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## THE EVOLVING ROLE OF BUILDING CONSULTANTS IN THE DELIVERY OF CONSTRUCTION PROJECTS IN NIGERIA

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### ABSTRACT

Nigeria's construction industry is undergoing profound transformation, shaped by accelerating urbanisation, digital disruption, mounting sustainability demands, and a rapidly evolving regulatory environment. Building consultants stand at the intersection of these forces, yet their changing professional role has not been comprehensively investigated through rigorous empirical inquiry, particularly for the Northern Nigerian context. This study systematically analyses and documents how the roles, competencies, and contributions of building consultants have shifted in response to these dynamics, focusing on three representative states: Abuja Federal Capital Territory (FCT), Kano State, and Bauchi State. A concurrent mixed-methods design was employed, combining a validated structured questionnaire survey (n = 412 valid responses; response rate 88.8%), semi-structured interviews (n = 25, purposive sampling), six in-depth case studies (maximum variation sampling), and systematic document analysis. Quantitative data were analysed using descriptive statistics, inferential tests (ANOVA, t-tests, chi-square), Exploratory Factor Analysis, and Structural Equation Modelling (SEM) via IBM SPSS 29 and IBM AMOS; qualitative data were subjected to reflexive thematic analysis (Braun and Clarke, 2021) in NVivo 14. SEM confirmed that Digital Technology Adoption significantly predicts Competency Level (beta = 0.61,  $p < .001$ ), which in turn significantly predicts Project Performance Outcomes (beta = 0.54,  $p < .001$ ). Six major themes emerged from the

qualitative analysis: Digital Technology as a Double-Edged Enabler; Sustainability Awareness Ahead of Capability; Integrated Project Delivery aspiration Versus Reality; Risk Management as an Expanding Core Function; CPD Inadequate, Fragmented, and Disconnected from Practice Realities; and Institutional and Regulatory Context Enabler and Constraint. The study produces a validated empirical framework for the evolving building consultant role, an evidence-based competency profile aligned to contemporary industry demands, and targeted recommendations for CORBON, NIOB, higher education institutions, and government agencies. Findings are expected to contribute to reducing project cost overruns and schedule delays, improving sustainability outcomes, and advancing professionalization of building consultancy in Nigeria.

**KEYWORDS:** *Building Consultants; Construction Project Delivery; Nigeria; BIM; Sustainable Construction; Fourth Industrial Revolution (4IR); Mixed-Methods Research; Northern Nigeria; Structural Equation Modelling; Competency Framework; UTAUT*

## 1. INTRODUCTION

### 1.1 Background to the Study

Nigeria's construction sector occupies a strategically significant position in the national economy. The National Bureau of Statistics (2024) reported that the construction sector contributed 3.35% to real GDP in the third quarter of 2024, within a national infrastructure deficit estimated at 30% of GDP far below the World Bank benchmark of 70% (US International Trade Administration, 2024). The government's National Integrated Infrastructure Master Plan (NIIMP) targets closure of this gap by 2043, supported by sustained annual public investment. In the 2024 federal budget, allocations included \$922.2 million for road construction and \$166.4 million for 20,000 affordable housing units. Over the medium term, the sector is forecast to grow at an average rate of 3.1% annually between 2025 and 2028.

Urbanisation is a primary structural driver of this growth. Nigeria's urbanisation rate stood at approximately 53% in 2021 and continues to rise at an average of 2.5% per year, with the World Bank projecting that nearly 70% of Nigerians will be urban dwellers by 2050 (Oxford Business Group, 2024). This trajectory generates enormous and sustained demand for residential, commercial, and infrastructure construction, placing building consultants professionals who provide expert advisory, design, supervisory, and management services

across the construction project lifecycle at the very heart of the sector's evolving challenges and opportunities.

Ikwueze and Nnadi (2024) found that inadequate consultancy and project management practices are among the foremost contributors to cost overruns and schedule delays in Nigerian construction. Omopariola et al. (2024) documented widespread skills shortages among Nigerian construction professionals, with notable competency gaps in digital technologies, sustainability practice, and advanced risk management. Popoola, Olanipekun and Ipinlaye (2024) noted that while BIM awareness has grown considerably, advanced BIM applications remain underutilised by most consultancy firms due to inadequate training, poor digital infrastructure, and resistance to change.

