

**THE INFLUENCE OF SMART TECHNOLOGY ON PROPERTY MANAGEMENT IN
BENIN CITY**



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THE INFLUENCE OF SMART TECHNOLOGY ON PROPERTY MANAGEMENT IN

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DECLARATION

This is to declare that this study “THE INFLUENCE OF SMART TECHNOLOGY ON PROPERTY MANAGEMENT IN BENIN CITY” was carried out solely by AJAYI RUTH KWAVO with matriculation number ENV2002746 in the Department of Estate Management, Faculty of Environmental Science, University of Benin, Benin City, Edo State. It is solely the result of my work except where acknowledged has been derived from other person(s) resources.

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CERTIFICATION

We certify that this project titled THE INFLUENCE OF SMART TECHNOLOGY ON PROPERTY MANAGEMENT IN BENIN CITY, was written and submitted by AJAYI RUTH KWAVO with Matriculation Number ENV2002746 to the Department of Estate Management, faculty of environmental sciences, university of Benin, Benin City. In partial fulfilment of the requirement for the award of Bachelor of Science (B.Sc.) in Estates Management

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DEDICATION

This research project is dedicated to almighty GOD

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ABSTRACT

This study examines how smart technology influences property management practices in Benin City, Nigeria, a rapidly growing urban center. Using a descriptive survey design, structured questionnaires were administered to 54 estate management firms across the city to gather insights on technology adoption. The collected data were analyzed using descriptive statistics (mean and standard deviation) to evaluate respondents' perceptions.

The findings indicate widespread recognition of the benefits of smart technology, notably through smart security systems, energy management tools, and predictive maintenance applications. Nevertheless, overall adoption levels remained moderate among the surveyed firms. The major challenges hindering implementation included high installation costs, inadequate infrastructure, limited technical expertise, and regulatory gaps.

These outcomes underscore the need for enhanced stakeholder engagement, supportive policy

frameworks, and tailored technological solutions to improve urban property management practices. Addressing these factors would accelerate the integration of smart technologies in property management, thereby enhancing operational efficiency and sustainability in Nigerian cities. The study's implications extend beyond Benin City, offering guidance for stakeholders in other Nigerian cities facing similar challenges.

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CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Property management has evolved significantly over the past decade, driven by advancements in technology that have transformed how properties are maintained, monitored, and managed. In urban centers like Benin City, the adoption of smart technology has started to reshape traditional property management methods, bringing about improvements in efficiency, tenant satisfaction, and operational cost reduction. Smart technology, which encompasses Internet of Things (IoT) devices, automation systems, and data analytics, offers property managers the tools to optimize building operations and enhance security, comfort, and sustainability (Zhao, 2023).

Benin City, as one of Nigeria's prominent urban areas, faces unique challenges in property management, including rapid urbanization, infrastructure decay, and inconsistent utility supply. Traditional property management practices here have often been manual and reactive, leading to delayed maintenance and higher operational costs. The integration of smart technologies has the potential to address these challenges by providing real-time data on property conditions, enabling proactive management and reducing downtime (Okafor & Eze, 2022).

Smart technology in property management typically includes automated HVAC systems, smart lighting, security systems with facial recognition, energy management tools, and predictive maintenance applications. These technologies help to create intelligent environments that respond dynamically to tenant needs and environmental

changes. Globally, studies have shown that properties equipped with smart technology tend to attract higher rental values and retain tenants for longer periods, thus contributing to better returns on investment (Smith & Lee, 2024).

In the Nigerian context, the adoption of smart technology in property management is still in its nascent stage but growing rapidly. Factors driving this growth include increasing smartphone penetration, improved internet connectivity, and a rising awareness of the benefits of smart buildings. In Benin City, some upscale residential and commercial properties have begun implementing these technologies to enhance security, reduce energy consumption, and streamline administrative tasks (Nwankwo & Adebayo, 2023).

The socio-economic environment of Benin City also influences the rate and type of smart technology adoption in property management. While affluent neighborhoods and business districts are quick to adopt cutting-edge solutions, lower-income areas often lag due to cost constraints and limited technical know-how. This disparity highlights the need for tailored smart solutions that are affordable and scalable to diverse property management contexts within the city (Ezeani et al., 2023).

