Risk Control Techniques and Project Success: Evidence from Building Construction Companies in Lagos State, Nigeria

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ABSTRACT

Boosting project risk control, as evidence for financial instruments, can assist the sustenance of project success to cushion builders' income, and ensure adequate property safety in Lagos State Nigeria. This study examined the relationship between risk control techniques and project success, with empirical evidence drawn from building construction companies in Lagos State. The study employed a cross-sectional survey design cum double sampling technique; comprising judgmental and convenience. The study employed a structured questionnaire to gather data from a population of 147 participants. Descriptive statistic, Friedman's rank test and simple regression techniques were adopted in the data analysis. The study revealed the rank-order analysis of risk control techniques and project success criteria. The results also displayed the positive relationship between risk control techniques and project success criteria of selected building construction companies in Lagos State, Nigeria. The study recommended that Government agency, saddled with building control in Lagos State, should ensure physical inspection is carried out on public building (either completely or under construction) in order to compel builders for proper control identification. Having carried out physical inspection, it is important for builders to be enlightened on builders 'liability insurance, as a risk control mechanism, to ensure that buildings under construction are covered by contractor's all-risk insurance policy.

Keywords: risk control techniques, project success, building construction companies, builder's liability insurance

INTRODUCTION

The construction sector contributes significantly to GDP, creates jobs, and adds value to the economy of every country (Boateng et al., 2020). Given the complexity and dynamic nature of construction activities, the industry is more vulnerable to risk than other business-

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es (Obondi, 2022). Risks are likely to arise during the course of a construction project, which could lead to a decrease in project performance (Obondi, 2020). The main causes of risk in construction projects are both internal and external variables such as project budget and schedule restrictions, technical challenges, complex procedures, hostile settings, scope modifications, and complexity (Alashwal & Al-Sabahi, 2018). Project managers that oversee construction projects frequently incur large losses as a result of their inadequate engagement in risk monitoring and control. These losses may reach eighty-fiv% of the project's overall cost (Obondi, 2020). The process of risk management is iterative and begins with the identification of potential risks related to the construction project. Risk assessment, which assesses the possible impact of hazards that have been discovered, comes after risk identification. Appropriate risk mitigation strategies or risk responses are developed when the project risks have been identified and evaluated. The effectiveness of a project is often determined by the suitable risk mitigation strategies used to reduce the hazards that have been identified (Satish et al., 2019).

Therefore, risk management entails identifying key elements that could ruin a project or investment, scheduling, and quality standards, estimating the risk's possible impact, and implementing controls to mitigate that impact (Algremazy et al., 2023). Risks must be properly managed, regulated, and monitored in order to ensure the successful completion of projects, as they have an impact on project performance. Risks that are not tracked or managed could result in budget overruns, delays in project completion, subpar project performance, and, eventually, project failure. The act of tracking identified risks, locating and evaluating new hazards, keeping an eye on the execution of risk response plans, and evaluating the efficiency of risk management procedures during the course of a project is known as project risk control (Project Management Institute (PMI), 2017). Risk management strategies are essential to human and corporate life. Abdul-Azeez and Ajemunigbohun (2022) argued that risk control strategies included risk avoidance, risk prevention, risk minimization, risk retention, and risk transfer. These methods might be classified as financial risk management or physical risk control. While financial risk control includes risk prevention, risk transfer, and risk minimization, physical risk control comprises risk avoidance and risk retention. The project's duration and expense increased due to the improper implementation of risk control strategies (Algremazy et al., 2023; Pirwani et al., 2020; Masengesho et al., 2020).

The nexus between risk control techniques and project success in construction projects is an important hence there exist no rank order analysis of the risk control techniques cum project success criteria in previous studies. The devoid of theoretical and empirical gap is also evident. Therefore, the study specific objectives are to examine the rank order analysis of risk control techniques among selected building construction companies in Lagos State; evaluate the rank order analysis of project success criteria among selected building construction companies in Lagos State; and ascertain the effect of risk control techniques on project success among selected building construction companies in Lagos State.