### **Aim and Objectives**

The overarching aim of this study is to systematically analyse and document the evolving role of building consultants in the delivery of construction projects in Nigeria, and to develop evidence-based recommendations for enhancing professional effectiveness. The specific objectives are to:

1. Examine changes in the roles, responsibilities, and scope of work of building consultants over 2015–2025;
2. Evaluate consultant contribution to project success outcomes encompassing time, cost, quality, and sustainability;
3. Assess the impact of digital transformation on professional practice;
4. Identify emerging skills and competencies required of building consultants; and
5. Develop evidence-based policy and professional development recommendations.

## **2. Literature Review**

### **2.1 The Building Consultant: Role and Professional Context**

Building consultants occupy a unique professional space at the intersection of technical expertise, project management, and client advisory services. The traditional consulting role has progressively expanded into continuous, cross-disciplinary involvement across the project lifecycle (Raza et al., 2023). In Nigeria, building consultancy practice is governed by CORBON and the Nigerian Institute of Building (NIOB). The revised National Building Code (2024) provides the regulatory backbone, introducing updated requirements for safety, energy performance, and environmental management. Nwogu and Erifeta (2025) noted that while the 2024 Code advances insulation and renewable energy requirements, important gaps

remain signalling that proactive, competent consultants must fill advisory functions beyond strict compliance management.

## **2.2 Digital Transformation: BIM and 4IR Technologies**

Building Information Modelling (BIM) is widely identified as the most consequential technological development reshaping building consultancy globally. Raza et al. (2023) demonstrated that BIM functions as a data-rich integration platform capable of transforming collaboration between consultants, contractors, and clients. In Nigeria, BIM adoption remains nascent but accelerating. Popoola, Olanipekun and Ipinlaye (2024) found that most practising firms deploy BIM primarily for 3D visualisation, leaving higher-dimension capabilities largely unexploited. Tanko et al. (2023) identified inadequate training and infrastructure as the most formidable adoption barriers. Beyond BIM, the Fourth Industrial Revolution (4IR) introduces AI, IoT sensors, digital twins, robotics, and cloud computing. Aigbavboa et al. (2021) found that 4IR principles demonstrably contribute to mitigating time and budget overruns through real-time monitoring and predictive analytics.

## **2.3 Sustainable Construction and Green Building Practice**

Unegbu et al. (2024a) found limited but expanding adoption of green building certifications in Nigeria, identifying inadequate professional competency among building consultants as a principal constraint. Chukwu et al. (2024) found significant sustainability knowledge gaps among Nigerian Building Technology Education students. Aliyu et al. (2025) found that financing workforce training and supporting BIM adoption are the most effective strategies for bridging the skills and technology deficit. A Springer Nature (2024) study reported that the construction sector contributes approximately 15% of national carbon emissions, underscoring the urgency of equipping consultants with the knowledge to lead decarbonisation strategies.

## **2.4 Project Management, Delivery Methods, and Collaboration**

Tanko, Mohammed and Aliyu (2023) documented both the collaborative benefits of BIM-IPD integration and the institutional and legal barriers that slow its adoption in Nigeria. Olugboyega et al. (2024) found a pervasive structural pattern in which institutional arrangements frequently prevent consultants from performing the integrative, cross-disciplinary roles that most benefit project outcomes, driven by inconsistent policy environments and limited enforcement of professional standards.

## **2.5 Risk Management in Nigerian Construction**

Ikwueze and Nnadi (2024) found that risk identification and mitigation are the project management functions most strongly associated with improved cost, schedule, and quality performance. Alu et al. (2024) identified inadequate professional management as a primary driver of cost escalation, while noting that experienced, well-trained consultancy personnel are the most effective risk mitigation resource available to project teams.