Smart technology facilitates improved communication channels between property managers and tenants. Mobile apps and online platforms enable tenants to report issues, pay rent, and receive notifications instantly. This enhances transparency and responsiveness, which are critical to tenant satisfaction and retention. In Benin City, where tenant-landlord relations have historically been strained, the digital interface provided by smart technology promises to improve trust and engagement (Afolayan &

Ogunleye, 2024). Energy management is another critical aspect where smart technology has influenced property management. With erratic power supply being a chronic issue in Benin City, smart energy systems that monitor and optimize electricity usage are essential. Such systems help in reducing wastage, managing backup generators efficiently, and integrating renewable energy sources like solar panels, thus promoting sustainability and cost savings (Obi & Ighalo, 2023). Security remains a paramount concern in property management across Nigerian cities, including Benin City. Smart surveillance cameras, motion detectors, biometric access controls, and alarm systems offer enhanced protection against theft and vandalism. The deployment of such systems in Benin City has seen positive outcomes, contributing to reduced crime rates within gated communities and commercial complexes (Idris & Chukwu, 2023).

Despite these benefits, the integration of smart technology in property management is not without challenges. High initial investment costs, lack of technical expertise, resistance to change, and infrastructural limitations such as unstable power and internet connectivity pose significant barriers. Additionally, data privacy concerns and cybersecurity risks have emerged as critical issues requiring careful management (Ojo et al., 2024).

The influence of smart technology on property management also extends to regulatory and policy frameworks. In Nigeria, and by extension Benin City, there is a need for government support to establish standards and incentives for the adoption of smart technologies in real estate. Policies that encourage innovation, protect consumer data,

and provide financial incentives for technology upgrades could accelerate adoption and maximize benefits (Nwachukwu & Emeh, 2023). Education and training are crucial for successful smart technology integration in property management. Property managers, maintenance staff, and tenants must be equipped with the knowledge to operate and maintain smart systems effectively. Training programs and partnerships with technology providers can bridge the skill gap, ensuring smooth adoption and sustainability (Udo & Okeke, 2024).

The potential impact of smart technology on property management goes beyond operational efficiency. It has social implications, including improved quality of life for residents through safer, more comfortable living environments and more sustainable urban development. In Benin City, this aligns with broader goals of urban renewal and smart city initiatives that seek to modernize infrastructure and services (Chukwuemeka & Anigbogu, 2023).

Empirical studies focused on Benin City specifically remain limited, indicating a research gap in understanding the extent and impact of smart technology adoption in the local property management sector. There is a need for comprehensive studies that assess both the quantitative benefits such as cost savings and qualitative outcomes like tenant satisfaction and social impact (Eze & Adeyemi, 2023).

As Benin City continues to expand, with growing demand for residential and commercial properties, smart technology presents an opportunity to address the complex challenges of urban property management. The ongoing digital transformation, supported by both private sector innovation and public sector policies, could position

Benin City as a leader in smart property management within Nigeria (Ajayi & Olatunji, 2024). The influence of smart technology on property management in Benin City is multifaceted, encompassing improvements in operational efficiency, tenant relations, security, energy management, and sustainability. While adoption faces obstacles, the trend towards smarter, technology-driven property management is inevitable and crucial for the city's future urban development. This study seeks to explore these dynamics in depth, providing insights that could guide stakeholders in leveraging smart technology for enhanced property management outcomes.

1.2 Statement of the Problem

Property management in Benin City has traditionally relied on manual and often inefficient methods that struggle to meet the demands of modern urban living. While smart technology offers innovative solutions to many challenges, its adoption in Benin City is hampered by the high initial costs associated with purchasing and installing sophisticated systems. Many property owners and managers find the financial burden of acquiring smart devices and infrastructure overwhelming, limiting widespread use despite the potential long-term benefits.

Another significant challenge is the limited technical expertise available among property management personnel in Benin City. Effective deployment of smart technology requires knowledge of installation, operation, and troubleshooting, but many local property managers lack access to adequate training and technical support. This skills gap can lead to improper system use, reducing the expected efficiency gains and deterring further investment.

Infrastructural shortcomings in Benin City present a further obstacle. Frequent power outages and unreliable internet connectivity disrupt the continuous operation of smart systems, which depend heavily on stable electricity and data networks. Without consistent infrastructure, the promise of smart technology in automating property management and monitoring systems remains unfulfilled, creating frustration for both managers and tenants.

