Journal of Governance and Integrity (JGI)
ISSN: 2600-7479; e-ISSN: 2600-786X; Volume 1, Issue 2, 135-149, July 2018

ORGANIZATIONAL FACTORS, CONSTRUCTION RISK MANAGEMENT AND GOVERNMENT REGULATIONS IN NIGERIAN CONSTRUCTION COMPANIES: DATA SCREENING AND PREMILINARY ANALYSIS

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ABSTRACT

The aim of this paper is to investigate the accumulated data pertaining to the organizational factors, construction risk management and government regulations in Nigerian construction companies. A total sample of 238 were selected from the total population of 338 contractors operating in Abuja and Lagos State construction companies in Nigeria. Therefore, a proportionate stratified random sampling approach was employed for this study to further divide the companies into different strata, and they were all picked randomly from each stratum. Furthermore, data cleaning and screening were conducted with the intent to fulfil the multivariate analysis assumptions. Hence, this study carried out various tests like missing data analysis, outliers, normality, Multicollinearity, non-response bias and common method variance with the use of Statistical Package for Social Science (SPSS) v21. Lastly, it was discovered that the data fulfil all the requirements for multivariate analysis.

Keywords: Construction risk management, Organizational internal factors, Organizational external factors, Government regulation, Nigerian construction companies

INTRODUCTION

Proper planning, editing and screening of preliminary data are paramount procedures before conducting multivariate analysis. Data screening is also important in order to ascertain any possible violation of the main supposes pertaining to the application of multivariate techniques (Hair et al., 2010). Furthermore, preliminary data investigation makes the researcher to have a deep knowledge about the data collected. Yet, this paramount pace of data screening and cleaning are being evaded by researchers in most cases (Hair et al., 2013). Evading this pace, will definitely affect the quality of the results rendered by the research. Hence, there is a need to measure the data with series of statistical techniques to ensure the data is error free.

An independent sample T-test was used to ascertain likely bias of non-response from the main variables of study in this paper which are design risks, management risks, finance risks, material risks, labour and equipment, effective communication, team competency and skills, active leadership, political factor, organizational culture, technology factor, economic factor and rules and regulations. Common method variance, missing data, outliers, normality and Multicollinearity were also deeply investigated.

LITERATURE REVIEW

Mammoth of studies have outlined the word "risk" from different perspectives. Risk was viewed as a practice to economic gain or loss of all phases involved in construction activities (Porter, 1981; Perry & Hayes, 1985). While Moavenzadeh & Rosow (1999) and Mason (1973) sensed this from only loss point of view. Bothroyed & Emmett (1998) defined construction risk related as a state where construction project results to uncertainty and which on the long run affects the quality, time and cost of the project (Adeleke et al., 2017; Arditi et al., 2017; Ansah et al., 2016). Construction risk will be perceived as the chance of natural events that can hamper the project objectives, from finance, design, management, materials and labour and equipment risks point of view in this paper.

The construction industries, compare to other industries, is risky (Adeleke et al., 2016). Likewise, El-Sayegh, (2008) viewed construction project to possess more inherent risks because of many parties that are partaking in the project. The size and complexity of the projects are increasing and which might be adding to the risks, as attached to the cultural, political, economic and social environments where the project is to be awarded.

The study of Aibinu and Odeyinka (2006) that identified forty-four risk factors that leads to delay due to deficiency of effective

construction risk management among construction projects in Nigeria, the study revealed major risk factors such as; management, material, finance and design risk factors. Frimpong et al., (2003) and Sweis et al., (2008) affirmed a positive relationship between internal and external organizational factors and construction risk management, Consistent with the study of Ahmed et al., (2002) in USA, which revealed a positive relationship between internal, external organizational factors and construction risk management.

Similarly, government tools such rules and regulations has been perceived to curb certain risk events from construction projects. Findings from Gibb (2011) also revealed a significant positive effect of rules and regulations on certain risk factors. As also portrayed from the previous researcher's results, rules and regulations has been a yardstick of measurement towards performance on construction projects (Niu, 2008). Rules and regulations strengthen the application of organizational internal and external factors towards some standard prerequisites for organizational operation. However, rules and regulation's abidance to reduce risk events on construction projects is required (Adeleke et al., 2016). In the same vein, Ismail (2001) revealed that in the Malaysian context, rules and regulations on housing stated that, there must be a replacement for the traditional building practices by an industrialized building system (IBS), which, on the long run, might save labour, cost, confer quality and durability and time of construction in Malaysian construction companies as cited by (Alaghbari et al., 2007). Figure 1 shows the proposed research framework.

