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AN EVALUATION OF CHANGE ORDER FACTORS AFFECTING BUILDING CONSTRUCTION PROJECTS IN NIGERIA

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ABSTRACT

Construction projects (CPs) are inherently prone to change orders (COs) due to their complex, dynamic, and capital-intensive nature, as well as the involvement of multiple stakeholders. COs if left unmanaged, can significantly compromise overall project success. Although numerous studies have investigated change order factors globally, the occurrence and influence CO exert in projects vary across regions and may change over time. This study evaluated the likelihood of occurrence (LO) of CO factors and the extent to which the factors could result in COs in building construction projects. Quantitative research approach was adopted. Structured questionnaires were administered to construction practitioners to collect data using convenience sampling technique. Data were analyzed using descriptive statistics and the Kruskal–Wallis test. Findings revealed 'change in economic conditions', 'change of schedule ', and 'unforeseen problems', to be the CO factors with highest LO in CPs. Additionally, 'change in economic conditions', clients' inflexible stance on project', 'errors and omissions in design' were found to be the top CO factors with highest tendency of resulting in CO in CPs. The Kruskal–Wallis test further revealed no statistically significant difference in respondents' overall ratings. The study concludes that, several CO factors have high LO in CPs which could potentially results to changes during CPs execution. The study recommends early identification of potential factors that could result to changes in CPs to minimise cost and time variations in CPs execution.

KEYWORDS: *Building, Construction projects, Change orders, Change order factors, Nigeria*

INTRODUCTION

Change orders (COs), also referred to as variations or modification requests, are a prevalent phenomenon in construction projects worldwide, including building projects in Nigeria. While COs may arise from legitimate project needs – such as unforeseen site conditions, client-driven changes, or regulatory revisions – they frequently disrupt planned schedules, budgets, and workflows, creating cascading challenges for project stakeholders. Typically occurring during the construction phase, COs modify the original contract scope, often resulting in adjustments to project costs, timelines, and overall performance (Khalifa & Mahamid, 2019; Kim et al., 2020). Parker (2002) defines a CO as any deviation from the initially agreed-upon construction plans, specifications, or methods. These deviations can significantly influence project outcomes, particularly in developing economies like Nigeria, where COs have been strongly associated with delays, cost overruns, disputes, and even project abandonment (Aibinu & Jagboro, 2002; Al-Kofahi, Mahdavian, & Oloufa, 2020).

COs can be categorized based on their nature and necessity as additive (introducing additional work and increasing cost/time) and deductive (removing work elements and reducing cost/time), or partial terminations involving substantial scope modifications (Luke & Farkey, 2018). By predictability, COs may be anticipated (foreseen and planned in advance) or emergent (unforeseen and arising during execution). By necessity, they may be required (mandatory for project completion) or elective (initiated at stakeholder discretion). While some COs can improve outcomes – enhancing quality, optimizing costs, or accelerating schedules – detrimental COs often impair performance, leading to inefficiencies, conflicts, and reduced productivity (Shrestha, Shrestha, & Zeleke, 2019).

Empirical research across global contexts reveals recurring drivers and effects of COs. In Palestine, Mujahed (2015) identified owners and consultants as primary initiators of COs due to frequent design changes and added work, leading to significant time and cost overruns. Similarly, Khalifa and Mahamid (2019) and Alkhattabi et al. (2023) found that in Saudi Arabia, owner-initiated additions, design errors, poor coordination, and financial constraints are the most frequent triggers of Cos – with up to 75% of cases deemed preventable through better planning and communication. Studies by Senouci et al. (2016) and Jarkas and Mubarak (2016) further emphasize that weak scope management, inadequate documentation, and poor stakeholder coordination are key CO determinants in developing regions.

To mitigate these effects, researchers have proposed several change order management (COM) frameworks. Abad, Eshtehardian, and Taghizade (2019) developed a fuzzy fault-tree model to proactively assess CO risks, while Gunduz and Mohammad (2020) and employed multi-criteria and structural equation modeling approaches to link effective CO management with project success. Their findings underscore the critical role of communication, documentation, and dispute resolution mechanisms in controlling CO frequency and impact. More recently, Shabani and Nik-Bakht (2021) and Du et al. (2019) highlighted the potential of system dynamics and multi-agent modeling in visualizing the ripple effects of COs on productivity and project duration.