## **2.6 Skills, Competencies, and Professional Development**

Omopariola et al. (2024) documented pervasive skills shortages among Nigerian construction professionals, with competency gaps in digital literacy, sustainability expertise, advanced risk management, financial modelling, and cross-disciplinary communication. Aliyu et al. (2025) proposed a multi-stakeholder institutional response involving professional bodies, government, and financial institutions to systematically close the skills gap through training grants, certification incentives, and technology partnerships.

## **2.7 Regulatory and Economic Context**

The revised National Building Code (2024) materially extends building consultant compliance obligations. At the macroeconomic level, Nigeria faces ongoing challenges of inflation, foreign exchange volatility, and rising material costs. Alu et al. (2024) found these economic stresses to be significant drivers of project cost overruns, with the implication that consultants who develop robust financial modelling and procurement risk management capabilities are more effective at protecting project viability.

## **2.8 Summary and Research Gap**

The reviewed literature reveals a construction consultancy profession under significant transformation pressure from digital technology, sustainability demands, regulatory tightening, new delivery models, and economic volatility. While individual aspects of this transformation have been studied in isolation, no comprehensive empirical study has synthesised these dimensions into a holistic analysis of the building consultant's evolving role for the Northern Nigerian context. The research gap is confirmed at the intersection of four underexplored dimensions: (1) multi-method empirical investigation; (2) Northern Nigerian geographical focus; (3) holistic role-evolution analysis across BIM, sustainability, IPD, and risk; and (4) validated competency profiling aligned to current regulatory requirements. This study directly and systematically addresses that gap.

### **3. RESEARCH METHODOLOGY**

#### **3.1 Research Philosophy and Design**

This study is grounded in a pragmatist research philosophy, which holds that research questions should drive methodological choices and that complex social phenomena are most fully understood through the complementary use of quantitative and qualitative evidence (Creswell and Plano Clark, 2018). A concurrent mixed-methods design was employed: quantitative survey data and qualitative interview and case study data were collected within the same research phase, analysed separately through their respective analytical frameworks, and integrated at the interpretation stage through convergent triangulation consistent with Olanipekun et al. (2023).

#### **3.2 Study Area**

The study was situated in Northern Nigeria, with three states purposively selected: Abuja FCT (North Central), Kano State (Northwest), and Bauchi State (Northeast). These states were selected for their construction activity levels, project type diversity, and accessibility of relevant professional populations.

#### **3.3 Population and Sampling**

The target population comprised all formally registered and practising building consultants, project managers, architects, quantity surveyors, and contractors involved in construction project delivery within the three study states. Cross-referencing CORBON (2024) registration data with state-level NIOB, NIQS, and NIA membership lists yielded an estimated target population of approximately 10,000 relevant professionals. Applying Yamane's (1967) formula ( $N = 10,000$ ; 5% margin of error) yielded a minimum sample size of  $n = 385$ . A gross sample of 481 was distributed to account for a 20% non-response rate. Of 427 returned questionnaires (88.8% response rate), 412 were valid. Purposive sampling recruited 25 interview participants. Maximum variation sampling selected six case study projects.

#### **3.4 Data Collection Instruments**

The structured questionnaire contained four sections assessing respondent profiles, role evolution (Likert items), technology adoption (BIM and UTAUT constructs), sustainability competency, and project performance attribution. Following a 30-participant pilot, Cronbach's alpha ranged from 0.78 to 0.89 across all constructs (minimum threshold: 0.70), confirming satisfactory internal reliability. The semi-structured interview guide comprised 12 open-ended questions addressing the five research questions (Appendix B). Case studies followed a protocol based on Yin (2018) (Appendix C). Document analysis systematically

reviewed the National Building Code (2024), CORBON Annual Report (2024), NIOB publications, and NBS GDP reports (2020–2024).

### 3.5 Data Analysis

Survey data were processed in IBM SPSS Statistics 29. Descriptive statistics, ANOVA, t-tests, chi-square tests, Exploratory Factor Analysis (EFA), Confirmatory Factor Analysis (CFA), and Structural Equation Modelling (SEM) were conducted sequentially. Model fit was evaluated using CFI, RMSEA, and SRMR. Qualitative data were analysed using reflexive thematic analysis (Braun and Clarke, 2021) in NVivo 14. Convergent triangulation integrated findings across all four data strands.

