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Research Article

# Enhancing Client Satisfaction in Design Build Project in Nigeria

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***Abstract***— Client satisfaction is closely linked to performance within the construction sector. Organizations that consistently achieve high levels of client satisfaction are better positioned to enhance their competitiveness in the industry. However, many clients often express dissatisfaction with the outcomes of their projects. Consequently, this study aims to explore how Design-Build contractors address these challenges. A total of 300 respondents, including clients, contractors, and consultants involved in completed design-build projects, were purposefully selected for the survey. Data analysis was conducted using IBM SPSS Version 22 and Warp PLS SEM 3.0v. The results highlighted that effective time management, a clear understanding of the performance brief, the attitudes of project managers, and the adoption of advanced technology are critical factors in achieving client satisfaction. Furthermore, the study emphasized the significance of trust, collaboration, and adopting a client-focused approach to ensure project success.

***Keywords***— Design-Build (DB), Client Requirement (CR) and Client satisfaction

## 1. Introduction

Client satisfaction in design-build projects is directly associated with delivering products and services that surpass predefined standards. Research indicates that clients often experience dissatisfaction with their projects, particularly in buildings and infrastructure delivered by contractors [1], [2]. This study aims to explore how Design-Build contractors have been addressing these persistent challenges.

In design-build (DB) projects, client organizations typically prepare a Request for Proposal (RFP) to invite contractors to submit tenders. The quality of the RFP can significantly influence the project's outcome. According to [3], deficiencies in deadlines, communication, vague objectives, unclear evaluation criteria, and a lack of transparency in RFP preparation often result in inadequate briefing, leading to dissatisfaction with contractors' responses and the final products [4].

Key factors influencing client satisfaction include minimizing complaints, meeting financial obligations, reducing administrative burdens, fostering effective relationships, achieving zero rework, eliminating deviations, ensuring proper waste management, maintaining honesty, utilizing quality raw materials, and adhering to performance specifications [5].

Various studies have adopted different approaches to address these issues and understand client satisfaction. These approaches include reviewing critical criteria, identifying factors contributing to satisfaction, prioritizing those factors, and measuring satisfaction levels. However, limited research has explored how design-build contractors themselves perceive client satisfaction [6].

Client satisfaction is partially dependent on the level of input from DB contractors. Nonetheless, the lack of substantial evidence on contractors' perceptions highlights a significant knowledge gap in this relationship [7].

This study, therefore, seeks to answer the question: How do Design-Build contractors in the Federal Capital Territory (FCT) perceive client satisfaction?
Client of construction industry takes critical decisions during project planning and implementation. Among these decisions is the selection of appropriate procurement strategy that can result in successful project delivery [8].

The use of the traditional procurement method is on a global scale. This is due to its long standing legal precedence and open competitio [9]. This procurement approach has draw-backs which include promoting adversarial working conditions, fragmentation of design and construction and emphasizing acceptance of low tender bids [10]. Consequent

upon this, clients of the Construction Industry have turned to alternative procurement methods such as integrated project delivery (IPD); Design-Build (DB); Contract manager at risk (CMR); Construction Management (CM) [11].One of these alternative procurement methods that has solved the problems created by the use of traditional procurement is Design-Build [12].

Design-Build Method (DB) is a procurement approach in which the clients prepare client requirements and use it to invite contractors to tender for the project who are responsible for both design and construction [13]. This procurement system allows early introduction of contractors and suppliers, and helps integrate their knowledge and expertise during the design stage [14]. Design-Build is reputed for cost certainty and time certainty, Quality assurance, scope compliance and owner satisfaction. It has indeed been ranked 76% excellent over all other alternative methods mentioned above by a global audience of project managers (Financial Management Institute [15]. The interest in the application of Design-Build techniques as an alternative procurement method in construction projects has increased since the last decade as a result of rising demand by project parties for effective procurement strategy [16].

Historical antecedents traced the use of Design-Build to 4,500 years in primitive Mesopotamia's fired brick, to early Egyptian cut-stone construction to the extra-ordinary modern structures [17], further reported that history's monuments like the great walls of China; UK's house of parliament, USA's white house and the pyramid of Gaza were built using Design-Build master builder's approach.

The drivers for Design-Build adoption in construction industry include maximixing the use of resources between project team members, reduce work variations, high success rate, improve tendering process, share expertice with project team, dispute prevention during the construction stage, greater allocation of risks to contractors, better project pricing, create a win-win situation between project stakeholders, and early contractors involvement in the design stage [13].