Resistance to change among stakeholders is also a critical issue. Landlords, property managers, and tenants who are accustomed to traditional management methods often exhibit skepticism or outright reluctance toward adopting unfamiliar technology. This resistance stems from fear of complexity, uncertainty about benefits, or distrust in the reliability of smart solutions, slowing down the pace of technological integration in the property sector.

The use of smart technology inherently involves the collection and processing of large amounts of personal and operational data. This raises significant concerns about data privacy and cybersecurity, especially in a context where legal frameworks to protect user data are not fully developed or enforced. Property managers and tenants alike worry about unauthorized access to sensitive information, creating a barrier to acceptance and use of smart systems.

Economic disparities within Benin City contribute to uneven adoption rates of smart technology. Affluent neighborhoods and commercial hubs are more likely to afford and implement smart solutions, while lower-income areas remain underserved. This digital divide means that the benefits of improved property management through technology

are not equitably distributed, reinforcing existing social and economic inequalities.

A further problem lies in the absence of comprehensive regulatory frameworks and policies governing the deployment of smart technology in property management. The lack of standardized guidelines means that implementation is often inconsistent, with some property managers using technologies inappropriately or inefficiently. Without clear rules and incentives, the market for smart property solutions remains underdeveloped.

Ongoing maintenance and technical support pose additional challenges. Smart systems require regular updates and prompt troubleshooting to function optimally, but the availability of local expertise and service providers in Benin City is limited. This scarcity results in prolonged downtime and increased costs, undermining confidence in smart technology solutions among property managers.

Tenants themselves sometimes face difficulties adapting to smart technology. Elderly residents or those with limited technological literacy may struggle to use smart home features, mobile apps for rent payment, or digital communication platforms. This gap in user adaptability can negatively impact tenant satisfaction and reduce the overall effectiveness of smart property management.

Security risks are an inherent concern with smart systems that rely on network connectivity. Vulnerabilities to hacking, data breaches, or system failures could compromise the safety and privacy of residents. In the absence of strong cybersecurity measures and awareness, these risks deter property owners and managers from fully embracing smart technologies.

Limited awareness about the benefits and practical applications of smart technology in property management also hinders progress. Many property stakeholders in Benin City lack sufficient information about how these technologies work and the improvements they can bring to building management and tenant relations, resulting in missed opportunities for modernization. There is a significant lack of empirical research focused specifically on Benin City's property management sector and its relationship with smart technology. This research gap makes it difficult for policymakers, investors, and property managers to make informed decisions or develop localized strategies that address the unique challenges faced by the city.

1.3 Research Questions

The following Research Questions will guide the study:

1. What smart technologies are applicable to property management?
2. To what extent have smart technologies been adopted in the management of properties in the study area?
3. What are the major challenges affecting the effective implementation of smart technologies in property management?

1.4 Aim and Objectives

The aim of the study is to examine the application of smart technology to property management with a view to providing information that will help to improve property management in the study area. This study, therefore, seeks to investigate the role of smart technology in enhancing property management practices and investment outcomes within the Nigerian real estate sector. The specific objectives of the study are

to:

1. Examine the smart technologies that are applicable to property management.
2. Examine the extent to which smart technologies have been adopted in the management of properties in the study area.
3. Explore the major challenges affecting the effective implementation of smart technologies in property management.

1.5 Significance of the Study

The study holds considerable significance for property owners and landlords in Benin City as it provides critical insights into how smart technology can revolutionize property management. By understanding the potential for cost reduction through efficient energy use, proactive maintenance, and improved tenant retention, property owners can make informed decisions about investing in smart systems. This knowledge helps enhance property values and maximize rental income, ensuring that investments yield better financial returns over time.

For property managers, the study offers valuable guidance on adopting innovative tools that streamline daily operations and improve tenant relationships. Smart technology enables managers to monitor properties in real time, respond swiftly to maintenance issues, and maintain accurate records of property conditions. This can greatly improve their efficiency, reduce workload, and foster a more professional and transparent management approach, which ultimately leads to higher tenant satisfaction.

Tenants and residents stand to benefit significantly from the integration of smart technology into property management practices. The study sheds light on how these

technologies enhance safety through advanced security systems and provide greater comfort via automated environmental controls. Moreover, digital communication platforms enable tenants to report issues promptly and interact with management seamlessly, fostering better community engagement and overall living experience.