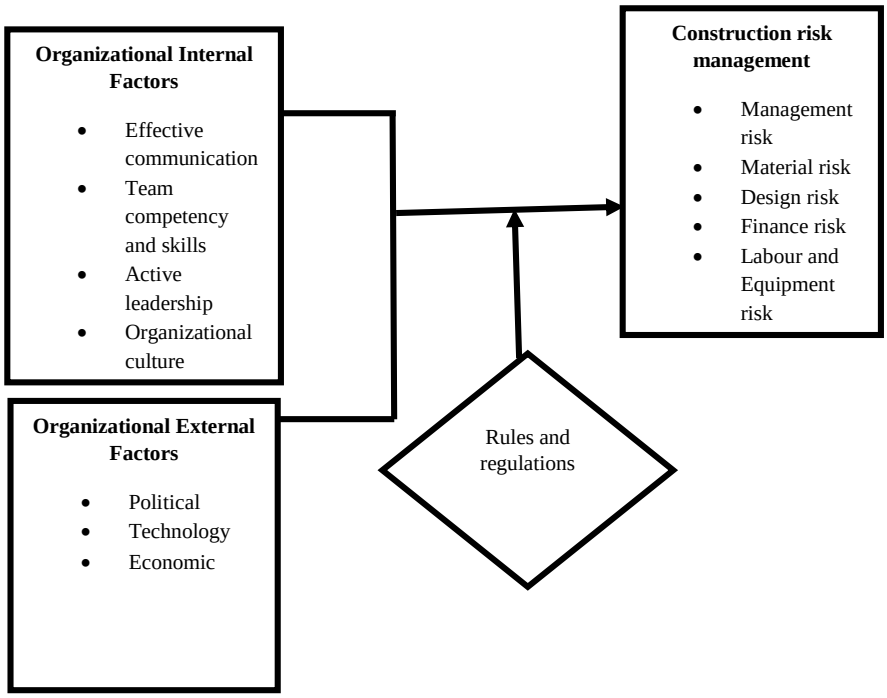

Figure 1 Conceptual Framework

METHODOLOGY

Cross-sectional design was employed in this paper, which indicated that the data was collected one time through a structured questionnaire (Sekaran & Bougie, 2013). The data for this research was gathered among the contractors and sub-groups in the Nigerian construction industries, through a stratified sampling technique.

Instrument design

Questionnaire was suggested by Asika (1991) to be the appropriate survey method for social research. The variables (internal and external organizational factors, construction risks and government rules and regulations) in this paper was adapted and modified from various sources. Similarly, scale ranging from very low to very high was used to assess the

response from the survey. The detail of the constructs and their analogous dimensions are depicted in Table 1.

Table 1 Source of Measurement

S/N	Constructs	Dimensions	Source	Remarks
1	Internal factors	Effective communication Team competency and skills Active leadership	Kumaraswamy & Chan (1998)	Adapted
2	External factors	Political factor Organizational culture Technology factor Economic factor	Jaafari (2001) Kamaruddeen et al., (2012) Sun & Meng (2009) Sun & Meng (2009)	Adapted
3	Government policy	Rules and regulations	Mezher & Tawil (1998)	Adapted
4	Effective construction risks management	Management Material Design Finance Labour and equipment	Aibinu & Odeyinka (2006)	Adapted

RESULTS

Response Rate

The word response rate denotes the total returned survey questionnaires, classified by the number of sample respondents who are qualified for the survey (Frohlich, 2002). Prior managerial studies depicted that 32% were the average response rate for survey studies (Fohlich, 2002). Thus, the author suggested some approaches to improve response rate in survey studies such as:

1. The respondents must be aware before the survey.
2. Give a sincere appeal on the cover letter.
3. Conduct a pilot study and use the existing scale for survey.
4. Be sure the items are well formatted and managed.
5. Mailed the questionnaire more than once.
6. Provide a prepaid postage.
7. Make non-stop follow up.
8. Send the questionnaire to the appropriate respondent.

