Global Risk Factors Affecting Performance of Construction Firms in Abuja, Nigeria

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Abstract

The study assessed the Global Risk Factors (GRFs) affecting performance of Nigerian construction firms, with a view to identifying the most severe and appropriate risk response techniques. In order to achieve this aim, the severity of GRF across different categories of firms, and the risk response techniques most suitable for each GRF were examined. A total of 105 questionnaires were administered out of which a total of 49 were fully completed and returned. Descriptive statistics was used to analyse the data collected using Likert scales, while Analysis of variance was used to evaluate the similarities/differences in the views of different categories of construction firms. The findings show that most construction firms consider payment delays (mean = 2.65), poor project scope (mean = 2.40) and inadequate design information (mean = 2.39) as the most severe GRF affecting the performance of Nigeria construction firms. It was also discovered that, despite the high likelihood and impact of GRF such as; payment delays, design changes, and inflation/bank Interest rates amongst others, most firms still opted to "accept" them. On the other hand, poor project scopes, strikes, failure to meet clients need and all factors related to unethical practices were "avoided", while all legal related risk factors were "mitigated". It is hoped that these findings will help construction firms in developing countries such as Nigeria to be more aware of the effect of GRF in order to be able to assess them effectively before embarking on construction projects.

Keywords: *Global Risk Factors, Probabiity-Impact Metrix, Negative Risk, Risk Management, Semi-Quantitative Technique.*

Introduction

Risk is one of the major factors affecting the performance of many construction firms across the world. While some risk factors are relatively easy to identify and assess, (such as internal risk factors) other risk factors related to the external environment in which the organisation operate seems to be more difficult to identify and assess. The latter is referred to as Global Risk Factors (GRF); these are risk factors outside the control of an organisation (Baloi, 2002). The assessment of GRF affecting construction firms entails the identification of their likelihood of occurrence and impact on the performance of the construction firm. The combination of these two variables yields the severity of such risk factor.

According to Odimabo & Oduosa (2013), Olufisayo, Isaac & Oladele(2018), building construction in developing countries like Nigeria is still characterised by poor quality work, cost and time overruns, resulting from the inability of the construction firms to properly take into consideration certain risk factors during project planning and implementation. While other developed countries across Europe and America are already taking the lead in the application of Risk Management (RM), the extent of usage and application amongst Nigerian construction firms is still reported to be at its infancy. Luka & Muhammad (2014) noted that, one of the challenges confronting the Nigerian construction firms is how to assess risk factors affecting the performance of projects.

RM concept is relatively new to Nigerian construction industry as projects carried out in the past decades did not meet basic standard (Augustine, Ajayi & Edwin, 2013). According to Ugwoeri (2012), Nigerian construction industry is suffering from low understanding of risk identification, analysis and assessment. Because all risks are significant and assessing all risk factors may result to spending huge amount of time and funds, it is most advisable to focus more on those risk factors that pose significant threat.

Global Risk Factors have been identified to pose more setback to project success than any other categories of risk factors, because they are not well structured, the information relating to them are retrieved from diverse sources, the environment is complex and dynamic and construction contractors are unfamiliar with these risks and do not have the experience and knowledge to manage them effectively (Baloi 2002). Ammar, Elsamdony, & Rabie (2009) noted that, construction risk varies from one country to

another and that economic, political, social and cultural conditions are different, while RM is greatly influenced by the uniqueness of the construction industry in specific countries.

Studies like Olufisayo et al (2018), Dada(2015) and Luka & Muhammad(2014) have examined risk factors affecting construction companies in Nigeria including the issue of RM in construction projects. A study conducted by Baloi & Price (2003) discussed issues of GRFs modelling, assessment and management in Mozambique. However, there exists no comprehensive study that assessed the attitude of Nigerian construction firms towards the RM of GRFs. This research effort profiles the attitude of Nigerian construction firms on the RM of GRFs.

Literature Review

Construction Risks Factors

Olufisayo et al (2018) noted that, risk factors are those occurrences or events both within and outside organisation which have the capacity to cause set back to set objectives and goals of an organisation. Due to the uniqueness and complexity of construction activities in terms of duration, complicated process, abominable environment, financial intensity and dynamic organisation structures, the construction industry is said to be prone to more risk and uncertainty than many other industries (Flanagan & Norman, 1993; Akintoye & Macleod, 1997; Smith, 2003). Not only is it unique in terms of numerous activities involved, but also in terms of huge numbers of stakeholders engaged from the initial stage of the project to completion. These entire stakeholders according to Shen, Wu, & Ng (2001) can't be easily coordinated unlike many other industries. Chapman (2001) supported this view by stating that, construction industry is mostly rated high on the annual rate of business failures as a result of various risk factors compared to other industries.

Arain & Pheng (2005) posited that, there have been various contributions to knowledge of the construction industry with regards to its structure, process, products, risks and uncertainties of its production systems and the problems of its organisational effectiveness. One of the recent researches that gave insight into some of the variables which have influence on construction is the study by Mahamid, Al-ghanamy, & Aichouni (2015) in which factors such as; resources availability, environmental conditions, financial problems, political conditions, poor productivity and contractual relations

amongst others were identified to be of high influence to construction processes. Abdulaziz, & Theodore(2015) identified the most critical risk factors as those related to client, consultants, contractor and exogenous in that order.

Also, Ozorhon, Arditi, Dikmen & Birgonul (2007) emphasised that risk associated with construction businesses may be divided into two namely; internal and external risk factors. Internal factors are those related to the management of internal resources, they are relatively more controllable and vary from project to project. On the other hand, the external risks are relatively uncontrollable, but they need to be continually scanned and forecasted in order to develop company strategies for managing their impact.