### 3.6 Validity, Reliability, and Ethics

Content validity was established through expert review by three construction management academics and two senior building consultants. Construct validity was confirmed through EFA and CFA. Qualitative trustworthiness was enhanced through member checking. Ethical approval was obtained from the Research Ethics Committee of Hassan Usman Katsina Polytechnic (Approval Reference: HUKPOLY/REC/2025/047). All participation was voluntary with written informed consent, and all data were anonymised in outputs.

## 4. RESULT AND DISCUSSION

A total of 481 questionnaires were distributed across the three study states — Abuja FCT (n = 192), Kano State (n = 168), and Bauchi State (n = 121) — proportional to the estimated professional population in each jurisdiction. Of the 427 completed questionnaires returned (overall response rate: 88.8%), 412 were retained as valid following data cleaning procedures that removed 15 questionnaires with greater than 20% missing data or evidence of systematic response bias (e.g., identical ratings across all items).

**Table 1** Distribution of Valid Responses by State and Professional Category. (n = 412)

Professional Category	Abuja FCT	Kano	Bauchi	Total	%
Building Consultant/Builder	78	62	43	183	44.4%
Project Manager	41	28	18	87	21.1%
Quantity Surveyor	29	22	14	65	15.8%
Architect	22	16	11	49	11.9%
Contractor/Site Manager	12	9	7	28	6.8%
Total	182	137	93	412	100%

*Note.* Data collected 2025. Professional categories reflect CORBON (2024) classification. Abuja FCT overrepresented due to higher registered professional density.

In terms of demographic characteristics, 74.3% of respondents were male and 25.7% female, consistent with the gender composition of the Nigerian construction workforce documented by Omopariola et al. (2024). Regarding experience, 18.2% had fewer than five years of practice, 34.5% had 5–10 years, 28.6% had 11–20 years, and 18.7% had over 20 years. Educational attainment was high: 52.4% held a Higher National Diploma (HND), 31.8% a Bachelor's degree, and 15.8% a postgraduate qualification. Table 2 presents the full demographic profile.

**Table 2 Demographic Profile of Survey Respondents. (n = 412)**

Variable	Category	Frequency	Percentage (%)
Gender	Male	306	74.3
	Female	106	25.7
Experience	< 5 years	75	18.2
	5–10 years	142	34.5
	11–20 years	118	28.6
	> 20 years	77	18.7
Education	HND	216	52.4
	BSc/B.Tech	131	31.8
	Postgraduate	65	15.8
Firm Size	1–5 employees	89	21.6
	6–20 employees	174	42.2
	21–50 employees	107	26.0
	> 50 employees	42	10.2

*Note.* HND = Higher National Diploma. Firm size refers to the organisation in which the respondent is employed or owns.

#### 4.2 Descriptive Statistics: Role Evolution and Responsibilities

Respondents were asked to rate the degree of change in 12 specific role dimensions over the period 2015–2025 on a five-point Likert scale, where 1 = No Change and 5 = Extensive Change. Table 3 presents mean scores, standard deviations, and the percentage of

respondents rating each dimension as having experienced significant or extensive change (ratings 4 or 5).

**Table 3 Descriptive Statistics: Perceived Changes in Building Consultant Roles. (2015–2025)**

Role Dimension	Mean	SD	% Rating 4 or 5
Cross-disciplinary coordination	4.31	0.71	87.6%
Digital tool integration in practice	4.28	0.74	85.9%
Sustainability advisory responsibilities	4.17	0.79	82.3%
Regulatory compliance management	4.14	0.82	80.1%
Risk management involvement	4.09	0.84	78.6%
Client communication and reporting	4.02	0.88	76.5%
Quality assurance and control	3.96	0.91	73.8%
Post-occupancy evaluation involvement	3.74	0.97	67.2%
Procurement advisory services	3.68	1.01	64.8%
Financial modelling and cost advisory	3.54	1.06	59.2%
Dispute resolution and claims management	3.41	1.09	54.6%
Facilities management advisory	3.22	1.14	48.3%

*Note.* Scale: 1 = No Change; 2 = Minimal Change; 3 = Moderate Change; 4 = Significant Change; 5 = Extensive Change. Ranked by mean score in descending order.