Despite growing scholarly attention, construction projects in Nigeria continue to experience frequent and disruptive change orders, often resulting in significant cost and time overruns. Most existing studies have focused on individual CO causes or mitigation mechanisms in developed or Middle Eastern contexts, with limited empirical evidence addressing how multiple CO factors interact within Nigeria's socio-economic and institutional environment. The absence of localized, data-driven analysis limits the ability of Nigerian construction practitioners and policymakers to prioritize high-impact CO drivers and develop effective mitigation strategies.

Although several international studies (e.g., Abad et al., 2019 and Gunduz & Mohammad, 2020) have explored change-order management using advanced modeling techniques, few have examined the likelihood and impact of CO factors specific to building projects in developing countries, particularly Nigeria. Also, CO factors are not alike across all regions and the potential degree of impact may change with time. Moreover, prior researches rarely focus on factors uniquely affecting Nigerian construction projects. Thus, there remains a clear need for an empirical investigation tailored to Nigeria's context to bridge this knowledge gap.

This study aims to evaluate the likelihood of occurrence of CO factors and the extent to which these factors could result into CO in building construction projects in Nigeria, with a view to providing foundation for developing practical insights and management strategies to minimizing CO-related disruptions thus, improving project delivery outcomes.

LITERATURE REVIEW

Causes of Change Orders in Construction Projects

Change orders (COs) are inevitable in complex construction environments, reflecting necessary adjustments to design, scope, or conditions encountered during execution. However, they often lead to disputes, cost overruns, and schedule delays if poorly managed (Hanna & Iskandar, 2017; Senouci et al., 2016). A wide range of causes has been identified across project contexts. Design-related factors – including errors, omissions, and inadequate detailing – are among the most frequent triggers (Jarkas & Mubarak, 2016; Oladiran & Onatayo, 2018; Khalifa Khalafallah & Shalaby, 2019). Owner-initiated scope changes, financial constraints, and late decision-making also contribute significantly to CO incidence (Khalifa & Mahamid, 2019; Kim et al., 2020; Alkhattabi et al, 2023; Lawal et al., 2024). Contractor-related issues, such as resource shortages, coordination lapses, and poor communication, further amplify CO occurrence (Gbleyi, 2002; Du et al., 2019). Environmental and unforeseen conditions – such as latent ground risks, unexpected site obstructions, or climatic variations – introduce additional variability (Kim et al., 2020; Shrestha & Shrestha, 2019). Also, Lawal et al. (2024), identified, harmonized and categorized CO factors as planning related factors (change in scope of work, change of schedule, value engineering, inadequate strategic planning); client related factors (clients' financial problem, client's inflexible stance on project demand); design and consultant related factors (errors and omissions in design, conflicts between contract documents, consultant's lack of judgment and experience, non-compliant design with government regulations, design complexity); contractor-related factors (lack of contractor's involvement in design, contractor's desired profitability, defective workmanship, health and safety regulations considerations); material and equipment related factors (technology change, unavailability of materials); coordination and communication related factors (impediment in prompt decision-making process, lack of coordination among stakeholders); procurement related factors (poor procurement process, long lead procurement); and external conditions related factors (different site conditions, adverse weather condition, change in government regulations, change in economic conditions, socio-cultural factors, unforeseen problems). Moreover, procurement methods influence the frequency and magnitude of COs, with design-bid-build projects generally showing higher CO rates compared to design & build arrangements (Alleman et al., 2020). In developing countries like Nigeria, these causes are compounded by unstable economic conditions, limited stakeholder coordination, and weak documentation culture, leading to compounded CO impacts on delivery outcomes (Aibinu & Jagboro, 2002; Al-Kofahi et al., 2020).