Global Risk Factors (GRF)

Baloi (2002) defined Global risk as those risk factors related to the surrounding or external environment within which an organisation operates. He described construction organisation as an open system with permeable boundaries, in which the process of import and export between the organisation and the environment is constant. Ozorhon *et al*, (2007) added that there are two categories of risk sources which affect cost performance of project, these are; Global risks (risks due to country/community conditions) and Project risk (risks due to project conditions). Global risks are called so because they go beyond the boundaries of an organisation yet they have large impact on it. This refers to risks factors that are not directly present in cost estimates yet they may lead to significant financial disasters.

Contractual terms and condition are mostly inserted to provide a reasonable and fair allocation of risk so that Contractors alone do not take full responsibilities of all risks that arise in a project (Baloi and Price, 2003). GRF have impact on project cost performance both through increase in cost estimates, and through changes in quantities, prices, productivity and loss due to labour inefficiency during the construction process (Schuette & Liska 1994).

It could be argued that GRF poses more challenge to construction contractors' than other categories of risks due to the difficulty in assessing them. Even though it is impossible to list all risk factors, Table1 shows the harmonised lists of GRF reviewed from previous studies conducted in the area of Risk Management(RM).

Table 1: Harmonised list of GRF from reviewed literatures.

G/n	Global Risk Categories	S/n	Global Risk Factors(GRF)
1	Estimator/ Design Related	1	Motivational Bias
		2	Cognitive Bias
		3	Poor Project scope
		4	Project complexity and size
		5	Inadequate Design information
		6	Design changes
2	Level of competition related	7	Policies of the contractor
		8	Need for job
		9	Number of bidders/increasing competition
3	Environmental/ construction related	10	Adverse Geological conditions
		11	Adverse Weather condition
		12	Unexpected site conditions
4	Financial/ Economic	13	Payments Delays
		14	Inflation/ Banks Interest rates
		15	Price Fluctuations/ Fuel/Oil Prices
		16	Failure to attract or retain top talent
		17	Failure to innovate/meet customer needs
		18	Exchange rates
		19	Economic slowdown
5	Legal	20	Legal disputes among parties of the contract
		21	Delayed disputes resolutions
		22	Difficulty to get permission from authorities
		23	Labour restrictions
		24	Ambiguous or poor conditions of contract
		25	Ambiguity of work legislations
6	Political/ Social	26	Adverse Government Policies
		27	Changes in Government
		28	Societal Agitation/instability
		29	Terrorism
		30	Strike
		31	Taxation on imported materials
		32	Political system
7	Unethical Practices	33	Fraud
		34	Theft
		35	Bribery

Sources: (Akintoye and MacLoed, 1997; Baloi, 2002; Ewelina and Mukaela, 2011; AON's Global Risk Management Survey Report, 2013; Baba, 2014 and Mahamid *et al*., 2015).

Risk assessment

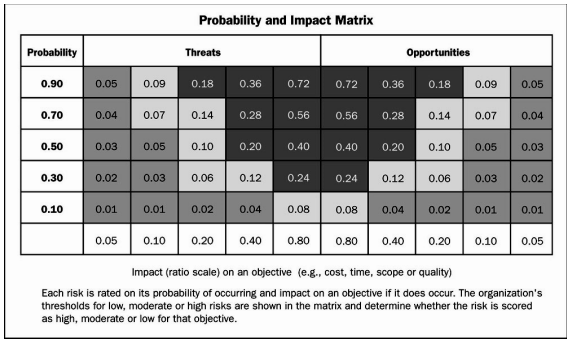
Risk assessment involves developing an understanding of risk in order to evaluate its magnitude (Ozorhon *et al* 2007). The process consists of the determination of the consequences and probabilities for identified risk events, taking into account the presence (or not) and the effectiveness of any existing controls. The consequences and their probabilities are then combined to determine a level of risk (International standard/ International Electro-technical Commission, ISO/IEC 31010, 2009).

Risk is analysed by combining consequences and their likelihood. In most circumstances existing controls are taken into account (Australian and New Zealand Standards, AS/NZS, 2004). Goncalves (2003) asserted that, when assessing risks, the first step should be to identify risk likelihood and impact using a list of risks, then combine the likelihood and the impact to obtain its severety, then finally rank the risks on the basis of the severity.

There are numerous available risk assessment techniques which may be used depending on varying degrees of detail, type of risk, purpose of the analysis, data/information and resources available. The (AS/NZS, 2004) gave the detail of types of risk assessment to be; qualitative, semi-quantitative and quantitative assessment. Qualitative assessment use words in describing impact level of risk, the quantitative assessment uses numerical values to arrive at a conclusion, while the semi-quantitative assessment seeks to strike the balance between the two assessment methods. Banaitiene & Banaitis (2012) noted that, qualitative methods of risk assessment are commonly used in construction than quantitative method and as such recommended the combination of both methodologies to improve risk management practices for construction projects.

Semi-quantitative risk assessment is the combination of quantitative and qualitative risk assessment, which involves the assignment of numerical values to qualitative scales. The Project Management Institute (PMI) has calibrated these numerical values in its Probabilities and Impact Matrix(PIM) in which probabilities (likelihood) ranges between 0.1to 0.9 while the impact ranges between 0.05 to 0.8. The value of the likelihood is combined with the impact to determine the level of severity of the risk factors on a risk matrix. Figure 1 shows the PIM developed by the PMI. On the figure, the region shaded in gray with

the largest values represents high risk, the medium gray region with lowest values represents low risk, while the region between the two represents the moderate risk and its shaded light gray.



Probability and Impact Matrix

Probability	Threats					Opportunities				
0.90	0.05	0.09	0.18	0.36	0.72	0.72	0.36	0.18	0.09	0.05
0.70	0.04	0.07	0.14	0.28	0.56	0.56	0.28	0.14	0.07	0.04
0.50	0.03	0.05	0.10	0.20	0.40	0.40	0.20	0.10	0.05	0.03
0.30	0.02	0.03	0.06	0.12	0.24	0.24	0.12	0.06	0.03	0.02
0.10	0.01	0.01	0.02	0.04	0.08	0.08	0.04	0.02	0.01	0.01
	0.05	0.10	0.20	0.40	0.80	0.80	0.40	0.20	0.10	0.05

Impact (ratio scale) on an objective (e.g., cost, time, scope or quality)

Each risk is rated on its probability of occurring and impact on an objective if it does occur. The organization's thresholds for low, moderate or high risks are shown in the matrix and determine whether the risk is scored as high, moderate or low for that objective.

