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APPLICATION OF ARTIFICIAL INTELLIGENCE IN ADDRESSING MANAGEMENT CHALLENGES OF PUBLIC RESIDENTIAL PROPERTIES IN LAGOS, NIGERIA

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ABSTRACT

Public residential property management in Lagos faces persistent structural failures, including deferred maintenance, rent collection inefficiency, allocation opacity, and poor records management. Artificial intelligence (AI) offers tools that may address these failures, yet empirical research on how property management professionals in Lagos perceive AI in this context remains scarce. This study assessed the severity of management challenges in LSDPC-managed estates, determined the level of AI awareness and use, and examined the perceived usefulness of AI tools and the barriers to their adoption among 120 property management professionals drawn from LSDPC and the Lagos State Ministry of Housing, using a cross-sectional survey design. Data were analysed using percentages, mean scores, standard deviations, ranking, and Pearson correlation. Results show that deferred maintenance and infrastructure decay ranked as the most severe challenge (mean = 4.55), while ML-based predictive maintenance recorded the highest perceived usefulness (mean = 4.38) and five of the six AI tools exceeded the usefulness threshold. Awareness of the tools was moderate (42.5% to 64.2%) and current use was low (7.5% to 18.3%). Inadequate digital infrastructure was the leading barrier to AI adoption (mean = 4.47). AI awareness correlated positively with perceived usefulness ($r = 0.61$, $p < 0.01$). Findings are discussed within the Technology Acceptance Model and the Diffusion of Innovations theory. The study recommends a planned maintenance programme supported by digital condition records, phased AI pilot programmes in high-density LSDPC estates, the integration of AI literacy into continuing professional development and a targeted PropTech policy by the Lagos State Government.

Keywords: artificial intelligence, Lagos, predictive maintenance, property management, public housing, Technology Acceptance Model, tenant management

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Introduction

Lagos is Nigeria's most urbanised state, and it has one of the most strained public housing systems on the continent. The city's residential property deficit currently stands at 3.4 million units, a figure that has widened over the past decade despite multiple government interventions (RIRFHUD, 2025). Nationally, the picture is no better: the National Housing Data Technical Committee placed Nigeria's housing shortfall at 14.925 million units in January 2026, with an additional 15.2 million existing homes classified as structurally inadequate (Federal Ministry of Housing and Urban Development [FMHUD], 2026). The Lagos State Development and Property Corporation (LSDPC), established in 1972, remains the primary public agency responsible for developing and managing affordable residential properties in the state and has delivered over 20,000 units across multiple schemes since its inception (LSDPC, 2025).

Yet the quantity problem is not the only concern. How these properties are managed once built is, arguably, the more immediate policy failure. Studies of LSDPC-managed estates consistently document deferred maintenance, irregular rent collection, opaque allocation procedures, and absent digital records (Ajayi et al., 2023; Ibrahim, 2025; Makinde, 2020). Buildings begin deteriorating shortly after completion. Accountability mechanisms are weak. Moreover, the professionals responsible for day-to-day estate management often work without the data systems or tools that would make their job manageable.

Artificial intelligence presents one avenue for redress. In property and facilities management globally, AI tools including machine learning-based predictive maintenance, automated rent platforms, and GIS-integrated asset mapping systems have demonstrated measurable improvements in maintenance efficiency, financial tracking, and records management (Bouabdallaoui et al., 2021; Musa et al., 2022). Within Nigeria, AI is increasingly deployed in real estate and property services (Aanda Consulting, 2025; Businessday NG, 2025). However, the application of AI to the management of public residential estates in Lagos, specifically, remains largely unexamined.

This study addresses that gap. It pursues four objectives. It assesses the nature and severity of management challenges confronting public residential properties in Lagos, examines the perceived usefulness of AI tools in addressing those challenges as reported by property management professionals operating within LSDPC-managed estates, determines the level of AI awareness and current use among these professionals, and identifies the perceived barriers to AI adoption. Findings are grounded in the Technology Acceptance Model (TAM) and the Diffusion of Innovations theory, and the paper concludes with research-based recommendations for policy and practice.

Aim and objectives of the study

The aim of this study is to assess the management challenges of public residential properties in Lagos and to examine how property management professionals perceive the use of artificial intelligence in addressing them. The specific objectives are to:

1. assess the severity of management challenges in LSDPC-managed public residential estates in Lagos;
2. examine the perceived usefulness of AI tools in addressing those challenges;
3. determine the level of AI awareness and current use among property management professionals; and
4. identify the perceived barriers to the adoption of AI in public residential property management.