The findings indicate that cross-disciplinary coordination ( $M = 4.31$ ,  $SD = 0.71$ ), digital tool integration ( $M = 4.28$ ,  $SD = 0.74$ ), and sustainability advisory responsibilities ( $M = 4.17$ ,  $SD = 0.79$ ) were perceived as the most significantly transformed role dimensions. This pattern aligns with the literature's identification of digital disruption and sustainability demands as the primary drivers of professional role expansion (Raza et al., 2023; Aliyu et al., 2025). Facilities management advisory recorded the lowest mean ( $M = 3.22$ ,  $SD = 1.14$ ), reflecting the still-nascent BIM Level 3 (7D) application context in Northern Nigeria.

#### 4.3 Descriptive Statistics: Technology Adoption and Digital Practice

The technology adoption section assessed consultants' current use of BIM and 4IR tools, and the UTAUT constructs of performance expectancy, effort expectancy, social influence, and facilitating conditions. Table 4 presents descriptive statistics for the BIM adoption items.

**Table 4 Current BIM Utilisation by Application Level. (n = 412)**

BIM Application Level	Mean	SD	% Currently Using
3D Visualisation and Design	3.84	0.93	71.4%
Clash Detection and Coordination	3.12	1.08	52.7%
4D Scheduling Integration	2.67	1.19	38.6%
5D Cost Management	2.41	1.21	31.8%
6D Sustainability / Energy Analysis	2.18	1.24	26.2%
7D Facilities Management	1.89	1.18	18.9%

*Note.* Scale: 1 = Never; 2 = Rarely; 3 = Sometimes; 4 = Often; 5 = Always. '% Currently Using' refers to respondents selecting 3, 4, or 5.

As anticipated from the literature (Popoola et al., 2024), BIM utilisation was heavily concentrated at the lower-dimensional levels: 3D visualisation (M = 3.84) and clash detection (M = 3.12) were the most commonly applied, while 7D facilities management applications remained marginal (M = 1.89). Regarding UTAUT constructs, all four scored above the scale midpoint, with Performance Expectancy recording the highest mean (M = 4.04, SD = 0.77), indicating that consultants broadly believe digital tools enhance their professional effectiveness. Facilitating Conditions scored lowest (M = 3.21, SD = 0.96), confirming the infrastructure and support deficits documented by Tanko et al. (2023).

#### 4.4 Descriptive Statistics: Sustainability and Green Building Competency

Self-rated sustainability competency was assessed across six dimensions using a five-point competency scale (1 = No Competency to 5 = Expert Competency). Table 5 presents the results.

**Table 5 Self-Rated Sustainability Competency of Building Consultants. (n = 412)**

Sustainability Competency Dimension	Mean	SD	% Proficient or Expert
Energy efficiency principles and application	3.41	0.98	58.7%
Green building certification requirements	2.94	1.09	43.2%
Sustainable material selection	3.18	1.02	52.4%
Environmental impact assessment advisory	2.87	1.12	40.8%
Carbon footprint measurement and reporting	2.54	1.19	31.6%
Renewable energy system integration	2.39	1.21	27.4%

*Note.* Scale: 1 = No Competency; 2 = Basic Awareness; 3 = Developing Competency; 4 = Proficient; 5 = Expert. '% Proficient or Expert' refers to ratings of 4 or 5.

Sustainability competency was generally assessed at the developing-to-proficient range, with energy efficiency principles (M = 3.41) and sustainable material selection (M = 3.18) attracting the highest self-ratings. Renewable energy system integration (M = 2.39) and carbon footprint measurement (M = 2.54) were the weakest areas. These findings corroborate Chukwu et al. (2024) and Unegbu et al. (2024a), who identified similar competency gaps in both the practising and student populations of Nigerian building professionals.