Change Orders in Developing Countries

The dynamics of COs differ considerably across global regions due to variations in institutional maturity, procurement culture, and economic stability. In developing countries, including Nigeria, COs tend to occur more frequently and have more severe effects due to inadequate planning, weak governance structures, and fluctuating macroeconomic indicators (Aibinu & Jagboro, 2002; Khalifa & Mahamid, 2019). African and Middle Eastern contexts often report high CO prevalence linked to design deficiencies, funding interruptions, and material price fluctuations (Senouci et al., 2016; Al-Kofahi et al., 2020). In contrast, developed economies like the U.S. and Qatar have shown success in mitigating CO impact through robust documentation, clear contractual risk allocation, and digital tools for real-time tracking (Alleman et al., 2020; Jarkas & Mubarak, 2016). Emerging research suggests that integrating data analytics, AI-based prediction models, and dynamic risk monitoring could transform CO management in developing contexts by enabling early warning systems and data-supported decision-making (Abad et al., 2019). Nonetheless, empirical studies addressing CO patterns in sub-Saharan Africa remain limited, revealing a significant research gap in understanding the interaction between CO causality, management capacity, and project performance in resource-constrained environments. Despite substantial global research, few empirical studies have holistically examined the likelihood and impact of CO factors within Nigeria's building construction sector, where contextual issues such as inflation, bureaucratic approvals, and poor stakeholder coordination exacerbate CO frequency and severity. Existing studies are either region-specific (e.g., Middle East, Asia) or focus primarily on infrastructure rather than building projects (Jarkas & Mubarak, 2016; Shrestha et al., 2019).

METHODOLOGY

This study adopted quantitative research method using survey and questionnaire as survey tool. The population of the study is construction professionals who are practicing which includes: Architects, Builders, Engineers, Quantity Surveyors and Project Managers. For construction practitioners, the population size is taken to be unknown. Sample size was determined in accordance with Cochran (1977), using 90% confidence level, 10% confidence interval and 50% degree of variability. A minimum sample size of 88 was obtained. However, considering the large number of variables contained in the data collection instrument and the response rate obtained from similar studies (as in Ishaq et al, 2021) containing large number of variables in the survey instrument, this study assumed a valid response rate of at least 50% of the total number of questionnaires distributed. Therefore, 100% of the estimated sample size was added. 176 questionnaires were distributed to respondents using convenience sampling technique. 158 were duly completed and returned while only 148 were found fit and used for analysis.

A structured closed ended questionnaire containing 27 change order factors was designed to enable data collection. The change order factors were grouped into 8. The questionnaire was validated by experts in academia and industry prior to commencement of data collection.

Respondents were asked to rate the likelihood of occurrence of the change order factors in building construction projects on a 5-point scale (1= Very low to 5= Very high). Also, respondents were asked to rate the extent to which these factors could result to change orders in building construction projects on a 5-point scale (1= Very low extent to 5= Very high extent). Descriptive and inferential statistics was used to analyse the data. Mean scores and standard deviation were computed and used to rank the the likelihood of occurrence of the change order factors in building construction projects. Change order factors having mean value ranging from 0 to 1.49 is considered as having very low impact/extent, while risk factor with mean score 1.5 to 2.49 is considered as having low impact/extent, change order factors with mean score 2.5 to 3.49 is considered as having moderate impact/extent, change order factors with mean score 3.5 to 4.49 is considered as having high impact/extent and change order factors with mean score ≥ 4.5 is considered as having very high impact/extent. The standard deviation was used to rank the factors where there is a tie in the mean scores. Moreover, Kruskal-Walli's test was used to determine the variation in respondents' ratings for the likelihood of occurrence of the CO factors in building construction as well as the extent to which the factors could result to CO. as such, the following hypotheses were postulated for the study:

$H_0$1: There is no significant differences in the respondents' ratings of the likelihood of occurrence of CO factors in building construction projects

H1: There is significant differences in the respondents' ratings of the likelihood of occurrence of CO factors in building construction projects.

$H_0$2: There is no significant difference in the respondents' ratings of the extent to which the CO factors could result to CO in building construction projects

H2: There is significant difference in the respondents' ratings of the extent to which the CO factors could result to CO in building construction projects

The reliability of respondents' ratings was evaluated to determine the internal consistency of the data collected and the result is presented in Table 1. Cronbach's Alpha, a widely recognized technique for assessing internal consistency, was utilized for this purpose.