Figure1: Probabilities and Impact Matrix
Source: Project Management Institute, (PMI, 2004).

Risk response

This stage of the RM process describes the various strategies that can be taken towards treating the identified risks. The most common strategies for risk response are; risk avoidance, risk reduction, risk transfer and risk retention (Berkeley, Humphreys, & Thomas, 1991; Flanagan & Norman, 1993; and Potts, 2008).

It is worthy to note that, strategies for responding to negative risks (Threats) is quite different from strategies for responding to positive risks (Opportunities). The PMI (2004) identified response strategies for both threats and opportunities. For threats the strategies are; avoid, transfer, mitigate and accept. While the strategies for opportunities are; exploit, share, enhance and accept. Similarly, Winch (2002) emphasized that the risk response strategies to be selected should depend on the kind of risks involved i.e. (negative or positive).

When confronted with risks of high negative impact on project objectives, alteration of the project objective may be required in order to eliminate the negativity. Risk avoidance could also be in form of outright cancelation of such a project. But the AS/NZS (2004) argued that unnecessary risk-aversion by an organisation could cause inappropriate application of risk avoidance. This may lead to loss of opportunities for gain. However, some risks that emanate at the early stage of a project can be avoided by obtaining in-depth information about them, improving communication or hiring expertise. Similarly, Darnall & Preston (2010) suggest the adoption of a familiar and well structured strategy instead of new ones, even if the new ones may appear to be more cost efficient. In this way, the risks can be avoided and work can proceed smoothly because of the team's familiarity with the old strategy.

Transferring risks with negative impact to another party who has adequate capability of managing them should be the most ideal

decision to be taken by an effective manager. This is supported by Potts (2008) who stated that the risk should be transferred to those that can manage them better. It must be recognized that the risk is not eliminated unlike in the case of risk avoidance (where risk is eliminated); here the risk is only transferred to the party that is best able to manage it (PMI, 2004).

Mitigation involves reducing the expected monetary value of risk events by reducing the likelihood of occurrence, reducing the risk event value or both by adopting new technologies and using insurance policy (PMI, 2004). In order to reduce the level of risk, Potts (2008) suggested that the exposed areas should be changed; unlike in the case of risk avoidance where the entire project objective is changed. Similarly, AS/NZS (2004) has suggested changing the likelihood of risk, to reduce or mitigate the likelihood of negative results associated with the project objectives.

Acceptance is a strategy that is common to both positive and negative risk factors. Risk acceptance arises as a result of risk residue from mitigated risks, since it is hardly possible to eliminate all risk threats from a project. This can also be a choice, when adopting other strategies will be uneconomical (Thomas, 2009). The PMI (2004) split risk acceptance into two, namely; passive and active acceptance. Passive acceptance require no action except to take record of the strategy, while the project team deal with the risk as they surface without any proactive measures. On the other hand, the active acceptance is a deliberate management strategy after a conscious evaluation of the possible losses and costs of alternative ways of handling risks. It requires the organisation to establish a contingency reserve, in form of money, time or resources to handle the risks.

Perera, Dhanasinghe, & Rameezdeen (2009) stressed that the proper management of risks requires that risk be identified and allocated in a well-defined manner. This can only be achieved if contracting firms understands their risk responsibilities, risk event conditions, and risk response strategies.This study focuses on strategies for responding to negative risks as GRF pose negative effect on project objectives. The aim here is to determine which of the GRF has more negative effect on performance of contracting construction firms and to determine the most suitable risk response strategies.

Research Design, Methods and Techniques

Wood & Haber (1998) described research design as a framework that the researcher creates to plan or organise scientific investigation. Designing of a research study involves the development of a plan or strategy that will guide the collection and analysis of data. To achieve the aim of this study, a 5-step research process was followed. The summary of the sequence is illustrated in Figure 2.

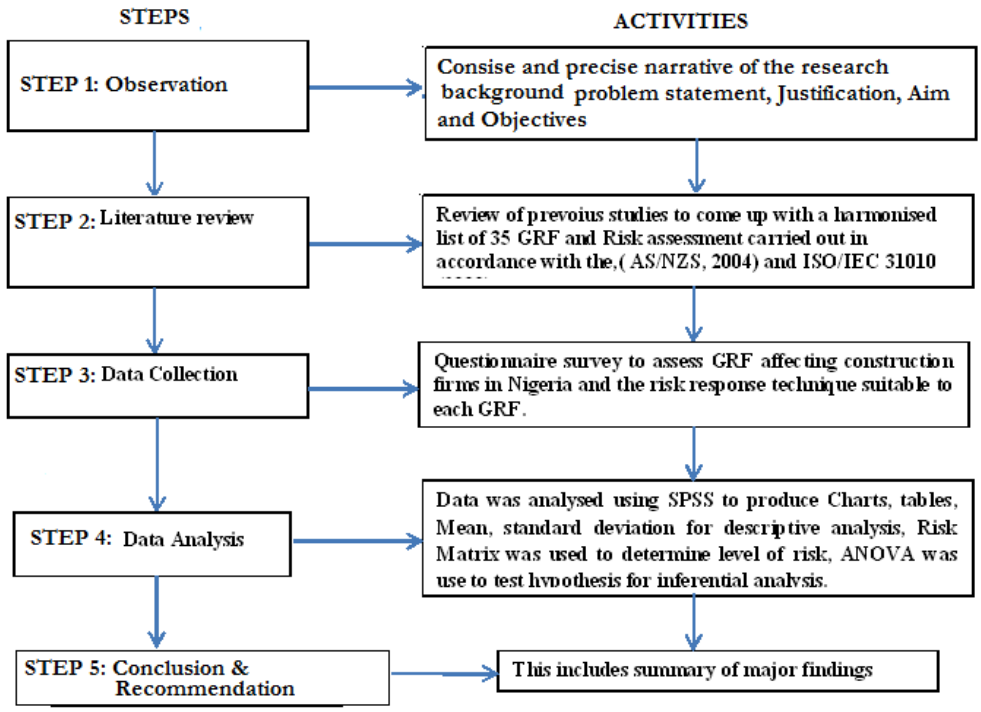


Figure 2: Research design

Source: Field survey, 2015.

