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Professor Kulomri J. Adogbo
ENVIRON Editor-in-Chief

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Volume 5 No. 1 Journal of Environmental Studies November, 2023

CONTENTS **Page**

PART I: CONSTRUCTION AND INFRASTRUCTURE

PART II: CREATIVE, INDUSTRIAL AND MATERIAL ARTS

PART III: GEO-SPATIAL AND URBAN PLANNING

EDITORIAL

Advancing the frontiers of knowledge and innovation is a prerogative of academic journal publications and this is clearly evident in ENVIRON Journal of Environmental Studies which aims to create an avenue for the dissemination of academic researches which cover the creation of built environments and landscapes that are designed to improve the artistic, natural, socio-cultural and physical quality of life and the natural environment.

ENVIRON is an inter-disciplinary scholarly peer reviewed publication and welcomes original articles exploring wide range of topics in the built environment discipline. This issue of the journal covers interesting and thought-provoking topics in Urban Management of transport systems, urban drainage system, land use, climate studies and building performance in educational institutions. The articles explored challenges and advancements in the field of construction project management, contract management, safety management and risk management. The trends in use of artistic and creative colour choices and materials are also explored with the view to capturing latest trends in the Fine Arts domains.

On behalf of the Editorial Board, I wish to express our profound gratitude to the distinguished academics who have sacrificed their time to review these articles. The Authors who conducted researches and submitted articles for publications have made this issue rich in content and we are most appreciative of your faith and trust in the Journal as a medium for disseminating your researches.

Moving forward, the Journal hopes to publish articles which explore ground-breaking research or projects on the importance of sustainable design/development, emerging technologies such as Industry 4.0/5.0; the application of Data analytics and Artificial Intelligence in the Built Environment, and perhaps touch on Industrial Design (Ceramics, Graphics and Textiles), Innovative Design Thinking and Quantity Surveying.

At ENVIRON Journal of Environmental Studies, we highly value your opinions and insights. We invite you to engage with us by sharing your feedback, comments, and suggestions on the articles published, the topics covered, and ideas for future research areas. Your thoughts are invaluable in shaping the future discourse of our Journal. We are committed to fostering knowledge exchange and innovation within the built environment community and we believe strongly that the articles in this, and future issues, will provide readers with relevant reference resources.

Professor Kulomri Jipato Adogbo
Editor-in-Chief

CONTRACTORS' TENDER-RELATED RISKS INFLUENCE ON COST AND TIME DELIVERY OF CONSTRUCTION PROJECTS IN ABUJA, NIGERIA

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Abstract
The construction industry is considered a high-risk sector owing to different factors such as the uniqueness and complexity of projects, diverse stakeholders', and procurement systems. The study aimed to assess the influence of pre-contract tender-related risks on the post-contract performance of construction projects. A survey-based research design was adopted for data collection using a well-structured questionnaire administered to construction professionals in Abuja that were purposively selected. The data gathered from 102 respondents were analysed using descriptive statistics and paired sample T-test. The study found that two risk factors; 'low contractor competence' and 'unforeseen site condition' ranked among the top three important risks throughout both pre-contract post-contract stages. It was also discovered that although both pre- and post-contract risks have large effects on the cost and time performance of construction projects, contractors worry more about the cost of work at tendering stage. The three top-ranked strategies for minimising the effects of tender-related risks on construction projects' performance identified are: top management understanding of modern techniques and principles needed for efficient and effective tendering; effective and efficient documentation preparations; and studying project drawings by comparing specifications with actual conditions on site. Contractors' most significant risks arise from the buildability of designs, level of quality (both at pre-contract stage) and effects of the deficiencies in the contractor's own competence (at post-contract stage). Therefore, periodic training workshops on tendering risks management will help ensure that adverse effects of tender-related risks are minimized.

Keywords: Contractors, Cost, Performance Risks, Pre-contract, Post-contract, Tender Related, Time

INTRODUCTION
Construction industry like other industries is subject to various risks due to its unique features and complexity of its activities, such as dynamic organization structures, financial intensity, environmental degradation, long gestation period, and complicated processes (Oyewobi *et al.*, 2012; Olanike *et al.*, 2020). Tendering is the administrative process of sending plans, specifications, and a bill of materials to construction companies with the goal of receiving a quote for the project's construction. Construction projects have used a variety of techniques, including open, selective, negotiation, competitive, and design-and-build tendering processes (Manthosi & Thawala, 2012; Kortenko *et al.*, 2021).When choosing a contractor to carry out a construction project, criteria such as the contractor's competency, technical

competence, financial capability, and others are considered in addition to the project's cost.

Risk on the other hand, according to Oxford dictionary is a situation involving exposure to danger. Purdy (2010) stated that the level of risk increases in the beginning of a project and reaches its highest level during the tendering process where the project uncertainty is at its peak. At the start of production, risks are either actualized or expired and the level of risk decreases as the project progresses. As a result, risk management becomes most vital during the tendering process. It is established in literature that there is a strong correlation between an early risk management and the success of a project (Ezeabasili *et al.,* 2021; Loizou & French, 2012; Gabrieyel, 2021). A key element of a project's success is the number of resources allocated to risk management efforts. Therefore, early risk management team involvement improves contractor conditions during both the tendering process and the execution phase.

Several studies on risk, such as (Kim *et al.,* 2008; Akkoyun, 2012; Bahamid & Doh, 2017; Gulam, 2018; Scott, 2019) showed that risks have historically either not managed at all or assessed as a stipulated percentage of the contract sum. Leitch (2010) illustrated that more than 50% of the contractors still do not use any formal techniques to assess risks in the tendering process (Leitch, 2010; Bahamid & Doh, 2017; Gulam, 2018). Structured risk management systems can be the difference between failure and success in the construction sector, which is becoming more complex. Bahamid *et al.* (2019) stated that not only is there a lack of available tools to support risk management, but that the few tools that are available have several disadvantages. Although researchers have studied risk management in construction (Lyons & Skitmore, 2004; Osipova& Eriksson, 2011; Pangilinan *et al.*, 2019; Bahamid*et al.,* 2019), few of such research investigated how risk is practically managed during the tendering phase of projects. The fact remains that risk management is important not only for the success of a single project, but for the success and continued survival of the entire sector. Therefore, it becomes imperative to evaluate the influence of tender related risk on construction project performance to ensure efficient delivery of projects that ensures resultant growth of the construction companies involved. The specific objectives of the study are: to identify the risks considered by contractors during the tendering (pre-contract) stage of construction projects; to assess the effect of pre-contract risks on the contractor's tender in terms of cost and time;to examine the risks encountered by contractors during the post-contract stage of construction projects; to determine the effect of post-contract risks on the project's cost and time performance; to suggest strategies to mitigate the influence of the tender related risks on the cost and time performance of construction projects.

Risks in the Tendering Process of Projects

In today's extremely competitive construction industry, contractors must win bids to stay in business of construction and must be able to successfully handle a variety of bidding circumstances. Before choosing an efficient tender strategy to win the tender, the firms must first decide whether to bid or not to bid. All human endeavours, including construction activities, carry a certain amount of risk, and those risks

might take many different forms. Risk can be seen as a psychological phenomenon that has implications for how people react to and experience situations (Oke, *et al*., 2017).

According to Samson *et al*. (2008), there is no universally accepted definition of risk. Thus, Samson *et al*. (2008) contend that each time a firm deals with a fresh set of decision-making issues, a new definition will be developed. This claim is consistent with the earlier assertion of Grimvall *et al*. (2003) that, many people's definitions of risk depend heavily on the circumstances in which those hazards materialized. Additionally, Grimvall *et al*. (2003) contend that the state of knowledge have some unfeasible effects in projects where hazards frequently emerge in a variety of various contexts and with many different individuals involved.