METHOD

This study employed a cross-sectional survey research design dependent upon a quantitative method to provide an improved perception of judgments associated with the nexus between risk control techniques and project success among building construction companies. This research design supported the planning and execution of the study in a way to attain expected outcomes and thus, generated an association with the real-life world situation (Creswell & Creswell, 2018; Gray, 2017). Data gathering was conducted through a field survey among selected building construction companies with the support of a structured questionnaire. The substance of choosing the participants was due to their role in the economic and social sustainability of Lagos State. The adoption of this data-gathering instrument was because of its appropriateness to the study design concerning being cost-effective, attracting wider coverage and sample representation, the sufficiency of time for participants to assign well thought-out responses and simplicity in the administration of the research instrument (Ghauri et al., 2020; Hesse-Biber & Johnson, 2015).

According to Obialo (2023), the registered building construction companies in Lagos State are 69 in number. Out of this, 37 building construction firms with the total population of 185 respondents were purposively selected for the distribution and collection of required data because each of these selected companies got at least five (5) copies of the questionnaire, which made its sample population to be 185 questionnaires. Out of this, 147 copies of this questionnaire were useful and appropriate for the data analysis, making up 79 % response rate. The study adopted census sample size determination; i.e., the entire population were been selected as the study respondents. The sampling techniques adopted were both purposive and convenient. For purposive, it required the opinions of the building contractors on the basis of their expertise. For convenience sampling, the readiness and availability of the participants justified it.

The study carried out tests of validity comprised of congruent, content, and criterion-related in nature. While the congruent validity was structured in accordance with the preceding literature, content validity took cognizance of the measures on the survey instrument, and the criterion-relation validity took a probe of the outcomes from other related participants (Booth et al., 2016). Also, the reliability test was conducted with a Cronbach alpha estimated for risk avoidance, risk reduction, risk retention options, risk transfer options, and project success. These outcomes from this study were in line with statistical computations of the soundness of the scale, and the safety of the internal consistency.

RESULT

Descriptive analysis of participants responses

This section delves into the analysis of demographic variables and the hypothesis testing

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conducted. This phase summarizes the demographic variables and rigorously tests formulated hypotheses, aiming to either validate or refute the proposed conjectures.

Variable	Category	Frequency (%)
Gender	Male Female	121 (82.3) 26 (17.7)
Age	18 but less than 30 30 but less than 40 40 but less than 50 50 but less than 60 60 & above	50 (34.0) 77 (52.4) 13 (8.8) 07 (4.8) 00 (0.0)
Income	Less than 1,000,000 1,000,000 but less than 3,000,000 3,000,000 but less than 5,000,000 5,000,000 but less than 10,000,000 10,000,000 & above	21 (14.3) 48 (32.6) 58 (39.5) 12 (8.2) 08 (5.4)
Educational qualification	B.Sc./HND Master's Doctorate Professional certificate Others	70 (47.6) 28 (19.1) 02 (1.4) 23 (15.4) 24 (16.5)

Table 1:Demographic information of participants

Source: Field Survey, 2024

The analysis of demographic variables reveals significant thoughts into the configuration of the studied population. The gender distribution indicates a wide gap representation, with 82.3 % identified as male and 17.7 % as female. This gap in gender ratio within the sample population proposes a degree of gender disparity within the building construction sector. Regarding age distribution, the data reflects a diverse age variety within the sample. The mainstream of participants falls within the age brackets of 30 to less than 40 years and 18 to less than 30 years, responsible for 52.4 % and 34 %, respectively. Comparatively smaller proportions are recorded in the older age groups, with 8.8 % falling between 40 to less than 50 years, and 4.8 % each for the 50 to less than 60 years; while nothing was recorded for 60 years & above categories. This distribution indicates a relatively younger unit ruling the sample. The income presents a stimulating surface of the demographic profile. The majorities, constituting 39.5 % and 32.6 %, are identified as those participants who earned three million but less than five million and those who earned one million but less than three million, while 14.3 %, 8.2 %, and 5.4 % were recorded for those who earned less than one million, five million but less than ten million, and ten million and above. This is evidence of 72.1 % earning reasonable sum of income. Educational qualifications within the sample population display changing heights of attainment. A considerable portion, accounting for 47.6 % holds a B.Sc./ HND qualification, followed by 19.1 % holding a Master's degree; followed 16.5 % recorded for others; while 15.4 % recorded for those possessing professional certificate. Only 1.4 % was recorded for those with doctorate degree.