In order to realise the objective of this research, quantitative research approach was used. Structured questionnaires were used to elicit information on the impact, likelyhood of occurrence and RM strategies of GRF from construction firms operating within Abuja. The choice of Abuja as the study area was based on the premise that, most construction firms have their head offices located therein and it is one of the fastest growing capital cities in the world with vast construction activities being carried out on a daily basis (Dada, 2005).

The population under study consists of Nigerian construction contracting firms, while the sampling frame is the construction contracting firms whose head offices are

located within Abuja. According to data received from Federal Inland Revenue Service (FIRS), there were 818 tax-compliant building construction firms within the FCT as at November, 2017.

The sample size for this research was calculated using the follwing formula from Kish (1965)

$$n = \frac{n_1}{1 + \left(\frac{n_1}{N}\right)} \text{-------1}$$

Where n is the sample size, N is the population size and $n_1 = \frac{s^2}{v^2}$, s^2 is the variance of the population (s takes up values from 0.1 to 0.5), and v is the standard error of sampling. Assuming maximum heterogeneity on the knowledge and experience of the population elements on the subject, then s =0.5. Taking the standard error of samping to be 5% then n_1=100 and the sample size n =89. The calculated sample size was adjusted by adding 18% to cover for unreturned questionnaires.

A combination of purposive and convinient smpling techniue was used to draw a sample of 105 construction firms. The rationale for adopting a combination of purposive and convenience sampling methods was to ensure that the selected or sampled firms have adequate knowledge and experience to respond to the questions in the questionnaire and are willing to be part of the research.

The questionnaires were distributed to the top and middle level managers of the selected firms which includes; Chief Executive Officers(CEO), Directors, Deputy directors, Project Managers, and Line Managers who are involved in the decision-making and have knowledge on the firm's tradition on risk management.

Thirty five (35) GRF were identified from literature and respondents were required to indicate the likelihood and impact of each risk factor on their firm's performance. The scale used for assessing likelihood varies from 0.1 (low likelihood) to 0.9 (Very high likelihood) and the series are 0.1, 0.3, 0.5, 0.7, and 0.9, while the scale for assessing the impact ranges from 0.05 (low impact) to 0.8 (high impact) and the series are 0.05, 0.10, 0.20, 0.40, and 0.80, according to the PIM on Figure 2.1.

Data Presentation and Analysis

Response Rate

A total of 105 questionnaires were administered to construction firms, of which 49 was completed and returned. This represents about 47% effective response rate, which is considered adequate

according to Moser and Kalton (1971) cited in Abubakar, Ibrahim, & Kado (2014).

Position of Respondents in the Firm

Table 2: Positions of respondent in the firm

Position	% distribution
C.E.O	9.2
Director	5.6
Project manager	31.7
Senior mgt personnel	33.1
Others	20.4
Total	**100**

Source: Field Survey,2015

The respondents to the questionnaire belong to the top and middle management level of the organisation that took part in the research. Most of them have clear understanding of the policies of the organisation, and have knowledge and experience as it relates to risk factors affecting their organisation.

Table 2 above shows that the senior management personnel of the organisation forms (33.1%) of the total respondents followed closely by Project managers which are (31.7%).The C.E.O's represents (9.2%) of the respondents, while Directors are (5.6%), leaving the remaining (20.4%) to other positions which includes; senior engineers , builders, quantity surveyors and so on.

Size of the firms

Table 3: Size of firms

Category	Percentate%
0-9 (micro)	33.1
10-99 (small)	35.2
100-299 (medium)	6.3
300 and above (large)	25.4

Source: Field survey, 2015

Table 3 shows the sizes in terms of full-time employees of the firms that participated in the research. The sizes are categorised as micro with 0-9 employees and they constitutes about (33.1%) of firms that took part in the survey, while the highest participant fall into the categories of firms with 10-99 employees (small) with (35.2%) and the third category 100-299 (medium) which represents just (6.3%) and finally firms with employees above 300 (large) which constitutes (25.4%) of the firm that responded to the questionnaire.

Firms experience in the construction industry

Table 4: Firms years of experience

Years of involvement in construction activities.	Valid Percent
Less than 5 years.	9.2
5-10 years.	29.6
more than 10 years	61.3
Total	100.0

Source: Field survey, 2015

Table 4 shows that majority of the firms that took part in the survey have long years of experience, this indicates that the responses provided by these firms are reliable and their experience is of high importance in assessing the impact of GRF affecting construction firms. About 61.3% of them have been involved in construction for more than 10 years. While 29.6% of the firms have 5-10 years experience in the construction industry, and about 9.2% of the firms have less than 5 years of experience in the construction industry.

Region(s) in which the firms have executed project in the last five years

Table 5: Number of projects executed by the respoding firms in each geo-political zone.

S/N	Region	Number of projects executed
1	North-West	30
2	North- East	16
3	North central	49
4	South-West	19
5	South-East	18
6	South-South	19

Source: Field survey, 2015

The information regarding the region(s) in Nigeria in which the construction firms have executed project in the last five years is important to verify if their response could be used to reflect the perception of construction firms in other part of the country in which the survey could not cover. Table 5 shows the six geo-political zones in Nigeria and the numbers of projects the respondents' firms have executed.