According to Oyewobi *et al.* (2012), there are four key risks in tendering process of project by contractors. (i) Design risk variables, (ii) Financial risk variables, (iii) Construction risk variables, and (iv) Political risk variables.

- Design risk factors include: flawed designs, varied work, altered initial designs, and inadequate task descriptions.
- Financial risks: Variables that increase financial risk include inflation, insufficient cash flow, exchange rates, cost overruns owing to delays in the schedule, and contractor default.
- Construction risk factors: These include the skill of the contractor, defective materials, suppliers who perform poorly, poor job quality, equipment productivity, labour availability, and unforeseen site conditions.
- Political risk factors: include unpredictability in political situations, banking policy, alterations in law and order, permits and ordinances, and force majeure.

The Importance of Risk Identification in Tendering by Contractors

The creation of a risk register, often known as a list of hazards with both positive and negative outcomes, is the main goal of the risk identification process (PMI, 2004). The risk register should be as thorough as feasible and should cover risks regardless of whether the organisation can mitigate their effects (ISO 3100:2009). According to Bajaj *et al*. (1997), if a risk is not detected, it cannot be controlled, transmitted, or managed in any other way. However, according to Potts (2008), it is impossible to foresee all project-related risk. He claims that if a corporation believes they can and bases the offer price on that belief, it will be counterproductive.

Strategies for Mitigating the Effect of Risks faced by Contractors during Tendering for Construction Projects

A lot of efforts are expended at the pre-construction/tender stage of projects by the clients and consultants in an attempt to secure a suitable contractor for a proposed project. The contractors also make efforts to remain in business by ensuring that, they secure jobs using available resources. Construction projects suffer from cost overrun, time overrun, quality problems, when the tender–related risks are not sufficiently minimised or eliminated (Odeyinka *et al.*, 2005). Oke *et al.* (2017) submitted that tendering for jobs and winning of construction contractors by contracting organisations,

are ways of improving competitiveness and survival in the construction sector.

Several studies have identified the risks factors as well as project characteristics influencing the contractors' tender price at the pre-contract stages of construction projects. A clear knowledge and understanding of the modern techniques and principles needed for efficient and effective tendering are required by management of contracting businesses. Regular training and development of technical, professional and management staff involved in tendering and commercial activities of the construction's organizations has also been recommended. This, to a large extent, assist in curtailing the risks inherent in tender pricing, especially as it impacts negatively on project cost and time, and quality (Oke *et al.*, 2017).

In a related development, Yuni *et al.* (2017) stated that the risks associated with tender pricing of the contractor at the pre-contract stage can be minimised to ensure that project budget and schedule are not exceeded, and better quality of work done. Ugochukwu and Okolie (2013) recognised that the present tendering duration in the public construction projects in Nigeria is inadequate and this has been blamed on competence, wrong estimating and pricing techniques, cutting of corners to obtained contracts awards. These have caused dissatisfactions, claims and disputes among parties to the contract. The authors called for the establishment of suitable framework for assessing the expertise of tenderers, ensuring adequate regulation of contracting organisations and practices, incorporating standard and weeding out quacks during tendering, among others.

In the Malaysian construction industry, Saaidin *et al.* (2016) recommended that the risks variables that influences contractors' tender price can be minimised by implementing the organisational policy on quality to minimise risk and boost profitability, use of contingency during pricing of tenders, effective and efficient documentation preparations, use of experienced and competent designers, and engaging competent contractors with proven track records. These would improve pricing and reduction of the effect of tendering issues on the performance of the projects. To reduce the effect of pre-tender estimating on final cost of construction projects, Cong *et al.* (2014) stated that a more reliable price estimate for a contract should be prepared by the quantity surveyors at the pre-contract stage. This was said to also improve construction-stage cost control activities.

Ogunsanmi (2013) concluded that procurement and tendering related activities have impact on the construction projects time, cost and quality delivery. Therefore, timely appointment of the key stakeholders prior to tendering stage and appropriate procurement and tendering method selection are key for better project performance. Tipili and Yakubu (2016) posited that a larger proportion of the construction stakeholders are unfamiliar with risk management processes, hence, the need for risk management workshops to help improve the understanding of firms in relation to risks management in construction projects. Table 1 below, summarised the strategies for minimizing the effects of tender-related risks on construction projects time and cost delivery.

Table 1: Strategies for Minimising the Effects of Tender-Related Risks on Construction Projects Performance

S/N	Strategies	**Source(s)**
1	Top management Understanding of modern techniques and principles needed for efficient and effective	Yuni *et al.* (2017);Oke *et al.*(2017); Tipili and Yakubu (2016)
2	Regular training and development of technical, professional and management staff involved in tendering and commercial activities	Oke *et al.* (2017);Yuni *et al.*(2017); Ogunsanmi (2013); Tipili and Yakubu (2016); Oyewobi *et al.* (2012
3	Reading/checking all documents Issued	Yuni *et al.* (2017)
4	Assigning experienced people in planning cost estimation	Yuni *et al.* (2017)
5	following of risks management procedures by construction experts during estimating to help meet budget target	Oyewobi *et al.* (2012); Tipili and Yakubu (2016)
6	Studying the drawings by comparing the specifications and the real conditions in the project site where possible	Yuni *et al.* (2017)
7	Calculating the volume of work accurately	Yuni *et al.* (2017)
8	Request completeness of detailed Drawings	Yuni *et al.* (2017)
9	Study all the tender drawings to ensure that the architectural, structural, MEP, are not in divergence to each other.	Yuni *et al.* (2017)
10	Double check of summation and multiplication to avoid errors in estimates	Yuni *et al.* (2017)
11	Make sure there is a match between the scope of work defined in the BOQ and specifications offered	Yuni *et al.* (2017)
12	Implementing the organizational policy on quality to minimise risk and boost profitability	Saaidin *et al.* (2016)
13	Using of contingency during pricing of tenders	Saaidin *et al.* (2016);Oyewobi *et al.* (2012
14	Effective and efficient documentation preparations	Saaidin *et al.* (2016)
15	Use of experienced and competent designers	Saaidin *et al.* (2016)
16	Engaging competent contractors with proven track records	Saaidin *et al.* (2016);Oyewobi *et al.* (2012); Ogunsanmi (2013)
17	establishment of suitable framework for assessing the expertise of tenderers	Ugochukwu & Okolie (2013)
18	ensuring adequate regulation of contracting organisations and practices	Ugochukwu & Okolie (2013)
19	incorporating standard and weeding out quacks during tendering	Ugochukwu & Okolie (2013)

Source: Author's compilation (2021)

RESEARCH METHODOLOGY

A survey-based research design was adopted because the study focused is on a group of people to obtain data from only a specific representative fraction of the entire group. Hence, data were collected using a well-structured questionnaire administered to constructional professionals in Abuja. The target population for this research was the key construction professionals employed by contractors which included Architects, Builders, Engineers, and Quantity Surveyors. They constituted the major construction stakeholders who managed risk on behalf of the contractors as well as the consultants and clients' organisations. A total of 372 professionals were sampled from a total population of 11,225 (comprising Architects: 672, Builders: 630, Engineers: 8,663 and Quantity Surveyors: 1,260) construction professional registered to practice in Abuja Nigeria. The study questionnaire was designed to 5-point Likert scale were self-administered which

achieved a response rate of 27.4% and a mean reliability index of 0.818. Analysis of the data gathered from 102 respondents utilised Frequency, Percentage, Mean score, Standard Deviation, and Paired Sample T-test which formed the basis for the conclusion reached.

