Tropical Built Environment Journal. Volume 14, No. 2, 1-25, 2026 www.tbejournal.com
ISSN: 1118-1790

Impact of Digital Intelligence Adoption on Real Estate Practice and Market Competitiveness in Lagos and Abuja, Nigeria

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Abstract

Digital intelligence is a set of cognitive skills that are needed by professionals in other to meet up with the challenges of digital life. The paper examined the impact of digital intelligence adoption on real estate practice and market competitiveness in Lagos and Abuja, Nigeria. The objectives include: to assess the current state of digital intelligence adoption among real estate firms; determine its relationship with business operations; client satisfaction and market competitiveness in the study areas. The paper adopted a quantitative method of research design. The study population comprised all registered real estate firms practicing in Lagos and Abuja, all together comprised 643 registered real estate firms. The entire study population was considered; hence it was a census approach. However, only 576 valid responses were obtained from the 643 registered estate firms and their responses utilized. The primary data for the study were obtained through questionnaires. The research objectives were analyzed with mean score, regression analysis, and the hypotheses were tested using the Pearson chi-square (X^2) test. The results from the analysis of the data collected revealed that digital intelligence has a significant relationship with real estate business operation, client satisfaction and market competitiveness, the standardized regression coefficients ($R= 0.618$, $p < 0.001$), ($R= 0.591$, $p < 0.001$), and ($R= 0.570$, $p < 0.001$) respectively indicates a significant positive relationship. The paper recommends that firms should adopt a strategic approach to technology adoption that aligns digital investments with business objectives and client needs.

Keywords: Impact, digital intelligence, real estate business, client satisfaction, market competitiveness, Proptech

1.1 Introduction

The innovative role of technology and its application practically in every area of life makes it indispensable for real estate professionals who are desirous of efficient service delivery to clients. As the world goes digital, there is need for professionals to keep abreast with how digitalization is reshaping the globe. The concept of digital intelligence creates an insight as to how professionals especially practicing real estate professionals can meet up with the changes introduced by digital innovations and remain competitive in Lagos and Abuja real estate markets. Digital intelligence is a set of cognitive skills which should be possessed by professionals in order to catch up with the challenges of digital life. Exploring data and information through disruptive technologies to enhance product promotion, establish solid client preferences, build a

good digital advert campaign among others are aspects of digital intelligence (Akinwamide et al. 2021).

According to Technostacks (2019), there are over three billion smartphone users across the world and the application of mobile technology (MT) is gaining popularity virtually in all areas of business be it service or tangible production including real estate. Mobile technology has brought about increase technological platforms that are applicable to almost all spheres of lives (Baum, Saull, & Braesemann, 2020). The reason for this is that mobile technology has offered better mobility, it is location-centric, and it offers access to instant notifications and consequently brought about the development of many mobile apps targeted at supporting customer and client access to service, serve as a direct marketing channel, handles paperwork, and solving specific industry problems (Technostacks, 2019). Mobile technology is simply the application of various software programs incorporated in movable devices to provide quick access to unique services. According to Cradduck (2013), and Oyetunji, Ojo, and Oyetunji (2018), it has showcased the business of real property on a well clear terms. It has helped in data collation, dissemination of information, search of property and listing, forecasting of cashflow among others at the comfort of our homes and offices.

Besides mobile technology, there are other innovative technologies reshaping the business world especially the real property sector. There is a prediction that an approximation of one-third of countries has made their land records digital (Shang and Price, 2019). The revolution of the fourth industrialization came with the uniqueness of the emergence and creation of innovative technologies. They include technologies like big data analytics, cloud computing, machine learning, the Internet of Things (IoT), Artificial Intelligence (AI), distributed manufacturing, 3D printing, robotics, and automated decision-making. These disruptive technologies have brought about significantly technological change in various industries, of which the real property sector is not left behind (Starr, Saginor & Worzala, 2021; Ullah, Sepasgozar, Thaheem, & Al-Turjman, 2021).

The real property industry in Lagos and Abuja is experiencing significant growth, driven by increasing demand for housing and commercial spaces. One of the most vibrant real estate markets in Nigeria is Lagos real estate market. The Lagos real estate market that has historically depended on conventional methods has witnessed massive changes owing to the changes

emanating from digitalization. The methods by which properties are promoted and sold have changed owing to the development of online property listing platforms, digital property paperwork, and virtual tours. Moreover, the adoption of blockchain technology and digital payment systems has raised the level of security and transparency (Saravanan, Valentina, Golden, Harold, Balaji, & Raghvendra 2020). The above could also be said as regard the Abuja property market.

Achieving and maintaining sustainability in digital real estate operations in this digital era, skills like digital intelligence is becoming relevant for real estate practitioners and firms. The revolutionary move from the conventional methods of property dealings to new innovative ways by the help of technology has created a gap in knowledge especially how property professionals can match up with new concept of digital intelligence so as to enhance real estate service delivery and maintain competitive edge in Lagos and Abuja real estate markets. Digital intelligence is interconnected with the following eight competencies. They include digital: use, safety, identity, rights, security, literacy, communication, and emotional intelligence (Park 2016; Akinwamide 2021a; 2021b). Digital intelligence is therefore all encompassing and it requires continuous learning, adoption and implementation. Therefore, this paper seeks to examine the impact of the adoption of digital intelligence on real estate practice and market competitiveness in selected major cities in Nigeria.