Aside from North-Central (Abuja) which is the study area for the research that has 49 firms, other zone in which the firms have executed project include North-West with 30 firms, 19 firms have executed project in south-west and south-south, 18 firms have executed project in the south-east and finally North-East with 16 firms which has the lowest number of firms that have executed project in that zone in the last 5 years. This may be as a result of insurgency in that region. This geographic spread justifies the choice of Abuja as the study area.

Assessment of GRF based on Categories of Construction Firms.

Table 6: Severity of Global Risk Factors(GRF) across categories of firms.

	Micro firms			Small firms			Medium firms			Large firms			**Overall**	
Global Risk Factors	Mean	SD	Rank	Mean	SD	Rank	Mean	SD	Rank	Mean	SD	Rank	**Mean**	**Rank**
Estimator/ Design Related														
Poor Project scope	2.33	.767	3	2.69	.630	4	2.33	1.155	3	2.23	.927	1	2.40	**1**
Inadequate Design information	2.61	.608	1	2.43	.938	3	2.00	1.000	6	2.14	.949	3	2.39	**2**
Design changes	2.44	.705	2	2.43	.852	2	2.67	.577	1	2.14	.770	2	2.39	**2**
Motivational Bias	2.22	.732	4	2.36	.745	4	2.33	.577	2	1.93	.829	4	2.18	**4**
Cognitive Bias	2.19	.655	5	2.21	.802	5	2.33	1.155	3	1.85	.801	6	2.11	**5**
Project complexity and size	2.17	.857	6	2.21	.802	5	2.33	1.155	3	1.86	.864	5	2.10	**6**
Level of competition related														
Number of bidders	2.33	.840	1	2.14	.949	3	2.67	.577	1	1.64	.842	2	2.10	**1**
Need for job	1.94	.725	2	2.36	.842	1	1.67	.577	3	1.71	.825	1	1.98	**2**
Policies of the contractor	1.83	.857	3	2.14	.770	2	2.67	.577	2	1.50	.519	3	1.88	**3**
Environmental related														
Unexpected site conditions	1.94	.873	3	2.14	.770	2	3.00	.000	1	1.64	.633	2	1.98	**1**
Adverse Weather condition	2.28	.669	1	1.79	.699	3	2.00	1.000	3	1.71	.611	1	1.96	**2**
Adverse Geological conditions	1.94	.802	2	2.21	.802	1	2.67	.577	2	1.57	.646	3	1.96	**2**
Economic related														
Payment Delays	2.78	.428	1	2.64	.633	1	2.67	.577	2	2.50	.650	1	2.65	**1**
Inflation/ Banks Interest rates	2.39	.850	3	2.36	.929	2	2.67	.577	3	2.21	.893	2	2.35	**2**
Exchange rates	2.56	.784	2	2.14	.864	6	2.67	.577	4	2.14	.770	3	2.33	**3**
Price Fluctuations/ Oil Prices	2.17	.707	5	2.21	.975	4	3.00	.000	1	2.07	.829	4	2.20	**4**
Failure to retain top talent	2.33	.767	4	2.21	.893	3	2.33	1.155	5	1.79	.893	6	2.14	**5**
Market condition	2.28	.669	7	2.14	.770	5	2.00	1.000	7	1.79	.699	5	2.08	**6**
Failure to meet client needs	2.17	.985	6	1.57	.646	7	2.33	1.155	5	1.21	.426	7	1.73	**7**
Legal related														
Poor conditions of contract	1.89	.963	3	2.31	.947	1	2.67	.577	2	1.69	.855	1	2.00	**1**
Difficulty in getting permission.	2.11	1.02	1	1.86	.864	3	2.67	.577	1	1.64	.842	2	1.94	**2**
Delayed disputes resolutions	2.00	.840	2	1.79	.802	5	2.33	1.155	3	1.36	.633	4	1.78	**3**
Labour restrictions	1.83	.924	5	1.93	.917	2	2.00	1.000	4	1.36	.633	5	1.73	**4**
Legal disputes.	1.83	.924	4	1.79	.893	6	1.67	1.155	5	1.36	.633	4	1.67	**5**
Ambiguity of work legislations	1.59	.712	6	1.79	.699	4	1.67	1.155	5	1.43	.646	3	1.60	**6**
Political/ Social related														
Taxation on imported materials	2.39	.778	1	2.29	.825	1	2.67	.577	3	2.21	.893	1	2.33	**1**
Changes in Government	2.28	.826	2	2.29	.825	2	3.00	.000	1	1.93	.829	3	2.22	**2**
Terrorism	2.06	.998	4	2.29	.914	3	3.00	.000	2	2.00	.961	2	2.16	**3**
Adverse Government Policies	2.11	.832	3	2.14	.770	4	2.33	1.155	5	1.57	.646	4	2.04	**4**
Societal Agitation/instability	2.00	.970	5	1.93	.917	5	2.00	1.000	7	1.43	.756	6	1.82	**5**
Political system	1.83	.786	7	1.79	.802	6	2.33	.577	4	1.57	.646	4	1.78	**6**
Strike	1.89	.900	6	1.64	.745	7	2.33	1.155	5	1.21	.426	7	1.65	**7**
Unethical Practices														
Bribery	2.17	.857	2	2.36	.745	1	1.67	1.155	3	1.86	.770	1	2.10	**1**
Theft	2.28	.826	1	2.00	.784	2	2.67	.577	1	1.86	.770	1	2.10	**1**
Fraud	2.00	.907	3	1.86	.864	3	2.00	1.000	2	1.79	.893	3	1.90	**3**

Source: Field survey, 2015.