RESULTS AND DISCUSSION

Demographic Information

From the results presented in Table 2, the distribution of the ages of the participants showed that 14.71% are aged less than 25years, 53.92% have are 25-35years old, 17.65% are 36-45years old, and 13.73% are more than 45years old. This distribution implies that young professionals who might not have much knowledge of tender-related risks because they are just beginning a career in the construction industry constitute only 15% of the sample. The results as presented further revealed that 59.8% of the respondents are males while 40.20% are females. Given the perception of the construction industry as a male dominated environment, the study has been able to obtain a relatively high proportion of female in the sample. In terms of employer type, 59.8% are employed by contractors and 40.20% are employed by consultants.

Table 2 showed the profession of the participants; Architects comprise (14.71%) of the respondents, Builders (12.75%), Engineers (43.14%), and Quantity surveyors (29.41%). The relatively high proportion of engineers might be explained as arising from the fact that the percentage value presented in Table 2 was made up of several specialities (mechanical, structural and electrical). In terms of academic qualification, 67.65% had obtained HND/ BSc/B.Tech which denotes bachelor's degree or its equivalent, 27.45% held Masters Degrees (MSc./M.Tech), while 4.90% had obtained a PhD. In terms of length of working experience, 13.73% have less than 5 years' experience, 41.18% have 5-10 years experiences, 32.35% have 11-15 years, and 12.75% have more than 15 years' experience. Overall, these results showed that the respondents were qualified both academically and professionally and have the requisite experience that aided this study.

Table 2: Respondent Characteristics

Category	Classification	Frequency	Percent	Cumm. Percent
Age	Less than 25 yrs	15	14.71%	14.71%
	25 yrs – 35 yrs	55	53.92%	68.63%
	36 yrs – 45 yrs	18	17.65%	86.27%
	More than 45 yrs	14	13.73%	100.00%
	TOTAL	**102**	**100%**	
Gender	Female	41	40.20%	40.20%
	Male	61	59.80%	100.00%
	TOTAL	**102**	**100%**	
Employer type	Contractor	61	59.80%	59.80%
	Consultant	41	40.20%	100.00%
	TOTAL	**102**	**100%**	
Type of work (Professionals)	Architecture	15	14.71%	14.71%
	Building	13	12.75%	27.45%
	Civil Engineering	44	43.14%	70.59%
	Quantity Surveying	30	29.41%	100.00%
	TOTAL	**102**	**100%**	
Education	HND/B.Sc	69	67.65%	67.65%
	M.Sc	28	27.45%	95.10%
	Ph.D	5	4.90%	100.00%
	TOTAL	**102**	**100%**	
Work experience	Less than 5 yrs	14	13.73%	13.73%
	5 yrs – 10 yrs	42	41.18%	54.90%
	11 yrs – 15 yrs	33	32.35%	87.25%
	More than 15 yrs	13	12.75%	100.00%
	TOTAL	**102**	**100%**	

Source: Author's fieldwork (2021)

Risks considered by contractors during the tendering (pre-contract) stage of construction projects.

This section dealt with the identification of the risks that contractors take cognisance of during tendering for construction projects. This was the first objective of the study. Mean score analysis and radar chart were employed in the analysis of data; the results obtained from these analyses was presented in Table 3.

Table 3 shows the ranking of the Risks considered by contractors at tendering (pre-contract) stage of construction projects**.** Under the design risks category, the relative ranking of the risks considered by contractors during the tendering (pre-contract) stage of construction projects are; Defective design (mean=4.28), Deficiencies in description of work (mean=4.22), Variation of work (mean=4.2), and Changes of original design (mean=4.12)

Under the Financial risks category, the top risks are; Corrupt practices such as collusion amongst contractors (mean=4.20), Inflation (volatility of general price levels in the country) (mean=4.18), Inadequate cash flow (mean=4.12), and Accuracy of quotations from suppliers and subcontractors (mean=4.11). Under the Construction risks category, the top risks considered are; Poor quality of work (mean=4.27), Unforeseen site condition (mean=4.23), labour, material & equipment availability

(mean=4.21), and Contractors competence (mean=4.18).

Under the Political risks category, the top Risks are; Political uncertainty (mean=4.07), Changes in government regulations (mean=3.94), Banks policy (mean=3.82), and Force majeure (mean=3.51). Under the Quantity Surveying risks category, the top Risks considered are; the Shortness of time available to prepare tender (mean=4.03), Familiarity of contractor/contractor's QS with the system of construction to be adopted for the proposed works (mean=3.95), Likelihood of obtaining current prices of construction resources through market survey (mean=3.90), and Pressure arising from current workload of the contractor's QS (mean=3.70).

Overall, the 10 top ranked Risks considered by contractors during the tendering (pre-contract) stage of construction projects are; Defective design (mean=4.28), Poor quality of work (mean=4.27), Unforeseen site condition (mean=4.230, Deficiencies in description of work (mean=4.22), Labour, material & equipment availability (mean=4.21), Variation of work (mean=4.20), Corrupt practices such as collusion amongst contractors (mean=4.20), Inflation (Volatility of general price levels in the country) (men=4.18), Contractors competence (mean=4.18), Changes of original design (mean=4.12), and Inadequate cash flow (mean=4.12).

On the other hand, the 10 least ranked Risks considered by contractors during the tendering (pre-contract) stage of construction projects are; Banks policy (mean=3.82), Poor performance of supplier (mean=3.75), Defective material (mean=3.74), Pressure arising from current workload of the contractor's QS (mean=3.70), Awareness of current prices of construction resources (mean=3.67) Level of experience of Contractor's quantity surveyor (QS) (mean=3.60), Complexity of the works detailed in the tender documents (mean=3.58), Force majeure (mean=3.51), Cost overruns due to schedule delay (mean=3.37), and Permits and Ordinances (mean=3.23).

Table 3: Risks considered by contractors during the tendering (pre-contract) stage of construction projects

S/N	Tendering risks	Mean score	S. D	Rank	Overall Rank
	Design risks				
1	Defective design	4.28	0.8603	1	1
2	Variation of work	4.20	0.9548	3	6
3	Changes of original design	4.12	0.9259	4	11
4	Deficiencies in description of work	4.22	0.8399	2	4
	Financial risks				
5	Inflation (Volatility of general price levels in the country)	4.18	0.9378	2	8
6	Inadequate cash flow	4.12	1.1798	3	10
7	Exchange rates	3.98	1.0339	6	17
8	Cost overruns due to schedule delay	3.37	1.2099	7	30
9	Contractors default	4.08	0.8976	5	14