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Research questions

1. How severe are the management challenges confronting LSDPC-managed public residential estates in Lagos?
2. How useful do property management professionals perceive AI tools to be in addressing these challenges?
3. What is the level of AI awareness and current use among these professionals?
4. What barriers do these professionals perceive to the adoption of AI in public residential property management?

Hypotheses

The correlation analysis between AI awareness and perceived usefulness is guided by the following hypotheses:

1. H0: There is no statistically significant relationship between AI awareness and the perceived usefulness of AI tools among property management professionals in LSDPC-managed estates.
2. H1: There is a statistically significant positive relationship between AI awareness and the perceived usefulness of AI tools among property management professionals in LSDPC-managed estates.

Literature review

Public residential property management in Lagos and Nigeria

The LSDPC has managed public residential estates across Lagos since 1972, spanning low-cost developments in Abesan, Jakande, Amuwo Odofin, Iponri, and Dolphin Estate (LSDPC, 2025). Table 1 summarises the principal estates, their locations, approximate unit counts, and the management challenges most frequently reported in the literature.

Table 1

Key LSDPC-Managed Estates in Lagos and Documented Management Challenges

Estate	Location	Year Est.	Approx. Units	Key Management Issues Reported
Iponri Estate	Surulere	1970s	~500	Maintenance failure, rent disputes
Abesan Estate	Ipaja	1980s	~3,000	Infrastructure decay, illegal subletting
Jakande Estate	Ikorodu	1980s	~1,000+	Poor records, allocation irregularities
Amuwo Odofin Est.	Amuwo Odofin	1980s	~600	Deferred maintenance, rent arrears
Dolphin Estate	Ikoyi	1970s	~300	Ageing infrastructure, occupancy disputes

Note. Sources: LSDPC (2025); Abdullahi & Bustani (2020); Makinde (2020).

The management failures documented across these estates are not isolated. Abdullahi and Bustani (2020) found that low-cost federal housing estates in Lagos, including the Jakande Estate in Ikorodu, suffer from a combination of absent preventive maintenance schedules, poor contract administration, and weak enforcement of tenancy obligations. Buildings begin demanding repair almost immediately after completion, yet institutional mechanisms for systematic maintenance barely exist (Ibrahim, 2025). Nationally, Ajayi et al. (2023) identify a structural disconnect at the root of the problem: local authorities responsible for estate management lack direct access to the

rents collected by central agencies, creating a funding gap that renders proactive maintenance nearly impossible.

Allocation is a separate but related problem. Makinde (2020) documents how allocation procedures in Nigerian public housing have historically favoured higher-income applicants, with corruption and nepotism shaping outcomes in ways that contradict stated social housing objectives. The Centre for Affordable Housing Finance Africa (CAHF, 2024) notes that over 80% of Lagos residents live in informal or rented housing, a situation compounded by public estate allocation processes that are widely regarded as neither transparent nor equitable (Makinde, 2020).

Management challenges: A typology

Six challenge clusters appear consistently across the literature on public housing management in Nigeria. Table 2 maps each challenge to the AI tools examined later in this study, establishing the analytic link between the problem and the proposed intervention.

Table 2

Mapping of Management Challenges to Applicable AI Tools

Management Challenge	Applicable AI Tool	Functional Role
Maintenance failure	Predictive maintenance (ML/IoT)	Detects faults before failure occurs
Rent collection inefficiency	Automated payment and arrears ML	Real-time tracking; default prediction
Allocation opacity	Decision support / blockchain-AI	Transparent, auditable allocation
Poor records management	GIS-AI asset mapping / NLP	Digital inventory and spatial tracking
Governance gaps	AI dashboards / data analytics	Performance monitoring and reporting
Subletting and occupancy violations	Tenant screening / occupancy analytics	Flags irregular occupancy and applicant risk

Note. Sources: Abdullahi & Bustani (2020); Ajayi et al. (2023); Bouabdallaoui et al. (2021); Ibrahim (2025); Musa et al. (2022).

Each mapping in Table 2 draws on documented applications elsewhere. Predictive maintenance using machine learning has been validated in building facilities management by Bouabdallaoui et al. (2021), whose five-step framework demonstrated the capacity of IoT-linked deep learning models to anticipate HVAC failures before they occur. Kang et al. (2022) reached a similar conclusion through a systematic review of machine learning applications in building maintenance, finding consistently that ML-based approaches outperform reactive schedules in reducing downtime and cost. For rent management, AI platforms that track tenant payment patterns and flag potential defaults are already operating in Lagos's private real estate sector (Aanda Consulting, 2025; Hontar Projects, 2024), though their application in public estates remains minimal. GIS-integrated AI for asset mapping addresses the records problem directly (Musa et al., 2022).