Table 6 shows the outcome of the semi-quantitative risk assessment across different categories of construction firms. The table shows the mean value, and ranks of effect of GRF on the performance of different categories of construction firms. Based on the outcome of the combination of the likelihood and impact of GRF, the result from the response of micro firms shows that "inadequate design information" is ranked 1st under the estimator/design related factors of the Global risk with a mean value of 2.61, followed by "design changes" which is ranked 2nd with a mean of 2.44. "Numbers of bidders" is ranked 1st under level of competition related factors with a mean of 2.33 and"Adverse weather condition" under environmental related factors is ranked 1st with a mean of 2.28.

Similarly, "payment delays" is ranked 1st under economic related factors with a mean of 2.78, while "market condition" is ranked 7th with a mean of 2.28. Also, micro firms considered "difficulty in getting permission from authority" which is ranked 1st the most challenging GRFa under legal related issues with a mean of 2.11, while ambiguity of work legislations is ranked 6th with a mean of 1.59. "Taxation on imported materials" is ranked 1st under political/social related factors, with a mean of 2.39, while strike is ranked 6th with a mean of 1.89. Finally under category of unethical practices, "theft" is ranked 1st with mean 2.28 followed by "bribery" which is ranked 2nd with mean 2.17.

Under factors related to estimator, small firms ranked "Poor project scope" 1st with mean value of 2.69, while medium firms ranked "design changes" to be 1st with a mean of 2.67. Also large firms ranked "Poor project scope" 1st with a mean of 2.23. Factors under level of competition has "Need for job" ranked 1st by both small and large firms with mean value of 2.36 and 1.71 respectively, medium firms ranked "Numbers of bidders" 1st with a mean of 2.67.

"Adverse geological conditions" under environmental related factor was ranked 1st by small firms with a mean of 2.21, medium firms ranked "unexpected site condition" 1st with a mean of 3.00, while large firms ranked "Adverse weather condition" 1st with a mean of 1.71. Small and large firms both ranked "Payment delays" 1st under category of economic related factors with means of 2.64 and 2.50 respectively, while medium firms ranked "Payment delays" 2nd.

Also, both small and large firms ranked

"Poor condition of contract" 1st under legal related factors, with a mean values of 2.31 and 1.69 respectively. Similarly, "Taxation on imported materials" is also ranked 1st by both small and large firms with mean values of 2.29 and 2.21 respectively. Finally, "Bribery" under factors related to unethical practices was ranked 1st by both small and large firms, while medium firms ranked "theft" 1st with a mean of 2.67. Table 6 further presents the overall ranking of GRF affecting the performance of construction firms, in which the following factors were all ranked 1st in their respective categories; poor project scope, numbers of bidder, unexpected site condition, payment delays, poor condition of contract, taxation on imported materials, theft and bribery.

Table 7: Global Risk response techniques adopted by construction firms.

S/N Global Risk Factors	Avoid risk		Transfer risk		Mitigate risk		Accept risk		Total	
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
Estimator/ Design Related										
1. Motivational Bias	10	20.4	3	6.1	21	**42.9**	15	30.6	49	100
2.Cognitive Bias	9	18.4	6	12.2	19	**38**	14	28.6	48	98
3. Poor Project scope	23	**46.9**	5	10.2	17	34.7	4	8.2	49	100
4. Project complexity and size.	6	12.2	8	16.3	14	28.6	21	**42.9**	49	100
5. Inadequate Design info.	15	30.6	9	18.4	19	**38.8**	6	12.2	49	100
6.Design changes	7	14.3	8	16.3	14	28.6	20	**40.8**	49	100
Level of competition related										
7. Policies of the contractor.	3	6.1	6	12.2	9	18.4	31	**63.3**	49	100
8.Need for job	7	14.3	6	12.2	8	16.3	28	**57.1**	49	100
9.Number of bidders	3	6.1	3	6.1	11	22.4	32	**65.3**	49	100
Environmental related										
10. Adverse Geologic conditions.	5	10.2	2	4.1	21	**42.9**	21	**42.9**	49	100
11. Adverse Weather condition.	6	12.2	3	6.1	18	36.7	22	**44.9**	49	100
12. Unexpected site conditions.	7	14.3	9	18.4	15	30.6	18	**36.7**	49	100
Economic related										
13.Payments Delays	4	8.2	9	18.4	17	34.7	19	**38.8**	49	100
14. Inflation/ Banks Interest rates.	7	14.3	5	10.2	15	30.6	20	**40.8**	47	95.9
15. Price Fluctuations/ Oil Prices.	1	2.0	6	12.2	17	34.7	25	**51.0**	49	100
16. Failure to retain top talent.	12	24.5	1	2.0	23	**46.9**	13	26.5	49	100
17. Failure to meet client needs.	19	**38.8**	4	8.2	16	32.7	10	20.4	49	100
18.Exchange rates	4	8.2	8	16.3	15	30.6	22	**44.9**	49	100
19.Market condition	-	-	6	12.2	15	30.6	28	**57.1**	49	100
Legal related										
20. Legal disputes.	15	30.6	9	18.4	22	**44.9**	3	6.1	49	100
21.Delayed disputes resolutions	8	16.3	7	14.3	34	**69.4**	-	-	49	100
22. Difficulty to get permission.	6	12.2	12	24.5	19	**38.8**	12	24.5	49	100
23.Labour restrictions	5	10.2	10	20.4	25	**51.0**	9	18.4	49	100
24. poor conditions of contract	14	28.6	12	24.5	23	**46.9**	-	-	49	100
25.Ambiguity of legislations	13	26.5	8	16.3	21	**42.9**	7	14.3	49	100
Political/ Social related										
26.Adverse Government Policies	11	22.4	9	18.4	9	18.4	20	**40.8**	49	100
27.Changes in Government	8	16.3	7	14.3	5	10.2	29	**59.2**	49	100
28.Societal Agitation/instability	8	16.3	5	10.2	23	**46.9**	13	26.5	49	100
29.Terrorism	27	**55.1**	4	8.2	6	12.2	12	24.5	49	100
30.Strike	19	**38.8**	5	10.2	15	30.6	10	20.4	49	100
31.Taxation on imported materials	3	6.1	14	28.6	14	28.6	18	**36.7**	49	100
32.Political system	7	14.3	3	6.1	17	34.7	22	**44.9**	49	100
Unethical Practices										
33.Fraud	34	**69.4**	3	6.1	6	12.2	6	12.2	49	100
34.Theft	26	**53.1**	3	6.1	10	20.4	10	20.4	49	100
35. Bribery	25	**51.0**	2	4.1	12	24.5	10	20.4	49	100

Source: Field survey, 2015.