DESCRIPTIVE ANALYSIS OF RESEARCH VARIABLES

Table 2:	Risk	control	techniques
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	Scale Level						
Variables	SD	D	U	Α	SA	Mean	Std dev.
	1	2	3	4	5		
My organization makes provision for physical avoidance of risk occur- rence in the line of operations such as identifying danger zone, risk com- munication in the workplace, etc.	0.7	0.7	1.4	42.9	54.3	4.50	0.634
My organization often strives to re- duce or minimize possible risk ele- ments for organization best interest such as provisions of fire extinguish- er, fire alarm, danger exit way, etc	1.4	4.1	4.1	53.7	36.7	4.20	0.810
Certain risk elements not beyond the control of my organization are usu- ally retained for possible solutions such as set aside funds, hedging, treasury bills, etc.	5.4	27.2	10.2	36.1	21.1	3.40	1.242
Certain risk elements beyond the control of my organization are usu- ally transferred to insurance compa- nies for possible solutions such as buying insurance policies for busi- ness interruption purpose, fire inci- dences, equipment transportation safety, staff safety	2.7	8.2	5.4	37.4	46.3	4.16	1.034

Source: Researchers' computations, 2024

In Table 2 (Fig. 1), the risk control survey items for which data were gathered from the entire participants were *risk avoidance, risk minimization, risk retention, and risk transfer.* The participants reacted to the numerous items, wherein 1.4 % expressed their disagreement in terms of risk avoidance, 1.4% indifferent, and 97.2 % indicated their agreement. For *risk minimization*, while participants expressed 5.5 % in not supporting this item, 4.1 % were undecided with it. Then, 90.4 % supported. As for *risk retention*, 32.6 % of the entire participants exhibited their disagreement, 10.2 % were indecisive, and 57.2 % agreed. For *risk transfer*, 10.9 % disagreed, 5.4 % undecided, and 83.7 % expressed their agreement. The mean and standard deviation scores supported the outcomes for all the items surveyed. This implies that builders' judgments towards the survey items were normally distributed and centered around the mean. The result of the descriptive statistics on risk control techniques plainly indicate that all the measures have identical decisions about all the subject matter in the distribution of the participants' opinions.



Fig. 1: The graphical model explains the risk control techniques among building construction companies in Lagos

Table 3: Project success criter	Table 3:	Project success criteria
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	Scale Level						
Variables	SD	D	U	Α	SA	Mean	Std. dev.
	1	2	3	4	5		
My company always manage monetary budget to enable its completion	1.4	2.0	6.8	39.5	50.3	4.35	0.809
My company ensures it meets up with project completion deadline oftentimes	0.7	0.7	3.4	46.2	49.0	4.42	0.661
My company often effect quality project deliverables in a bid to meet required expectations	0.7	0.0	4.1	53.1	42.1	4.36	0.630
My company ensures application of necessary technicalities on project execution	0.7	1.4	10.2	47.6	40.1	4.25	0.748
My company ensures compliance with project outlines that often endear time- bound completion	1.4	2.0	6.1	50.3	40.2	4.26	0.777
My company ensures compliance with any project embarked upon to produce required output	0.7	0.0	0.0	41.5	57.8	4.56	0.575

Source: Researchers' computations, 2024

In Table 3 (Fig. 2), the project success survey items for which data were gathered from the entire participants were project cost, project time, project quality, project technicalities, project schedule, and project satisfaction. The participants reacted to the numerous items, wherein 3.4 % expressed their disagreement in terms of project cost, 6.8 % indifferent, and 89.8 % indicated their agreement. For *project time*, while participants expressed 1.4 % in not supporting this item, 3.4 % were undecided with it. Then, 95.2 % supported. As for project quality, 0.7 % of the entire participants exhibited their disagreement, 4.1 % were indecisive, and 95.2 % agreed. For *project technicalities*, 2.1 % disagreed, 10.2 % undecided, and 87.7 % expressed their agreement. As for project schedule, 3.4 % of the entire participants exhibited their disagreement, 6.1 % were indecisive, and 90.5 % agreed. For *project satisfaction*, 0.7 % disagreed, and 99.3 % expressed their agreement. The mean and standard deviation scores supported the outcomes for all the items surveyed. This implies that builders' judgments towards the survey items were normally distributed and centered around the mean. The result of the descriptive statistics on project success plainly indicate that all the measures have identical decisions about all the subject matter in the distribution of the participants' opinions.