Table 1: Internal consistency test for the Measurement Items

Test	Number of Items	Cronbach's Alpha Coefficient
Likelihood of Occurrence of Change Order Factors	27	0.900
Extent to which Factors Result in Change Orders	27	0.934

As can be seen in Table 1, all the Cronbach Alpha coefficients are above 0.70, which indicates that the data is reliable as suggested by Nunnally and Bernstein (1994).

RESULTS AND DISCUSSION

Evaluation of the Likelihood of Occurrence of Change Order Factors in Building Construction Projects

Respondents were presented with 27 change order factors affecting building construction projects and were asked to rate the likelihood of occurrence of the change order factors on a 5-point scale as described in the methodology. The result is presented in Table 2

Table 2: Likelihood of occurrence of change order factors in building construction projects.

S/N	Change Order Factors	Mean	SD	Rank
1	Change in economic conditions	3.66	1.114	1
2	Change of schedule (Fast tracking work)	3.49	1.285	2
3	Unforeseen problems	3.46	0.982	3
4	Lack of coordination among stakeholders	3.38	0.932	4
5	Clients' financial problem	3.38	1.143	5
6	Lack of contractor's involvement in design	3.27	1.076	6
7	Adverse weather condition	3.26	1.073	7
8	Change in Scope of work	3.24	1.018	8
9	Client's inflexible stance on project	3.22	0.745	9
10	Errors and omissions in design	3.20	0.993	10
11	Different site conditions	3.20	1.205	11
12	Contractor's desired profitability	3.18	1.254	12
13	Value engineering	3.16	0.980	13
14	Conflicts between contract documents	3.14	1.064	14
15	Impediment in prompt decision-making process	3.12	1.033	15
16	Design complexity	3.12	1.072	16
17	Health and safety regulations considerations	3.08	1.030	17
18	Socio-cultural factors	3.07	0.912	18
19	Inadequate strategic planning	3.00	1.047	19
20	Defective workmanship	2.99	1.104	20
21	Technology change	2.93	1.127	21
22	Change in government regulations	2.91	1.357	22
23	Consultant's lack of judgment and experience	2.85	0.975	23
24	Long lead procurement	2.84	0.937	24
25	Non-compliant design with government regulations	2.78	1.050	25
26	Unavailability of materials	2.76	1.168	26
27	Poor procurement process	2.72	0.785	27

Table 2 presents the likelihood of occurrence of the 27 change order factors considered in this study. As seen in the table, the top five change order factors with the highest mean scores are Change in economic conditions (3.66)**,** Change of schedule (Fast-tracking work) (3.49)**,** Unforeseen problems (3.46)**,** Lack of coordination among stakeholders (3.38)**,** and Clients' financial problem (3.38)**.** These factors are ranked 1st, 2nd, 3rd, 4th, and 5th, respectively. This implies that economic changes and scheduling issues are prominent concerns in building construction projects, often leading to significant project scope and timeline modifications.

On the other hand, the bottom five change order factors with the lowest mean scores are Consultant's lack of judgment and experience (2.85)**,** Long lead procurement (2.84)**,** non-compliant design with government regulations (2.78)**,** Unavailability of materials (2.76)**,** and Poor procurement process (2.72)**.** These factors are ranked 23rd, 24th, 25th, 26th, and 27th, respectively. These results indicate that while these factors may influence project changes, they are perceived as less likely to occur compared to the top-ranked factors. Moreover, this result aligns with Khalifa and Mahamid (2019) and Gunduz and Mohammad (2020), who reported that fluctuations in market prices, inflation, and unstable economic policies significantly increase the incidence of contractual variations. Similarly, Kim, Miller, and Kim (2020) noted that unforeseen site conditions are among the most frequent triggers of COs in renovation and infrastructure projects. The relatively low rankings of consultant's lack of judgment and experience (Mean = 2.85) and poor procurement process (2.72) suggest that professional capacity and procedural inefficiency are becoming fewer dominant issues in Nigerian projects compared to external and client-induced factors. This may reflect improvements in design consultancy standards and the adoption of more transparent procurement frameworks.

Moreover, Kruskal-Walli's test was conducted to determine the variation in respondents' ratings and the result is presented in Table 3.