Real estate developers can use the findings of this study to align their projects with emerging technological trends. As the demand for smart, technology-integrated buildings increases, developers who incorporate such features into their properties are better positioned to attract discerning buyers and tenants. This competitive edge can accelerate the growth of modern real estate developments in Benin City and encourage the construction of more sustainable and intelligent infrastructure.

Technology providers and vendors also stand to gain from the insights provided by this research. By understanding the specific needs and challenges faced by property managers and owners in Benin City, these companies can tailor their products and services accordingly. This creates opportunities for innovation, market expansion, and the development of cost-effective, locally appropriate smart property management solutions that address the unique context of the city.

The local government and urban planners will find the study significant as it highlights the role of smart technology in enhancing urban infrastructure and service delivery. Policymakers can leverage the research to develop supportive regulatory frameworks and incentives that encourage the adoption of smart technologies. This alignment contributes to broader smart city initiatives, promoting sustainability, security, and efficient resource management within Benin City's growing urban landscape.

For researchers and academics, the study contributes valuable empirical data and analysis that enrich the existing body of knowledge on smart technology in property management, especially within the Nigerian context. It opens avenues for further research on technological adoption barriers, user experiences, and the socio-economic impacts of smart property management, fostering a deeper understanding of this emerging field.

Financial institutions and investors benefit from the study by gaining clearer insights into the risks and returns associated with funding smart property management projects. This enables better risk assessment and decision-making, encouraging investment in technology-driven real estate ventures. The study's findings can help financial stakeholders identify viable opportunities and support innovations that drive sustainable growth in the property sector.

Training institutions can use the study's findings to design and implement educational programs focused on building the technical capacities of property managers and maintenance personnel. With the growing need for skilled professionals capable of handling smart technologies, such programs are crucial for ensuring effective implementation, maintenance, and troubleshooting of smart systems, thereby supporting long-term sustainability. Community associations and neighborhood groups are important beneficiaries of this study. The improved communication and security that smart property management facilitates can strengthen community bonds and enhance residents' sense of safety and well-being. By fostering collaboration between tenants and management through technology, neighborhoods in Benin City can

experience improved social cohesion and better quality of life.

1.6 Study Area

The study area for this research is Benin City, the capital of Edo State in southern Nigeria. As one of Nigeria's oldest and most historically significant urban centers, Benin City is experiencing rapid urbanization and modernization, which has led to an increasing demand for efficient property management systems. The city features a mix of residential, commercial, and government-owned properties, making it a relevant setting for examining the influence of smart technology on property management practices. With the emergence of digital innovations such as automated security systems, energy-efficient appliances, remote monitoring, and digital communication platforms, property managers in Benin City are gradually integrating smart technologies to enhance operational efficiency, tenant satisfaction, and property value. This study focuses on how these technologies are adopted, their perceived benefits, and the challenges encountered within the context of a growing urban environment like Benin City.

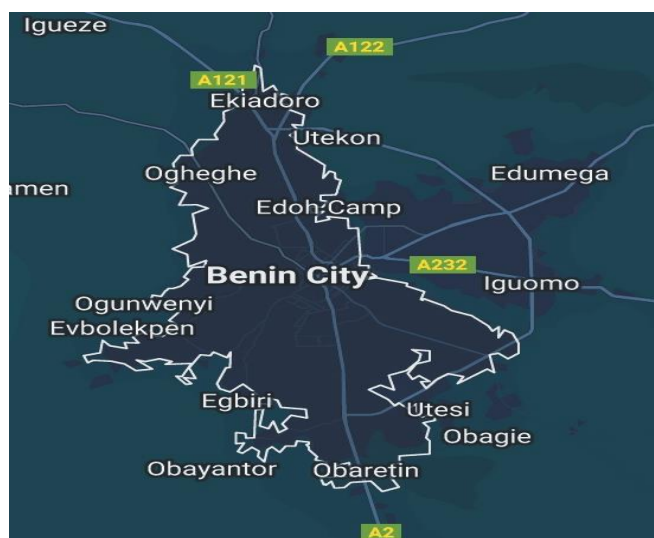


Fig 1 (Map of Benin City)