#### 4.5 Descriptive Statistics: Project Performance Attribution

Respondents attributed the degree of building consultant contribution to four project performance dimensions: time, cost, quality, and sustainability. They also rated the overall impact of consultant involvement on project success. Table 6 presents results.

**Table 6 Perceived Building Consultant Contribution to Project Performance Outcomes. (n = 412)**

Performance Dimension	Mean	SD	% High or Very High Contribution
Quality assurance outcomes	4.22	0.74	84.2%
Schedule / time management	3.98	0.86	76.9%
Cost management outcomes	3.87	0.91	73.3%
Regulatory compliance	4.08	0.82	79.4%
Sustainability performance	3.54	1.02	61.7%
Overall project success	4.14	0.79	81.8%

*Note.* Scale: 1 = No Contribution; 2 = Low; 3 = Moderate; 4 = High; 5 = Very High Contribution.

Consultants were perceived to make the greatest contribution to quality assurance outcomes (M = 4.22) and regulatory compliance (M = 4.08), followed by overall project success (M = 4.14). Sustainability performance (M = 3.54) recorded the lowest attribution score, reflecting the earlier-documented competency gaps in this domain. These findings directly address Research Question 2 and confirm the centrality of building consultants to project performance across multiple dimensions.

## 5.6 Inferential Analysis

One-way ANOVA was conducted to examine whether mean scores on digital technology adoption (DTA), sustainability competency (SC), and project performance outcomes (PPO) differed significantly across professional categories, states, and experience levels. Table 7 presents the summary ANOVA results.

**Table 7 One-Way ANOVA Results: Group Differences in Key Constructs.**

Construct	Grouping Variable	F-value	df	p-value	Eta <sup>2</sup>
Digital Technology Adoption	Professional Category	8.74	4, 407	< .001	0.079
Digital Technology Adoption	State	5.32	2, 409	0.005	0.025
Digital Technology Adoption	Experience Level	11.21	3, 408	< .001	0.076
Sustainability Competency	Professional Category	6.48	4, 407	< .001	0.060
Sustainability Competency	State	3.87	2, 409	0.021	0.018
Sustainability Competency	Experience Level	7.93	3, 408	< .001	0.055
Project Performance Outcomes	Professional Category	4.21	4, 407	0.002	0.040
Project Performance Outcomes	State	2.14	2, 409	0.118	0.010
Project Performance Outcomes	Experience Level	9.64	3, 408	< .001	0.066

*Note.* Significant results ( $p < .05$ ) are shown in bold. Effect sizes (Eta<sup>2</sup>): small = .01, medium = .06, large = .14. Post-hoc tests (Tukey HSD) confirmed significant pairwise differences.

Digital technology adoption differed significantly across professional categories ( $F(4, 407) = 8.74, p < .001$ ), with building consultants and architects scoring significantly higher than site managers and quantity surveyors (Tukey HSD,  $p < .05$ ). Experience level emerged as a consistent significant moderator across all three constructs, with respondents possessing 11–20 years of experience scoring highest on DTA and PPO, suggesting that mid-career professionals have most actively adapted to evolving practice demands. State-level differences were significant for DTA and SC but not for PPO, indicating that while digital tool access and sustainability awareness vary by geography, project performance attribution is more uniformly distributed.

## 4.7 Exploratory Factor Analysis

Exploratory Factor Analysis (EFA) was conducted on the 48-item questionnaire using principal axis factoring with oblique rotation (Promax), given the theoretical expectation of correlated factors. The Kaiser-Meyer-Olkin measure of sampling adequacy was 0.87, well

above the acceptable threshold of 0.60, and Bartlett's Test of Sphericity was significant ( $\chi^2 = 6,847.3$ ,  $df = 1,128$ ,  $p < .001$ ), confirming the factorability of the correlation matrix. Table 8 presents the five-factor solution.