## 2. Related Work

**Design-Build Client Satisfaction Criteria**

Meeting or exceeding client expectations is fundamental to achieving satisfaction in design-build projects. To achieve this, understanding client expectations outlined in project briefs and tender or contract documents is crucial. The expertise, knowledge, and skills of project managers play a vital role in interpreting these documents and ensuring that the final product meets client requirements, thereby delivering satisfaction [14], [3].

The literature associates client satisfaction in design-build delivery with various attributes and project success. These two aspects are often interconnected, as client satisfaction in the construction industry is frequently linked to the successful completion of projects [12].

Factors such as effective collaboration, the use of project management techniques, and efficient communication between project managers and stakeholders contribute significantly to client satisfaction in design-build projects. Project managers' decision-making abilities help manage activities, successfully deliver projects, and meet client needs. Moreover, the processes and activities involving multiple stakeholders in design-build projects influence project delivery outcomes [17]. Additionally, [17] highlights that project managers' skills and ability to manage diverse construction activities effectively lead to project success and client satisfaction. Supporting this view, [2] emphasizes that project managers' ability to identify and address issues in construction works ensures compliance with clients' requirements, further enhancing satisfaction.

Strong relationships among project team members and between the team and the client are also critical. Such relationships facilitate better understanding and collaboration, ensuring project success. Mutual cooperation and coordination of project activities among participants significantly contribute to achieving client satisfaction [11].

**Determining Design-Build Client Satisfaction**

Currently, there is no universal tool for assessing client satisfaction in design-build projects. However, client satisfaction can be evaluated through:

1. Direct methods, such as directly engaging with clients to gather feedback [15].
2. Indirect methods, such as observing repeat business or referrals from clients [5].

Repeat business and client referrals are particularly relevant in private-sector procurement. However, public-sector projects often adhere to strict competitive bidding regulations, which may limit such practices.

**Perception of Design-Build Client Satisfaction**

Client satisfaction in design-build projects is influenced by numerous attributes, with each becoming important at different project stages due to the evolving nature of client requirements. Meeting these attributes fosters trust, enhances confidence, improves work processes, delivers high-quality outcomes, meets deadlines, and ultimately ensures client satisfaction. The competence of construction project managers plays a critical role in fulfilling clients' expectations [3], [4].

One aspect of this competence involves understanding and addressing client needs. Research on project managers' perceptions highlights the importance of deploying techniques to improve client satisfaction, especially in the Saudi Arabian construction industry. This perspective aligns with [3], who notes that client satisfaction has not received sufficient attention in the industry.

This study explores how construction project managers perceive and approach client satisfaction, emphasizing the importance of identifying and meeting client needs for improved outcomes.

 

## 3. Theory

**System Theory of Clients Requirements Management**

The clients' requirements management, according to [9] comprises of technical, financial and managerial requirements of the clients which need to be satisfied by a Design Builder in a DB project. These requirements are in a system form [12] predicts that what happens to any component in a system affects all the other parts. The client requirement management are definition. Structuring, managing Risks, and managing changes including integration of design and construction [5] Problems arise wherever any of the clients' requirements management are ambiguous. Inefficient and unclear, and the design builder will just assume before submitting tender. Such negative effect is carried through to the design and construction phases with a ripple effect on subsequent phases [7]

In order to reduce the negative effect that the inefficiencies in clients' requirement management has on the DB delivery, a moderating variable is required using transactional leadership.The D&B procurement method is one of the systems advocated by mainstream construction industry practitioners and researchers in order to overcome inadequacies of the traditional procurement method . The basic concept of the D&B approach is the client having the project contracted to a single organization (one stop shop total solution) that would be responsible for design, procurement and engineering as well as commissioning, allowing for integrated project delivery. D&B, as it was intended, appears to be a panacea to many of the problems faced by the clients and other key stakeholders in the construction industry. This delivery system has been used around the globe extensively and its popularity has grown substantially over the years [12].