AI in property management and urban governance

Musa et al. (2022) conducted a bibliometric analysis of 175 Scopus-indexed articles on AI and property management published between 1980 and 2021, finding that post-2019 literature shifted sharply toward AI-enabled risk management and disruption response. The Nigerian context, however, is barely represented. Igbokwe-Ibeto and Osakede (2026) provide one of the few African public-sector studies, finding that AI adoption in African government institutions can deliver efficiency gains but introduces risks including cybersecurity vulnerabilities and algorithmic bias in service delivery. Egba et al. (2026) extend this argument to urban governance specifically, arguing that AI enables a shift from reactive to predictive management in African city systems, though they caution that institutional frameworks must be in place before tools can deliver at scale.

Within Nigeria, Adeyemi et al. (2025) applied machine learning to project risk management in the Lagos Water Corporation, demonstrating the feasibility of AI in a Nigerian public infrastructure context. A Businessday NG (2025) report on AI and property design in Nigeria points to growing industry awareness, even if adoption in the public sector lags considerably behind private-sector interest. Abugamea and Ahmad (2024) provide empirical grounding from a comparative government study, finding that the relationship between perceived usefulness and adoption intention in government settings is mediated significantly by organisational readiness and legal frameworks.

Theoretical framework

Two theoretical frameworks guide this study. The Technology Acceptance Model, first proposed by Davis (1989) and operationalised in this study through Zhang et al. (2025), provides the primary lens for understanding why property management professionals might or might not perceive AI tools as useful. TAM's core constructs (perceived usefulness and perceived ease of use) map directly onto the study's second objective. Prior applications of TAM to organisational AI adoption confirm its fit: Zhang et al. (2025) found that perceived usefulness was the single strongest predictor of AI adoption intention across a sample of 420 respondents from multiple industries, with top management support amplifying the effect through the perceived usefulness pathway.

The Diffusion of Innovations theory, propounded by Rogers (2003), provides the second framework. Its five innovation attributes (relative advantage, compatibility, complexity, trialability, and observability) are used here to interpret awareness levels and adoption barriers among Lagos property management professionals. Nwaimo et al. (2024) described these attributes in a survey of 318 officials in federal and Imo State ministries, departments and agencies. Absent ICT infrastructure and financial constraints ranked as the leading barriers to technology adoption in that survey. Figure 1 presents the conceptual framework that integrates both theories for this study.

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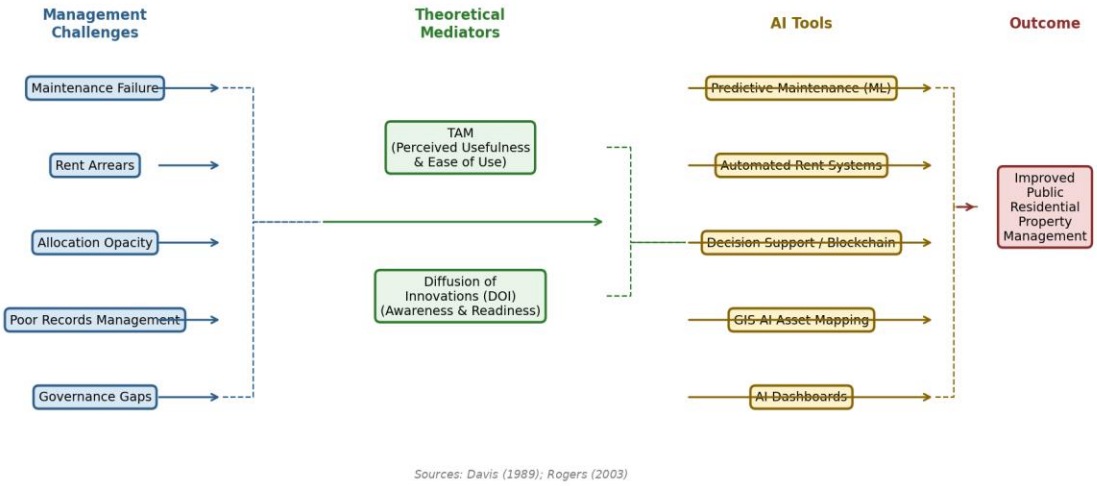


Figure 1. Conceptual Framework Integrating TAM and Diffusion of Innovations for AI Adoption in Lagos Public Residential Property Management. Sources: Davis (1989); Rogers (2003).

Methodology

Research design and study area

A quantitative cross-sectional survey was adopted, consistent with a positivist epistemological stance. Cross-sectional designs are appropriate for measuring professional perceptions across a defined population at a single point in time (Abugamea & Ahmad, 2024). The study area is Lagos State, with specific focus on LSDPC-managed estates in Surulere (Iponri), Amuwo Odofin, Ipaja (Abesan), Ikorodu (Jakande) and Ikoyi (Dolphin). These locations represent the densest concentration of public residential stock in the state and largely correspond to the estates documented in Table 1.