**Table 8 Exploratory Factor Analysis: Five-Factor Solution. (n = 412)**

Factor	Label	No. of Items	Eigenvalue	% Variance	Cronbach's $\alpha$
F1	Digital Technology Adoption (DTA)	10	8.74	18.2%	0.89
F2	Competency and Professional Development (CPD)	10	6.31	13.1%	0.86
F3	Project Performance Outcomes (PPO)	9	5.18	10.8%	0.83
F4	Sustainability and Green Practice (SGP)	10	4.62	9.6%	0.81
F5	Role Evolution and Scope Expansion (RSE)	9	3.89	8.1%	0.78
Total		48		59.8%	

*Note.* Factor loadings ranged from 0.48 to 0.84. Items with loadings  $< 0.40$  were excluded from the final solution. Total variance explained = 59.8%.

All five factors demonstrated good internal consistency, with Cronbach's alpha values ranging from 0.78 to 0.89, exceeding the minimum acceptable threshold of 0.70 (Creswell and Plano Clark, 2018). The five-factor structure — Digital Technology Adoption, Competency and Professional Development, Project Performance Outcomes, Sustainability and Green Practice, and Role Evolution and Scope Expansion — aligns closely with the integrated CBT–UTAUT theoretical framework and provides the measurement model for the subsequent SEM analysis.

#### 4.8 Structural Equation Modelling (SEM/CFA) Results

Confirmatory Factor Analysis (CFA) was first conducted to validate the five-factor measurement model identified through EFA. Model fit indices were: CFI = 0.96, RMSEA = 0.051 (90% CI: 0.044–0.058), and SRMR = 0.063, all within acceptable thresholds (CFI  $> 0.90$ ; RMSEA  $< 0.08$ ; SRMR  $< 0.08$ ), confirming the adequacy of the measurement model. All factor loadings were statistically significant ( $p < .001$ ) and ranged from 0.52 to 0.87.

The structural model was then estimated to test the hypothesised relationships between the three latent constructs: Digital Technology Adoption (DTA), Competency Level (CL), and Project Performance Outcomes (PPO). Table 9 presents the structural path coefficients.

**Table 9 Structural Equation Modelling: Path Coefficients and Model Fit.**

Hypothesised Path	$\beta$ (Standardised)	SE	C.R.	p-value	Supported?
DTA → Competency Level (CL)	0.61	0.047	12.98	< .001	Yes
CL → Project Performance Outcomes (PPO)	0.54	0.052	10.38	< .001	Yes
DTA → PPO (direct)	0.18	0.061	2.95	0.003	Yes
Social Influence → DTA	0.43	0.058	7.41	< .001	Yes
Facilitating Conditions → DTA	0.39	0.063	6.19	< .001	Yes
Performance Expectancy → DTA	0.52	0.054	9.63	< .001	Yes
Effort Expectancy → DTA	0.31	0.067	4.63	< .001	Yes

*Note.*  $\beta$  = standardised path coefficient; SE = standard error; C.R. = critical ratio. Model fit: CFI = 0.96, RMSEA = 0.051, SRMR = 0.063,  $\chi^2/df$  = 2.14. Total variance explained in PPO = 47.8%.

The SEM results provide robust empirical support for the integrated CBT–UTAUT framework. Digital Technology Adoption strongly predicted Competency Level ( $\beta = 0.61$ ,  $p < .001$ ), confirming the UTAUT premise that technology adoption drives professional capability enhancement. Competency Level in turn significantly predicted Project Performance Outcomes ( $\beta = 0.54$ ,  $p < .001$ ), operationalising the CBT proposition that competency is the proximate determinant of professional effectiveness. A significant but smaller direct path from DTA to PPO ( $\beta = 0.18$ ,  $p = 0.003$ ) indicates a partial mediation of CL in this relationship. Among the UTAUT antecedents of DTA, Performance Expectancy emerged as the strongest predictor ( $\beta = 0.52$ ), followed by Social Influence ( $\beta = 0.43$ ) and Facilitating Conditions ( $\beta = 0.39$ ), the latter's relatively moderate coefficient confirming the constraining role of inadequate infrastructure documented throughout the literature.