1.2 Statement of the Problem

Despite efforts by African real estate practitioners especially in Nigeria to align with the recent waves of technological innovations in real estate practice, there is still low adoption of these disruptive technologies by real estate practitioners in Nigeria. According to Braesemann and Baum (2020), clients demand for property technology services in the real property companies is sky rocketing in most advanced nations but in African nations, the reverse is the case (Aihie, 2019). As at present, African countries are faced with challenges of investing in property technology owing to high level of poverty, instability in government and financial mismanagement (Adebiyi, Sanni, & Oyetunji, 2019). African real estate markets Nigeria inclusive are generally rated low in the JLL Transparency Index and, this is evidence that access to data is low. It could mean low investment inflow into the market.

The traditional real estate service delivery methods in Africa especially in Nigeria and precisely Lagos and Abuja are often characterized by inefficiencies, lack of transparency, and limited accessibility. Digital intelligence is capable of transforming the sector by enhancing operational efficiency, improving decision-making, and providing better customer experiences.

In order for investor to get a sustainable Property Technology, investors need adequate information on an asset's performance index, cashflow, risks, capital expenses, house prices, building operations, land and structure valuation, home report, pricing strategy and spatial analysis among others in real estate market (Altus Group, 2019; Bourassa, Hoesli, Merlin & Renne, 2021; Liu, 2021; Mayer, Bourassa, Hoesli, & Scognamiglio, 2022). Hence, data generated in this process need to be transferred effectively and efficiently among clients, legal advisors, property solicitors and real estate professionals. It is therefore, imperative to known that achieving clients' satisfaction in the real estate business world demands an understanding of real estate clients' needs functionally (Araloyin & Olatoye, 2011), emotionally (Akinwamide & Bello, 2019b; Akinwamide & Hahn, 2022) and digitally (Akinwamide, 2021b, Akinwamide, Oyetunji & Hahn, 2021). There are no sufficient relevant literatures in Nigerian context linking digital intelligence adoption to business operations, client satisfaction and market competitiveness especially in the context of real estate practice in Lagos and Abuja. Lagos and Abuja are seen to be the two most economic hub of real estate practice because of their unique features. While Lagos remains the most vibrant commercial nerve of Nigeria, Abuja remains the seat of political power and capital of Nigeria. Therefore, the paper attempts to cover the knowledge gap.

1.3 Aim

The paper aims at examining the impact of digital intelligence adoption on real estate practice and market competitiveness in selected major cities in Nigeria with a view to providing information that will enhance real estate service delivery and sustain the future of real estate market in Lagos and Abuja.

1.4 Objectives

The objectives are to:

- assess the current state of digital intelligence adoption among real estate firms in Lagos and Abuja;

- determine digital intelligence relationship with business operations;
- determine digital intelligence relationship with client satisfaction; and
- determine digital intelligence relationship with market competitiveness in the study areas.

1.5 Test of Hypothesis

H_{01}: There is no significant relationship between digital intelligence and business operation in the study areas.

H_{02}: There is no significant relationship between digital intelligence and client satisfaction in the study areas

H_{03}: There is no significant relationship between digital intelligence and market competitiveness in the study areas

1.6 Scope of the Paper

The paper is design to examine the impact of digital intelligence adoption on real estate practice and market competitiveness in selected major cities in Nigeria. It focused on two major well known cities in Nigeria: Lagos and Abuja. However, the paper was delimited to real estate services in commercial and residential properties in the areas of study. It covered property management, estate agency and valuation. Besides, the paper focused on Principal Partners of registered estate firms as the target population; therefore, data was specifically collected from them.

2.0 Review of Relevant Literature

Emerging technologies are profoundly transforming various sectors, and the real property sector is no exception. Previously real estate organizations and professionals would make decisions based on professional experience and historical trends (Appic softwares, 2024). Artificial intelligence and machine learning are revolutionizing various fields, including real estate. Artificial intelligence, a simulation of human intelligence in machines, empowers machines to think and act like humans. In the real estate this involves using Generative Artificial Intelligence with natural language processing to understand customer inquiries and provide relevant responses, and predictive analytics to project market movement pattern. Machine Learning involves training models on historical data to forecast prices of property, recommend properties to potential buyers based on their preferences, and analyze market trends. It can also include anomaly detection to identify fraudulent or unusual market activities.

Fitzpatrick et al. (2023) in a McKinsey article calculated that generative AI as a technological instrument might facilitate and produce 61% on investment return or even greater in terms of value for the property market. Generative Artificial Intelligence enhances decision-making by analyzing large quantum of data, it provides tools like conversational chatbots, answer questions and remove doubt from customer decisions and It helps accurate personalized recommendations for buyers, renters, and investors.

Practicing real property practitioners now leverage on the use of Artificial intelligence powered tools to analyze market conditions, evaluate property values, and identify investment opportunities with greater precision. By harnessing predictive analytics, businesses have privilege for better informed decisions, mitigate risks, and optimize their strategies to stay ahead in a competitive market (National Association of Realtors, 2023). These tools can sift through vast amounts of data, including historical sales, economic indicators, and demographic trends, to provide real-time insights into current market conditions granting property practitioners privilege for data-driven decisions. Further contribute to the industry's evolution by enabling predictive analytics, personalized marketing strategies, and efficient property management. The innovative tools is bringing change to the real property market by analyzing vast amounts of data to identifying market trends, optimizing pricing strategies, and even predicts maintenance needs, thereby reducing operational costs and improving overall efficiency. Finally, big data and analytics are empowering real estate professionals with insights derived from extensive data sets, enabling informed decision-making and strategic planning. The convergence of these emerging technologies is not only bringing a change to the real property world but also setting new standards for innovation and efficiency across the industry.