Fig. 2: The graphical model explains the project success criteria among building construction companies in Lagos

HYPOTHESES TESTING

Friedman's rank test

Friedman's symbiotic analysis test, denoted by K, assesses a population that is repeatedly sampled and has the same median. Friedman's test assumes, in a hypothetical scenario where there is no effect, that the dependent variable follows a consistent distribution, necessitating at least ordinal measurement (Eisinga et al., 2017). Data under Friedman's rank test is organized in a

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tabular model with 'n' rows and 'k' columns. Friedman's test determines if the aggregate rank effects for each condition significantly differ from the predicted estimations (St. Laurent & Turk, 2013).

		P	
	Survey Items	Mean rank	Rank
1.	Risk avoidance	2.95	1
2.	Risk minimization	2.54	3
3.	Risk retention	1.88	4
4.	Risk transfer (insurance)	2.62	2

Table 4:Results of Friedman's rank test on risk control techniques among building
construction companies in Lagos State

Source: Researchers' computations, 2024

Table 5:Chi-square results from the Friedman's test

N	147
Chi-square	78.790
Df	3
Asymp.sig.	.000

Friedman test

The analytical outcomes of the Friedman's test signify the existence of a statistically significant variance in risk control techniques [*risk avoidance, risk minimization, risk retention, risk transfer*, X² (3, n=147) = 78.790, p < 0.05]. Consequently, taking critical scrutiny of the mean calculations suggested a descending layer in risk control techniques adopted in the selected building construction companies from *risk avoidance* (2.95) to *risk transfer* (2.62), to *risk minimization* (2.54), to *risk retention* (1.88). The significance of these techniques affecting risk control in the selected building construction struction companies were plainly ranked to give grounds for the above clarifications.

Table 6:	Results of Friedman's rank test on metrics for project success among building
	construction companies in Lagos State

	Survey items	Mean rank	Rank
1.	Project cost	3.55	3
2.	Project time	3.63	2
3.	Project quality	3.43	4
4.	Project technicalities	3.22	6
5.	Project schedule	3.26	5

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	Survey items	Mean rank	Rank
6.	Project satisfaction	3.91	1

Source: Researchers' computations, 2024

Tuble // One by an	Table 7:	Chi-square	results from	the Frie	dman's test
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N	147
Chi-square	23.794
Df	5
Asymp.sig.	.000

Friedman's test

The analytical outcomes of the Friedman's test signify the existence of a statistically significant variance in project success metrics [*project cost, project time, project quality, project technicalities, project schedule, project satisfaction,* X^2 (5, n=147) = 23.794, p < 0.05]. Consequently, taking critical scrutiny of the mean calculations suggested a descending layer in project success adopted in the selected building construction companies from *project satisfaction* (3.91) to *project time* (3.63), to *project cost* (3.55), to *project quality* (3.43), to project schedule (3.26), to *project technicalities* (3.22). The significance of these metrics affecting project success in the selected building construction companies for the above clarifications.

			1 0					L	1 5	
	Model	R	R square	Adjusted R square	Std. error of estimate	Change Statistics				
						R square change	F change	df1	df2	Sig. F change
		. 320ª	.102	.096	2.698	.102	16.506	1	145	.000

 Table 8:
 Simple regression results for risk control techniques vs. project success

Predictors: (constant), risk control techniques. Dependent variable: project success

ANOVA ^a									
Model		Sum of squares	Df	Mean square	F	Sig.			
	Regression	120.175	1	120.175	16.506	.000 ^b			
1	Residual	1055.703	145	7.281					
	Total	1175.878	146						

a. Dependent variable: project success. predictors: (constant), risk control techniques

Coefficients ^a									
Model		Unstandardized coefficients		Stan- dardized coefficients	т	Sig.	95.0% Confidence Inter- val for B		
		В	Std. error	Beta			Lower bound	Upper bound	
	(Constant)	19.980	1.548		12.906	.000	16.920	23.040	
1	Risk control techniques	.383	.094	.320	4.063	.000	.197	.569	