According to [15] Clients requirements management are in a system form, comprising technical, managerial and financial issues relative to the project. System theory [12] is an interdisciplinary study of system which is cohesive group of related parts. Every system [11] is influenced by its environment and expresses synergy or emergent behavior. The theory [2] predicts that changing one part affects the other parts. This implies that the factors which affect clients' requirements management [9] have a negative ripple effect on the successful Delivery of DB projects. [5] and [7] have defined clients' requirements as objectives, needs, wishes and expectations of the client. They went on to state that these requirements are in a system form within which business strategy, building components, operations and maintenance is integrated. The problems their inefficiencies pose impact DB delivery negatively.

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## 4. Experimental Method

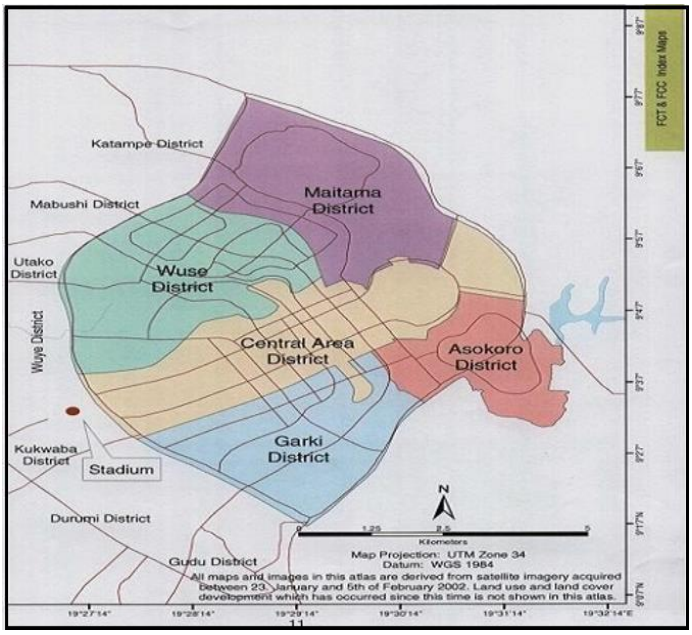


Figure 1: Map of FCT, Abuja showing the Study Area

**Source:** [9].

**Study Area**

This research was conducted in the Federal Capital Territory (FCT), Abuja, Nigeria. Data on individual projects were sourced from the Presidency Media and Publicity Unit (PMPU) press release [9].

**Sample and Data Collection**

According to [15], a total of 400 participants were selected from 50 completed Design-Build projects. These participants included project managers (2 per project, totaling 100), project sponsors (2 per project, totaling 100), and professional team members (4 per project, totaling 200). Survey questionnaires were hand-delivered to the respondents and later retrieved either in hard copy or via email. Out of the 400 distributed questionnaires, 340 were returned.

After excluding questionnaires with significant missing data, a total of 300 valid responses were analyzed, representing a 75% response rate. Data collection spanned from December 2022 to March 2023. The success of Design-Build (DB) projects was assessed using criteria such as cost, schedule adherence, quality, and owner satisfaction. These criteria were evaluated on a five-point Likert scale ranging from "very low" to "very high," in alignment with prior empirical studies.

 

Client satisfaction in Design-Build projects was measured using descriptive statistics of mean scores, following the approach outlined by [13].

**Data Analysis Method**

Given the problem of the study which outlines the challenges the Design Build projects Delivery is facing with regard to clients requirement management, it calls for Transactional leadership to address the challenge. A quantifiable data was collected using a structured questionnaire covering the stakeholders comprising project managers, project sponsors and project team members. Data analyses were done with descriptive and inferential statistics because it represents a yardstick for all observation.

$$Where\ \mathcal{U} = Stochastic\ term$$

$$\beta_2 = Elicitation \quad \beta_1 = Intercept$$

$$\beta_3 = Analysis \qquad Slopes\ of\ the\ Regression$$

$$\beta_4 = Specification$$

$$\beta_5 = Validation$$

$$\beta_6 = Transactional\ Leadership$$

$$\beta_7 = interaction\ of\ EL\ with\ TL$$

$$\beta_8 = interaction\ of\ AN\ with\ TL$$

$$\beta_9 = interaction\ of\ SP\ with\ TL$$

$$\beta_{10} = interaction\ of\ VA\ with\ TL$$

The Regression coefficients were extracted using ordinary least squares (OLS) method and tested for significance at 95% confidence level using two tailed t-test on the hypothesis

$$H_0 : bi = oi$$

$$H_A : bi \neq 0$$

Where b are the values of individual betas in the estimated regression equation.

