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Appraising The Management Strategies For Risk Events In The Nigeria Construction Industry

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***Abstract*—The complexities of the construction Industry and the numerous risks inherent therein made the industry very sensitive to cost overrun, and project delay. And, every decision made by the stakeholders involved in the project matters a lot because they have to be risk conscious. Project risk management offers effective approaches for the purpose of improving the decision making to minimise project risks. This study was carried out to address holistically project risks and the decision making, putting into consideration the systematic and practical methods.**

A mixed method of research was employed, and data collected from the questionnaires and interviews on thirty-one construction professionals was analysed to know and understand how the risks identified was managed.

The findings made revealed that there is dearth of good risk management expert in the Industry. More so, the high volatile economic and political situation in Nigeria result to the less effectiveness of proactive action strategy of risk management when any risk occurs. Thus, the contingency theory and cost are therefore being adapted more often as a more meaningful strategy for risk Management in the Nigerian Construction Industry.

1.0 INTRODUCTION

Construction projects are environment dependent and multi-organisational. This makes the management of risk in construction project tasking and imperative for delivery project objectives because risk models are not only developed for risk forecasting and measurement but also used to preserve its empirical properties. (Bony & Khreshna, 2020.

The clients and contractor are included on the task planning, design and construction phases of projects which are responded as integrated tasks.

Whereas, the risk manager takes the responsibility of monitoring and controlling risks together with the implementation of responses obtained concerning threats (Bentley, 2010).

Risk management is subdivided by various authors and institutes. Hofmann, Busse, Bodi, and Henke, (2014); Scholten, Scott, and Fynes, (2014) categorized its processes as identification, classification, analysis and response. And, the framework for risk management has been further divided as "risk planning, risk identification, risk analysis, risk response, risk monitoring and control"(PMI, 2013). Furthermore, Adams (2008) divided the management of risk process into three as the following: identification, analysis and evaluation, and response.

When planning is done, the risks that would be identified are analysed to assign a relevant risk response to them. However, new risk may appear during a project which may make the response for the corresponding risk not be suitable anymore. Risk response can be breakdown into avoidance, reduction", preservation, and transfer relocation (Serpella, Ferrada, Howard, & Rubio, 2014).

The feasibility phase is very important in any project delivery and it is not without risk. As a result of that, it is saddled with moments of decision or indecision for commencing projects. The feasibility phase actually comes before the planning phase in construction, and the ignorance of this phase makes it the most risky of all the phases in construction. The project feasibility phase brings up a go/no go decision for commencement of new projects and therefore significant because a no-go area is likely going to be a very risky area. And, it is imperative that Risk Management Process (RMP) addresses all aspects of projects risks starting from the feasibility phase so as to address the risks related to new projects before commencement.

1.1 Contingency Theory and Construction Risk Management

The contingency theory postulates that there are several right methods for achieving things but best approach is routed in the context (Mikes and Kaplan, 2014). Projects therefore require different contingency approaches since each comes with various requirements as various variable have been altered to an extent. Formal tools used by project managers at the inception of projects are abandoned for new tools during project execution as they may be of little use.

This inherent relationship between projects that are unique and unpredictable and contingency theory (plans) that advocates new approaches are plausible.

This theory permits several background risks (variable), every one of them influencing the project it is applied to. The variables include technological level, external environment, structure of the organization, cost and dimension, People's culture and their involvement, the strategy of supply chain among others. Getting used to contingency theory takes place through organizational learning which is similar to organizations knowledge occurring as a result of its previous experiences. Desai and Madsen (2010) stated that organization learning is dynamic, developed, improved, changed, and modified as the members of the organization experience reality and try to develop their personal and group understanding to have a picture of the lessons they have learnt from the experiences. Contingency can also be used as estimated value of risk that was not insured or taken care of by terms of contract but encountered during the project phase and is determined through different approaches. Usually 5-10% of project cost is added to the initial project sum as contingency (Deng, and Smyth, 2013).

2.0 RESEARCH METHOD

The primary data was collected through questionnaire responses from 31 construction professionals. Afterwards, semi-structured interviews were further conducted. Moreover, the data from questionnaires and interviews were collected from registered construction project professional groups (contractor, consultants and clients) listed by the Nigeria corporate commission and Bureau for public procurement.

The risks types were mentioned in the questionnaire with mitigating measures as strategies for their management. Different type of measures were suggested for the twenty risk types and they were also ranked from 1-5 so that the effectiveness of the measures are known in the Nigerian Environment.

The interviews were structured with a set of nineteen (19) questions mainly concerning project types, risk in construction, their management strategies, contingency plans and implementation, learning process and relationship.

3.0 DATA ANALYSIS

The criticality level, effectiveness of the mitigation options and the opinions of various participants about the different contribution projects were analysed and evaluated. And, different opinions from the interviews about risks and management of projects in addition to the extent at which the risk influence are perceived by the fifteen-construction professional involved were obtained.

4.0 RESULT AND DISCUSSION

The result showed that only 58.1% (18 persons) of the 31 participants who were fully involved in the questionnaire exercise agreed to participate in the oral interview.

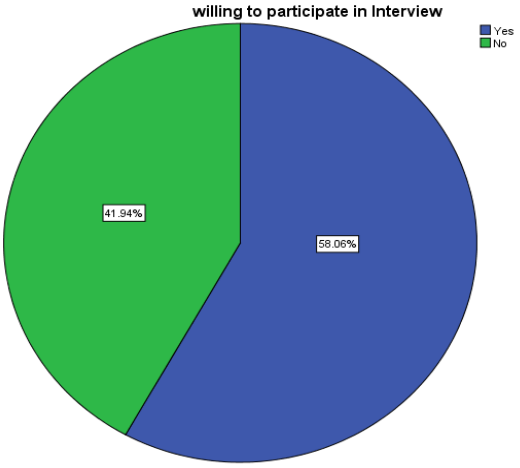

Figure 4.1: Percentage distribution of willingness to take part in interview section of the study.