9. Provide the third-party logo (such as construction company logo) on the survey questionnaire, and
10. Add more effort to get accurate result at the end of the research.

This research adopted the strategy listed above but with the exceptions of number of 5 and 6 because the questionnaires were delivered by hand to all respondents to get more response. In this study, a total of 331 questionnaires were shared to the Local, National and Multi-national construction industries in two states (Abuja and Lagos state) of Nigeria. In an effort to attain high response rates, a lot of SMS (MacLean et al., 2005) and phone call reminders (Sekaran, 2003) were sent from time-to-time to all the respondents who were yet to complete their given questionnaires after four weeks (Dillman, 2000; Porter, 2004).

Consequently, the outcomes of this survey yielded 248 returned questionnaires, out of 331 questionnaires that were distributed to the target respondents. This gives a response rate of 75% following Jobber's (1989) response rate definition. Out of the 248 returned questionnaires, 10 were void because a substantial part of those questionnaires was not filled by the respondents; and the remaining 238 useable questionnaires were used in this study analysis. This there indicated 72% useable response rate (Adeleke et al., 2017). Therefore, a response rate of 72% is regarded appropriate for this study analysis because Sekaran (2003) proposed that 30% response rate was abundant for surveys (see Table 2), as this study followed Sekaran.

Table 2 Questionnaire Distributed and Decisions

Response	Frequency/Rate
No. of distributed questionnaires	331
Returned questionnaires	248
Return and usable questionnaires	238
Return and excluded questionnaires	10
Response rate	75%
Valid response rate	72%

Normality test

Previous studies of (Haenlein, & Henseler, 2009) have conventionally presumed that PLS-SEM offers accurate model estimations in circumstances with enormously non-normal data. Nevertheless, these presumptions may change to be false. Lately, Hair et al., (2012) proposed that researchers might conduct a normality test on the data. Extremely kurtotic or skewed data can amplify the bootstrapped normal error estimates (Chernick, 2008), which in turn undervalue the statistical

significance of the path coefficients (Dijkstra, 1983; Ringle et al., 2012a, Bamgbade et al., 2017, Salimon et al., 2016).

Going by Field's (2009) proposition, in the current study, a histogram and normal probability plots were carried out to ensure that normality presumptions were not breached.

Multicollinearity Test

Multicollinearity is a state where more exogenous latent constructs are highly correlated. The existence of multicollinearity between the exogenous latent constructs can considerably change the estimates of regression coefficients of the tests for their statistical significance (Chatterjee & Yilmaz, 1992; Hair et al., 2006, Nawanir et al, 2016). Specifically, multicollinearity increases the standard errors on the coefficients, which later makes the coefficients statistically non-significant (Tabachnick & Fidell, 2007, Bamgbade et al., 2017, Salimon et al., 2017). To detect multicollinearity, variance inflated factor (VIF) with its tolerance value were examined to detect the multicollinearity problems. Hair, Ringle and Sarstedt (2011) proposed that multicollinearity was a concern if VIF value is more than 5 and the tolerance value is less than .20.

Non-response bias Test

Non-response bias was defined by Lambert and Harrington (1990) as "the dissimilarities in the answers provided by the non-respondents and respondents." Hence, in order to eradicate the likelihood of non- response bias, Armstrong and Overton (1977) proposed a time-trend extrapolation method, that involves relating the early and late respondents (i.e., non-respondents). It was further disclosed from the author's argument that late respondents share akin features with non-respondents.

To be specific, an independent samples t-test was carried out to discover any likely non-response bias on the actual study variables comprising management risks, material risks, design risks, finance risks, labour and equipment, effective communication, team competency and skills, active leadership, political factor, organizational culture, technology factor, economic factor and rules and regulations. Table 3 depicts the results of independent-samples t-test attained.