With the advent of cutting-edge technologies, the real property sector is experiencing digital transformation which is now gaining attention in recent times. Researchers are now exploring the sector’s paradigm shift to smart real estate (SRE) and the adoption of innovative technologies. Fengchen (2023) systematically review the evolving dimension of smart real estate, utilizing bibliometric analysis to assess major patterns in research from 2012 to 2022. The study’s emphasize is on the fast growth of smart real estate field. The study notes that data-driven technologies such as big data, information management, and machine learning has gain

acceptance to the field. This demonstrates that the sector is growing, with focus on disruptive technologies that support operational efficiency and decision-making processes.

Similarly, Ullah, Sepasgozar, and Wang (2018) examine big9 innovative technologies and their adoption. The technologies include Artificial Intelligence, virtual reality, and drones, Internet of Things, among others. The study's review was based on 213 articles, exploring the transforming nature of these technologies in the real property industry by making innovative technological solutions available to key stakeholders including clients, agents, and government authorities. The study examines the needs of stakeholder and offers a robust explanation on the ability of each technology to meet those needs, thereby enhancing client satisfaction and minimizing regrets. The paper in addition did not fail to introduce a framework that amalgamates the Technology Adoption Model (TAM) with stakeholder-driven factors, providing a brilliant access for real estate transition by technology adoption.

Moreover, Piduru (2023) examines the relationship between real estate agents and consumers in the digital era, with focus on the implications of technological innovations on agency practices and consumer behavior. The paper examines the modes of adaptability to change in consumer preferences by agent, integrating disruptive digital instruments and platforms to enhance client satisfaction and competitiveness. The research reveals comprehensive knowledge on the way digital innovations is transforming business operations in real property, reshaping the techniques utilized by agents to retain and grow their patronage.

By extending discourse on digital transformation of industries Cziesla (2014), stresses the contribution of information technologies in remodeling industries like financial services. However, the paper does not point directly on property; the relevance of the outcome cannot be over emphasized. The outcome reveals the establishment of new business methods, promotes centricity of clients, and transforms the relationship between users and technology through digital innovations. The study in addition, showcase the rapid contribution of information digitalization, an occurrence that is reflecting in the real property sector as it paradigm shift to more data-oriented and customer-oriented practices.

Looking at the subject matter from Africa, especially from Nigeria, David and Michael (2024), examine digital intelligence and real estate digital marketing in Nigeria, focusing on Estate

Surveyors and Valuers perceptions of the relevance of digital intelligence for sustainable real estate marketing in Nigeria, using Edo State as the study area. the data for the study were soured from 120 registered and practicing Estate Surveyors and Valuers using structured questionnaires. The study employed mean score, cross-tabulation and chi-square in the analysis of data. Findings revealed that there is a significant relationship of the relevance of digital intelligence and the level of utilization of social media marketing.

Modinat, Daramola, and Theophilus (2021), researched on the awareness and usage of mobile technology in real estate practice in developing Countries. The focal area was Ikeja, Lagos State, Nigeria. This technology provides opportunities for efficient real estate service delivery. Nevertheless, technology adoption in real estate is low or limited. The study examined the awareness level and usage of innovative technology among real estate firms in the Ikeja area of Lagos State, Nigeria. Findings unfolded that the awareness level of Estate Surveyors and Valuers' firms of innovative technology in real estate was somewhat high (mean=3.77 on a scale of 5) but a few mobile applications such as email, google earth, social media apps, and google map have been adopted whilevert, sitegeist, and argus valuation are yet to gained popularity among the ESV firms. There is a negative impact on the quality of service delivery of real estate firms as a result of the low level of adoption of mobile technology especially when such technology becomes unavoidable. The study was limited to real estate firms in Lagos only which might not represent holistically the Nigerian property market. Hence, there is need to extend the research area to include Abuja. This study intends to cover the gap.

Examining the review, there is need for quantitative research on the impact of digital intelligence on real estate practice and market competitiveness in Lagos and Abuja since there are few studies that have looked at the subject matter from theoretical and empirical view point.

3.0 Methodology

The paper adopted quantitative research design method. The rationale behind the adoption of this design among others was to enable the study to give a proper description of the prevailing situation through survey method. The target population for this study mainly comprised all registered estate surveying and valuation firms in Lagos and Abuja. The rationale for the adoption of estate surveying and valuation firms lied in the fact that by the enactment of the

Estate Surveyors and Valuers Registration Board of Nigeria (ESVARBON) Decree No.24 of 1975, now CAP E. 13 LFN 2007, they are the professionals established by law and licensed to carry out real property services, with stamp and seal for execution of property valuation jobs. They are also the members of the Nigerian Institution of Estate Surveyors and Valuers (NIESV) who possess the required skills and underwent the necessary training that qualified them to render real property services in Nigeria. Data obtained from NIESV's state branch secretariats Lagos State and Abuja, showed that there were 459 firms in Lagos while in Abuja; there were 184 registered estate firms. The study adopted a census approach for the registered estate firms, intending to cover all registered firms in the study areas. The paper was restricted to real estate firms because of its large targeted population and study areas. The primary data for the study were collected through questionnaires.