S/N	Tendering risks	Mean score	S. D	Rank	Overall Rank
10	Corrupt practices such as collusion amongst contractors	4.20	0.7583	1	7
11	Accuracy of quotations from suppliers and subcontractors	4.11	0.9889	4	12
	Construction risks				
12	Contractors competence	4.18	0.8134	4	9
13	Defective material	3.74	1.4137	8	24
14	Poor performance of supplier	3.75	1.3693	7	23
15	Poor quality of work	4.27	0.6916	1	2
16	Productivity of equipment	4.11	0.8194	5	13
17	Labour, material & equipment availability	4.21	0.9784	3	5
18	Unforeseen site condition	4.23	0.7566	2	3
19	Pressure from current workload of the contractor	3.87	1.0017	6	21
20	Complexity of the works detailed in the tender documents	3.58	1.2059	9	28
	Political risks				
21	Political uncertainty	4.07	0.8474	1	15
22	Banks policy	3.82	1.0475	3	22
23	Changes in government regulations	3.94	0.9316	2	19
24	Permits and Ordinances	3.23	1.0427	5	31
25	Force majeure	3.51	1.0024	4	29
	Quantity Surveying risks				
26	Shortness of time available to prepare tender	4.03	1.3384	1	16
27	Level of experience of Contractor's quantity surveyor (QS)	3.60	1.3443	6	27
28	Familiarity of contractor/contractor's QS with the system of construction to be adopted for the proposed works	3.95	1.0377	2	18
29	Pressure arising from current workload of the contractor's QS	3.70	1.2411	4	25
30	Awareness of current prices of construction resources	3.67	1.1110	5	26
31	Likelihood of obtaining current prices of construction resources through market survey	3.90	1.2469	3	20

Source: Author's fieldwork (2021)

The average Mean Scores for each of the five categories of pre-contract risks were plotted as a radar chart and presented in Figure 1. It can be seen that Design risks (mean=4.20) is ranked 1st, followed by Financial risks (mean=4.00), then in the 3rd position is Construction risks (mean=3.99), Quantity Surveying risks (mean=3.81) is ranked 4th and lastly, Political risks (mean=3.71) is ranked 5th. These major pre-contract risk categories, irrespective of their ranking, need to be given adequate consideration by the contractor at the pre-contract stage. The reason for this is because the mean score of all of the five categories was more than 3.50 (70.00%), which implies that they have considerable impact on construction project outcomes.

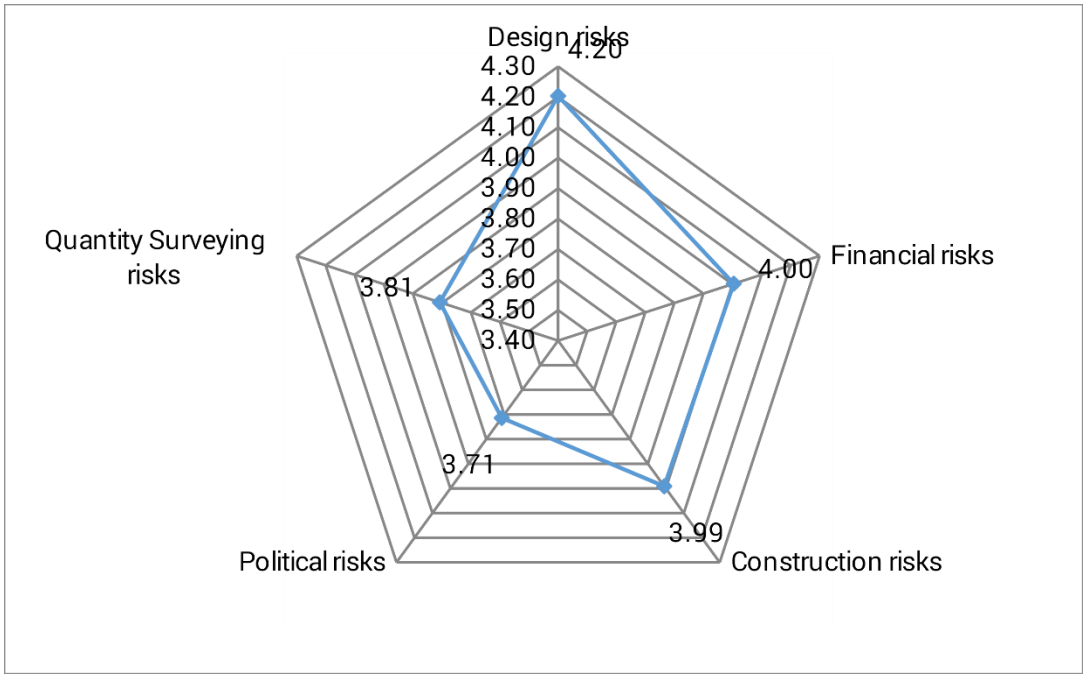

Figure 1: Average weighting of major category of pre-contract risks factors

Effect of Pre-Contract Risks on the Contractor's Tender in Terms of Cost and Time

This section dealt with the effect of the risks that contractors consider during tendering on the cost and duration of construction projects. This was the second objective of the study. Mean score analysis and bar chart were employed in the analysis of data; the results obtained from these analyses was presented in Table 4.

Table 4 shows the effect of Pre-Contract Risks on the Contractor's Tender in Terms of Cost and Time. The most significant effect of design risks on tender sum are; Changes of original design (mean=2.56), Deficiencies in description of work (mean=2.54) and Variation of work (mean=2.51). While the most influencing effect of design risks on completion time are; Variation of work (mean=2.37), Changes of original design (mean=2.37), and Deficiencies in description of work (mean=2.35).

The most influential financial risk on tender sum are: contractors' default (mean=2.55), Inflation (Volatility of general price levels in the country) (mean=2.52), and Exchange rates (mean=2.49). While the most influential financial risks on completion time at the pre-contract stage are; Inflation (Volatility of general price levels in the country) (mean = 2.38), Contractors default (mean = 2.38) and Exchange rates (mean = 2.33).

The most influential Construction risks on tender sum are; Pressure from current workload of the contractor (mean = 2.58), Labour, material & equipment availability (mean = 2.53), and Poor quality of work (mean = 2.45). While the most influential construction risks on completion time at the pre-contract stage are; Pressure from current workload of

the contractor (mean = 2.42), Defective material (mean = 2.37), and Labour, material & equipment availability (mean = 2.36).

Political risks have high impact on tender sum and the risk factors contributing to this are; Changes in government regulations (mean=2.56), Political uncertainty (mean=2.54) and Banks policy (mean=2.52). While the effect on completion time is equally high with the major factors being; changes in government regulations (mean=2.37), Political uncertainty (mean=2.36), and Banks policy (mean=2.36).

Quantity Surveying risks also have high impact on tender sum and the risk factors contributing to this are; Likelihood of obtaining current prices of construction resources through market survey (mean=2.56), Familiarity of contractor/contractor's QS with the system of construction to be adopted for the proposed works (mean=2.39), and Pressure arising from current workload of the contractor's QS (mean=2.38). While the effect on completion time is equally high with the major factors being; Likelihood of obtaining current prices of construction resources through market survey (mean=2.38), Level of experience of Contractor's quantity surveyor (QS) (mean=2.22), and Familiarity of contractor/contractor's QS with the system of construction to be adopted for the proposed works (mean=2.22).