Table 3: Kruskal-Walli's test results for the likelihood of occurrence of change order factors in building construction projects.

S/N	Variables	Kruskal- Wallis H	Asymp.Sig.
1	Change in Scope of Work	7.397	0.116
2	Change of Schedule (Fast Tracking Work)	42.426	0.000
3	Value Engineering	17.332	0.002
4	Inadequate Strategic Planning	15.285	0.004
5	Client's Financial Problem	3.430	0.489
6	Client's Inflexible Stance on Project	24.744	0.000
7	Errors and Omissions in Design	11.855	0.018
8	Conflicts Between Contract Documents	14.391	0.006
9	Consultant's Lack of Judgment and experience	12.861	0.012
10	Non-compliant Design with Government Regulations	27.010	0.000
11	Design Complexity	16.745	0.002
12	Lack of Contractor's Involvement in Design	10.592	0.032
13	Contractor's Desired Profitability	17.369	0.002
14	Defective Workmanship	12.277	0.015
15	Health and Safety Regulations Considerations	14.778	0.005
16	Technology Change	23.698	0.000
17	Unavailability of Materials	12.018	0.017
18	Impediment in Prompt Decision-Making Process	9.225	0.056
19	Lack of Coordination Among Stakeholders	17.776	0.001
20	Poor Procurement Process	18.432	0.001
21	Long Lead Procurement	6.641	0.156
22	Different Site Conditions	15.188	0.004
23	Adverse Weather Condition	11.640	0.020
24	Change in Government Regulations	2.318	0.677
25	Change in Economic Conditions	15.475	0.004
26	Socio-Cultural Factors	22.644	0.000
27	Unforeseen Problems	17.821	0.001
	Average		**0.061**

Based on the results of the Kruskal-Walli's test in Table 3, the P-values of several factors were found to be less than the significance level of 0.05, indicating significant differences in the respondents rating of the likelihood of these factors occurring in building construction projects. Specifically, factors such as "Change of Schedule (Fast Tracking Work)" (P = 0.000), "Value Engineering" (P = 0.002), and "Non-compliant Design with Government Regulations" (P = 0.000) had statistically significant differences across professional groups, suggesting that different professionals have varying views on the likelihood of these factors occurring in building construction projects.

Conversely, factors like "Change in Scope of Work" (P = 0.116), "Client's Financial Problem" (P = 0.489), and "Long Lead Procurement" (P = 0.156) had P-values greater than 0.05. This means there were no significant differences in the perceptions of professionals, indicating general agreement on the likelihood of these factors causing change orders in building projects.

Out of the 27 change order factors, the null hypothesis was rejected for 22 factors, meaning significant differences exist in how professionals perceive the likelihood of these factors occurring in building construction projects. For 5 factors, the null hypothesis was accepted, showing no significant differences across professional groups. The overall average p values of all the factors is 0.061 which is greater than 0.05, implying that, overall, there is no significant difference in respondents' ratings of the likelihood of occurrence of the CO factors in building construction projects. Thus, the null hypothesis is accepted.

Evaluation of the Extent to Which Change Order Factors Could Result in Change Orders in Building Construction Projects

Respondents were presented with 27 change order factors and were asked to rate the extent to which these factors could result in change orders in building construction projects on a 5-point scale (1 = Very Low Extent, 2 = Low Extent, 3 = Moderate, 4 = High Extent, 5 = Very High Extent). The descriptive statistics for each factor are presented in Table 4.

Table 4: Extent to which change order factors could result in change orders in building construction projects.