The study objectives were analyzed with mean scores, regression analysis, and hypotheses were tested using Pearson Chi-square (X^2) test. The regression model is expressed as DI = $\beta_0 + \beta 1DS + \beta 2DL + \beta 3DC \ldots + \in$. Where DI = Digital Intelligence (Independent variable), DS = Digital Safety, DL = Digital literacy, DC = Digital Communication, DI = digital Identity, DS = Digital Security, DS = Digital Safety, DR = Digital rights, EI = Emotional Intelligence and $\in$= Error term (other factors affecting Digital Intelligence that are not included in the model . The regression assumptions were assessed before conducting the regression analysis. The assumptions of linearity, independence of observations, normality of residuals, homoscedasticity, absence of multicollinearity and influential outliers were examined to ensure the appropriateness and reliability of the regression model. The questionnaire was closed ended. A five point likert scale was used for the variables which included strongly agreed, agree, undecided, disagree and strongly disagree. The content validity was established through expert review, while face validity was confirmed through pilot testing. The overall Cronbach's alpha of 0.937 indicates excellent internal consistency, confirming that the questionnaire items reliably measure the intended constructs. Based on the results, the research instrument was deemed reliable and valid for addressing the research objectives. The dimensions and indicators for digital intelligence included: digital skills, digital literacy, digital communication, digital identity, digital security, digital safety, digital rights and emotional intelligence. Ethical principles were observed throughout the study. Participants were informed about the purpose of the research and their

participation was voluntary. Informed consent was obtained from all participants before the administration of the questionnaire. Participants were assured that the information provided would be treated confidentially and used strictly for academic purposes. No personal information that could identify individual participants was disclosed in the presentation or publication of the findings.

4.0 Result and Discussions

4.1 Questionnaire Administration and Response Rate

The success of any survey-based research depends significantly on the adequacy of the response rate achieved, as this determines the representativeness and generalizability of the findings. For this study, the target population comprised all registered estate surveying and valuation firms in Lagos and Abuja, as obtained from the records of the Nigerian Institution of Estate Surveyors and Valuers (NIESV) state branch secretariats. According to the records, there were 459 registered estate firms in Lagos and 184 registered estate firms in Abuja, making a total population of 643 registered firms. The study adopted a census approach for the registered estate firms, intending to cover all registered firms in the study areas. Therefore, the entire population of 643 registered firms was targeted for questionnaire administration. Table 1 shows the questionnaire distribution and retrieval rate.

Table 1: Questionnaire Distribution and Response Rate

Category	Lagos Distributed	Lagos Retrieved	Lagos Valid	Abuja Distributed	Abuja Retrieved	Abuja Valid	Total Valid
Real Estate Firms	459	432	408	184	176	168	576

As shown in Table 1, the valid responses comprised 576 from registered estate firms (408 from Lagos and 168 from Abuja). The higher number of valid responses from Lagos compared to Abuja reflects the larger population of registered estate firms in Lagos. The response rates were impressive: 89.6 percent for estate firms in Lagos (408 out of 459), while 91.3 percent for estate firms in Abuja (168 out of 184).

4.2 Socio-Economic and Demographic Characteristics of Real Estate Firms

The essence of the socio-economic characteristics is it relevance in expressing and getting a valid response to the research questions.

Table 2: Characteristics of Registered Estate Firms

Firm Characteristic	Category	Lagos (n=408)	Abuja (n=168)	Total (n=576)
Years of Operation	Less than 5 years	68 (16.7%)	38 (22.6%)	106 (18.4%)
	5-10 years	98 (24.0%)	52 (31.0%)	150 (26.0%)
	11-15 years	72 (17.6%)	18 (10.7%)	90 (15.6%)
	Above 15 years	170 (41.7%)	60 (35.7%)	230 (39.9%)
Number of Professional Staff	1-5 staff	158 (38.7%)	88 (52.4%)	246 (42.7%)
	6-10 staff	106 (26.0%)	42 (25.0%)	148 (25.7%)
	11-15 staff	74 (18.1%)	24 (14.3%)	98 (17.0%)
	Above 15 staff	70 (17.2%)	14 (8.3%)	84 (14.6%)
Primary Specialization	Valuation Only	42 (10.3%)	24 (14.3%)	66 (11.5%)
	Property Management	52 (12.7%)	30 (17.9%)	82 (14.2%)
	Estate Agency	72 (17.6%)	32 (19.0%)	104 (18.1%)
	Multiple Services	242 (59.3%)	82 (48.8%)	324 (56.3%)

Table 2 reveals that 39.9 percent of firms have been in operation for more than 15 years, with Lagos having a slightly higher proportion (41.7 percent) compared to Abuja (35.7 percent). This suggests that the Lagos property market has a more established professional presence, which may influence technology adoption patterns. Firms with 5 to 10 years of operation constituted 26.0 percent of the sample, while those with less than 5 years represented 18.4 percent. The presence of newer firms is important for understanding digital intelligence adoption, as these firms may be more likely to embrace digital technologies from their inception compared to older firms that may have established traditional practices.