Figure 4.2 below showed that 51.61% of these who answered the questionnaire have twenty (20) years and above industry experience while about 48.39% of the participants have years of experience ranging from 11 to 19 years in the construction industry. Nevertheless, the greater no of participants with advanced number of experiences is good for evaluating risk in the construction industry. Therefore, the quality of experience and background training of the participant really matters during this study.

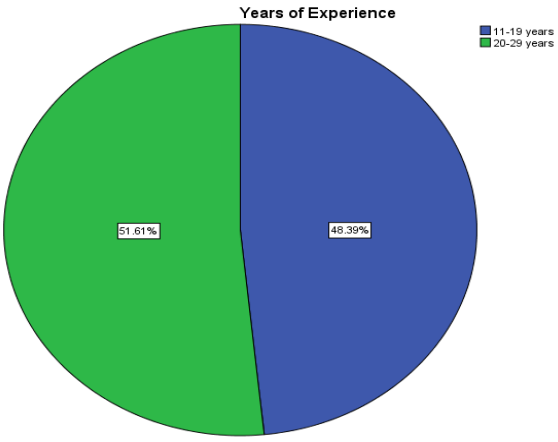

Figure 4.2: Percentage distribution of the participant's years of experience in industry

The analysis shown on figure 4.3 and 4.4 indicated that there is lack of interaction and relationship between risk management experts and non-experts during construction project. And, there is also lack of satisfaction for risk management. Moreover, the analysis showed that there is no risk manager during construction projects in Nigeria. However, what is seen are schedules officers who do jobs of risk management without being assigned the job of risk

management. These officers may be site Engineers, project Engineers or Builders.

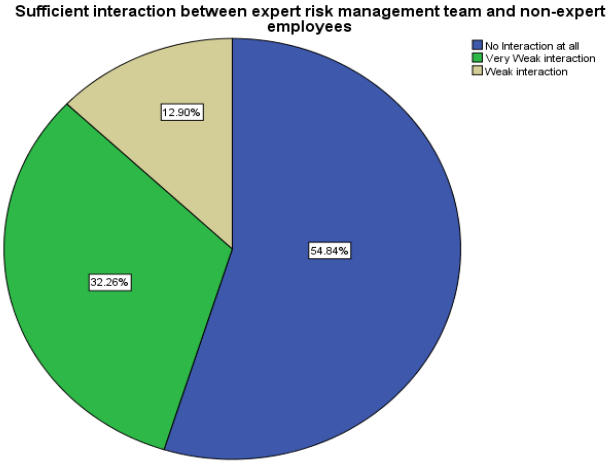

Figure 4.3: Percentage distribution of the sufficiency of relationship between the risk management team and employees in construction companies

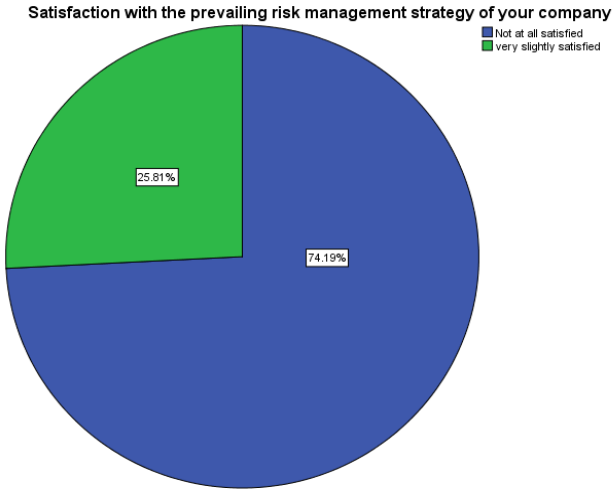

Figure 4.4: Percentage distribution of participants' satisfaction with the prevailing risk management in their companies

4.1EFFECTIVENESS OF STRATEGIES FOR RISK MITIGATION AND ITS EVALUATION

Result of the analysis on effectiveness of risk mitigation in the Nigerian construction industry.

1. Development control permit

Ml. A: Submission at appropriate time of feasibility study and other document to government agencies with the right type of document. This strategy was rated as being effective by the participants, though their responses are not significant.

X^2=5.03; df =2; *p* =0.086

Ml.B: Having good relationship with highly placed government officials is rated as effective by clients and contractors since the strategy through, good relationship is vital for speeding up things.

X^2= 11.68; df =2; *p* =0.012

Consultants are key to obtaining permits for most projects as preparing the vital documents used to obtain approvals is the responsibility of the consultants. Yet, the consultant considers this strategy as less effective on reducing the risk in construction projects associated with permit.

2. Government Influence on Disputes and justice enforcement

M2.A: Provide ambiguous dispute and arbitration claims in contract

X^2 =2.12; df =2; *p* =0.064

M2.B: Maintaining contacts with the government officials and concerned government agencies

X^2 =13.16; df =2; *p* =0.016

Lobbying has been one of the effective means of remaining relevant in Nigerian society. The strategy of maintaining contact with the government officials and concerned government agencies are rated more effective by contractors and clients and not effective by consultants. This result have suggested that lobbying and good relationship was considered a strategy for resolving the risk of governments influence.

3. *Corruption*

Nigeria is one of the countries that experience political instability. Because of this, it is believed that rules and regulations are not strictly adhered to and consequently rules are bent or broken by managers or client. Bribery has remained and is a factor as at times having that kind of relationship is more effective than following regulations. This makes participants, especially clients and contractors consider bribery effective.