Table 4 Effect of Pre-Contract Risks on the Contractor's Tender in Terms of Cost and Time

S/N	Tendering risks	Tender Sum				Completion Time			
		Mean score	S.D	Rank	Overall Rank	Mean score	S.D	Rank	Overall Rank
	Design risks								
1	Defective design	2.50	0.70	4	12	2.34	0.76	4	13
2	Variation of work	2.51	0.66	3	11	2.37	0.76	1	5
3	Changes of original design	2.56	0.65	1	2	2.37	0.77	1	5
4	Deficiencies in description of work	2.54	0.64	2	6	2.35	0.75	3	12
	Financial risks								
5	Inflation (Volatility of general price levels in the country)	2.52	0.66	2	9	2.38	0.76	1	2
6	Inadequate cash flow	2.27	0.73	7	28	2.10	0.76	7	28
7	Exchange rates	2.49	0.66	3	13	2.33	0.76	3	14
8	Cost overruns due to schedule delay	2.30	0.73	6	26	2.14	0.77	6	27
9	Contractor's default	2.55	0.64	1	5	2.38	0.76	1	2
10	Corrupt practices such as collusion amongst contractors	2.43	0.64	4	15	2.24	0.72	4	17
11	Accuracy of quotations from suppliers and subcontractors	2.41	0.68	5	20	2.20	0.74	5	24
	Construction risks								
12	Contractors' competence	2.43	0.64	4	15	2.24	0.72	6	17
13	Defective material	2.41	0.75	6	18	2.37	0.76	2	5
14	Poor performance of supplier	2.18	0.79	9	31	1.98	0.80	9	31
15	Poor quality of work	2.45	0.64	3	14	2.25	0.72	4	15
16	Productivity of equipment	2.42	0.64	5	17	2.25	0.72	4	15
17	Labour, material & equipment availability	2.53	0.64	2	8	2.36	0.76	3	9

S/N	Tendering risks	Tender Sum				Completion Time			
		Mean score	S.D	Rank	Overall Rank	Mean score	S.D	Rank	Overall Rank
18	Unforeseen site condition	2.41	0.63	6	18	2.24	0.72	6	17
19	Pressure from current workload of the contractor	2.58	0.64	1	1	2.42	0.76	1	1
20	Complexity of the works detailed in the tender documents	2.26	0.63	8	29	2.10	0.67	8	28
	Political risks								
21	Political uncertainty	2.54	0.64	2	6	2.36	0.76	2	9
22	Banks policy	2.52	0.64	3	9	2.36	0.76	2	9
23	Changes in government regulations	2.56	0.65	1	2	2.37	0.77	1	5
24	Permits and Ordinances	2.32	0.69	5	24	2.18	0.78	5	25
25	Force majeure	2.39	0.68	4	21	2.22	0.75	4	20
	Quantity Surveying risks								
26	Shortness of time available to prepare tender	2.25	0.71	6	30	2.06	0.77	6	30
27	Level of experience of Contractor's quantity surveyor (QS)	2.32	0.77	4	24	2.22	0.82	2	20
28	Familiarity of contractor/contractor's QS with the system of construction to be adopted for the proposed works	2.39	0.66	2	21	2.22	0.74	2	20
29	Pressure arising from current workload of the contractor's QS	2.38	0.69	3	23	2.22	0.79	2	20
30	Awareness of current prices of construction resources	2.28	0.67	5	27	2.16	0.74	5	26
31	Likelihood of obtaining current prices of construction resources through market survey	2.56	0.64	1	2	2.38	0.76	1	2

Source: Author's fieldwork (2021)

The average Mean Scores for each of the five categories of pre-contract risks were plotted as a bar chart and presented in Figure 2. It can be seen that the impact of pre-contract risks are noticeably heavier on the cost than the time (duration) of projects. This implies that pre-tender affects the cost of project relative to time. However, pre-contact risks have a large effect on tender sum and completion time for construction projects. The greatest impact comes from design risks, financial risks, political risks and construction risks.

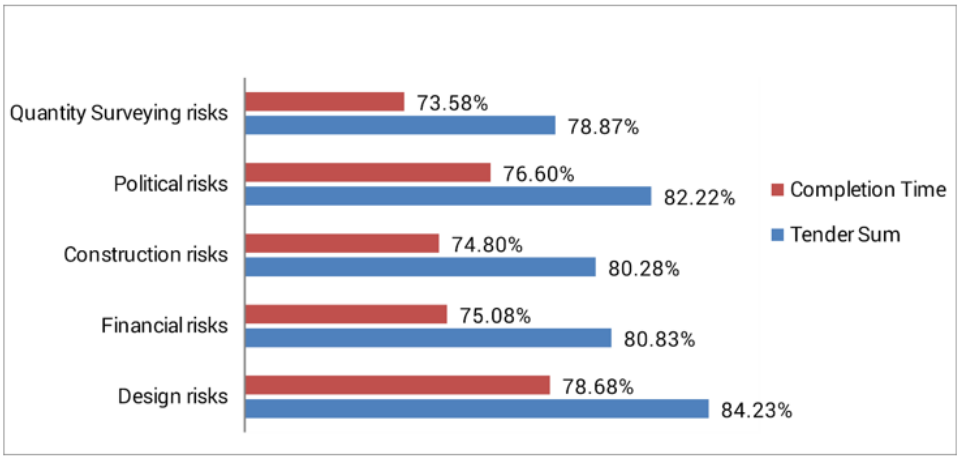

Figure 2: Bar chart of pre-contract risk effects on tender sum and time

Risks encountered by Contractors during the Post-Contract Stage of Construction Projects

This section dealt with the identification of the risks that contractors consider as being impactful on the cost and duration of construction projects during the post-contract stage of construction projects. This was the third objective of the study. Mean score analysis and radar chart were employed in the analysis of data; the results obtained from these analyses was presented in Table 5.

Table 5 shows the ranking of the Risks Encountered by Contractors during the Post-Contract (Construction) Stage of Construction Projects. Under the design risks category, the relative ranking of the Risks Encountered by Contractors during the Post-Contract (Construction) Stage of Construction Projects are; Reduced 'buildability' due to defective design (mean=4.14), Increased costs due to deficiencies in description of work (mean=4.11), Variation of work due to changes in scope (mean=4.05), and Variation of work due to Changes of original design (mean=4.03).

Under the Financial risks category, the relative ranking of the Risks Encountered by Contractors during the Post-Contract (Construction) Stage of Construction Projects are; Schedule delay and Increased costs due to Inadequate cash flow (mean=4.09), Increased costs due to Corrupt practices such as collusion amongst contractors (mean=4.09), Variation of work due to inaccuracy of quotations from suppliers and subcontractors (mean=4.05), and Increased costs due to Inflation (Volatility of general price levels in the country) (mean=4.03).

Under the construction risks category, the relative ranking of the Risks Encountered by Contractors during the Post-Contract (Construction) Stage of Construction Projects are; Poor quality of work due to low contractor competence (mean=4.34), Schedule delay and Increased costs due to Unforeseen site condition (mean=4.29), Schedule delay and Increased costs due to low contractor competence (mean=4.25), and Schedule delay and Increased costs due to Labour, material & equipment unavailability (mean=4.25).

Under the political risks category, the relative ranking of the Risks Encountered by Contractors during the Post-Contract (Construction) Stage of Construction Projects are; Schedule delay due to Political uncertainty (mean=3.93), Schedule delay due to Changes in government regulations (mean=3.82), Increased costs due to Banks policy (mean=3.68), and Schedule delay and Increased costs due to Force majeure (mean=3.39).

Under the Quantity Surveying risks category, the relative ranking of the Risks Encountered by Contractors during the Post-Contract (Construction) Stage of Construction Projects are Increased costs due to Shortness of time available to prepare tender (mean=4.11), Increased costs due to unfamiliarity of contractor/contractor's QS with the system of construction to be adopted for the proposed works (mean=4.02), Increased costs due to low Likelihood of obtaining current prices of construction resources through market survey (mean=3.99), and Increased costs due to non-awareness of current prices of construction resources (mean=3.70).