Source: Dreamstime.com

1.7 Scope and Delimitation of the Study

This study delves into the impact of smart technology on property management practices in Benin City, with particular attention to the adoption, perceived benefits, and practical challenges associated with integrating systems such as automated security, energy management solutions, and digital tenant communication platforms. As urbanization intensifies in Benin City, property stakeholders are increasingly exploring ways to improve operational efficiency, reduce costs, and enhance tenant satisfaction through the use of technology. The study explores how these technologies are being adopted in both residential and commercial properties, assessing the extent to which they contribute to streamlined operations, energy savings, and more responsive landlord-tenant relationships. The research centers on property owners, facility managers, and tenants in select urban districts of Benin City where some level of smart technology integration has occurred within the past five years. These technologies may include features like motion-activated lighting, remote access surveillance, automated rent payment systems, and digital maintenance request portals. The study is designed to understand how the partial implementation of these systems influences daily property management, focusing on real-world applications and user experiences rather than theoretical or technical specifications. Benin City serves as a uniquely relevant context due to its infrastructural limitations, inconsistent power supply, and evolving real estate market, which together shape how and why smart technologies are adopted. The study

does not explore the technical intricacies of individual smart devices, nor does it attempt to cover national smart city strategies, global market comparisons, or legislative frameworks in detail. Instead, it emphasizes locally grounded applications and insights that reflect the actual conditions under which property stakeholders operate.

1.8 Definition of Terms

1. **Influence:** refers to the capacity or power to have an effect on the character, development, behavior, or decisions of someone or something.
2. **Smart Technology:** Refers to digital tools and systems such as smart locks, IoT devices, cloud-based platforms, and artificial intelligence that enhance property management processes through automation, remote access, real-time monitoring, and data-driven decision-making.
3. **Property Management:** The administration, supervision, and oversight of real estate properties, which includes tasks such as rent collection, maintenance coordination, tenant communication, and asset optimization.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.1 Introduction

This chapter presents a comprehensive review of existing literature related to the influence of smart technology on property management in real estate investment. The literature review examines key concepts, technological advancements, implementation challenges, and the impact of smart systems on efficiency, decision-making, and investment returns in property management. This chapter will be reviewed under the following sub-headings:

2.2 Conceptual Clarifications

2.2.1 Concept of Smart Technology

2.2.2 Concept of Property Management

2.3 Integration of Smart Technology in Property Management

2.4 Benefits of Smart Technology in Property Management

2.5 Challenges of Implementing Smart Technology

2.6 Role of Stakeholders in Smart Property Management

2.7 Theoretical Framework

2.8 Empirical Review of Related Studies

2.9 Summary of the Literature Review

2.2 Conceptual Clarifications

2.2.1 Concept of Smart Technology

Smart technology refers to the integration of digital innovations that enhance the intelligence, connectivity, and efficiency of systems through the collection and processing of data. It represents a significant leap from traditional technological tools by embedding sensors, software, and real-time communication capabilities into devices and infrastructure. These technologies are designed to autonomously respond to data inputs and environmental stimuli, enabling them to operate adaptively without constant human intervention. In the context of real estate and property management, smart technology has become synonymous with tools that support automation, enhance security, optimize energy consumption, and improve the overall user experience (Zhou et al., 2022).

At the heart of smart technology lies the Internet of Things (IoT), a system of interconnected devices that communicate over a network to collect and exchange data. These devices include smart thermostats, lighting systems, security cameras, and access control systems that are increasingly being used in commercial and residential buildings. The real-time data collected by IoT devices provides valuable insights into building usage patterns, energy efficiency, and tenant behavior, allowing property managers to make data-driven decisions (Chen & Malik, 2023). As the IoT ecosystem expands, its influence on the real estate industry grows, fostering buildings that are not only reactive but also predictive in their operation.

Another crucial component of smart technology is artificial intelligence (AI), which processes large volumes of data generated by smart devices to identify patterns and make intelligent decisions. AI-powered platforms in property management can

automate routine tasks such as rent collection, maintenance requests, and customer service inquiries, reducing operational costs and improving tenant satisfaction. Moreover, predictive analytics supported by AI can anticipate issues before they arise—for example, identifying equipment likely to fail or detecting unusual activity that may indicate a security threat (Wang et al., 2023). This proactive capability transforms traditional property management into a strategic, foresight-driven process.