- Client if it is government is in position to either take or accept bribes or gratifications and would not give to other parties.

- The contractor is likely is in position to pay bribes to either client or consultants as the circumstances demands and does not receive bribes or gratification due to their roles in construction.

- The consultant is always the one that plays the middle person. He most times gives the bribe to client or his representative or is bribed by the contractor. The consultant is recruited by client to supervise contractors' performance and for this their relationship is highly significant. It can therefore be said that it is proper that consultants do not offer bribe to client, so that they remain trustworthy. Nevertheless, taking bribe from contractors is very common in Nigeria and bribing the client's representative happens so as the consultant maintains his job.

M3.A: provide budget for expenses that are unavoidable.

X^2 =12.68; df=2; p<0.011

A cursory look at the differences of these respondents is considered in two areas as strategies for mitigating the specific risk type. Expenditures that cannot be avoided can be viewed as bribe or money to spend on crucial aspects of the projects so that bribery does not arise. 95% of clients have the opinion that strategy is effective which connote that when the consultants and contractors budget for the task they are deemed responsible for and to do them well the need for corruption will not arise. It could equally be that some of them think that budgeting to bribe is an option for mitigating this type of risk. However, the probability of admitting bribery is effective means to deal with risk will be low in reality, thus it is more acceptable to think that some clients thought this strategy that parties do their assignments properly to reduce corruption. Consultants usually capitalize on jobs not done well to extort money from contractors prior to issuance of certificate.

On the side of the contractors, this strategy is effective because in both views the strategy is helpful to them.

For the consultants; in relative comparison to the clients and contractor, the strategy is adjudged less effective being that the giver (contractor) and core receiver (clients) considers this strategy as effective.

M3.B: Cultural and professional awareness creation for top level personal that might be assigned to interact with corrupt cases.

X^2=5.50; df =2; p =0.185

Considering the above two (2) perspectives capacity building or education maybe seen as either to teach how to stop the bribery or how to bribe at the right time and the proportion. From the perspective of training on how to eradicate bribe, this strategy was thought as less effective since bribery and corruption in Nigerian has become a way of life and means to achieving success. In the scenario of training how to give bribe, this strategy is less effective and no existence of hard and fast rules from these and it is an act acquired from experience.

M3.C: Avoidance of hiring of middlemen

X^2= 5.48; df=2;p =0.0745

This strategy was evaluated as less effective and not significant. This might follow from the notion that it may not be easy to have direct working relationship with workers especially at top echelon and so unavoidable existence of various employees within the strata as middlemen may breed bribery.

M3.D: Get all necessary approvals and on time to reduce the probability of corrupt official to delay commencement of work or total description of work.

X^2 =3.19; df =2; p =0.069

This strategy is rated as effective though not significant. The opinion of the participants can be viewed from two perspectives; being effective may assume that obtaining approvals at the proper time may minimize the corruption but also it may not be easy to obtain all approval and to continue work without the authorities demanding bribe especially as it is noted that Nigeria is familiar with bribery as means to quicken success.

M3.E: Maintaining of good relationship with government agencies involved

X^2= 5.56; df =2; p =0.124

Though this strategy is not significant, it is deemed effective by the three groups. Though maintaining good relations various government authorities were deemed on effective strategy for various risks the risk of corruption may be different because of these views. Good relations may lead to bribery easily (less difficultly) when there is no fear between parties or the necessity to get it reduced. It can be effective as it helps parties to move on. At times as professionals one find his old colleagues and friends in development control position and the bribery may turn to gratification.

4. Political influence and Instability

M4.A: Developing self-contingency plans against political instability e.g evacuation or not taking up projects in high-risk area

X^2 =2.27; df = 2; p =0.072

The strategy is evaluated as being less effective by all three parties. In view of the political instability of Nigeria; feasibility of predicting these unstable times with the location and developing contingency plans for them may be considered minimal. However, the intensity of the political violence is some parts of the country scares construction workers but some balance is struck by those desperate for a living at all costs.

M4.B: Seek document termination or delay clauses in contract

X^2 =3.58; df = 2; p =0.244

This strategy is not significant but has been evaluated by three groups that participated as effective.

M4.C: Information of political development by using information source like radio, newspapers and smart phones

X^2 =5.83; df = 2; p= 0.023

The strategy is evaluated by all parties as less effective, but when closely observing the above, a slight difference exists between contractors and

consultants. In view of the volatile political atmosphere of Nigeria, the thinking of the participants as the information from the sources not many may accept the information given by them. This could be regarded as risk mitigation strategy. The information gotten about crimes, crises of political nature are so numerous that many may disregard them as being usual with the polity.

5. ***Cultural Differences***

M5.A: Comprehensive with negotiation governments and agreement with stakeholders

X^2 =8.28; df =2; *p*= 0.021

All the parties evaluated this strategy as averagely effective but when individually analysed, consultants have deemed them more effective and this differing view may have resulted from the practice experience responsibilities that influence their opinion.

M5.B: Introduce clear and discussed risk sharing agreements when contracts agreements are drafted.

X^2=13.12; df =2; *p*= 0.002

This strategy was considered more effective only by the clients while contractors and consultants view it is less effective. This may follow that the clients view the effectiveness of this strategy from theoretical perspective, the professionals in the field have seen as less effective in real life.

M5.C: Having large equity share as much as possible

X^2 =2.72; df=2; *p*=0.067

The strategy has been assessed as being less effective by all the parties.

M5.D: Provision of clauses of settlement in the contract agreement

X^2=7.27; df =2; *p*=0.011

The experience of the client and the other professionals and their cultural backgrounds may have determined what the view is with respect to the effectiveness of these strategies. The consultant and contractor did not accede to putting this clause in the contract agreement as very effective. Personal interest in settlement clause increases the challenges many a time.