In terms of firm size measured by number of professional staff, the findings show that the majority of firms (42.7 percent) employed between 1 and 5 professional staff, indicating that small-scale practices dominate the Nigerian real estate landscape. This is consistent with the professional service structure in many developing economies, where sole proprietorships and small partnerships are the predominant business models. Firms employing 6 to 10 professional staff constituted 25.7 percent of the sample, while those employing 11 to 15 staff represented 17.0 percent. Only 14.6 percent of firms employed more than 15 professional staff. The comparison between Lagos and Abuja reveals that Lagos has a higher proportion of medium to large-sized firms, with 17.2 percent employing above 15 staff compared to only 8.3 percent in

Abuja. This difference reflects the more competitive and transaction-intensive nature of the Lagos property market, which according to Oyetunji, Ojo, and Oyetunji (2018), necessitates larger operational capacities to handle the volume of real estate transactions.

Regarding primary specialization, the majority of firms (56.3 percent) reported engagement in multiple service areas, including valuation, property management, estate agency, and consultancy. This indicates the multidisciplinary nature of estate surveying practice in Nigeria, where firms often provide comprehensive real estate services rather than specializing narrowly. Firms specializing primarily in estate agency constituted 18.1 percent of the sample, while property management specialists represented 14.2 percent, and valuation-only firms represented 11.5 percent. The higher proportion of multiple-service firms in Lagos (59.3 percent) compared to Abuja (48.8 percent) suggests that Lagos firms may have greater capacity to diversify their service offerings, potentially including technology-enhanced services.

Table 3: Personal Characteristics of Estate Firm Respondents

Characteristic	Category	Lagos (n=408)	Abuja (n=168)	Total (n=576)
Highest Academic Qualification	B.Sc/HND	88 (21.6%)	42 (25.0%)	130 (22.6%)
	M.Sc/MBA	278 (68.1%)	114 (67.9%)	392 (68.1%)
	PhD	42 (10.3%)	12 (7.1%)	54 (9.4%)
Professional Designation	Probationer	42 (10.3%)	24 (14.3%)	66 (11.5%)
	Associate (ANIVS)	184 (45.1%)	78 (46.4%)	262 (45.5%)
	Fellow (FNIVS)	130 (31.9%)	50 (29.8%)	180 (31.3%)
	Other	52 (12.7%)	16 (9.5%)	68 (11.8%)
Years of Professional Experience	Less than 5 years	76 (18.6%)	32 (19.0%)	108 (18.8%)
	5-10 years	106 (26.0%)	46 (27.4%)	152 (26.4%)
	11-15 years	88 (21.6%)	34 (20.2%)	122 (21.2%)
	16-20 years	66 (16.2%)	24 (14.3%)	90 (15.6%)
	Above 20 years	72 (17.6%)	32 (19.0%)	104 (18.1%)

Table 3 shows that 68.1 percent of respondents held master's degrees (M.Sc or MBA), while 9.4 percent held doctoral degrees (PhD). Only 22.6 percent held bachelor's degrees or HND qualifications as their highest academic qualification. This high level of educational attainment suggests that Nigerian estate surveying professionals possess the cognitive capacity to understand and adopt complex digital technologies, supporting the assertions of Ayodele,

Oladokun, and Kajimo-Shakantu (2020) regarding the significance of advanced education in facilitating technology adoption. The similar distribution between Lagos and Abuja indicates that educational standards are comparable across both study areas.

Professional designation analysis showed that 45.5 percent of respondents were Associates of the Nigerian Institution of Estate Surveyors and Valuers (ANIVS), while 31.3 percent were Fellows (FNIVS), indicating significant professional maturity. Probationer members, who are in the process of qualifying for full professional membership, constituted 11.5 percent of respondents. The remaining 11.8 percent held other professional designations or were in the process of upgrading their membership status. The high proportion of Associate and Fellow members suggests that the respondents were experienced professionals with substantial knowledge of real estate practice, lending credibility to their responses regarding digital intelligence adoption.

Years of experience in real estate practice ranged from less than 5 years (18.8 percent) to above 20 years (18.1 percent), providing a diverse perspective on digital intelligence adoption across different career stages. The largest proportion of respondents (26.4 percent) had between 5 and 10 years of experience, followed by those with 11 to 15 years (21.2 percent). According to Akinwamide and Hahn (2022), professionals with longer experience may demonstrate resistance to new technologies, while younger practitioners often exhibit greater digital fluency, making this diversity valuable for understanding adoption patterns. The distribution of experience levels was relatively similar between Lagos and Abuja, with Abuja having a slightly higher proportion of respondents with above 20 years of experience (19.0 percent compared to 17.6 percent in Lagos).

4.3 Current State of Digital Intelligence Adoption

The first objective examined the current state of digital intelligence adoption among real estate firms in Lagos and Abuja, focusing on the eight digital intelligence competencies identified by Park (2016) and operationalized by Akinwamide (2021a; 2021b). The analytical tool employed for this objective included mean score. The eight competencies examined were digital use, digital identity, digital communication, digital literacy, digital emotional intelligence, digital rights, digital security, and digital safety. Respondents were asked to rate their level of adoption of practices related to each competency on a five-point scale, and mean scores were calculated for each item.

