].As a result, the majority of Nigeria's construction companies do not use or have technical knowledge of risk management uses in their projects. Thus, the goal of this study is to demonstrate the actual risk management process used in construction projects and to assess the effects of risk management benefits and applications on the cost performance and cost of construction projects. Construction is a volatile industry with numerous risks and the majority of these risks are repeat offenders. According to Jeff Gerardi [11], the subsequent are some of the most common dangers that are likely to arise during the construction period and he identified as a result of risks in the construction project, bankruptcy, change orders, delays, improper paperwork, material pricing and profitability, labour shortages, poor project management, unclear scope of work, payment disputes, health and safety hazards can occur.

The role of the construction worker is responsible for a high number of fatalities and injuries. Building or structure construction, alteration, repair, or destruction poses significant risks and hazards to their safety. Some of the most common dangers are working at height, manual handling, noise, electricity, collapse, slips, trips, and falls, and moving vehicles. According to [12], risk management must be carried out throughout the construction project's life cycle, from inception to project decommissioning. Failure to manage project risks throughout a construction project's life cycle will result in poor project performance [9].

Chileshe and John Kikwasi [13] discovered a link between risk management and risk assessment practices, project performance and further research revealed that unexpected events frequently complicate construction projects. Cost and quality parameters suffer as a result of these uncertainties, which frequently leads to failure. According to [14, 15, 16], the majority of project contractors in advanced countries lack the necessary experience and knowledge to effectively handle risk-related cases. They fail because they are unfamiliar with the risk factors inherent in construction projects. To summarize, schedule overruns, design requirement variations, rising raw material costs, rising labour fees, fluctuating product prices, changing market demand, fluctuating interest, and exchange rates, and so on are all unforeseeable factors that can hinder or even prevent a project from reaching its predetermined destination and also these doubts contributed to poor work quality, delayed schedule and cost overruns, and project abandonment in a construction project**.** [17, 18, 19] also believes that cost and schedule overruns, scope creep and project abandonment will continue to rise until risk management practices are known as an important member of project success and implemented it

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accordingly. By discussing the purpose, one can make more accurate predictions, keep the schedule under control, and ensure that projects are successfully completed. Setbacks or interruptions, cost overruns, and project abandonment plague the Nigerian construction industry [20, 21, 22, 23]. Nigerian construction professionals are thought to be well-versed in risk factors identification, the possibility of occurrence and its effect at the pre-contract and post-contract stages have yet to be examined. However, few studies on risk management in the Nigerian construction industry have been conducted. The construction industry in Nigeria is heavily reliant on government funding and underperforms due to avoidable risk factors. Understanding project risk management is becoming increasingly important.

Delays are regarded as one of the most significant risks in construction projects and should be avoided as soon as possible due to serious consequences for both the project contractor and the client. Almost always, construction project risks result in the project's inability to meet its objectives. Delays, according to [24, 25], have a negative impact on project success in terms of time, cost, quality, and security. Delays, cost overruns, and decreased project qualities are all common negative outcomes of construction projects' inherent risk. Failure to manage risks may result in financial loss, reputational damage, and future business loss. Therefore, systematic risk management must be implemented to address the major risks of construction projects on site.

Contractor attitude, project programme scheduling, risk management model introduction, risk management cost, availability of knowledge and expertise believed would aid in the development of risk management practices in Nigeria.

The main target of this paper is to identify the major causes, effects and solutions associated with risk management in an indigenous construction project in southwestern. Organizing brainstorming sessions with project stakeholders is the best way to identify risks. The goal is not to solve any particular problem, but to identify as many possible scenarios as possible and theirimplications for the project.

III. METHODOLOGY

For the aim of attaining the goals of causes, effects and solutions associated with risk management in an indigenous construction firm in southwestern states of Nigeria, a total of 120 questionnaires were distributed, and construction sites were chosen at random. The state of Lagos had fifty (50) questionnaires followed by Ogun State with twenty-five (25), Oyo State fifteen (15), Ekiti, Ondo and Osun with ten (10) questionnaires respectively. Both primary and secondary sources were used to collect data including surveys, interviews, books, journal papers, and online resources.

Data analysis was conducted using social statistics tools, including the mean and standard deviation (SPSS). One of the statistical tools used in this study was the relative significance index (RSI), which was used to identify the elements influencing the causes, effects, and solutions associated with risk management in an indigenous construction industry in Nigeria's southwestern states. The factors under study were ranked using the relative significance index ranking (RSI). In their construction research, authors like [26, 27, 28, 29, 30] and others had applied these techniques.