M5.E: Clause for contracts

X^2 =1.28; df=2; *p* =0.734

Largely, the strategy for differences in culture is rated as less effective as different communities and towns have variety of culture. Consequently, inclusion in contract clauses is not seen as effective strategy as risk related to humanness may still occur. It is worthy of note that cultural differences risk is rate as intermediate earlier and therefore is not a very critical factor to construction project compared to other risks.

6. ***Human Resource*** **availability and management**

M6.A. Having permanent and stable employment contract with staff who are technically disposed remains valuable and solves some these problems at different times.

X^2= 9.57; df=2; *p*=0.038

The strategy is as effective on average by all the parties, however, clients considered it better.

M6.B: Offer training of staff and capacity building

X^2=5.67; df=2; *p*=0.082

This strategy is considered as an effective one by all the parties. It is obvious that training and capacity building enhances productivity.

M6.C: Offering better remuneration package to workers

X^2 =1.08; df =2; *p* =0.290

This mitigation strategy is evaluated as being an effective one for the human resource risk by all three groups.

7. ***Cash flow challenges of the management***

M7.A: Examination of the financial viability of companies (Financial proposal) technical proposal, management competence and relationship with government through the corporate affairs commission.

X^2 =5.19; df =2; *p*=0.059

M7.B: a clear definition of the real authority and responsibility, in contract terms and conditions of contract.

X^2 =4.38; df =2; *p*=0.291

The first two (2) strategies analysed for this risk was assessed as effective because information availability about accounts of partners helps to mitigate financial related risk. You do not deal with a firm that is bankrupt or has cash flow challenges.

M7.C: Define the understanding in relation to assets, employees, and organization before mergers or partnership.

X^2=2.20; df =2; *p*=0.067

This strategy has determined less effective because may be the result of assessment of the feasibility of the strategy is not common in Nigeria.

8. ***Foreign Exchange availability and challenges***

X^2=3.23; df =2; *p* =0.069

The strategy has been evaluated as effective by participants for mitigating the risk of foreign exchange and challenges. But the snag is government does not agree to preferential treatment of firms except in high sensitive ones like will affect security or equivalents.

9. ***Inflation and Interest Rates***

M9.A: Obtain advance payment guarantee and performance bond from the banks

X^2=3.43; df = 2; *p*= 0.091

M9.B: Adopt other types of payment e.g., debt-equip swaps etc

X^2= 1.88; df=2; *p*= 0.316

M9.C: List all compensation clearly in the contract agreement and risk register for settlement

X^2=2.75; df =2;*p*= 0.158

These three strategies have been evaluated as effective in inflation and interest rates fluctuation level that has become unpredictable in Nigerian. Bulk purchase of materials at commencement of contract could aid these strategies in addition to incorporating contingency costs.

10. ***Cost Overrun***

M10.A: Prepare accurate price estimates during bidding period

X^2 -2.54; df =2; *p*=0.072

M10.B: Develop a proper plan and schedule of cost control.

X^2= 0.94; df =2; *p* =0.343

M10.C: Have a reserve cash in cash flow schedules

X^2=4.51; df =2; *p*= 0.061

Ml0.D: Incorporate contingency clauses and costs for inflation, time overrun and interest

X^2=2.66; df =2; *p*=0.148

M10.E: Obtain advance payment guarantee and performance bonds from banks. This could help in procuring bulk materials at commencement of the project so as to prevent fluctuation affecting it.

X^2=3.17; df =2; *p*=0.117

M10.F: Put in compensation clauses in agreement for contracts for extension and losses

X^2=5.65; df =2; *p*=0.029

M10.G: Secure fixed rate loan contract with special banks i.e Islamic banks or construction banks

X^2=2.34; df =2;*p*=0.134

M10.H: Arrange pre-determined prices with materials suppliers

All the strategies have been assessed more effective in mitigating risks associated with cost overrun in Nigeria.

11. ***Inadequate Design***

MI1.A: Insert clauses that allow for adjustment in review plans, constructability and adjustments.

X^2=5.92; df =2; *p*=0.047

On the average, this strategy has been evaluated as effective, but individually, each group has slight differences. All the professionals involved assessed this strategy as effective with a high rating from the clients (100%). This P value is less than 0.05 here.

M11.B: Do thorough site investigation prior to construction.

X^2=2.05; df =2; *p*=0.1487

M11.C: Insertion of a time overrun or contract extension phrase in the contract agreement is recommended.

X^2=2.52; df =2; *p* =0.159

M11.D: Provide for thorough proof reading for all documents, drawing etc, by a qualified team of Architect, Engineers Quantity Surveyors, etc.

X^2=2.08; df =2; *p*=0.418

All these strategies are evaluated as effective in mitigating construction project risk emanating from inadequate design.

12. ***Low Productivity***

Ml 2.A: Including good quality control methods

X^2=7.26; df =2; *p*=0.016

This strategy is considered as effective with clients rating it. The practical knowledge of the consultants and contractors respectively is 30% and 20% for flaws in the implementation process towards quality control.

M12.B: Adopting health and safety programs

X^2= 9.18; df=2; *p*=0.024

This strategy has been evaluated as being effective on the average by all the groups and more by the clients. However, all the clients considered it more effective unlike (for Government projects) the contractor and consultants. This is maybe it is the government who constitutes most of client in this case accepts to provide health care to project, but the professionals feel this cannot succeeded 100%.

M12.C: Incorporate weather impacts into project schedule

X^2=2.51;df=2; *p*=0.152

The strategy has been assessed as less effective by all the groups because inserting impacts of weather maybe be effective for increasing productivity of construction in Nigeria. There are many periods of good and poor weather but Nigeria is generally blessed with good weather.