Table 4: Current State of Digital Intelligence Adoption

Digital Intelligence Competency and Items	Lagos Mean (n=408)	Abuja Mean (n=168)	Overall Mean	Rank
Digital Communication			**4.11**	**1**
Frequent communication with clients using digital signals	4.26	4.14	4.22	
Effective use of digital footprints to understand consumer behaviour	4.14	3.96	4.07	
Digital collaboration tools for information sharing	4.06	3.90	4.01	
Digital Use			**3.88**	**2**
Efficient screen time management for client response	3.94	3.76	3.87	
Digital health awareness for work-life balance	3.86	3.70	3.80	
Online community participation for professional development	3.90	3.78	3.86	
Digital Literacy			**3.75**	**3**
Content creation and sharing through digital channels	3.84	3.66	3.77	
Content evaluation for accuracy and relevance	3.76	3.60	3.70	
Computational thinking for problem solving	3.70	3.56	3.64	
Digital Identity			**3.64**	**4**
Online identity management and reputation control	3.86	3.44	3.70	
Brand awareness creation through digital platforms	3.80	3.36	3.62	
Short and long-term digital identity impact management	3.74	3.30	3.56	
Digital Rights			**3.51**	**5**
Digital privacy adherence in client interactions	3.66	3.40	3.56	
Intellectual property rights knowledge for digital content	3.50	3.26	3.40	
Protection of speech rights in online property business	3.46	3.30	3.40	
Digital Security			**3.41**	**6**
Secure password and data protection tools	3.56	3.36	3.48	
Internet security free from cyber threats	3.40	3.26	3.34	
Mobile security for safe transactions	3.36	3.20	3.30	
Digital Safety			**3.37**	**7**
Behavioral risk management in online	3.44	3.26	3.37	

transactions				
Content risk management for inappropriate information	3.40	3.24	3.34	
Contract risk management in digital service delivery	3.36	3.20	3.30	
Digital Emotional Intelligence			**3.34**	**8**
Touchpoint identification in digital client interactions	3.50	3.16	3.36	
Empathetic listening through digital channels	3.46	3.10	3.30	
Data-driven consumer behavior analysis for relationship building	3.40	3.06	3.26	

Table 4 presents the mean scores for digital intelligence adoption across the eight competencies. The findings reveal varying levels of adoption across these competencies. Digital Communication recorded the highest overall mean score of 4.11, ranking first among all competencies. This indicates that real estate firms have substantially embraced digital channels for communicating with clients and stakeholders. This finding aligns with observations by Akinwamide and Olukolajo (2024) that social media platforms, instant messaging applications, and email have become integral to real estate marketing and client interaction in Nigeria. Items such as "frequent communication with clients using digital signals" (mean = 4.22) and "effective use of digital footprints to understand consumer behavior" (mean = 4.07) recorded particularly high scores, suggesting that firms recognize the value of digital communication in building client relationships.

Digital Use, encompassing efficient time management on digital devices and maintenance of digital health, recorded an overall mean score of 3.88, ranking second. This indicates moderate to high adoption of basic digital work practices. Items such as "efficient screen time management for client response" (mean = 3.87) and "online community participation for professional development" (mean = 3.86) suggest that practitioners have developed foundational digital work habits.

Digital Literacy, including content creation, evaluation, and computational thinking, recorded an overall mean score of 3.75, ranking third. This suggests that while firms possess basic digital skills, more advanced capabilities remain underdeveloped. Items such as "content creation and

sharing through digital channels" (mean = 3.77) and "content evaluation for accuracy and relevance" (mean = 3.70) indicate moderate competence in digital content management. However, "computational thinking for problem solving" (mean = 3.64) recorded a lower score, suggesting that more advanced analytical capabilities are less developed. This finding supports the observations of Ayodele, Oladokun, and Kajimo-Shakantu (2020) regarding skill gaps in the Nigerian real estate profession, where technical competencies in specialized digital tools lag behind general computer literacy.

Digital Identity recorded an overall mean score of 3.64, ranking fourth, with notable differences between Lagos and Abuja. Items such as "online identity management and reputation control" (mean = 3.70) and "brand awareness creation through digital platforms" (mean = 3.62) indicate moderate adoption. The significant difference between Lagos (3.86) and Abuja (3.44) for online identity management suggests that firms in the more competitive Lagos market place greater emphasis on managing their digital presence and reputation. This finding reflects the strategic importance of digital identity in competitive markets, where online reputation can significantly influence client acquisition and retention.

Digital Rights recorded an overall mean score of 3.51, ranking fifth. Items such as "digital privacy adherence in client interactions" (mean = 3.56) and "intellectual property rights knowledge for digital content" (mean = 3.40) indicate that firms have some awareness of digital rights issues but may not have fully developed policies or practices in this area. The moderate scores suggest that while practitioners recognize the importance of rights-related issues, implementation may be inconsistent. This finding is concerning given the sensitive nature of real estate transaction data and the potential legal implications of rights violations.

Digital Security recorded an overall mean score of 3.41, ranking sixth, while Digital Safety recorded 3.37, ranking seventh. These competencies, critical for protecting client data and ensuring secure transactions, shows moderate adoption but significant room for improvement. Items such as "secure password and data protection tools" (mean = 3.48) and "internet security free from cyber threats" (mean = 3.34) indicate that while basic security measures are in place, more comprehensive security practices may be lacking. According to Prince, Femi, and Ayorinde (2024), real estate firms are increasingly vulnerable to cyber attacks, making security competencies essential for protecting client information and maintaining professional standards.

Digital Emotional Intelligence recorded the lowest overall mean score of 3.34, ranking eighth. This finding is particularly significant given Akinwamide and Bello's (2019a) demonstration of the positive correlation between digital emotional intelligence and real estate digital marketing performance. Items such as "touchpoint identification in digital client interactions" (mean = 3.36), "empathetic listening through digital channels" (mean = 3.30), and "data-driven consumer behavior analysis for relationship building" (mean = 3.26) all recorded relatively low scores. The moderate adoption level suggests that many firms have not yet fully developed the capacity to translate digital interactions into emotionally resonant client experiences, potentially limiting their ability to build lasting client relationships in the digital space.