Table 7 shows the percentages and frequencies of firms and the risk response techniques most suitable for each GRF. From the table, "Mitigation" was most appropriate risk response technique for Motivational bias and cognitive bias which have percentages of 42.9% and 38% respectively. For factors related to estimator, "avoidance" was chosen by the firms to be most appropriate for poor project scope with percentage of 46.9%, "mitigation" for inadequate design information, while "acceptance" with percentages of 42.9% and 40.8% was chosen to be most suitable for project complexity and design changes risk factors respectively.

The "acceptance" of these key risk factors by most firms could be associated to the fact that most firms have the capacity in terms of personnel experience and state of the art equipment to deal with both risk factors without having severe impact on the firms. The result further shows that all the risk factors under level of competition were all "accepted" this is as a result of the low effect of these risk factors to the overall project object. Also, all risks under environmental related factors were "accepted" by majority of the respondents, which may be attributed to the fact that, construction firms have little or no control over the environment and as such, could not totally avoid such project on the ground of environmental risk if they want to remain in business, and Nigeria being in the tropical region only has two season; (rainy and dry season) construction can be planned in such a way that most activities are executed during the dry season.

Under economic related factors, payment delays, inflation, price fluctuation, exchange rate and market condition were all "accepted", this may be explained by the fact that, the occurrence of such factors during construction is inevitable so avoiding them will not make an economic sense to any business entity. While most firms consider "mitigation" and "avoidance" for failure to retain top talent and failure to meet clients need respectively, retaining top talent within an organisation is vital to the long-term success of the organisation and as such mitigating such risk of losing top talent was considered most appropriate.

The results further shows that the most suitable risk response to all legal related risk factors was to "mitigate" them. Political/ social related factors; adverse government policies, changes in government, taxation on imported materials and political system were all "accepted" by most construction

firms. This could be as a result of friendly policies of government to the construction industry and the stability in government experianced from 1999 to date. In addition, most firms chose to avoid risks related to terrorism, strike and all factors related to unethical practices.
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In summary, most firms "accept's" to carry-out certain projects even when the likelihood of such risk are high, as long as the firms will be able to overcome the effect. Risk that cannot be overcome by the firms entirely, were "mitigated" to reduce the effect of the risk before such risk is accepted. Also, in a case were risks were mitigated and the residual risks can still pose significant impact to the outcome of a project, most firms "transfer" such risk to a party that has better capacity to bear the risk.

Furthermore, risks that cannot be either accepted mitigated or transfered, were "avoided". It was also found that, most construction firms in this research did not apply "risk transfer" as a technique for responding to risk; this finding conforms to the conclusion by Baloi (2002) which stated that "risk transfer" technique is a very difficult response option for construction firms. This is because insurance is considered costly by many firms making them unwilling to purchase an insurance package. Considering their low profit margin, buying insurance would make their proposal uncompetitive.

Test of Research Hypotheses.

Table 8: Result of ANOVA test for null hypothesis one.

S/N	Test Items	Sum of Squares	Df	F	Sig. (p)
1	Motivational Bias	27.3347	48	.825	.487
2	Cognitive Bias	26.457	45	.725	.543
3	Poor Project scope	29.319	46	.814	.493
4	Project complexity and size	34.490	48	.565	.641
5	Inadequate Design information	33.633	48	1.056	.377
6	Design changes	27.388	48	.648	.588
7	Policies of the contractor	29.265	48	3.005	**.040**
8	Need for job	30.980	48	1.787	.163
9	Number of bidders	38.490	48	2.185	.103
10	Adverse Geological conditions	29.918	48	2.671	.059
11	Adverse Weather condition	23.918	48	2.228	.098
12	Unexpected site conditions	30.980	48	2.961	**.042**
13	Payments Delays	15.102	48	.631	.599
14	Inflation/ Banks Interest rates	35.102	48	.255	.858
15	Price Fluctuations/ Fuel/Oil Prices	31.959	48	1.095	.361
16	Failure to retain top talent	36.000	48	1.177	.329
17	Failure to meet client needs	35.551	48	4.785	**.006**
18	Exchange rates	30.776	48	1.175	.330
19	Market condition	25.673	48	1.261	.299
20	Legal disputes	34.776	48	.934	.432
21	Delayed disputes resolutions	32.531	48	2.280	.092
22	Difficulty to get permission	40.816	48	1.382	.260
23	Labour restrictions	35.551	48	1.336	.274
24	poor conditions of contract	40.000	48	1.600	.203
25	Ambiguity of work legislations	23.470	47	.591	.624
26	Adverse Government Policies	29.918	48	.738	.535
27	Changes in Government	32.531	48	1.599	.203
28	Societal Agitation/instability	39.347	48	1.234	.309
29	Terrorism	42.694	48	1.090	.363
30	Strike	31.102	48	2.933	**.044**
31	Taxation on imported materials	30.776	48	.307	.820
32	Political system	26.531	48	.949	.425
33	Fraud	36.490	48	.174	.913
34	Theft	30.490	48	1.338	.274
35	Bribery	32.490	48	1.193	.323

Source: Field survey, 2015.Df = Degree of freedom, F = F- test, sig. (p) = probability value.