M12.D: Introducing concepts/philosophies as Lean Construction and Just in Time, to reduce rework or variability.

X^2=1.68; df=2; *p*=0.251

M12.E: Reviewing programs plans together with stakeholders to effect required changes.

X^2=3.38; df =2; *p*=0.071

Strategies fourth and fifth are evaluated as being effective.

13. Safety at construction site

M13.A: compensation for the public and company staff should be insured

X^2=2.93; df = 2; *p*=0.413

This strategy was considered effective by all the groups. Provision of insurance policies is capable of improving productivity. It reduces the litigation between Construction Company and the public in event of accident or damage. The time saved from litigation procedure can be employed into timely completion of projects. Likewise, the staffs at the construction site are better cared for when assurance to their lives is put in place.

M13.B: Imbibe professional safety control programs, management, supervision, incentives and preventive methods.

X^2=9.91; df = 2;*p*=0.002

The strategy assess as being more effective on the average by all the groups, however, the clients who are mostly government viewed it as being completely successful. Based on the practical experience of the contractors and consultants, they considered some element of failure in the strategy.

14. *Late Payment*

M14.A: Study the financial resources, liability and employers' financial status

X^2=2.35; df=2; *p*=0.193

M14.B: Study and Examine the reputation of employer in payment. Many employers have history of owing even government in Nigeria due to misappropriation and corruption practices

X^2=4.18; df=2; *p*=0.089

M14.C: Allocating extra budget in bidding phase maybe through **virements.**

X^2=1.67; df=2; *p*=0.139

M14.D: Review in details contracts so as to allocate extra budget during bidding

X^2=3.79; df =2; *p* = 0.234

All the strategies were evaluated as being more effective for mitigating late payment risk in construction projects in Nigeria.

15. Inadequacy Quality control

M15.A: Adopt proper quality control processes, supervision and incentives

X^2=9.62; df=2; *p*=0.015

The strategy has been evaluated by all the groups as being more effective. However, the contractors as different from client and consultants considered this as less strategic. Supervision is normally carried out by the client or the consultant who represent the client in the construction projects. The contractors are the one being supervised, so they may not have found this exercise as feasible especially where there is lack of cooperation; whereas the supervisors themselves have considered it as an effective strategy because they use it to monitor and evaluate the quality of work done by the contractor. M15.B: incentives on personnel and other employees could improve quality

X^2=8.25; df=2; *p*=0.023

The strategy is adopted as being effective averagely by all the professionals; and the clients view it as being 100% effective. The difference in the view point of the clients has been explained in the previous issues on the ground of professionalism and theoretical perception. On a normal condition, it is expected that use of motivation will enhance performance of workers; in the case of construction projects, this may be feasible as construction projects in itself is supervision -based, thus no additional motivation can improve performance better than inbuilt supervision in the project work.

M15.C: Joint review of plans with other partners to assess changes.

X^2=9.32; df = *2; p* = 0.007

The strategy is evaluated as more effective by clients of the three (3), but contractors and consultants differ from clients on the degree of effectiveness of this strategy.

16. Insufficient Project Management

M16.A: Hiring of competent project managers

X^2=1.17; df =*2; p*=0.211

M 16.B: Define every staff work scope

X^2=2.66; df = *2; p* = 0.152

M16.C: Provide for clauses for resolutions of conflicts in contract clause and state clearly any construction extension time in the agreement if the delays is caused by the client.

X^2=2.48; df =*2; p*=0.119

M16.D: clause for delay and extra payment should be pointed out in the agreement should the delay come from the client.

X^2=2.48; df = *2; p*= 0.089

All the strategies were seen considered as being more effective in addressing the risk of "Project Management".

17. *Environmental issues*

M17.A: Adopt strict pollution and other environmental control measures

X^2=5.33; df = *2; p* = 0.034

This strategy was considered by all the groups as being effective. However, difference of opinions occurs between clients and contractors. A high contractor percentage evaluates it as effect against the contractor non effective vote. These environmental issues in project construction can be for the two group's clients knows about the location of project and the peculiar environmental problem of which approval is needed before project commencement. The contractor is the one who deals with these environmental challenges mainly during construction such as soil erosion, pollution or noise. Consequently, any environmental challenges assessed prior to the starting the project may not be as realistic or involving as one that happens on the execution of the project.

M17.B: Adoption of stringent pollution control methods.

X^2=9.92; df =*2; p*=0.003

This strategy was accepted on the average as being more effective by all the three groups, however, the difference in client's opinion as opposed to contractors and consultant maybe due to specific evaluations of the possibility of the strategy. The contractors and consultants have the responsibility to employ these measures during construction and may have thought of the cost and difficulties and also availability of the equipment for valuation and measurements in Nigeria. Again, almost of the clients considered it as effective because they may not have considered the practical implications of the decision. For instance, in building bridges, and roads delays and unforeseen costs may occur because of unpredictable environmental conditions.

18. ***Force Majeure***

M18.A: A when a party cannot meet contract obligation due to force majeure it should give notice to the other within the shortest reasonable time.

X^2=2.64; df=2; *p*=0.069

This strategy was considered by all the three parties as less effective. This is so since notifying may not mitigate the issue.

M18.B: Obtain guarantee from the appropriate authority to adjust tariff and extend the period of concession.

X^2=4.33; df=2;*p*=0.095

The strategy is assessed as being more effective means to mitigate force majeure.

M18.C: Insuring all force majeure risks available

X^2=2.34; df=2; *p*=0.118

All the parties consider this strategy as being more effective.

M18.D: Get guarantee from Government to for financial assistance as needed.