The significance of the model was tested using multiple coefficient of determination ($R_2$), the F-Test and P- Value. The overall significance of the moderation model was tested using $R_2$ change which shows the increase in variation explained by the interaction f transaction leadership (TL).

## 5. Results and Discussion

Table 1: Stakeholders Perception of Design-Build client Satisfaction Criteria

| S/n | Items | MS | Rank |
|---|---|---|---|
| 1. | Re- use of the contractor by clients | 3.66 | 1 |
| 2. | Referral by the clients | 3.37 | 5 |
| 3. | Making direct inquiry by contractors | 3.11 | 7 |
| 4. | High quality | 3.50 | 4 |
| 5. | Right on time | 3.30 | 6 |
| 6. | Goods service | 3.58 | 3 |
| 7. | Final costs were met | 3.61 | 2 |

Table 2: Contractors perception of factors impacting Design-Build clients' satisfaction

| S/n | Items | MS | Rank |
|---|---|---|---|
| 1. | Effective financial management | 3.82 | 6 |
| 2. | Use of skilled labour | 3.67 | 9 |
| 3. | Use of advance technology | 3.90 | 4 |
| 4. | Use of known standards | 3.81 | 7 |
| 5. | Attitudes of project managers | 3.91 | 3 |
| 6. | Skills of project managers | 3.79 | 8 |
| 7. | Use of team work | 3.56 | 10 |
| 8. | Use of good communication | 3.88 | 5 |
| 9. | Understanding the performance brief | 3.92 | 2 |
| 10. | Good time management | 3.94 | 1 |

**To determine the relationship between design-build projects delivery and clients' requirement management in the study area.**

The level of significance for all inferential statistical tests was established at 0.05. the magnitude of relationship reported was interpreted using, descriptor with coefficient > .69 as very strong, .50 to .69 as substantial, .30 to .49 as moderate, 0.10 to .29 as weak and .01 to 0.9 as negligible. The effect size was calculated based on R-square (coefficient of determination), which is proportion of share variability. It has a range from 0 to 1, usually expressed in percentage, the effect size was categorized "Small 1%", "Medium 10%", "Large, 25" [4].

Table 3: Relationship between Cost and Clients Requirement Management Inefficiencies

| | | | Elicitation | Analysis | Specification | Validation | Cost |
|---|---|---|---|---|---|---|---|
| Spearman's rho | Elicitation | Correlation Coefficient | 1.000 | .788** | .836** | .713** | -.010 |
| | | Sig. (2-tailed) | . | .000 | .000 | .000 | .867 |
| | | N | 300 | 300 | 300 | 300 | 300 |
| | Analysis | Correlation Coefficient | .788** | 1.000 | .778** | .686** | -.087 |
| | | Sig. (2-tailed) | .000 | . | .000 | .000 | .134 |
| | | N | 300 | 300 | 300 | 300 | 300 |
| | Specification | Correlation Coefficient | .836** | .778** | 1.000 | .801** | .051 |
| | | Sig. (2-tailed) | .000 | .000 | . | .000 | .378 |
| | | N | 300 | 300 | 300 | 300 | 300 |
| | Validation | Correlation Coefficient | .713** | .686** | .801** | 1.000 | .119* |
| | | Sig. (2-tailed) | .000 | .000 | .000 | . | .040 |
| | | N | 300 | 300 | 300 | 300 | 300 |
| | Cost | Correlation Coefficient | -.010 | -.087 | .051 | .119* | 1.000 |
| | | Sig. (2-tailed) | .867 | .134 | .378 | .040 | . |
| | | N | 300 | 300 | 300 | 300 | 300 |

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

Statistics used: Correlation coefficient
Data set: Measured at the interval ratio level
Results: Shown no linear relationship between the two variables
: No significant outliers, data is normally distributed

The relationship between design-build projects delivery and clients' requirement management in the study areas were investigated using Pearson product-moment correlation

 

coefficient (Table 25). The result shows that there is negligible negative correlation between the elicitation and cost variables, r = -.010, n = 300, p = 0.867 making it statistically insignificant p < .0.05. The result also shows that there is weak insignificant, negative correlation between the analysis and cost variables, r = -.087, n = 300, p = 0.134 making it a statistically insignificant at p < .0.05. It also shows that there is weak insignificant, positive correlation between the specification and cost variables, r = .051, n = 300, p = 0.378 making it a statistically insignificant at p < .0.05. However, it also shows that there is weak significant, positive correlation between the validation and cost variables, r = 0.119, n = 300, p = 0.040 making a statistically significant at p < .0.05.