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a. Dependent variable: project success. Source: Researchers' computations, 2024

From the Table 8 results of the regression analysis presented above, it is clear that there is positive relationship between risk control techniques and project success. The model also shows the variations experienced by the dependent variable that could be explained by the independent variable (R square) which shows that risk control techniques are responsible for about 10.2 % of variance in project success. This means that 89.8 % of the project success enjoyed among building construction firms in Lagos State comes from other factors other than the predictor used in this model (*risk control techniques*). The generalization of the results (Adjusted R square) indicates that true 9.6 % of the variation in project success is explained by risk identification techniques (*risk avoidance, risk minimization, risk retention, risk transfer*). This result is almost close to reality as the difference between R Square and Adjusted R Square is not high. The standard error fit, which is a measure of the precision of the model, shows how wrong the statistical outcomes could be at 3 % if one uses this model to make real life predictions. The above result is statistically significant as seen in the ANOVA table (*p-value* = 0.000) as it is greater than the 0.05 confidence interval used in this study. A value greater than 1 show that F-ratio yield an efficient model but 16.506 F-ratio indicates that this model is not very efficient.

DISCUSSION

This study confirms the nexus between risk control techniques and project success among building construction companies in Lagos, Nigeria.

The results from hypothesis one indicated that 'risk avoidance' was ranked first, followed by "risk transfer," "risk minimization," and "risk retention." This result is corroborated with the recent studies (such as Abdul Azeez & Ajemunigbohun, 2022; Satish et al., 2019) who noted the risk control techniques as significant in the effectual capacities of building construction firms.

The results for the second hypothesis indicated that "project satisfaction" was ranked first; followed by "project time," "project cost," "project quality," "project schedule," and "project technicalities." This result aligned with recent studies (such as Albtoush et al., 2022; Oko-Osi et al., 2023; Zekavat & Momenian, 2019) who noted that regular push for quality project at low cost and prompt

delivery time would possibly avoid project failure. They also noted well-designed project schedule, with high level technicalities to meet up project satisfaction for organizational attainment.

The result from hypothesis three revealed that risk control techniques have positive and low relationship with project success among building construction companies in Lagos State, Nigeria, thereby invalidating the null hypothesis and validating the alternate hypothesis at (p = 0.000). it is clear that there is positive relationship between risk control techniques and project success. The result also shows that risk control techniques are responsible for about 10.2 % of variance in project success. This means that 89.8 % of the project success enjoyed among building construction firms in Lagos State comes from other factors other than the predictor used in this model (*risk control techniques*). The overview of the results indicates that true 9.6 % of the variation in project success is explained by risk identification techniques (*risk avoidance, risk minimization, risk retention, risk transfer*). This result is maintained by earlier studies (such as Algremazy et al., 2023; Alsaadi & Norhayatizakuan, 2021; Oko-Osi et al., 2023) that the positive and statistically significant nexus elucidated the link that subsist between the various techniques of risk identification and project success of building construction companies in Lagos State, Nigeria.

CONCLUSION

Findings from the study have exhibited the significance of risk control techniques on project success among selected building construction companies in Lagos State, Nigeria. Findings being drawn revealed the opinions of the selected participants where "risk avoidance," "risk transfer," "risk minimization," and "risk retention" were all ranked according to their mean results. Results for hypothesis two showed that a ranked analysis for project success comprising "project satisfaction," "project time," "project cost," "project quality," "project schedule" and "project technicalities" were evaluated. The hypothesis three proved the positive relationship between risk control and project success criteria. As a result, the building construction companies should ensure that well-designed risk control techniques be entrenched in their policy document to address future risk emerging from the project site. Government agency, saddled with building control in Lagos State, should ensure physical inspection is carried out on public building (either completely or under construction) in order to compel builders for proper control identification. Having carried out physical inspection, it is important for builders to be enlightened on builders 'liability insurance, as a risk control mechanism, to ensure that buildings under construction are covered by contractor 's all-risk insurance policy. More risk retentive capacities should be built by building construction companies in a bid to handle small proportions of their risks possibly by creating a risk management unit/department.

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