X=8.48; df=2; *p*=0.002

The strategy is considered as more effective on the average by all the three parties. However, the difference between clients' opinion and others could arise from the fact that government being most of the client is willing to offer financial assistance, so they rated it 100%. The contractors and consultants are sceptical that this strategy has to undergo series of due process which normally takes long period of time such that the expected damage may eventual occur before government gets ready with some help.

M18.E: inclusion of clauses for delay in the plan for contingency in project.

X^2=4.89; df = 2; *p* = 0.064

The strategy is evaluated as being effective by all the three groups.

19. ***Market Demand***

M19.A: Engage specialized 3rd party consultant for forecasting of market demand

X^2= 11.62; df=2; *p* = 0.009

This strategy is very effective, but the opinions of the three parties differ significantly. The clients view this strategy as 100% effective while others sees some impediments to its implementations. This use of third party consultant may increase cost of project for the contractor, and may result in conflicting interest between the project consultant and market demand analyst.

20 Competitions

M20.A: Do market investigation and studies so to get factual information about the competitive nature of the on-going projects.

X^2= 1.99; df=2; *p* = 0.111

M20.B: Do market study to get the proper information about competitive projects

X^2= 2.15; df=2;*p* = 0.213

The two (2) strategies are evaluated less or not effective for competition risk in Nigeria.

5.0 CONCLUSION

Risk analysis and managerial techniques are not formally employed in Nigeria because of lack of knowledge and experience of the subject. Risk perception by construction industry professionals is based on intuition and field experiences.

Risk mitigation, elimination and transfers remain popular risk responses measures but they are accompanied by delays, low quality outputs and low productivity.

Moreover, the contingency plans remain effective to a level as projects are reviewed monthly for updating within the organizations and during monthly site meetings. The contingency cost of 5 - 10% of project sum still applies but in the present situation it is tending to the maximum value. This application is

still useful, and methods should be adopted to make it more relevant especially during bidding by contractors so as to reduce the challenges of actualizing project delivery.

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The Identification Of Risks And Its Criticality In The Nigeria Construction Industry

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***Abstract*—Failure in project delivering can be attributed to many risk events in the Nigerian Construction Industry. This risk could be as a result of the dynamic, sensitivity, and complexity of the construction Industry towards its environment, socio-political, economic, technology, and cultural variables in Nigeria. Nevertheless, the low level of Risk Management in Nigeria construction Industry, and the little understanding and knowledge of the subject by Project Stakeholders prompt this study.**

A quantitative method of research was carried out, and among the sixty (60) questionnaires administered to clients, consultants, and contractors in the Nigerian construction industry, thirty-one (31) valid responses were obtained. The questionnaires were designed on the twenty (20) types of risks that were identified by construction professionals which were categorized into five namely; Government and Politics; Finance and Economical; Management and Technology; social and Cultural; Natural and Environmental Risks. And, findings made revealed that economic and financial risks surpass all other types in the Nigeria Construction Industry.

1.0 INTRODUCTION

Risks should always be considered when embarking on any construction project. The risks associated with construction projects delivery maybe high, but when identified is half way towards the management of its effects and impact on construction project delivery (Loai, 2020). If a risk is not identified, then there is no way of mitigating what is unknown. Moreover, any project without a risk event is no worth pursuing (Chapman & Ward, 2011). Thus, there is no project without a risk. In other words, according to the above statement; risk event is one of the characteristics of a project.

Risk identification is the core aspect of risk management and has to be done on every construction project because there are no construction projects that are alike (Serpella, Ferrada, Howard, & Rubio, 2014).

The share of the involvement of Risk in the Nigerian construction Project delivery which is also responsible for delays in schedule, litigation, and more especially cost overrun cannot be ignored or neglected. And the identification of those risks will help solve the problem of cost overrun, and delay.

Therefore, the management of risks among others assist in the completion of project on schedule, within budget, and have other benefits such as:

- Making decision more objective and systematic.
- Minimizes loss and maximizes opportunities in construction projects.
- Encourage pro-activeness in risk response actions and improving the understanding of risk identification.
- Always highlighting awareness of project outcomes on management and improving communication.

However, one of the issues of risk management practices is that the risk identification is done as “post mortem” practices.

Some techniques and tools that can be used to identify risk events are– checklists, brainstorming, studying past, records and data of identical projects, weakness, strengths, threats, & opportunities (Swot) Analysis, Risk registers (Adam, 2008).

1.1 Continuous Learning

The continuous learning from previous events and projects are vital towards gaining more experience on risk identification and management. It could be argued that a combination of experience and knowledge from the past is not enough for a stakeholder or construction manager to be able to predict accurately the risks on up-coming projects, but findings have also shown that most construction projects are not the same, and therefore it is significant to identify risk in each project (Serpella et, al., 2014; Perera, Dhanasinghe, &Rameezdeen, 2009; Tohidi, 2011). Risk management practitioners most times use judgment from recent projects and past knowledge, but because of the varying nature of risks in construction, it is not likely to make him an all-rounder in the risk management issues. Moreover, most of the judgments by individuals with the equivalent knowledge of risk practice maybe vary because of their values, perception, personality and preference.

Nevertheless, risk management process becomes more appropriate when a process to find out views

from many experts is used. This process helps to reduce individual views and bias on risk recognition and estimation which promote efficient risk management (Adams, 2008). Apart from the above, other consideration like availability of quality data, cost of production of the forecast, time horizon affects forecasting process effectiveness. Flanagan and Norman (1996) model, shows that some necessities, thoughts, and human inputs in addition to existing methods as well as capability in deploying the estimation methods makes forecasting in the qualitative and quantitative realm plausible.