Table 4: Relationship between Analysis and Clients Requirement Management Inefficiencies

| | | | Elicitation | Analysis | Specification | Validation | Time |
|---|---|---|---|---|---|---|---|
| Spearman's rho | Elicitation | Correlation Coefficient | 1.000 | .788** | .836** | .713** | -.003 |
| | | Sig. (2-tailed) | . | .000 | .000 | .000 | .963 |
| | | N | 300 | 300 | 300 | 300 | 300 |
| | Analysis | Correlation Coefficient | .788** | 1.000 | .778** | .686** | -.020 |
| | | Sig. (2-tailed) | .000 | . | .000 | .000 | .735 |
| | | N | 300 | 300 | 300 | 300 | 300 |
| | Specification | Correlation Coefficient | .836** | .778** | 1.000 | .801** | .094 |
| | | Sig. (2-tailed) | .000 | .000 | . | .000 | .103 |
| | | N | 300 | 300 | 300 | 300 | 300 |
| | Validation | Correlation Coefficient | .713** | .686** | .801** | 1.000 | .186** |
| | | Sig. (2-tailed) | .000 | .000 | .000 | . | .001 |
| | | N | 300 | 300 | 300 | 300 | 300 |
| | Time | Correlation Coefficient | -.003 | -.020 | .094 | .186** | 1.000 |
| | | Sig. (2-tailed) | .963 | .735 | .103 | .001 | . |
| | | N | 300 | 300 | 300 | 300 | 300 |

**. Correlation is significant at the 0.01 level (2-tailed).

The relationship between design-build projects delivery and clients' requirement management inefficiencies in the study areas were investigated using Pearson product-moment correlation coefficient (Table 26). The result shows that there is negligible negative correlation between the elicitation and time variables, r =.-003, n = 300, p = 0.967 is making a statistically insignificant p < .0.05. The result also shows that there is weak insignificant, negative correlation between the analysis and time variables, r = 0.-020, n = 300, p = 0.735 is making a statistically insignificant at p < .0.05. It also shows that there is weak insignificant, positive correlation between the specification and time variables, r = 0.094, n = 300, p = 0.103 is making a statistically insignificant at p < .0.05. However, it also shows that there is weak significant, positive correlation between the validation and time variables, r = 0.186, n = 300, p = 0.001 is making a statistically significant at p < .0.05.

Table 5: Relationship between Specification and Clients Requirement Management Inefficiencies

| | | | Elicitation | Analysis | Specification | Validation | Satisfaction |
|---|---|---|---|---|---|---|---|
| Spearman's rho | Elicitation | Correlation Coefficient | 1.000 | .788** | .836** | .713** | .119* |
| | | Sig. (2-tailed) | . | .000 | .000 | .000 | .040 |
| | | N | 300 | 300 | 300 | 300 | 300 |
| | Analysis | Correlation Coefficient | .788** | 1.000 | .778** | .686** | .106 |
| | | Sig. (2-tailed) | .000 | . | .000 | .000 | .067 |
| | | N | 300 | 300 | 300 | 300 | 300 |
| | Specification | Correlation Coefficient | .836** | .778** | 1.000 | .801** | .253** |
| | | Sig. (2-tailed) | .000 | .000 | . | .000 | .000 |
| | | N | 300 | 300 | 300 | 300 | 300 |
| | Validation | Correlation Coefficient | .713** | .686** | .801** | 1.000 | .325** |
| | | Sig. (2-tailed) | .000 | .000 | .000 | . | .000 |
| | | N | 300 | 300 | 300 | 300 | 300 |
| | Satisfaction | Correlation Coefficient | .119* | .106 | .253** | .325** | 1.000 |
| | | Sig. (2-tailed) | .040 | .067 | .000 | .000 | . |
| | | N | 300 | 300 | 300 | 300 | 300 |

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

The relationship between design-build projects delivery and clients' requirement management inefficiencies in the study areas were investigated using Pearson product-moment correlation coefficient. The result shows that there is weak negative correlation between the felicitation and satisfaction variables, r =.119, n = 300, p = 0.040 is making a statistically significant p < .0.05. The result also shows that there is weak insignificant, negative correlation between the analysis and satisfaction variables, r = 0.106, n = 300, p = 0.067 is making a statistically insignificant at p < .0.05. It also shows that there is a moderate insignificant, positive correlation between the specification and satisfaction variables, r = 0.253, n = 300, p = 0.000 is making a statistically significant at p < .0.05. However, it also shows that there is moderate significant, positive correlation between the validation and satisfaction variables, r = 0.325, n = 300, p = 0.001 is making a statistically significant at p < .0.05.