Population and sampling

The target population comprised estate surveyors, property and facilities managers, housing officers, and maintenance supervisors employed by LSDPC and the Lagos State Ministry of Housing. Purposive sampling was used to ensure respondents held direct property management responsibilities, supplemented by snowball referrals to reach professionals across multiple estates. Sample size was determined using Cochran's (1977) formula for unknown populations at a 95% confidence level and a 0.10 margin of error, yielding a minimum of 96 respondents.

Cochran's formula assumes random selection, so it served as a guide to the minimum number of responses rather than a basis for inference. The wider 0.10 margin was accepted because the study is exploratory and aims to describe perceptions, not to estimate population parameters. Purposive and snowball selection ensured that every respondent held direct management responsibility for estates. The 120 usable responses exceed the minimum and correspond to a margin of error of about 0.09 at the same confidence level. A total of 135 questionnaires were distributed; 120 were returned complete, giving a response rate of 88.9%.

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Research instrument

A structured questionnaire covering five areas was developed and pilot-tested with 15 respondents before full administration. Table 3 summarises the instrument structure.

Table 3

Structure of the Research Instrument

Component	Content	Scale / Format
Respondent profile	Designation, experience and estate	Categorical
Challenge severity	Severity of management challenges (8 items)	5-point Likert (1 = Not severe, 5 = Extremely severe)
AI awareness and use	Awareness and current use of six AI tools, with two items on frequency of use (8 items)	Yes/No + frequency
Perceived usefulness	Usefulness of AI tools for each challenge (6 items)	5-point Likert (1 = Not useful, 5 = Extremely useful)
Adoption barriers	Barriers to AI adoption (7 items)	5-point Likert (1 = Strongly disagree, 5 = Strongly agree)

Note. Source: Authors' instrument design.

Content validity was established through review by three academic experts in estate management and information technology. Reliability was assessed using Cronbach's alpha, with all three scaled sets of items returning values above the 0.70 threshold recommended by Nunnally (1978): challenge severity ($\alpha = 0.83$), perceived usefulness ($\alpha = 0.87$), and adoption barriers ($\alpha = 0.81$).

Data collection and analysis

Questionnaires were administered both online via Google Forms and in person at LSDPC headquarters and selected estate offices over four weeks in January and February 2026. Ethical approval was obtained for the study, informed consent was obtained from all participants, and all respondents were assured of anonymity. Data were analysed using IBM SPSS Statistics (Version 25). Mean scores and standard deviations were computed for the severity, usefulness and barrier items; items with mean scores at or above 3.00 on the severity scale were deemed severe, and those at or above 3.50 on the usefulness scale were classified as useful. The severity threshold of 3.00 is the scale midpoint, so any challenge rated above neutral was treated as present. The usefulness threshold of 3.50 marks the conventional lower bound of agreement on a five-point scale, which required judgements to be clearly favourable. For the barrier items, items with mean scores at or above 3.00 were treated as barriers, with means of 4.00 and above classified as major and those between 3.00 and 3.99 as moderate. Pearson correlation was used to test the association between AI awareness levels and perceived usefulness scores. Awareness was scored for each respondent as the number of the six AI tools in Table 6 that the respondent reported knowing (Yes = 1, No = 0), giving a score from 0 to 6, and perceived usefulness was the mean of the respondent's ratings on the six usefulness items.

Results and discussion

Respondent profile

Table 4 presents the demographic characteristics of the 120 respondents. The largest professional group was estate surveyors (31.7%), followed by housing officers (26.7%). The

largest group of respondents (42.5%) had between five and ten years of experience, suggesting a mid-career cohort with sufficient operational context to assess both existing challenges and prospective technologies. Abesan and Jakande estates accounted for the majority of primary work locations (53.3% combined), consistent with their status as the highest-density LSDPC estates in the sample.

Table 4

Demographic Profile of Respondents

Variable	Category	Frequency (n)	Percentage (%)
Designation	Estate Surveyor	38	31.7
	Housing Officer	32	26.7
	Facilities Manager	28	23.3
	Maintenance Supervisor	22	18.3
Years of experience	< 5 years	29	24.2
	5-10 years	51	42.5
	> 10 years	40	33.3
Primary estate managed	Abesan / Ipaja	35	29.2
	Jakande / Ikorodu	29	24.2
	Amuwo Odofin	24	20.0
	Iponri / Surulere	18	15.0
	Others (Dolphin, etc.)	14	11.7

Note. Source: Research Survey (2026). n = 120.