Table 3 Results of independent-sample T-test for non-response bias

					Levene's Test for Equality of Variances	
Variable	**GROUP**	**N**	**Mean**	**Std. Deviation**	**F**	**Sig.**
EC	Early response	25	2.8640	.72277	1.182	.278
	Late response	213	2.7174	.76598		
TC	Early response	25	2.6240	.80482	.046	.831
	Late response	213	2.7362	.80941		
AL	Early response	25	2.5600	.70814	2.529	.113
	Late response	213	2.7817	.85877		
PL	Early response	25	2.3520	.66151	.123	.726
	Late response	213	2.4122	.68131		

Table 3 Results of independent-sample T-test for non-response bias (continued)

					Levene's Test for Equality of Variances	
Variable	**GROUP**	**N**	**Mean**	**Std. Deviation**	**F**	**Sig.**
OC	Early response	25	2.5600	.68866	.440	.508
	Late response	213	2.5282	.63340		
TG	Early response	25	2.4400	.82689	.543	.462
	Late response	213	2.4988	.87365		
EN	Early response	25	2.3000	.69970	.186	.667
	Late response	213	2.4460	.66279		
MG	Early response	25	2.6862	.60239	.219	.640
	Late response	213	2.6941	.61336		
MT	Early response	25	2.8100	.95274	1.632	.203
	Late response	213	2.7171	.79620		
DS	Early response	25	2.6200	.81155	.257	.613
	Late response	213	2.6886	.70732		
FI	Early response	25	2.1700	.75939	.044	.834
	Late response	213	2.3439	.73570		
LAB	Early response	25	2.5657	.75534	.008	.931
	Late response	213	2.7103	.76239		
RG	Early response	25	2.2800	.73711	.264	.608
	Late response	213	2.4404	.69802		

EC= effective communication, TC= team competency and skills, AL= active leadership, PL= political factor, OC= organization culture, TG= technology factor, EN= economic factor, MG= management risk, MT= material risk, DS=design risk, FI= finance risk, LAB= labour and equipment risk and RG= rules and regulations

Common method variance

Common method variance can be viewed as a potential problem in behavioral research, CMV is defined as the variance which is constantly attributable to the measurement process relatively than the main constructs the measures characterize (Podsakoff et al., 2003). There has been a serious issue on how to eliminate method biases because it is one of the primary sources of measurement error detected in behavioural research.

This research has used self-reported data acquired from Local, National and Multi-national construction industries from Nigeria, which generate potential for common method variance (CMV). The implication of this is that the predictors variables and criterion variables were gathered from a single source (employee). Some statistical and procedural measures were therefore taken in the research process to solve the issue of CMV (Podsakoff et al., 2003, Bamgbade et al., 2017, Salimon et al., 2017).

Sample Characteristics

This part depicts the demographic profile of the respondents to the sample. The demographic features observed during this study contain positions at the company, years of experience and gender. The questionnaire survey was carried out among 238 respondents, which 10.9%, 3.4%, 5.0%, 31.5%, 30.3% and 18.9% were for the contract manager; executive director; marketing manager; project manager; engineer and other employees. The respondents working experience ranged from 1 to 47. 76.5% of the male and 23.5% of the female participated in the survey as shown in Table 4 and 5.

Table 4 Demographic breakdown of the respondents

Respondents	**Frequency**	**Percentage (%)**
Position in the company		
Contract manager	26	10.9
Executive director	8	3.4
Marketing manager	12	5.0
Project manager	75	31.5
Engineer	72	30.3
Other employees	45	18.9
Working experience (Years)		
Lowest working experience	1	0.4
Highest working experience	47	5.9
Gender		
Male	182	76.5
Female	56	23.5

Table 5 Demographic breakdown of the companies

Parameters	**Frequency**	**Percentage (%)**
Company specialization		
Apartment buildings	87	36.6
Roads	130	54.7
Bridges	16	6.7
Others	5	2.1
Company ownership type		
Local	150	63.0
National	15	6.3
Multi-national	72	30.3
Others	1	0.4
Company business location		
Local market areas	143	60.1
Within few states	9	3.8
Regional	6	2.5
Across Nigeria	40	16.8
International markets	39	18.4
Company existence (years)		
Lowest	1	0.4
Highest	29	12.2
Company employee		
Lowest	1	0.4
Highest	14	5.9

CONCLUSIONS

Inclusion, this paper has evaluated the gathered data through series of statistical techniques to ensure it is error free and to fulfil the multivariate assumptions. Therefore, all the assumptions were achieved from the data cleaning and screening procedures from the response rate, normality test, multicollinearity test, non-response bias test and common method variance missing data analysis, outliers, normality and multicollinearity assessments that were conducted. Hence, this study data fulfilled all the multivariate analysis assumptions, and future studies can effectively make use of the investigated variables, which will further provide more empirical evidence to the growing body of knowledge of this domain.

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