Table 6: Relationship between Validation and Clients Requirement Management

| | | | Elicitation | Analysis | Specification | Validation | Quality |
|---|---|---|---|---|---|---|---|
| Spearman's rho | Elicitation | Correlation Coefficient | 1.000 | .788** | .836** | .713** | .170** |
| | | Sig. (2-tailed) | . | .000 | .000 | .000 | .003 |
| | | N | 300 | 300 | 300 | 300 | 300 |
| | Analysis | Correlation Coefficient | .788** | 1.000 | .778** | .686** | .193** |
| | | Sig. (2-tailed) | .000 | . | .000 | .000 | .001 |
| | | N | 300 | 300 | 300 | 300 | 300 |
| | Specification | Correlation Coefficient | .836** | .778** | 1.000 | .801** | .247** |

 

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | Sig. (2-tailed) | .000 | .000 | . | .000 | .000 |
| | | N | 300 | 300 | 300 | 300 | 300 |
| | Validation | Correlation Coefficient | .713** | .686** | .801** | 1.000 | .327** |
| | | Sig. (2-tailed) | .000 | .000 | .000 | . | .000 |
| | | N | 300 | 300 | 300 | 300 | 300 |
| | | Correlation Coefficient | .170** | .193** | .247** | .327** | 1.000 |
| | Quality | Sig. (2-tailed) | .003 | .001 | .000 | .000 | . |
| | | N | 300 | 300 | 300 | 300 | 300 |

**. Correlation is significant at the 0.01 level (2-tailed).

The level of delivery were moderate among DB contractors in the study area, there were confidence that the information elicited for the project were captured on the project plan. The implications are materials & labours were efficiently managed. The severity of CRM on DBD were moderate, the information elicited were moderately free of misinterpretation. While drawing visualization were moderately understood in defining scope. There is generally a weak relationship between CRM and DBD. It called for moderation as reported by the studies of (Keegan & Hartog, 2004). It implies that moderation boosted or its reduced weak relationship and reduced the moderate impact. The influence of CRM on DBD takes place at high intervention of a moderator.

Table 6: Summary of results objective Three

| Constructs | Variables | R Value | Remark |
|---|---|---|---|
| Cost | Elicitation | 0.-010 | Negligible Correlatio |
| | Analysis | -.087 | Weak Correlation |
| | Specification | .378 | Weak Correlation |
| | Validation | 0.119 | Weak Correlation |
| Time | Elicitation | -.003 | Negligible Correlatio |
| | Analysis | 0.-020 | Weak Correlation |
| | Specification | 0.094 | Weak Correlation |
| | Validation | 0.186 | Weak Correlation |
| Quality | Elicitation | .119 | Weak Correlation |
| | Analysis | 0.106 | Weak Correlation |
| | Specification | 0.253 | Moderate Correlation |
| | Validation | 0.325 | Moderate Correlation |
| O/Satisfaction | Elicitation | .-170 | Weak Correlation |
| | Analysis | 0.247 | Moderate Correlation |
| | Specification | 0.327 | Moderate Correlation |
| | Validation | 0.186 | Weak Correlation |

Data set was analysed using pearson product moment correlation coefficient

**Assumption**

- Correlation is significant at 0.01 level (2 tailed)
- Correlation is significant at 0.05 level (2 tailed)
- Statistics: Pearson product moment correlation
- Scale: Burris descriptors interval/ratio scale
- Categorization of effect size for $R^2$: Small 1%, medium 10%, large 25% (Nandy, 2012)

**Result Discussion**

From **Table 1**, respondents provided their perceptions of Design-Build client satisfaction criteria, with an overall average mean score of 3.45. Among the seven criteria evaluated, the reuse of contractors was ranked as the highest determinant of client satisfaction, with a mean score of 3.66. Referrals by clients were ranked fifth, scoring a mean of 3.37, while direct inquiries made by contractors were placed seventh with a mean score of 3.11.