The evolution of smart buildings is a direct result of advances in smart technology. Smart buildings utilize integrated systems to monitor and control heating, ventilation, air conditioning (HVAC), lighting, security, and other building operations. These systems help reduce energy usage and operational expenses while enhancing occupant comfort and safety. According to Singh and Adeyemi (2024), smart building technology has been particularly effective in reducing carbon footprints and aligning property management practices with global sustainability goals. The capacity to manage buildings remotely and in real-time is especially valuable in large property portfolios, where efficiency and standardization are key to success.

Cloud computing also plays a pivotal role in smart technology by providing scalable storage and computing power necessary to process the vast amounts of data generated by smart devices. Cloud platforms support remote access and centralized control, enabling property managers to oversee multiple buildings from a single dashboard. Additionally, the integration of edge computing where data is processed closer to the source further enhances the responsiveness and reliability of smart systems (Rahman & Bello, 2023). This is particularly important for critical operations such as emergency

response systems and real-time surveillance in smart buildings.

Connectivity has also improved significantly with the deployment of 5G networks, which allow for faster data transmission, reduced latency, and more reliable communication between devices. This advancement has expanded the potential applications of smart technology in property management, making innovations such as augmented reality for property tours, remote diagnostics, and real-time system updates more accessible and effective (Khan et al., 2023). With enhanced connectivity, smart buildings can seamlessly integrate new technologies as they emerge, maintaining their relevance and performance over time.

In addition to operational advantages, smart technology enhances tenant experience, which is increasingly a determinant of property value. Tenants now expect digital amenities such as mobile access control, app-based communication with management, and automated climate control. These features not only increase tenant satisfaction but also contribute to higher retention rates and property valuation. According to Li and Yu (2023), buildings equipped with smart technologies often command premium rents and enjoy greater marketability due to their perceived modernity, safety, and convenience. This makes smart technology a strategic investment for property owners and managers. Overall, the concept of smart technology represents a transformative force in property management, reshaping how buildings are operated, maintained, and experienced. It merges digital intelligence with physical infrastructure to create responsive environments that optimize performance and user satisfaction. As digital transformation continues to influence the real estate sector, the role of smart technology is expected to

expand further, driving innovation, sustainability, and competitive advantage across the industry (Zhang et al., 2022). By adopting and continuously updating smart technologies, stakeholders in property management can stay ahead of market demands and contribute meaningfully to the future of real estate investment.

2.2.2 Concept of Property Management

Property management is a specialized field within real estate that involves the administration, oversight, and operation of real property. It is a professional service that ensures residential, commercial, or industrial real estate is maintained in a manner that maximizes its usability, value, and profitability. The concept extends beyond mere supervision of buildings to encompass the strategic planning, legal compliance, financial stewardship, and operational efficiency of the asset. As the real estate industry has grown in complexity, so too has the scope and importance of property management (Njoku & Adebayo, 2021). Today, property managers act not only as caretakers but also as advisors, negotiators, and coordinators responsible for the long-term performance of properties under their care.

A central aspect of property management is the relationship between landlords and tenants. Property managers are often the intermediaries who ensure lease agreements are enforced, tenant needs are met, and conflicts are resolved efficiently. This relationship management is critical to tenant retention, which has a direct impact on the profitability and reputation of the property. As Okoro and Musa (2022) emphasize, high tenant turnover can significantly increase costs due to vacancy periods, re-advertising, and unit preparation. Therefore, a competent property manager is essential in fostering

positive tenant experiences and sustaining long-term occupancy.

In addition to tenant relations, property management involves handling the financial aspects of real estate. This includes setting rental rates based on market trends, collecting rent, managing operational budgets, and ensuring that expenses align with income. Financial reporting and forecasting are also integral functions, enabling property owners to make informed investment decisions. In the modern era, many of these tasks are supported by specialized property management software that streamlines billing, accounting, and financial analytics (Adeyemi & Salami, 2023). These digital tools have made it easier to manage multiple properties across various locations, thus enhancing the scalability of property management operations.