Comparative analysis between Lagos and Abuja reveals consistently higher adoption scores for Lagos firms across all digital intelligence competencies. The most significant differences were observed in digital identity (Lagos: 3.86, Abuja: 3.44) and digital emotional intelligence (Lagos: 3.50, Abuja: 3.16), suggesting that the more competitive Lagos market has driven greater investment in sophisticated digital capabilities. According to Braesemann and Baum (2020), market competitiveness often accelerates digital transformation, as firms seek to differentiate themselves through superior digital service delivery. The consistently higher scores across all competencies suggest that Lagos firms may be at a more advanced stage of digital transformation compared to their Abuja counterparts, reflecting the different market dynamics and competitive pressures in the two cities.

4.4: Relationship of Digital Intelligence with Real Estate Business Operation

The second objective determines the relationship of digital intelligence with real estate business operations. The analytical tools employed for this objective included regression analysis. Respondents were asked to rate their level of agreement with statements describing potential relationship on a five-point Likert scale.

Table 5: Digital Intelligence Relationship with Real Estate Business Operation

Category and Items	Lagos Mean (n=408)	Abuja Mean (n=168)	Overall Mean	Rank
Relationship with Business Operations				
Improved communication efficiency	4.40	4.30	4.36	1
Faster transaction processing	4.36	4.22	4.30	2

Enhanced documentation and record-keeping	4.30	4.18	4.26	3
Reduced operational costs	4.10	3.96	4.05	4
Better staff productivity	4.06	3.92	4.00	5
Improved data management capabilities	4.02	3.88	3.97	6

Table 5 presents the descriptive statistics of the relationship of digital intelligence with real estate business operations. The findings revealed strong positive relationship. The highest-rated association were improved communication efficiency (mean = 4.36), faster transaction processing (mean = 4.30), and enhanced documentation and record-keeping (mean = 4.26). These findings align with observations by Ullah, Sepasgozar, and Wang (2018) that digital technologies streamline real estate operations by automating routine tasks, reducing paperwork, and enabling real-time communication among stakeholders. The relatively lower scores for reduced operational costs (mean = 4.05) and better staff productivity (mean = 4.00) suggest that while cost benefits are recognized, the primary operational benefits may be in service quality and speed rather than direct cost reduction.

4.5: Relationship of Digital Intelligence with Real Estate Client Satisfaction

The third objective determines the relationship of digital intelligence with real estate client satisfaction. The analytical tools employed for this objective included regression analysis. Respondents were asked to rate their level of agreement with statements describing potential relationship on a five-point Likert scale.

Table 6: Digital Intelligence Relationship with Client Satisfaction

Relationship with Client Satisfaction	**Lagos Mean (n=408)**	**Abuja Mean (n=168)**	**Overall Mean**	**Rank**
Enhanced accessibility to property information	4.22	4.06	4.16	1
Improved responsiveness to client inquiries	4.16	4.00	4.10	2
Greater transparency in transactions	4.06	3.90	4.00	3
Better communication experience	4.00	3.86	3.94	4
Increased trust in service provider	3.90	3.76	3.84	5
Enhanced overall satisfaction	3.86	3.76	3.82	6

From Table 6, client satisfaction relationship recorded mean scores ranging from 3.82 to 4.16, with enhanced accessibility to property information (mean = 4.16) and improved responsiveness

to client inquiries (mean = 4.10) receiving the highest ratings. These findings support the service quality framework proposed by Parasuraman, Zeithaml, and Berry (1994), which identifies responsiveness and information accessibility as key determinants of perceived service quality. According to Akinwamide, Oyetunji, and Hahn (2021), digital intelligence enables real estate professionals to provide more timely and accurate information to clients, thereby enhancing satisfaction and building trust. Greater transparency in transactions recorded a mean score of 4.00, reflecting the role of digital platforms in providing clear, traceable records of property transactions. This is particularly significant in the Nigerian context, where concerns about fraud and information asymmetry have historically challenged real estate transactions.

4.6 Digital Intelligence Relationship with Market Competitiveness

The fourth objective determines the relationship of digital intelligence with market competitiveness. The analytical tools employed for this objective included regression analysis. Respondents were asked to rate their level of agreement with statements describing potential relationship on a five-point Likert scale.

Table 7: Digital Intelligence Relationship with Market Competitiveness

Relationship with Market Competitiveness	Lagos Mean (n=408)	Abuja Mean (n=168)	Overall Mean	Rank
Improved ability to compete with other firms	4.10	4.00	4.06	1
Enhanced market reach and visibility	4.06	3.92	4.00	2
Better client retention rates	3.96	3.80	3.90	3
Increased market share	3.90	3.76	3.84	4
Enhanced firm reputation	3.86	3.70	3.79	5
Access to new market segments	3.80	3.66	3.74	6

Digital intelligence with market competitiveness relationship recorded mean scores between 3.74 and 4.06, with improved ability to compete with other firms (mean = 4.06) and enhanced market reach and visibility (mean = 4.00) receiving the highest ratings. These findings suggest that digital intelligence adoption provides strategic advantages in increasingly competitive real estate markets. According to Baum, Saull, and Braesemann (2020), firms that effectively leverage digital technologies gain significant advantages in attracting clients, differentiating their services, and capturing market share. The slightly lower scores for enhanced firm reputation (mean = 3.79)

and access to new market segments (mean = 3.74) suggest that while digital adoption provides competitive benefits, this may take time to materialize fully as firms build digital capabilities and market recognition.