#### 4.9 Discussion of findings

Systematic analysis of documentary sources including the National Building Code (2024), CORBON Annual Report (2024), NIOB publications, NBS GDP reports (2020–2024), and

state development plans for Abuja FCT, Kano, and Bauchi revealed five policy-relevant findings.

First, the revised National Building Code (2024) introduces substantive new obligations for building consultants in the areas of energy performance documentation, environmental impact advisory, and post-completion certification. However, implementation guidance for practitioners is still in preparation, creating a compliance ambiguity that several interview participants described as problematic. Second, CORBON's 2024 Annual Report reveals that registered building professional numbers have increased by 23% over the preceding five years, but that CPD compliance rates remain below 60% a governance gap with direct competency implications. Third, state-level development plans for Kano and Bauchi identify construction capacity gaps as a priority area but do not specifically address the building consultancy profession, suggesting a policy articulation failure. Fourth, NBS GDP data (2020–2024) confirm the sustained growth trajectory of the construction sector, providing macroeconomic justification for the regulatory and professional investment this study recommends. Fifth, NIOB publications indicate that gender diversity in the building consultancy profession remains a concern, with female practitioners constituting fewer than 20% of registered building professionals nationally — a figure consistent with the study sample.

#### **4.10 Theoretical Contribution**

This study makes three theoretical contributions to the construction management and professional development literature. First, it produces the first empirically validated CBT–UTAUT integrated framework applied to building consultancy practice evolution in a developing-country context, demonstrating the explanatory power and empirical tractability of this theoretical combination. Second, it identifies Economic Volatility and Client Demand as empirically significant pathways not fully captured by the standard UTAUT model, contributing to the theory's refinement for developing-economy applications. Third, it operationalises Competency-Based Theory at the specific professional level of building consultancy, producing a validated competency profile that has both theoretical and practical utility.

### **5. CONCLUSION**

This study systematically analysed the evolving role of building consultants in the delivery of construction projects in Northern Nigeria, focusing on Abuja FCT, Kano State, and Bauchi

State. Using a concurrent mixed-methods design combining a validated quantitative survey (n = 412), semi-structured interviews (n = 25), six in-depth case studies, and systematic document analysis the study generated a comprehensive, multi-perspectival evidence base on the transformation of building consultant practice over the period 2015–2025.

Five substantive conclusions are drawn. First, building consultant roles have undergone extensive and multidimensional change, with cross-disciplinary coordination, digital tool integration, and sustainability advisory emerging as the most transformed dimensions. Second, building consultants make significant, measurable contributions to project performance outcomes particularly quality assurance and regulatory compliance with Competency Level confirmed as a significant structural predictor of performance ( $\beta = 0.54$ ,  $p < .001$ ). Third, Digital Technology Adoption is the strongest predictor of Competency Level ( $\beta = 0.61$ ,  $p < .001$ ), yet adoption remains constrained by inadequate infrastructure (Facilitating Conditions) and insufficient CPD provision. Fourth, a clear and urgent competency gap exists in sustainability practice and advanced digital tool application, with current professional development structures demonstrably inadequate to close this gap at pace. Fifth, the institutional and regulatory environment while advancing with the National Building Code (2024) remains characterized by enforcement failures, governance gaps in CPD compliance, and policy inattention to the building consultancy profession at the state level.

## 6. Recommendations

In light of the findings, the following recommendations are proposed:

**I. CORBON and NIOB** should update the competency framework for building consultants to include digital technologies (BIM and 4IR), sustainability practices, and advanced risk management, while improving CPD accessibility through online training platforms and stronger compliance enforcement.

**II. Higher education institutions** should revise curricula to integrate BIM, sustainability, and modern risk management skills, supported by improved laboratory facilities and structured industry internships.

**III. Government and policymakers** should strengthen implementation of the National Building Code, improve digital infrastructure, and provide funding for technology development in construction education.

**IV. Construction firms and clients** should promote BIM adoption, provide in-house digital training, and involve building consultants early in project planning to enhance project delivery and sustainability outcomes.

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