Severity of management challenges (Objective 1)

Table 5 presents mean severity scores for the eight management challenge items. All eight items exceeded the 3.00 decision threshold, indicating consensus that each challenge is a real and present problem in LSDPC estates. Figure 2 presents these results visually.

Table 5

Mean Severity Scores for Management Challenges in Lagos Public Residential Estates

Management Challenge	Mean	SD	Rank	Decision
Deferred maintenance and infrastructure decay	4.55	0.61	1	Severe
Absence of maintenance planning systems	4.42	0.67	2	Severe
Rent collection inefficiency and arrears	4.31	0.72	3	Severe
Lack of digital tenant and asset records	4.29	0.74	4	Severe
Poor inter-agency coordination	4.18	0.79	5	Severe
Corruption and opacity in allocation	4.05	0.83	6	Severe
Illegal subletting and occupancy violations	3.97	0.88	7	Severe
Inadequate staffing and professional capacity	3.88	0.91	8	Severe

Note. Source: Research Survey (2026). n = 120. Decision rule: mean ≥ 3.00 = challenge is severe. Ranked 1 = most severe.

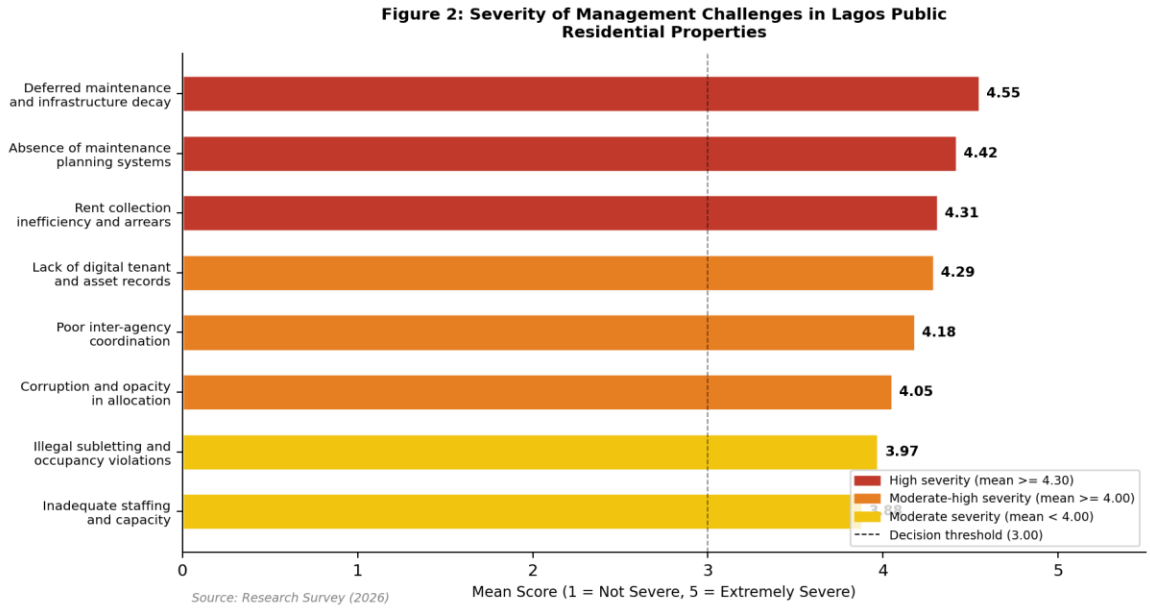


Figure 2. Severity Ranking of Management Challenges in Lagos Public Residential Properties. Source: Research Survey (2026).

Deferred maintenance and infrastructure decay ranked first (mean = 4.55, SD = 0.61). This finding is consistent with Ibrahim (2025), whose case study of a public residential quarters in Bauchi documented biological deterioration alongside plumbing failures at 61.8%. The absence of maintenance planning systems ranked second (mean = 4.42), a result that aligns with Ajayi et al.'s (2023) finding that no clearly defined institutional framework for housing maintenance exists in Nigerian public estate management. Rent collection inefficiency and arrears ranked third (mean = 4.31), corroborating the observation by Abdullahi and Bustani (2020) that management of low-cost housing in Lagos extends well beyond physical maintenance to include chronic financial administration failures.

Corruption and opacity in allocation ranked sixth (mean = 4.05) but carried the highest standard deviation among the top six items (0.83), suggesting greater variation in how severely respondents assessed this challenge. That variance is not surprising. Respondents who work primarily on estate maintenance may have less direct exposure to allocation procedures than those in administrative roles. Makinde (2020) and CAHF (2024) both document the allocation problem extensively at the systemic level, but its severity is perhaps less uniformly experienced across job roles than physical maintenance failures, which affect every estate professional daily.