Table 5: Risks Encountered by Contractors during the Post-Contract (Construction) Stage of Construction Projects

S/ No	Post-contract risks	Mean score	S.D	Rank	Overall Rank
	Design risks				
1	Reduced 'buildability' due to defective design	4.14	1.1084	1st	6th
2	Variation of work due to changes in scope	4.05	1.1721	3rd	12th
3	Variation of work due to Changes of original design	4.03	1.0851	4th	13th
4	Increased costs due to deficiencies in description of work	4.11	1.0615	2nd	7th
	Financial risks				
5	Increased costs due to Inflation (Volatility of general price levels in the country)	4.03	1.1558	4th	13th
6	Schedule delay and Increased costs due to Inadequate cash flow	4.09	1.2905	1st	9th
7	Increased costs due to Exchange rates fluctuations	3.84	1.2166	6th	21st
8	Cost overruns due to schedule delay	3.34	1.3011	7th	30th
9	Increased costs and delays due to Contractors default	3.92	1.1052	5th	19th
10	Increased costs due to Corrupt practices such as collusion amongst contractors	4.09	1.0254	1st	9th
11	Variation of work due to inaccuracy of quotations from suppliers and subcontractors	4.05	1.1608	3rd	11th
	Construction risks				
12	Schedule delay and Increased costs due to low contractor competence	4.25	0.8045	3rd	3rd
13	Schedule delay and Increased costs due to use of defective material	3.76	1.4154	8th	23rd
14	Schedule delay and Increased costs due to Poor performance of supplier	3.91	1.2673	7th	20th
15	Poor quality of work due to low contractor competence	4.34	0.6674	1st	1st
16	Schedule delay due to low Productivity of equipment	4.18	0.8134	5th	5th
17	Schedule delay and Increased costs due to Labour, material & equipment unavailability	4.25	0.9717	3rd	3rd
18	Schedule delay and Increased costs due to Unforeseen site condition	4.29	0.7391	2nd	2nd
19	Schedule delay due to Pressure from current workload of the contractor	3.96	1.0042	6th	17th
20	Reduced 'buildability' due to Complexity of the works detailed in the tender documents	3.75	1.1641	9th	24th
	Political risks				
21	Schedule delay due to Political uncertainty	3.93	1.0648	1st	18th
22	Increased costs due to Banks policy	3.68	1.2036	3rd	26th
23	Schedule delay due to Changes in government regulations	3.82	1.1206	2nd	22nd
24	Schedule delay and Increased costs due to Permits and Ordinances	3.17	1.1439	5th	31st
25	Schedule delay and Increased costs due to Force majeure	3.39	1.1787	4th	29th
	Quantity Surveying risks				
26	Increased costs due to Shortness of time available to prepare tender	4.11	1.3043	1st	7th
27	Increased costs due to Level of experience of Contractor's quantity surveyor (QS)	3.58	1.4788	6th	28th
28	Increased costs due to unfamiliarity of contractor/contractor's QS with the system of construction to be adopted for the proposed works	4.02	1.1856	2nd	15th
29	Increased costs due to Pressure arising from current workload of the contractor's QS	3.66	1.3895	5th	27th
30	Increased costs due to non-awareness of current prices of construction resources	3.70	1.2958	4th	25th
31	Increased costs due to low Likelihood of obtaining current prices of construction resources through market survey	3.99	1.2935	3rd	16th

Source: Author's fieldwork (2021)

The average Mean Scores for each of the five categories of post-contract risks were plotted as a radar chart and presented in Figure 3. From Figure 3, based on the average weighting of major category of post-contract risks factors; Design risks (mean=4.083) is ranked 1st, followed by construction risks (mean=4.080), then in the 3rd position is financial risks (mean=3.99), Quantity Surveying risks (mean=3.84) is ranked 4th and lastly, Political risks (mean=3.60) is ranked 5th. These major risks categories regardless of their ranking should be given adequate consideration by the contractor at the post-contract stage. This is because the mean score of each category was more than 3.50 (70.00%), implying that all the post-contract risk categories have considerable impact on construction project outcomes.

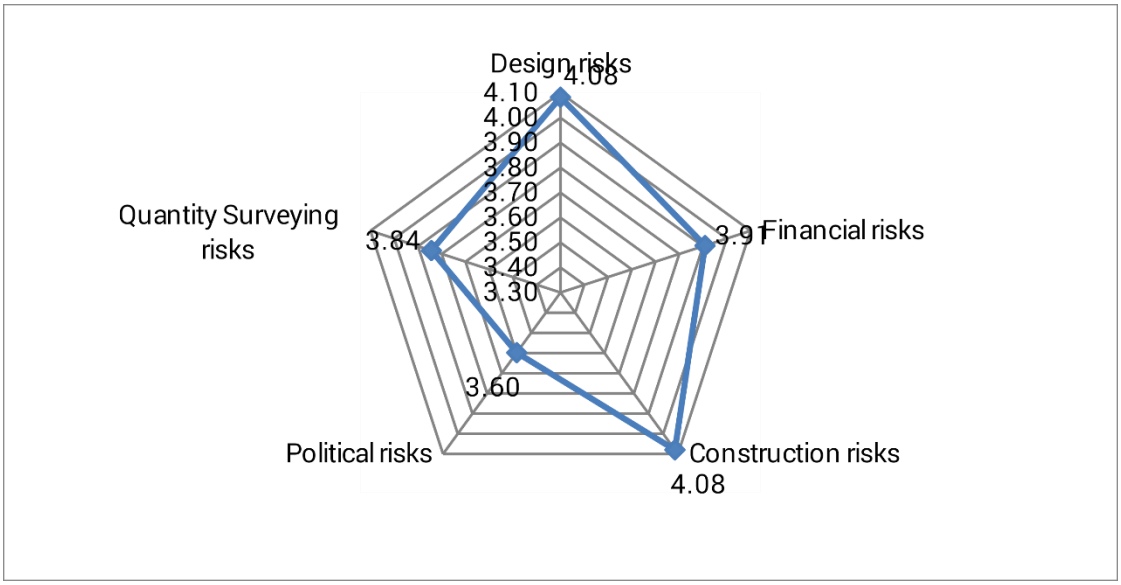

Figure 3: Average weighting of major categories of post-contract risks Effect of Post-Contract Risks on the Cost and Time Performance of Construction Projects

This section dealt with the effect of post-contract risks on the cost and duration of construction projects. This was the fourth objective of the study. Mean score analysis and bar chart were employed in the analysis of data; the results obtained from these analyses was presented in Table 6. The results show the effect of post-contract risks on the project's cost and time performance. The factors impacting on project cost most under the design risks are; Reduced 'buildability' due to defective design (mean=2.55), Variation of work due to Changes of original design (mean=2.53), and Increased costs due to deficiencies in description of work (mean=2.51) While The factors impacting on project completion time most under the design risks are; Variation of work due to Changes of original design (mean=2.52), Increased costs due to deficiencies in description of work (mean=2.49), and Variation of work due to changes in scope (mean=2.45).

The factors impacting on project cost most under the financial risks are; Increased costs and delays due to Contractors default (mean=2.53), Increased costs due to Inflation (Volatility of general price levels in the country) (mean=2.50), and Increased costs due to Exchange rates fluctuations (mean=2.46). While the factors impacting on project completion time most under the financial risks are; Increased costs and delays due to Contractors default (mean=2.51), Increased costs due to Inflation (Volatility of general price levels in the country) (mean=2.48), and Increased costs due to Exchange rates fluctuations (mean=2.48).

The factors impacting on project cost most under the construction risks are; Schedule delay due to Pressure from current workload of the contractor (mean=2.53), Schedule delay and Increased costs due to Labour, material & equipment unavailability (mean=2.50), and Schedule delay and Increased costs due to use of defective material (mean=2.44). While the factors impacting on project completion time most under the construction risks are; Schedule delay due to Pressure from current workload of the contractor (mean=2.57), Schedule delay and Increased costs due to Labour, material & equipment unavailability (mean=2.52), and Poor quality of work due to low contractor competence (mean=2.42).