Liu and Low (2009) described organizational learning as processes of integration in which an organization identifies and make use of existing knowledge to develop new and better opportunities. Previous mistakes must be avoided while taking decisions and, therefore it is important to put together the knowledge gathered from methods of risk management for organizational learning.

2.0 RESEARCH METHOD

Primary data was collected from the 31 valid responses out of the total of 60 questionnaires which were sent out to construction industry professionals. The research questionnaire was designed to list risks on a scale of 1-5(Low to High), showing the criticality of risk with the respondents ranking them with numbers as they want with respect to their opinion and industrial experience.

Risk was categorized and allocated for the benefit of analysing the risks and their relationship at the end of data collection.

The risks are categorized as follows: -

I. Government and political risks
II. Social and Cultural risks
III. Management and Technological risks
IV. Economic and Financial Risks
V. Nature and Environmental Risks

The twenty (20) risks includes: Development permit, approval challenges, approved changes in laws and justice enforcement, influence of government, corruption and corrupt practices, political instability, cultural issues, human resources, ash flow, foreign exchange, inflation and high interest rates, cost overrun, inadequate design, low productivity, safety issues, late payment of constrictors, environmental protection, force majeure, market demand, and competition.

An empty space was initially provided for the participant to think independently about the risks they perceive and rank them before proceeding to the main questionnaire.

The respondents were asked to arrange in ranks the risk groups from 1 to 8 from (least severe to most severe) with respect as it relates to their individual experiences. Pilot testing was used in checking whether the questionnaire contents were clear or not before distributing the three groups in construction (consultants, contractor and clients).

3.0 DATA ANALYSIS METHOD

The data collected from the questionnaire was described with diagrams, charts and figures, and a codebook was prepared for various sections after collecting back the questionnaires. The data from each questionnaire as marked was keyed into Microsoft office excel with respect to the codebook provided, and utilized the ID available prior to the distribution of the questionnaire. The quantitative data were analysed using Statistical Package for the Social Sciences (SPSS) version 20. Furthermore, a triangulation method was used to increase reliability and validity of results obtained.

The 20 risks were categorized under the followings:

1. Government and Politics (G P)
2. Technical knowledge and Management (T M)
3. Finance and Economic (FE)
4. Social Culture (SC)
5. Nature and Environment

While the 20 risk variables used in the study are listed as bellow:

1. Development Control Permit
2. Government Influence on Disputes and justice enforcement
3. Corruption
4. Political influence and Instability
5. Influence of Culture and social
6. Human Resource availability and management
7. Cash Flow challenges of the management
8. Foreign Exchange Policy availability and challenges
9. Interested and inflation rates
10. Cost overrun
11. Insufficient project design
12. Low construction/poor productivity
13. Safety in construction sites
14. Late payment
15. Quality control
16. Project management
17. Environmental issues
18. Force Majeure
19. Market demand
20. Competition

The above listed project risks are allocated to the five (5) major categories stated above as follows;

Government and Political (PG) - External

- Development Control Permit and certification
- Government Influence on Disputes and justice enforcement
- Corruption
- Competition
- Political influence and Instability

Management and Technological (MT) - Internal

- Poor and low productivity
- Cost overruns
- Project management
- Insufficient project design
- Safety in construction sites
- Quality control

Finance and Economic (FE)- External

- Late Payment
- Cash Flow challenges of management
- Market demand
- Foreign Exchange challenges and availability
- Interest rates / Inflation Rates

Social and Culture (SC) - Internal

- Influence of Culture
- Human Resource Management and availability

Natural and Environmental (NE)

- Environment issues
- Force Majeure

The level of criticality of the 20 risks were analysed initially from the viewpoint of all the 31 respondents before each group is evaluated independently to differentiate or compare them.

4.0 RESULT AND DISCUSSION

The result of the descriptive analyses shows that nine (9) clients, twelve (12) contractors and ten (10) consultants participated in the study. Figure 4.1 show that 32.26% of the participants are consultants, while contactors and clients are 38.71% and 29.03% respectively. Thus, the results showed that majority of the participants are contractors followed by constants and then clients.

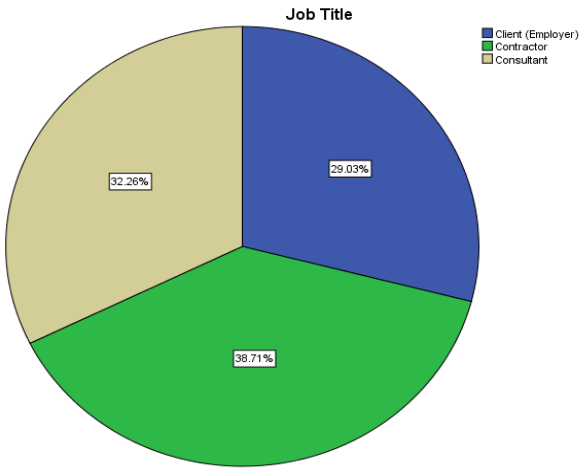

Figure 4.1: Percentage distribution of participants from each group.

The company's annual turnover and mean number of employees are illustrated on Figure 4.2 and 4.3 respectively. The result from the number of employees reveals the size of companies, while annual turnover shows the size of projects undertaken in construction industry in Nigeria. The result shown indicates that nineteen (19) of the participants have an average of 1 to 50 employees is while the remaining twelve (12) participants indicated having an average of 51 to 100 employees. None of the participants have number of employees above 100. Thus, this indicates that about 61% of the companies in Nigeria have an average of 1 to 50 employees, and suggests that most of the construction companies in Nigeria are small sized firms when compared to Nigerian classification of firms.