AI awareness and current use

Table 6 presents awareness and current use figures for six AI tools. Awareness was moderate across all tools, ranging from 42.5% for AI-powered tenant management systems to 64.2% for automated rent collection systems. But current use was uniformly low, peaking at 18.3% for automated rent systems.

Table 6

AI Awareness and Current Use Among Property Management Professionals

AI Tool / Application	Aware (%)	Currently Using (%)
Predictive maintenance software	58.3	12.5
Automated rent collection systems	64.2	18.3
GIS-based asset mapping	49.2	9.2
AI-powered tenant management systems	42.5	7.5
Decision support systems	51.7	11.7
Data analytics dashboards	55.8	14.2

Note. Source: Research Survey (2026). n = 120.

The gap between awareness and use is telling. Knowing that a tool exists and actually deploying it within a public estate management context are separated by infrastructure, funding, institutional culture, and policy. This pattern reflects the gap between the knowledge and implementation stages in Rogers's (2003) account of adoption. It also matches the finding of Nwaimo et al. (2024) that infrastructure and funding constraints dominate technology adoption in Nigerian government institutions. GIS-based asset mapping recorded the second-lowest awareness (49.2%) and second-lowest current use (9.2%), after AI-powered tenant management systems (42.5% and 7.5% respectively). This may be because it requires spatial data infrastructure that most LSDPC offices do not possess.

Perceived usefulness of AI tools (Objective 2)

Table 7 presents perceived usefulness scores for six AI applications, each linked to a specific management challenge. Five of the six tools exceeded the 3.50 usefulness threshold. Figure 3 provides a visual comparison.

Table 7

Perceived Usefulness of AI Tools Among Property Management Professionals

AI Application	Challenge Addressed	Mean	SD	Rank	Decision
ML predictive maintenance	Infrastructure decay	4.38	0.65	1	Useful
Automated rent tracking	Rent arrears	4.21	0.71	2	Useful
GIS-AI asset mapping	Poor records	3.95	0.82	3	Useful
AI decision support (allocation)	Allocation opacity	3.78	0.89	4	Useful
AI governance dashboards	Coordination gaps	3.62	0.94	5	Useful
Tenant screening algorithms	Subletting violations	3.44	1.01	6	Below threshold

Note. Source: Research Survey (2026). n = 120. Decision rule: mean ≥ 3.50 = perceived as useful. Ranked 1 = highest perceived usefulness.

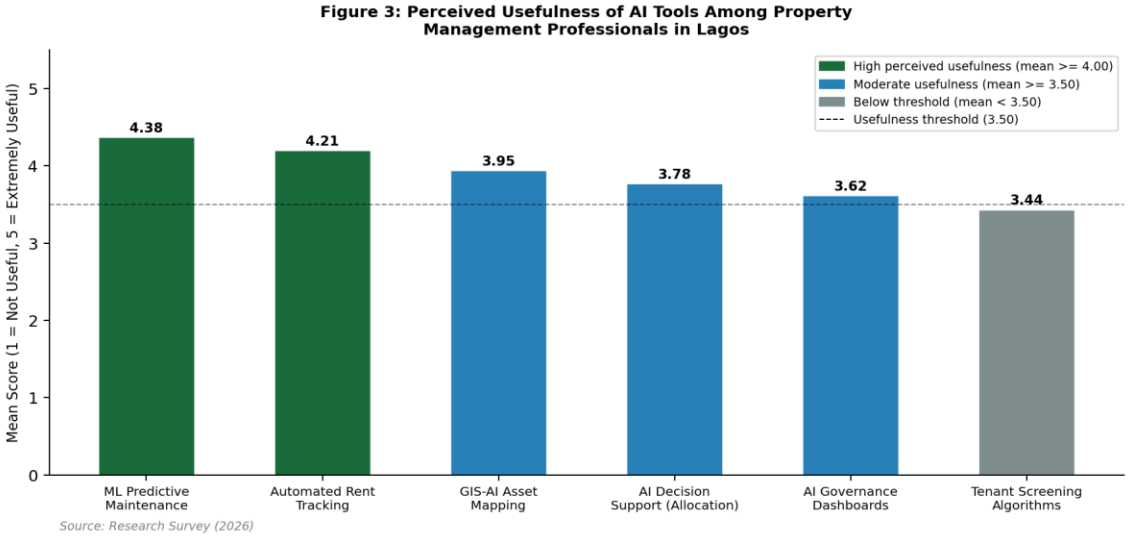


Figure 3. Perceived Usefulness of AI Tools Among Property Management Professionals in Lagos. Source: Research Survey (2026).