S/N	Change Order Factors	Mean	SD	Rank
1	Change in economic conditions	3.58	1.293	1
2	Client's inflexible stance on project	3.50	0.880	2
3	Errors and omissions in design	3.42	1.073	3
4	Conflicts between contract documents	3.38	1.202	4
5	Change of schedule (Fast-tracking work)	3.36	1.093	5
6	Change in Scope of work	3.36	1.117	6
7	Unforeseen problems	3.35	1.276	7
8	Impediment in prompt decision-making process	3.30	0.989	8
9	Design complexity	3.26	1.061	9
10	Clients' financial problem	3.26	1.206	10
11	Inadequate Strategic planning	3.24	1.145	11
12	Value engineering	3.23	1.001	12
13	Lack of coordination among stakeholders	3.23	1.080	13
14	Non-compliant design with government regulations	3.19	0.946	14
15	Contractor's desired profitability	3.16	1.135	15
16	Different site conditions	3.15	1.235	16
17	Adverse weather condition	3.14	1.038	17
18	Defective workmanship	3.07	1.077	18
19	Change in government regulations	3.04	1.152	19
20	Socio-cultural factors	3.00	1.123	20
21	Long lead procurement	2.99	1.066	21
22	Poor procurement process	2.97	1.020	22
23	Consultant's lack of judgment and experience	2.96	1.039	23
24	Unavailability of materials	2.91	1.023	24
25	Technology change	2.88	0.843	25
26	Lack of contractor's involvement in design	2.72	1.141	26
27	Health and safety regulations considerations	2.59	0.978	27

The result presented in Table 4 indicates that the top five change order factors with the highest mean scores are Change in economic conditions (Mean = 3.58), Client's inflexible stance on project (Mean = 3.50), Errors and omissions in design (Mean = 3.42), Conflicts between contract documents (Mean = 3.38), and change of schedule (Fast-tracking work) (Mean = 3.36). These factors are ranked 1st, 2nd, 3rd, 4th, and 5th, respectively, indicating that economic conditions, client decisions, and design-related issues significantly contribute to change orders. These findings affirm that both external economic fluctuations and internal decision-making rigidity play central roles in driving project scope changes. The results are consistent with Abad, Eshtehardian, and Taghizade (2019), who emphasized the role of macroeconomic and design-related risks in generating contractual modifications. Likewise, Ardakani and Nik-Bakht (2021) demonstrated that procurement type and design coordination complexity significantly influence CO frequency and magnitude. This emphasizes the importance of managing economic fluctuations, client expectations, and design coordination to reduce the occurrence of change orders in building projects. Additionally, fostering effective communication and decision-making processes can help address unforeseen problems and maintain project continuity. This suggests that contractors should pay close attention to these areas to mitigate the risk of delays and increased costs.

On the other hand, the bottom five factors, which are least likely to result in change orders, include Health and safety regulations considerations (Mean = 2.59), Lack of contractor's involvement in design (Mean = 2.72), Technology change (Mean = 2.88), Unavailability of materials (Mean = 2.91), and Poor procurement process (Mean = 2.97). These factors are ranked 27th, 26th, 25th, 24th, and 22nd, respectively, indicating that while these factors may contribute to change orders, they are perceived as less critical compared to the higher-ranked factors. Interestingly, the low-mean factors suggest that while these issues are recognized, their perceived capacity to trigger COs remains limited within the Nigerian context. This contrasts with Alleman et al. (2020), who found that regulatory and material constraints significantly affected highway projects in the U.S., suggesting contextual variation between developed and developing construction markets.

Furthermore, Kruskal-Walli's test was conducted to determine the variation in respondents' ratings and the result is presented in Table5.

Table 5: Kruskal-Wallis Test Results for the Extent to which Change the factors could result in Change Orders in building construction projects amongst Respondents.

S/N	CO Factors	Kruskal-Wallis H	Asymp.Sig.
1	Change in Scope of Work	23.528	0.000
2	Change of Schedule (Fast Tracking Work)	14.026	0.007
3	Value Engineering	6.455	0.168
4	Inadequate Strategic Planning	11.079	0.026
5	Client's Financial Problem	10.367	0.035
6	Client's Inflexible Stance on Project	14.066	0.007
7	Errors and Omissions in Design	29.502	0.000
8	Conflicts Between Contract Documents	27.995	0.000
9	Consultant's Lack of Judgment and Experience	18.444	0.001
10	Non-compliant Design with Government Regulations	14.843	0.005
11	Design Complexity	15.776	0.003
12	Lack of Contractor's Involvement in Design	5.646	0.227
13	Contractor's Desired Profitability	3.777	0.437
14	Defective Workmanship	18.832	0.001
15	Health and Safety Regulations Considerations	20.209	0.000
16	Technology Change	22.084	0.000
17	Unavailability of Materials	27.446	0.000
18	Impediment in Prompt Decision-Making Process	29.008	0.000
19	Lack of Coordination Among Stakeholders	22.216	0.000
20	Poor Procurement Process	11.523	0.021
21	Long Lead Procurement	3.409	0.492
22	Different Site Conditions	12.805	0.012
23	Adverse Weather Condition	19.729	0.001
24	Change in Government Regulations	11.161	0.025
25	Change in Economic Conditions	16.287	0.003
26	Socio-Cultural Factors	15.482	0.004
27	Unforeseen Problems	27.459	0.000
	Average		**0.055**