The factors impacting on project cost most under the political risks are; Schedule delay due to Changes in government regulations (mean=2.52), Schedule delay due to Political uncertainty (mean=2.50), and Increased costs due to Banks policy (mean=2.50). While the factors impacting on project completion time most under the political risks are; Schedule delay due to Changes in government regulations (mean=2.50), Schedule delay due to Political uncertainty (mean=2.49), and Increased costs due to Banks policy (mean=2.49).

The factors impacting on project cost most under the Quantity Surveying risks are; Increased costs due to low Likelihood of obtaining current prices of construction resources through market survey (mean=2.54), Increased costs due to unfamiliarity of contractor/contractor's QS with the system of construction to be adopted for the proposed works (mean=2.36), Increased costs due to Pressure arising from current workload of the contractor's QS (mean=2.32). While the factors impacting on project completion time most under the Quantity Surveying risks are; Increased costs due to low Likelihood of obtaining current prices of construction resources through market survey (mean=2.52), Increased costs due to Pressure arising from current workload of the contractor's QS (mean=2.35), Increased costs due to Level of experience of Contractor's quantity surveyor (QS) (mean=2.34).

Table 6 Effect of Post-Contract Risks on the Project's Cost and Time Performance

S/N	Post-contract risks	Tender Sum				Completion Time			
		Mean score	S.D	Rank	Overall Rank	Mean score	S.D	Rank	Overall Rank
	Design risks								
1	Reduced 'buildability' due to defective design	2.55	0.65	1	1	2.36	0.77	4	19
2	Variation of work due to changes in scope	2.48	0.67	4	12	2.45	0.65	3	12
3	Variation of work due to Changes of original design	2.53	0.67	2	3	2.52	0.66	1	2
4	Increased costs due to deficiencies in description of work	2.51	0.66	3	7	2.49	0.64	2	7
	Financial risks								
5	Increased costs due to Inflation (Volatility of general price levels in the country)	2.50	0.67	2	8	2.48	0.66	2	10
6	Schedule delay and Increased costs due to Inadequate cash flow	2.24	0.73	7	28	2.24	0.72	7	28
7	Increased costs due to Exchange rates fluctuations	2.46	0.67	3	13	2.48	0.66	2	10
8	Cost overruns due to schedule delay	2.26	0.73	6	27	2.26	0.72	6	27
9	Increased costs and delays due to Contractor's default	2.53	0.66	1	3	2.51	0.64	1	5
10	Increased costs due to Corrupt practices such as collusion amongst contractors	2.39	0.65	4	16	2.40	0.63	4	14
11	Variation of work due to inaccuracy of quotations from suppliers and subcontractors	2.35	0.68	5	21	2.40	0.68	5	15
	Construction risks								
12	Schedule delay and Increased costs due to low contractor competence	2.39	0.65	5	16	2.38	0.65	5	17
13	Schedule delay and Increased costs due to use of defective material	2.44	0.74	3	14	2.29	0.80	7	25
14	Schedule delay and Increased costs due to Poor performance of supplier	2.14	0.78	9	31	2.15	0.78	9	31
15	Poor quality of work due to low contractor competence	2.40	0.65	4	15	2.42	0.64	3	13
16	Schedule delay due to low Productivity of equipment	2.38	0.65	6	18	2.39	0.63	4	16
17	Schedule delay and Increased costs due to Labour, material & equipment unavailability	2.50	0.66	2	8	2.52	0.64	2	2
18	Schedule delay and Increased costs due to Unforeseen site condition	2.37	0.64	7	19	2.38	0.63	5	17
19	Schedule delay due to Pressure from current workload of the contractor	2.53	0.66	1	3	2.57	0.64	1	1
20	Reduced 'buildability' due to Complexity of the works detailed in the tender documents	2.24	0.63	8	28	2.24	0.62	8	28
	Political risks								
21	Schedule delay due to Political uncertainty	2.50	0.66	2	8	2.49	0.64	2	7
22	Increased costs due to Banks policy	2.50	0.66	2	8	2.49	0.64	2	7
23	Schedule delay due to Changes in government regulations	2.52	0.67	1	6	2.50	0.66	1	6
24	Schedule delay and Increased costs due to Permits and Ordinances	2.27	0.72	5	26	2.28	0.69	5	26
25	Schedule delay and Increased costs due to Force majeure	2.35	0.67	4	21	2.34	0.67	4	21
	Quantity Surveying risks								
26	Increased costs due to Shortness of time available to prepare tender	2.17	0.73	6	30	2.19	0.71	6	30
27	Increased costs due to Level of experience of Contractor's quantity surveyor (QS)	2.29	0.78	4	24	2.34	0.72	3	21
28	Increased costs due to unfamiliarity of contractor/contractor's QS with the system of construction to be adopted for the proposed works	2.36	0.67	2	20	2.34	0.67	3	21
29	Increased costs due to Pressure arising from current workload of the contractor's QS	2.32	0.72	3	23	2.35	0.70	2	20
30	Increased costs due to non-awareness of current prices of construction resources	2.28	0.67	5	25	2.30	0.66	5	24
31	Increased costs due to low Likelihood of obtaining current prices of construction resources through market survey	2.54	0.66	1	2	2.52	0.64	1	2

Source: Author's fieldwork (2021)

The average Mean Scores for each of the five categories of post-contract risks were plotted as a bar chart and presented in Figure 4. The impact of post-contract risks is nearly same on project cost and time. This implies that post-contract risks have impact on project cost and time. Post-contract risks have large effect on the cost and time performance of construction projects. The greater impact is caused by design risks and political risks.

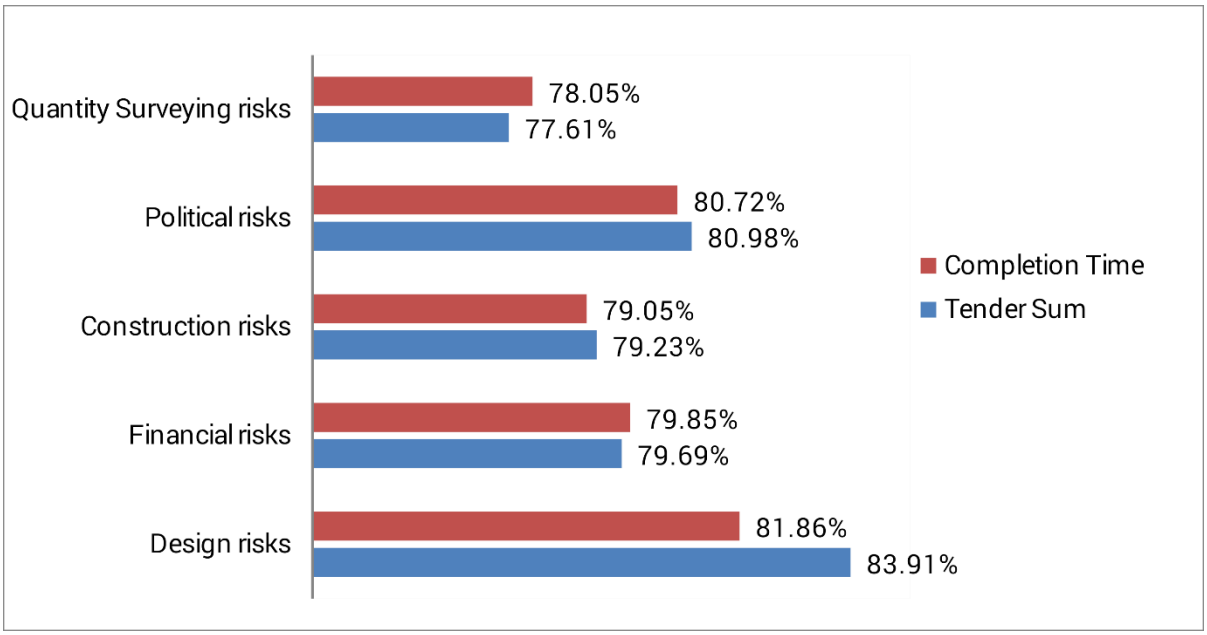

Figure 4: Post-Contract Risks Impact on Tender Sum and Time

Strategies to mitigate the influence of tender related risks on the cost and time performance of construction projects