ML-based predictive maintenance recorded the highest perceived usefulness (mean = 4.38), which is logically consistent with the severity ranking, where maintenance failure topped the challenge list. Respondents appear to recognise that the most pressing problem on their estates is also the one where AI has the most direct and concrete solution. Bouabdallaoui et al. (2021) demonstrated this in a building facility management application, and Kang et al. (2022) reported through a systematic review that ML-based maintenance prediction consistently delivers measurable performance improvements in building facilities. The alignment between challenge severity and tool usefulness across the two leading tools, maintenance and rent collection, which correspond to the first and third most severe challenges, suggests that respondents are not evaluating AI in the abstract; they are mapping tools onto felt problems.

Tenant screening algorithms fell below the 3.50 threshold (mean = 3.44). This is the one outlier. One reading is that respondents regard allocation and screening as sensitive governance functions, ones where the perceived risks of algorithmic decision-making outweigh efficiency gains. Igbokwe-Ibeto and Osakede (2026) raise exactly this concern at the systemic level, noting that bias in AI decision-making poses particular risks in public service contexts. The lower score may also reflect lower familiarity with what tenant screening algorithms actually do, since awareness of AI-powered tenant management systems was the lowest of any tool in Table 6.

Pearson correlation analysis revealed a statistically significant positive relationship between AI awareness and perceived usefulness ($r = 0.61$, $p < 0.01$), so the null hypothesis was rejected in favour of H1, meaning that professionals who were more aware of AI tools tended to rate them as more useful. This finding is consistent with Zhang et al. (2025), whose TAM-based analysis found that perceived usefulness is strongest among respondents with prior technology exposure. It suggests that targeted AI literacy programmes may shift perceived usefulness upward, a practical implication taken up in the recommendations section.

Barriers to AI adoption

Table 8 and Figure 4 summarise the perceived barriers to AI adoption. All seven items exceeded the 3.00 threshold. Inadequate digital infrastructure ranked first (mean = 4.47), a barrier so fundamental that it precedes any question of tool selection or professional willingness.

Table 8

Perceived Barriers to AI Adoption in Public Residential Property Management

Barrier to AI Adoption	Mean	SD	Rank	Classification
Inadequate digital infrastructure	4.47	0.59	1	Major
Insufficient funding for technology	4.24	0.66	2	Major
Low AI literacy among staff	4.08	0.74	3	Major
Lack of government policy on PropTech	3.91	0.81	4	Moderate
Institutional resistance to change	3.84	0.87	5	Moderate
Cybersecurity and privacy concerns	3.61	0.93	6	Moderate
Data unavailability and poor record culture	3.52	0.97	7	Moderate

Note. Source: Research Survey (2026). n = 120. Ranked 1 = most significant barrier. Classification: mean ≥ 4.00 = major; 3.00 to 3.99 = moderate.

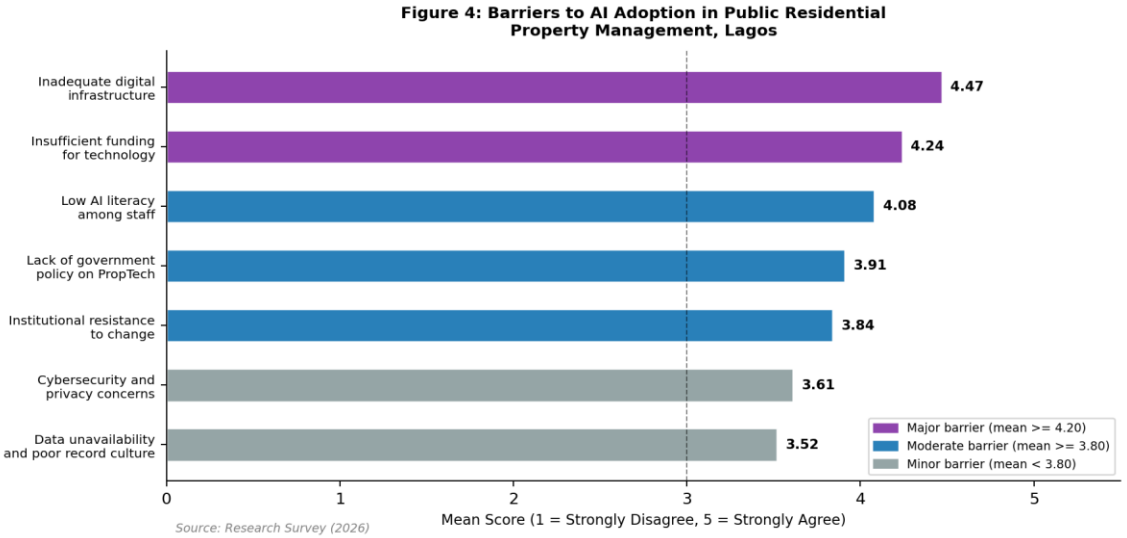


Figure 4. Barriers to AI Adoption in Public Residential Property Management, Lagos. Source: Research Survey (2026).