Based on the Kruskal-Walli's test results in Table 5, several change order factors exhibited significant differences in the respondents' ratings of the extent to which they could result in change orders across the professional groups, with P-values less than 0.05. For instance, factors such as "Change in Scope of Work" (P = 0.000), "Errors and Omissions in Design" (P = 0.000), and "Unavailability of Materials" (P = 0.000) showed statistically significant differences. This suggests that professionals have varying opinions on how strongly these factors influence the occurrence of change orders in building construction projects.

On the other hand, factors like "Value Engineering" (P = 0.168), "Lack of Contractor's Involvement in Design" (P = 0.227), and "Long Lead Procurement" (P = 0.492) had P-values greater than 0.05, indicating that there are no significant differences in the perceptions of these factors among professionals. This suggests a general agreement in terms of the ratings of the factors across the different groups regarding their extent of influence on change orders.

The Kruskal-Wallis results indicated statistically significant differences for 23 of the 27 factors ($p < 0.05$), highlighting divergent professional opinions regarding the extent to which the factors could result to CO in building projects.

Factors such as errors and omissions in design, conflicts between contract documents, and unavailability of materials recorded the highest inter-group differences. This emphasises the need for enhanced interdisciplinary coordination and communication mechanisms during project planning and design phases – a recommendation also advanced by Du, Jing, and Castro-Lacouture (2019) in their simulation-based studies.

In general, when compared with prior research, the dominance of economic instability as a CO driver is unique to developing economies such as Nigeria, where inflation, currency volatility, and unstable import conditions directly impact project costs. The consistent ranking of fast-tracking work across global studies (e.g., Al-Kofahi et al., 2020) confirms that time pressure universally heightens the risk of design errors and rework. However, the strong influence of client-related factors – such as inflexible decision-making and financial challenges – highlights institutional and managerial shortcomings prevalent in Nigerian projects. The overall average p values of all the factors is 0.055 which is greater than 0.05, implying that, overall, there is no significant difference in respondents' ratings of the extent to which the factors could result to CO in building construction projects. Thus, the null hypothesis is accepted.

CONCLUSION AND RECOMMENDATIONS

Conclusion

This study assessed the likelihood and impact of various change-order factors influencing building construction projects in Nigeria. The findings revealed that change in economic conditions, change of schedule (fast-tracking work), unforeseen problems, lack of coordination among stakeholders, and clients' financial problems were the most likely to occur, while change in economic conditions, client's inflexible stance on project, errors and omissions in design, conflicts between contract documents, and change of schedule had the greatest impact on change orders. Overall, change in economic conditions and fast-tracking work emerged as the most critical factors, being both having high LO and strongly influential in generating change orders. The study's findings highlight the need for proactive and adaptive change-order management strategies in the Nigerian construction industry. From a managerial standpoint, these findings suggest the need for proactive planning for economic fluctuations, early-stage design coordination, and integrated decision-making frameworks. Policymakers and clients should institutionalize contingency allowances and adopt risk-adjusted contract clauses to cushion against macroeconomic shocks. Moreover, promoting collaborative contracting models such as partnering or integrated project delivery (IPD) could enhance coordination and reduce changes during CPs execution.

The study recommends that, construction practitioners should closely monitor economic conditions and incorporate flexibility in project plans to mitigate time and cost impact that could be resulted due to changes in project requirements during project execution, thus improving projects delivery outcomes. In addition, further research to assess the influence of CO factors on time and cost performance of CPs is also recommended.

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