For the purpose of quantifying qualitative variables, the Likert scale, which asks respondents to rate items on a scale between 1 and 5, was established for use in social sciences and management research. It gathered information about construction safety and occupational health in the fourth industrial revolution era from building construction specialists. On a scale from 1 to 5, the replies to the questionnaire's items were recorded. The questionnaire items were scored on a 5-point scale ranging from 1 to 5. "Strongly Agree" was given a score of 5, "Agreed" was given a score of 4, "Undecided" was given a score of 3, "Disagreed" was given a score of 2, and "Strongly Disagreed" was given a score of 1.

[26] proposed an equation for calculating the Relative Significance Index (RSI) in prevalence data:

$$RSI = \frac{\sum \square}{AN} \qquad 0 \leq index \leq 1$$

Where μ is the weighting assigned by respondents to each factor.

A has the most weight (i.e. 5 in this case).

N represents the total number of respondents

IV. RESULTS, DATA PRESENTATION AND ANALYSIS

The collected data is now presented and analysed. Table 1 displayed the respondent's profile, Table 2 displayed the length of service, and Table 3 displayed the respondents' professional qualifications. It revealed that respondents hold a variety of professional qualifications, including NIQS, NIA, NIOB, NSE, and others. To make the data clearer and easier to interpret, tables were used to display it. In the analysis, statistics from both descriptive and inferential sources were used.

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Table 1: Sex

Sex	Frequency	Percentage
Male	92	76.67
Female	28	23.33
Total	120	100.00

Men and women who responded was displayed in Table 1. It revealed that 92 (76.67%) of respondents are men and 28 (23.33%) are women. The outcome demonstrates how genders are represented in the research area's construction industry.

Table 2: Length of service

Years	Midpoint (x)	Frequency (f)	Fx	Percentage
1-5	8	26	208	11.57
6-10	10	23	230	12.79
11-15	15	22	330	18.35
16-20	20	24	480	26.70
above 21	22	25	550	30.59
Total		**120**	**1798**	**100.0**

Mean = ∑fx/∑f= 1798/120 = 14.98

Table 2 shows the respondents' estimated average year of experience, which is fifteen years (15years). With an average of fifteen years of work experience, respondents are deemed to have sufficient experience to provide reliable data for the study.

Table 3: Professional qualification

Educational Qualification	Frequency	Percentage (%)
NIOB	44	36.67
NIQS	22	18.33
NIA	20	16.67
NSE	18	15.00
Others	16	13.33
Total	**120**	**100**

The respondents' educational backgrounds are displayed in Table 3 for comparison. The percentage of people who are registered with a professional body is 36.67 percent for NIOB, 18.33 percent for NIQS, 16.67 percent for NIA, 15.00 percent for NSE, and 13.33 percent for other professional groups. The outcome demonstrates that every respondent has professional bodies they are registered with in Nigeria and has received the necessary training to provide accurate data for the survey.

CAUSES OF MAJOR RISKS ASSOCIATED WITH THE CONSTRUCTION INDUSTRY

Table 4 displays the various causes of major risks in the construction industry and ranks the factors using the Relative Significance Index (RSI).

Table 4: Causes of major risks associated with the construction industry.

S/N	Causes	1	2	3	4	5	Total	RSI	Rank
1.	Physical risk	34	21	26	21	18	120	0.547	10
2.	Economic risk	24	25	19	26	26	120	0.608	4
3.	Political and regulation risk	25	22	24	32	17	120	0.590	5
4.	Managerial risk	14	30	29	21	26	120	0.625	3
5.	Contracting and administration risk	35	18	18	24	25	120	0.567	9
6.	Environmental regulation causes	28	24	24	27	17	120	0.568	8
7.	Financial risk	16	21	16	40	27	120	0.668	1
8.	Construction design cause risk	23	22	19	25	31	120	0.632	2
9.	Safety accident risk	34	20	16	22	28	120	0.583	6
10.	Technical risk	25	25	28	26	16	120	0.572	7
11.	Personal risk	25	22	24	32	17	120	0.590	5

Financial risk is the most significant source of major risks in the construction industry, ranking first with an RSI value of 0.668 (66.8%). Construction design risk was ranked second with an RSI of 0.632 (63.2%), and managerial risk was ranked third with an RSI of 0.625 (62.5%). Physical risk and contracting and administration risk contribute the least to major risk causes, with RSIs of 0.547 (54.7%) and 0.567 (56.7%), respectively.

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EFFECTS OF MAJOR RISKS ASSOCIATED WITH THE CONSTRUCTION INDUSTRY

Table 5 depicts the various effects of major construction risks, as well as the ranking of the factors using the Relative Significance Index (RSI).

Table 5: Effects of important risks associated with the construction industry.