ANOVA test for Null hypothesis one

Table 8 shows the results of the ANOVA statistic test for null hypothesis one i.e. H_0= there is significant difference in severity of GRF among different categories of Construction firms. The results of ANOVA statistic test in table 8 shows that items 7, 12, 17 and 30 have their p – value (0.040, 0.042, 0.006, 0.044 respectively) < 0.05 alpha level of significance, this indicates that the null hypothesis should be rejected for the four items. For the remaining items with p-value > 0.05 alpha level of significance, indicates that the null hypothesis should be accepted.

ANOVA test for Null hypothesis two

Table 9 Result of ANOVA test for null hypothesis two.

S/N	Test Items	Sum of Squares	Df	F	Sig. (p)
1	Motivational Bias	56.694	48	1.230	.310
2	Cognitive Bias	53.917	45	1.793	.163
3	Poor Project scope	55.918	46	.948	.426
4	Project complexity and size	52.980	48	2.137	.109
5	Inadequate Design information	52.776	48	.924	.437
6	Design changes	55.918	48	.370	.775
7	Policies of the contractor	41.633	48	2.210	.100
8	Need for job	60.694	48	.660	.581
9	Number of bidders	1567.6	48	.356	.785
10	Adverse Geological conditions	41.347	48	.974	.413
11	Adverse Weather condition	48.000	48	.961	.420
12	Unexpected site conditions	54.490	48	.205	.892
13	Payments Delays	43.918	48	4.016	**.013**
14	Inflation/ Banks Interest rates	52.979	48	1.052	.379
15	Price Fluctuations/ Fuel/Oil Prices	29.102	48	.901	.448
16	Failure to retain top talent	59.061	48	.983	.409
17	Failure to meet client needs	69.102	48	.487	.693
18	Exchange rates	45.265	48	.212	.888
19	Market condition	24.122	48	1.811	.159
20	Legal disputes	45.551	48	.445	.722
21	Delayed disputes resolutions	28.204	48	.715	.548
22	Difficulty to get permission	45.061	48	.233	.873
23	Labour restrictions	36.531	48	3.294	**.029**
24	poor conditions of contract	35.347	48	2.631	.061
25	Ambiguity of work legislations	52.122	47	1.044	.382
26	Adverse Government Policies	70.531	48	.742	.533
27	Changes in Government	67.265	48	3.465	**.024**
28	Societal Agitation/instability	48.694	48	1.078	.368
29	Terrorism	80.816	48	1.160	.336
30	Strike	68.776	48	1.224	.312
31	Taxation on imported materials	43.918	48	1.885	.146
32	Political system	52.490	48	.121	.948
33	Fraud	58.776	48	1.742	.172
34	Theft	75.673	48	1.299	.286
35	Bribery	76.000	48	.235	.871

Source: Field survey, 2015. Df = Degree of freedom, F = F- test, sig. (p) = probability value.

Table 9 shows the results of the ANOVA statistic test for null hypothesis two i.e. H_0= there is significant difference in the perceptions of construction firms regarding the most suitable risk response technique to GRF. The results of ANOVA statistic test in Table 9 shows that items 13, 23 and 27 have their p – value (0.013, 0.024 and 0.024 respectively) < 0.05 alpha level of significance, which implies that the null hypothesis should be rejected for the three items. For the remaining items that have their p-value > 0.05 alpha level of significance, the null hypothesis should be accepted.

Summary, Conclusions and Recommendations

Summary of Findings

The overall ranking of GRF affecting the performance across different categories of construction firms shows that the following factors were all ranked 1st in their respective categories; poor project scope, numbers of bidder, unexpected site condition, payment delays, poor condition of contract, taxation on imported materials, theft and bribery. This finding is in conformity with the findings of Bu-Qammaz (2007) which stated that experts in construction have described bribery to be of considerable threat while executing construction activities. Also, the result of ANOVA test (on Table 8) indicates that, there is no significant difference in severity of GRF among different categories of construction firms on policies of the contractors, unexpected site condition, failure to meet client's needs and strike.

The risk reponse strategy selected by construction firms on Payment Delays, Design Changes, and Inflation/ Banks Interest rates as GRF was "accept" them despite their high likelyhood and impact. This is inline with the views of Hillson & Murray-Webster (2007) who stated that risk response and the extent to which a firm is willing to take it depend on the capability of the firm and the extent to which uncertainty is seen critical.

On the other hand, Poor project scopes, strikes, failure to meet clients need and all GRF under unethical practices were "avoided", while legal related risk factors were all "mitigated". The result of ANOVA test shows that there is no significant difference in the perceptions of construction firms regarding the most suitable risk response technique on payment delays, labour restrictions and changes in government. The null hypothesis was rejected on all other items.

Conclusions

The assessment of GRF is necessary to reduce the casess of poor quality of work, cost and time overrun that characterised construction activities in Nigeria. This paper has evaluated the severity of GRF on the performance of construction firms and identified the most approprate risk rsponse stategy for each category of risk. This enables diferent categories of contractors to not only prioritise risk on the basis of their severity but also to identify the most suitable response technique.

Payment delays was found to be the most severe risk factors affecting construction firms and majority of the firms still choose to accept it, followed by poor project scope which most firms responded to by avoiding. Moreso, the most appropriate response strategy for inadequate design information is mitigation.

The overall outcome of the study was that, having risk factors with a high severity doesn't necessitate avoidance of such project but rather the capacity of the firms to handle such risk effectively will be the deciding factor. This finding is helpful as it brings to bear the need for construction firms and other stakeholders in the construction industry to increase their awareness of GRF in order to be able to manage them effectively when engaged in contracts.

Recommendations

In view of the findings and conclusions above the following recommendations were put forth;

i. Micro, small and medium firms are advised to further cultivate the culture of risk management in their organisation so as to reduce the severity of GRF.
ii. Construction firms should avoid risk factors related to poor project scope, strike, failure to meet client's needs and unethical practices like; fraud, theft, and bribery.
iii. Construction companies should avoid a risk factor not on the basis of its severity but rather on the capaity of the firm to handle it effectively.

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