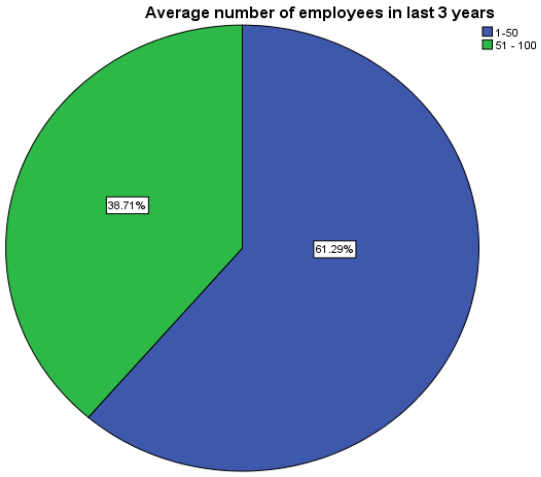

Figure 4.2: Percentage distribution of average number of employees in the construction industry.

Furthermore, the participants indicated that 9.7% of the annual turnover fall below (200 million Naira), 6.5% is between 200 million to 500 million Naira while 83.9% is as high as from 500 million to Billion Naira per annum. Thus, this indicates that a good number of companies in Nigeria undertake a high scale construction project.

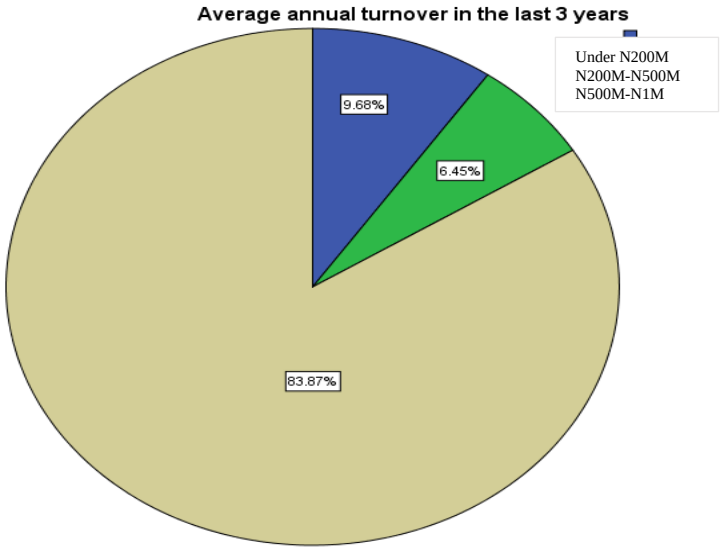

Figure 4.3: Percentage distribution of average annual turnover in the construction industry.

Figure 4.4 shows the level of criticality of the 20 risks were analysed initially from the viewpoint of the 31 respondents before each group is evaluated independently to differentiate or compare them.

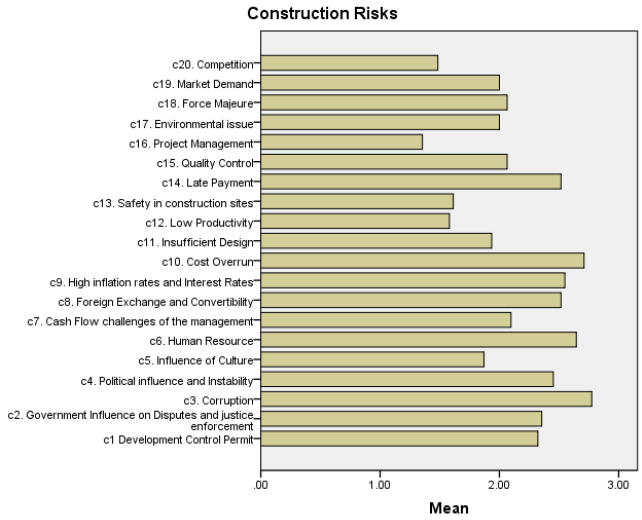

Figure 4.4: The20 risks and their Criticality from participant's viewpoints

A further analysis is done using the Chi-squared test to test the viewpoints of the respondents on the criticality of the 20 risks individually as shown on Table 4.1 below.

Table 4.1: 20 risks and their Criticality from participant's viewpoints

Identified Project risks	X^2	df	*P*	Nature of the Risk
Development Control Permit	12.977	4	0.004	Critical
Government Influence on Disputes	11.912	4	0.018	Intermediate
Corruption	10.563	4	0.003	Critical
Political influence and Instability	6.527	4	0.039	Intermediate
Influence of Culture and social	4.862	4	0.302	Not Critical
Human Resource availability and management	5.163	4	0.271	Critical
Cash Flow challenges of the management	12.682	4	0.001	Intermediate
Foreign Exchange Policy availability and challenges	11.094	4	0.005	Critical
Interested and inflation rates	4.669	4	0.095	Intermediate
Cost overrun	4.392	4	0.356	Intermediate
Insufficient project design	3.739	4	0.443	Intermediate
Low construction/poor productivity	4.506	4	0.342	Intermediate
Safety in construction sites	2.803	4	0.591	Not Critical
Late payment	23.505	4	0.007	Critical
Quality control	11.875	4	0.028	Intermediate
Project management	4.736	4	0.315	Not Critical
Environmental issues	7.378	4	0.117	Intermediate
Force Majeure	5.184	4	0.269	Intermediate
Market demand	2.481	4	0.648	Intermediate
Competition	5.076	4	0.280	Not Critical

5.0 CONCLUSION

The criticality level of risks in Nigeria construction projects is found higher than intermediate. Furthermore, the Economic and Financial risks are dominant among other risk types in Nigeria construction projects, and they are affected by the various political/government risks in Nigeria which are compounding risks issues in the construction industry.

Hierarchically the economic and financial risks, is followed by political and government risks, management and technological risk, cultural and social risks and then natural and environmental.

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