High-quality outcomes were ranked fourth with a mean score of 3.50, on-time project delivery was ranked sixth (3.30), and good service delivery was ranked third with a mean score of 3.58. Meeting the final cost expectations was ranked second, achieving a mean score of 3.61. These results align with the findings of [5] and [15], who noted that clients tend to be highly critical of contractors, often leading contractors to avoid directly seeking feedback on satisfaction. However, the surveyed respondents indicated that they regularly consult with clients regarding satisfaction levels. This proactive approach reflects an understanding of the critical role client satisfaction plays in sustaining business relationships. Furthermore, while referrals are more common in private-sector procurement, this practice is less feasible in the public sector due to procurement regulations [6].

**Table 2** illustrates contractors' perceptions of the factors influencing Design-Build client satisfaction. Ten factors were evaluated, yielding an average mean score of 3.82 on a 4.0 scale. Good time management was ranked highest, with a mean score of 3.94, emphasizing its critical role in client satisfaction. Effective time management, combined with a skilled workforce, reduces waste, errors, risks, and accidents, resulting in higher-quality outcomes and improved project performance [7].

Understanding the performance brief was ranked second with a mean score of 3.92, followed closely by the attitude of project managers in third place (3.91). The use of advanced technology ranked fourth with a mean score of 3.90. Advanced technologies were noted to positively influence both contractor and client satisfaction. The integration of human expertise alongside technological advancements further amplifies productivity, leading to superior outcomes [10].

Good communication ranked fifth (3.58), effective financial management was ranked sixth (3.82), adherence to known standards was seventh (3.81), and the skill level of project managers was eighth (3.79). The use of skilled labor was ranked ninth (3.67), while teamwork ranked tenth, with a mean score of 3.56. These rankings highlight the multifaceted nature of client satisfaction, where both technical and interpersonal factors play essential roles in achieving positive outcomes.

## 6. Conclusion and Future Scope

This study explored the key factors that influence client satisfaction in Design-Build projects in Nigeria. The results highlighted that effective time management, thorough understanding of the performance brief, positive attitudes of project managers, and the use of advanced technologies significantly contribute to client satisfaction. Furthermore, trust, collaboration, and a client-focused approach were

 

identified as essential for achieving and maintaining client satisfaction in Design-Build projects. The level of delivery were moderate among DB contractors in the study area, there were confidence that the information elicited for the project were captured on the project plan. The implications are materials & labours were efficiently managed. The severity of CRM on DBD were moderate, the information elicited were moderately free of misinterpretation. While drawing visualization were moderately understood in defining scope. There is generally a weak relationship between CRM and DBD. It called for moderation as reported by the studies of (Keegan & Hartog, 2004). It implies that moderation boosted or its reduced weak relationship and reduced the moderate impact. The influence of CRM on DBD takes place at high intervention of a moderator.

**Recommendations**

To enhance client satisfaction and improve project outcomes in Design-Build projects, the following recommendations are proposed:

1. Establish robust communication strategies to ensure transparency and clarity across all stages of the project.
2. Encourage a culture of mutual trust and collaboration among all project participants.
3. Focus on timely delivery of projects while actively managing and aligning client expectations.
4. Embrace a client-focused approach, emphasizing a deep understanding of client preferences and requirements.
5. Leverage technology-based tools to improve communication, streamline collaboration, and optimize project management processes.
6. Introduce and implement targeted project management training programs for Design-Build teams to enhance their skills and capabilities.
7. Regularly conduct client satisfaction assessments to identify areas for improvement and to adapt practices accordingly.

By applying these strategies, practitioners in Nigeria's Design-Build industry can strengthen client satisfaction, foster repeat business, and establish a competitive edge through enhanced service delivery and stronger stakeholder relationships.

**Area for Further Research**

Conduct longitudinal studies to track the evolution of design-build project performance in Abuja Metropolis over time. This could provide insights into the effectiveness of current practices, identify areas for improvement, and inform future policy decisions. Level of severity is average, further study should use measure. Correlation is weak, further study should use qualitative analysis Moderation is weak, further study should use mediation.

**Conflict of Interest**

This unique replica is not being considered for publishing anywhere and has not been disseminated. There are no conflicts of interest to declare as a result.

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**Author Contributions**

Each author made an equal contribution to this research dissertation. They all looked over and verified the original manuscript's final draft.

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