S/N	Effects	1	2	3	4	5	Total	RSI	Rank
1.	Health and safety hazards that lead to worker accidents and injuries.	17	24	22	32	25	120	0.640	4
2.	Project alterations	27	16	21	40	16	120	0.603	8
3.	Incomplete drawings	26	19	25	26	24	120	0.605	7
4.	**Ambiguous scope of work** and site conditions.	17	24	22	32	25	120	0.640	4
5.	Poor contract writing and project management.	25	18	18	24	35	120	0.643	2
6.	Unexpected increases in material costs and profitability.	17	24	24	27	28	120	0.642	3
7.	Labour shortages.	28	16	20	22	34	120	0.630	5
8.	Damage or theft to equipment and tools.	16	28	25	26	25	120	0.627	6
9.	**Bankruptcy**	31	19	22	25	23	120	0.583	9
10.	**Delays.**	18	26	21	21	34	120	0.645	1
11.	**Payment disputes**	26	29	30	21	14	120	0.547	10

The Relative Significance Index (RSI) measures the magnitude of the effects of major risks associated with the construction industry, as shown in Table 5 above.With delay having highest RSI value of 0.645 (64.5%) ranked first, followed by a poorly written contracts and **poor project management with RSI score of 0.643 (64.3%),**unexpected increases in material costs with RSI score of 0.642 (64.2%) ranked third. Payment disputes gave the least RSI score of 0.547 (54.7%). The outcome also demonstrated that each component is significant, with the least significant factor having a significant level of 0.547 (54.7%).

SOLUTIONS OF MAIN RISK MANAGEMENT ASSOCIATED WITH THE CONSTRUCTION INDUSTRY

Table 6 depicts the various solutions to the main risks associated with the construction industry, as well as the ranking of the factors using the Relative Significance Index (RSI).

Table 6: Solutions of main risk management associated with the construction industry.

S/N	Solutions	1	2	3	4	5	Total	RSI	Rank
1.	Material management	22	24	12	16	46	120	0.667	2
2.	Adequate and proper communication	17	12	20	59	12	120	0.662	3
3.	Maintain the firm's credibility and reputation.	26	16	32	10	36	120	0.623	7
4.	Cost estimation and work schedule creation.	20	22	11	39	28	120	0.655	4
5.	Risk response can be well-planned by assigning risk to a compatible party.	22	24	28	26	20	120	0.597	10
6.	Accurate estimate	18	21	35	26	20	120	0.615	8
7.	Reduction of material and labour wastage	20	24	24	24	28	120	0.627	6
8.	Prevention accident rate on site	20	18	34	34	14	120	0.607	9
9.	Reduce the insecurity of construction activities.	25	26	25	28	16	120	0.573	11
10.	Reduction of mistakes and errors	24	23	11	32	30	120	0.635	5
11.	Improving decision making, planning and prioritization	20	12	24	26	38	120	0.683	1

Improving decision making, planning, and prioritization is the most significant relief of the critical risks associated with the construction industry, ranking first with an RSI value of 0.683 (68.3%). Material risk management in the construction industry came in second with an RSI value of 0.667 (66.7%), while adequate and proper communication came in third with an RSI value of 0.662 (66.2%). Reduce the insecurity of construction activities and risk response can be well-planned by assigning risk to a compatible party contribute the least to the causes of major risks with RSI of 0.573 (57.3%) and 0.597 (59.7%), respectively, among the solutions considered.

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V. DISCUSSION OF FINDINGS

This paper presented the findings of an analysis of questionnaires distributed to construction professionals in order to learn about their perceptions of the causes, effects, and solutions associated with risk management in an indigenous construction industry in Nigeria's southwestern states. The findings revealed the causes, effects and solutions associated with risk management. Financial risk is the most significant causes of the major risks associated with construction industry (66.8%), construction design caused risk (63.2%), managerial risk, contracting and administration risk (56.7%) and physical risk (54.7%). The results on the effects of important risks associated with the construction industry were illustrated in Table 5 above. Delay having highest RSI value of (64.5%), poorly written contracts and poor project management (64.3%)**,**unexpected increases in material costs (64.2%) and payment disputes gave (54.7%). The outcome also demonstrated that each component is significant, with the least significant factor having a significant level of 0.547. Table 6 identifies the solutions of main risk management associated with the construction industry. Improving decision making, planning and prioritization is the most significant relief of the vital risks associated with construction industry (68.3%), material management of construction industry risk (66.7%), adequate and proper communication (66.2%). Among the solutions considered, reduce the insecurity of construction activities (59.7%) and risk response can be well-planned by assigning risk to a compatible party (57.3%).

VI. CONCLUSION

Risk management has been found to have a significant impact on project success because risks in construction projects have an impact on project performance. Risk management practices have varying effects on project performance. Risk management practices have varying effects on project performance. Risk management is essential for making sound decisions and planning in a timely manner. This paper examined the causes, effects, and solutions associated with risk management in an indigenous construction industry in Nigeria's southwestern states. It is strongly advised (among other things) that the body of each profession have regulations/laws guiding against some specific causes and effects that can cause delay. This can be accomplished by training and retraining construction workers in the critical path method (CPM) and project management techniques in order to improve efficiency and profit orientation.

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