4.6: Hypothesis Testing for H_{01}, H_{02} and H_{03}: Digital Intelligence Relationship with Real Estate Business Operation, Client Satisfaction and Market Competitiveness

To formally test the null hypothesis that there is no significant relationship between digital intelligence adoption and real estate business operations, client satisfaction, and market competitiveness, simple linear regression analysis was conducted

Table 8: Regression Analysis of Digital Intelligence Relationship with Real Estate Business Operation

Dependent Variable	R	R^2	Adjusted R^2	F	Sig.	B	T	Sig.
Business Operations	0.618	0.382	0.376	41.82	0.000	0.618	6.47	0.000

Table 8 presents the results of the regression analysis. For business operations, the model was significant ($F = 41.82$, $p < 0.001$), with digital intelligence adoption explaining 38.2 percent of the variance ($R^2 = 0.382$). The standardized regression coefficient ($R = 0.618$, $p < 0.001$) indicated a strong positive relationship, confirming that higher levels of digital intelligence adoption are associated with improved business operational performance.

Table 9: Regression Analysis of Digital Intelligence Relationship with Client Satisfaction

Dependent Variable	R	R^2	Adjusted R^2	F	Sig.	B	T	Sig.
Client Satisfaction	0.591	0.349	0.343	38.44	0.000	0.591	6.20	0.000

For client satisfaction, the regression model was also significant ($F = 38.44$, $p < 0.001$), with digital intelligence adoption explaining 34.9 percent of the variance ($R^2 = 0.349$). The standardized regression coefficient ($R = 0.591$, $p < 0.001$) demonstrated a substantial positive

relationship, supporting the theoretical proposition that digital capabilities enhance service quality and client satisfaction (Akinwamide & Hahn, 2022).

Table 10: Regression Analysis of Digital Intelligence Relationship with Market Competitiveness

Dependent Variable	R	R^2	Adjusted R^2	F	Sig.	β	T	Sig.
Market Competitiveness	0.570	0.325	0.319	35.22	0.000	0.570	5.94	0.000

For market competitiveness, the model explained 32.5 percent of the variance ($R^2 = 0.325$), with a significant positive regression coefficient ($R = 0.570$, $p < 0.001$). Based on these findings, the null hypotheses (H_{01}, H_{02}, and H_{03}) are rejected, and the alternative hypotheses are accepted, confirming that digital intelligence adoption has a significant positive relationship with real estate business operations, client satisfaction, and market competitiveness in the study areas.

5.0 Discussion of Findings

The significant positive relationship of digital intelligence adoption with business operations, client satisfaction, and market competitiveness provide empirical support for the value proposition of digital transformation in real estate. The strong relationship with business operations reflects the efficiency gains achievable through digital tools, which automate routine tasks, streamline communication, and enhance information management. According to Ullah, Sepasgozar, and Wang (2018), these operational improvements translate into tangible benefits including faster transaction processing, reduced costs, and improved staff productivity. The association with client satisfaction supports the theoretical proposition that digital capabilities enhance service quality by improving responsiveness, accessibility, and transparency. According to Parasuraman, Zeithaml, and Berry's (1994) SERVQUAL framework, these dimensions are fundamental determinants of perceived service quality.

6.0 Conclusion

The study concludes that digital intelligence adoption significantly enhances real estate service delivery quality, business operations, client satisfaction, and market competitiveness. The strong positive relationships documented across multiple outcome variables provide compelling evidence that investment in digital capabilities yields substantial returns for real estate firms and benefits for their clients. This finding positions digital intelligence as a tool that real estate

practitioners can leverage on to expand their market share. This suggests that firms failing to develop digital competencies may experience competitive disadvantage in increasingly technology-driven markets. The regression models demonstrated that digital intelligence explains between 32.5 and 38.2 percent of the variance in key performance outcomes, indicating that digital capabilities could likely be among the most important determinants of contemporary real estate practice effectiveness.

7.0 Recommendation

- Real estate practitioners and firms should prioritize the systematic development of digital intelligence competencies across all eight dimensions identified in this study. Given the finding that digital communication and basic digital use are already well-developed, attention should focus on strengthening weaker competencies including digital security, digital safety, digital emotional intelligence, and digital rights.
- Firms should adopt a strategic approach to technology adoption that aligns digital investments with business objectives and client needs. Rather than adopting technologies reactively or imitatively, firms should assess their market positioning, client demographics, and competitive context to identify technologies that offer the greatest strategic value.

9.0 Limitation of the Study

While this study makes significant contributions, several limitations should be acknowledged when interpreting its findings and considering their implications. These limitations relate to geographical scope, research design, measurement, and sampling.

The study's geographical scope was limited to Lagos and Abuja, two major urban markets that may not fully represent real estate practice across Nigeria's diverse regions. While these cities account for substantial property market activity and were deliberately selected as the focus of this investigation, rural and smaller urban markets may exhibit different patterns of digital adoption influenced by distinct contextual factors. The findings may not be generalizable to other Nigerian cities or to rural areas where infrastructure, market conditions, and client characteristics

may differ substantially. Future research should extend geographical coverage and study population to include other Nigerian cities and professional in the built environment, providing a more comprehensive picture of digital intelligence impact nationwide.

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