Table 7 shows the strategies to mitigate the influence of the tender related risks on the cost and time performance of construction projects. It can be seen that the top 5 most important strategies to mitigate the influence of the tender related risks on the cost and time performance of construction projects are top management understanding of modern techniques and principles needed for efficient and effective tendering is required by the management of contracting businesses (mean=4.55; S.D.=0.6983), effective and efficient documentation preparations (mean=4.41; S.D.=0.7879), studying the drawings by comparing the specifications and the real conditions in the project site where possible (mean=4.38; S.D.=0.9015), reading/checking all documents Issued (mean=4.34; S.D.=1.1124), assigning experienced people in planning cost estimation (mean=4.32; S.D.=1.1446), and calculating the volume of work accurately (mean=4.32; S.D.=0.9137). While, the least five strategies to mitigate the influence of the tender related risks on the cost and time performance of construction projects are make sure there is a match between the scope of work defined in the BOQ and specifications offered (mean=3.84; S.D.=1.2645), ensuring adequate regulation of contracting organisations and practices (mean=3.84; S.D.=1.2487), incorporating standard and weeding out quacks during tendering (mean=3.72; S.D.=1.2694), following of risks management procedures by construction experts during estimating to help meet the budget target (mean=3.67; S.D.=1.3883) and using of contingency during the pricing of tenders (mean=3.44; S.D.=1.2864).

Regardless of the relative ranking of the assessed strategies, they are all effective strategies for mitigating the influence of tender related risks on the cost and time delivery of construction projects. This is

premised on the range of the mean score obtained with the maximum mean score of 4.55 (90.98%) and a minimum of 3.44(68.82%), and an average score of 4.10 (82.04%).

Table 7: Strategies for Minimizing the Effects of Tender -Related Risks

S/N	Strategies For Minimizing the Effects of Tender -Related Risks	Mean score	S. D	Rank
1	Study all the tender drawings to ensure that the architectural, structural, and Mechanical and electrical drawing are not in divergence from each other.	4.17	0.8335	10th
2	Double-check summation and multiplication to avoid errors in estimates	4.16	0.8982	11th
3	Implementing the organizational policy on quality to minimize risk and boost profitability	4.11	1.0236	12th
4	establishment of a suitable framework for assessing the expertise of tenderers	3.95	1.2054	13th
5	Engaging competent contractors with proven track records	3.89	1.2735	14th
6	Make sure there is a match between the scope of work defined in the BOQ and the specifications offered	3.84	1.2645	15th
7	ensuring adequate regulation of contracting organizations and practices	3.84	1.2487	15th
8	incorporating standard and weeding out quacks during tendering	3.72	1.2694	17th
9	following risks management procedures by construction experts during estimating to help meet the budget target	3.67	1.3883	18th
10	Using of contingency during the pricing of tenders	3.44	1.2864	19th
11	Top management Understanding of modern techniques and principles needed for efficient and effective tendering is required by the management of contracting businesses	4.55	0.6983	1st
12	Effective and efficient documentation preparations	4.41	0.7879	2nd
13	Studying the drawings by comparing the specifications and the real conditions in the project site where possible	4.38	0.9015	3rd
14	Reading/checking all documents Issued	4.34	1.1124	4th
15	Assigning experienced people in planning cost estimation	4.32	1.1446	5th
16	Calculating the volume of work accurately	4.32	0.9137	5th
17	Regular training and development of technical, professional and management staff involved in tendering and commercial activities	4.31	1.1430	7th
18	Use of experienced and competent designers	4.30	0.7418	8th
19	Request completeness of detailed Drawings	4.21	0.9048	9th

Source: Author's fieldwork (2021)

Discussion of Results

The top ranked risks considered by contractors during the tendering (pre-contract) stage of construction projects as unearthed by this study include (i) defective design, (ii) poor quality of work, and (iii) unforeseen site condition. By comparison, during the post-contract stage of construction projects the risk that are considered the most include (i) poor quality of work due to low contractor competence, (ii) schedule delay and increased costs due to Unforeseen site condition, and (iii) schedule delay and increased costs due to low contractor competence. Unforeseen site condition is a risk factor that is present throughout the pre-contract as well as the post-contract stages of construction projects. While contractors worry over the buildability of

designs as well as the level of quality that they can provide at realistic prices while tendering for jobs, at the construction stage the main worry has to do with the effects of the deficiencies in the contractor's own competence. This finding aligns with that of Oke *et al.* (2017), that the technical backgrounds of contractor's personnel, level of quality to be delivered, as well as availability of required technology and expertise are the risk factors that could impact on the contractor's success at the pre-contract stage. The finding of this study has thus established that the contractor-centred risk factor of 'low contractor competence' is the most influential at both the pre-contract and post-contract stages of construction projects, where the cost and duration of such projects are being considered.

The top-ranked strategies for minimizing the effects of tender-related risks that have been identified in this study include (i) Top management understanding of modern techniques and principles needed for efficient and effective tendering is essential; (ii) Effective and efficient documentation preparations, and (iii) Studying the drawings by comparing the specifications and the real conditions in the project site where possible. The findings of this study agree with and are supported by what has been reported in previous studies. For example, Yuni *et al.* (2017) suggested the minimisation of tender risks through a careful study of all project documents (drawings, specifications, and BOQ). Furthermore, regular training of key technical staff on the processes of tendering will impact the quality of documents produced, according to Oke *et al.* (2017).

CONCLUSION AND RECOMMENDATIONS

The study assessed the influence of pre-contract tender-related risks on construction project performance. This study concluded that with respect to the issue of tender-related risks, contractors' most significant risks arise from the buildability of designs as well as the level of quality that they can provide at realistic prices while tendering for jobs (pre-contract stage). However, at the post-contract (construction) stage, contractors' most significant risks have to do with the effects of the deficiencies in the contractor's own competence. At tendering (pre-contract) stage contractors' tender-related risks affect the cost of work more than the time, unlike the situation at the construction stage, when effects of contractors' tender-related risks are almost equally split between the cost and time of the projects. It was also concluded that minimizing the effects of tender-related risks requires mainly improvements in the professional capacity of contractors' technical personnel and due diligence on the part of contractors. From the findings, this study recommends that; detailed construction project design should be produced prior to tendering. This is vital to avoid design related risks. Adequate budgetary provision and cash flow system should be put in place to mitigate the effect of financial risks; adequate planning of work; contractor should be experienced enough to handle the Construction related risks; Quantity Surveyors should be given ample time during tendering stage to prepare detailed BOQ, to avoid assumptions and over-quoting.

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