The top three barriers, infrastructure deficiency, funding constraints, and AI literacy gaps, reflect material conditions that no amount of professional willingness can resolve independently. Nwaimo et al. (2024) reached a similar conclusion in their Nigerian government study: absent ICT infrastructure and financial constraints ranked ahead of resistance to change among the barriers to technology adoption in ministries, departments and agencies (MDAs). Institutional resistance to change ranked fifth (mean = 3.84), which is lower than might be expected. This result should, however, be interpreted with caution, because resistance may be underreported in a professional sample, where respondents could perceive their own openness to AI as more socially acceptable than acknowledging institutional inertia.

Lack of government policy on PropTech ranked fourth (mean = 3.91). Egba et al. (2026) argue that AI in African urban governance can only deliver at scale when embedded in institutional policy frameworks. Without a Lagos State or federal PropTech policy that mandates the digitisation of estate records, the automation of rent collection and the piloting of predictive maintenance, the tools are likely to remain at the knowledge stage described in Rogers's (2003) framework, known but undeployed.

Conclusion

This study set out to assess management challenges in public residential properties in Lagos and to examine property management professionals' perceptions of AI as a tool for addressing those challenges. On the first objective, the findings are clear: all eight management challenge items exceeded the severity threshold, with deferred maintenance topping the ranking (mean = 4.55) and absence of maintenance planning systems close behind (mean = 4.42). These are not perceptual anomalies; they corroborate decades of documented findings on public estate conditions in Lagos and Nigeria more broadly (Abdullahi & Bustani, 2020; Ajayi et al., 2023; Ibrahim, 2025).

On the second objective, respondents expressed positive perceptions of AI across five of six tools tested, with ML-based predictive maintenance and automated rent tracking generating the highest usefulness scores. The alignment between challenge severity rankings and perceived usefulness rankings is notable: professionals are not endorsing AI tools in the abstract; they are connecting specific tools to the specific problems they confront daily. The single tool that fell below threshold, tenant screening algorithms, points to understandable professional caution about algorithmic involvement in sensitive allocation decisions.

Barriers are real and structural. Inadequate digital infrastructure, insufficient funding, and low AI literacy are not problems that individual institutions can resolve alone. They require policy intervention at the state and federal levels.

Recommendations

Based on the findings, four recommendations are offered, one for each objective of the study.

1. Deferred maintenance and infrastructure decay (mean = 4.55) and the absence of maintenance planning systems (mean = 4.42) were the most severe challenges. LSDPC should therefore adopt a planned maintenance programme supported by digital condition records for every estate, beginning with Abesan and Jakande, the highest-density estates in the sample.
2. ML-based predictive maintenance (mean = 4.38) and automated rent tracking (mean = 4.21) were rated most useful. LSDPC should initiate a phased AI pilot programme starting with these two tools in the highest-density estates, following the replicable five-step framework of Bouabdallaoui et al. (2021).
3. Awareness of AI tools was moderate while current use remained low, and awareness correlated positively with perceived usefulness (r = 0.61). The Nigerian Institution of Estate Surveyors and Valuers (NIESV) and estate management training institutions should integrate AI literacy into continuing professional development programmes, since correlation does not establish causation but building awareness appears to be a tractable lever for increasing adoption readiness.
4. Inadequate digital infrastructure (mean = 4.47), insufficient funding (mean = 4.24) and low AI literacy (mean = 4.08) were the major barriers. The Lagos State Government should develop a PropTech policy framework that mandates minimum digitisation

standards for all LSDPC-managed estates, covering digital tenant records, rent collection platforms and condition monitoring systems, because without such a policy AI is likely to remain at the knowledge stage in public housing (Egba et al., 2026; Nwaimo et al., 2024).

Suggestions for further studies

This study is cross-sectional and confined to Lagos. It also relied on self-reported perceptions from a non-probability sample, which limits the generalisability of its findings. Future research should adopt a longitudinal design to track changes in AI awareness and adoption intentions over time as PropTech penetration increases in the Nigerian public housing sector. A multi-state comparative study, covering Abuja, Port Harcourt, and Kano, would test whether Lagos's challenge profile is generalisable. Additionally, evaluations of actual AI pilot implementations in LSDPC estates, once initiated, would provide outcome data that perception-based surveys cannot supply.

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