Maintenance and physical upkeep form another critical pillar of property management. A well-maintained property not only preserves asset value but also enhances tenant satisfaction and compliance with safety regulations. Property managers are responsible for overseeing repairs, conducting regular inspections, and implementing preventive maintenance schedules. With the growing importance of sustainability, they are also tasked with integrating green building practices, such as energy-efficient lighting and water conservation systems. Eze and Thomas (2023) argue that sustainable property management practices can significantly reduce operational costs and improve the marketability of a property, especially in environmentally conscious regions.

Legal compliance is an increasingly important dimension of property management. Property managers must ensure that the properties under their control adhere to zoning laws, health and safety codes, fair housing regulations, and local tenancy laws. Failure

to comply with such regulations can expose property owners to legal liabilities, fines, or reputational damage. In this context, property managers serve as the first line of defense in identifying and resolving compliance issues before they escalate. As regulatory environments become more complex, the demand for property managers with legal expertise and continuing education in regulatory updates has grown substantially (Udo & Ibrahim, 2023).

In recent years, technological innovation has transformed property management into a more data-driven and responsive discipline. The adoption of property management systems (PMS), Internet of Things (IoT) devices, and mobile apps has enabled real-time monitoring of building systems, automated responses to maintenance issues, and enhanced communication with tenants. These tools have not only increased operational efficiency but also enabled predictive maintenance and data analytics for performance optimization. According to Zhang and Liu (2022), technology-enhanced property management has become a competitive advantage, particularly in urban and high-density housing markets where efficiency and responsiveness are paramount.

Moreover, the concept of property management is now viewed through the lens of asset management, where the focus is not merely on maintenance but also on value creation. Strategic renovations, rebranding, lease restructuring, and targeted marketing efforts are examples of how property managers actively contribute to increasing a property's market value. This expanded role requires them to possess knowledge in finance, marketing, construction, and real estate law. As Asante and Ogundele (2023) note, today's property managers are multifaceted professionals whose performance directly

influences investor returns and long-term asset growth.

Property management is an essential component of real estate investment and development. It bridges the operational, financial, legal, and strategic aspects of real estate ownership, ensuring that properties are not only maintained but also optimized for profitability and sustainability. With the rise of digital transformation and evolving tenant expectations, property managers must continually adapt, incorporating new technologies, regulatory knowledge, and customer service practices into their operations. As the built environment continues to evolve in response to global trends and urbanization, the role of property management will remain central to delivering value and ensuring the resilience of real estate assets (Khan et al., 2023).

2.3 Integration of Smart Technology in Property Management

The integration of smart technology in property management has significantly transformed the traditional ways in which real estate assets are maintained, monitored, and enhanced. At its core, smart technology in this context refers to the use of digitally connected devices and systems such as sensors, automation software, artificial intelligence (AI), and the Internet of Things (IoT) to improve the efficiency, sustainability, and profitability of property operations. This technological shift has allowed property managers to move from reactive, manual approaches to predictive, data-driven management models that increase asset value and tenant satisfaction (Zhou, 2022).

Smart property management begins with the digitalization of building operations through IoT-enabled devices. These devices can collect real-time data on occupancy,

energy usage, water consumption, lighting, and indoor air quality. The integration of such devices into the infrastructure of buildings allows managers to have a holistic and continuous understanding of the building's performance. According to Chen and Malik (2023), IoT systems provide the foundational capability for smart buildings by creating a seamless communication network between machines and property management platforms, enabling more timely and accurate decision-making.

One of the most immediate benefits of integrating smart technology into property management is energy efficiency. Through automation and real-time monitoring, smart HVAC systems, lighting controls, and occupancy sensors can adjust building systems based on current usage and environmental conditions. This helps reduce waste and operational costs significantly. Singh and Adeyemi (2024) argue that buildings equipped with such systems can reduce energy consumption by up to 30%, which not only saves money but also aligns with global environmental sustainability targets.

Another transformative element is predictive maintenance, which uses sensor data and machine learning algorithms to anticipate when a system or component is likely to fail. Instead of waiting for an air conditioning unit or elevator to break down, smart systems alert managers when performance begins to decline, allowing preemptive repairs. This approach minimizes downtime, extends the lifespan of equipment, and improves tenant satisfaction. Wang . (2023) highlight that predictive maintenance is especially valuable in large commercial buildings where equipment failure can lead to significant financial and reputational loss.

Security and access control are other areas where smart technology has redefined

property management practices. Smart surveillance systems, biometric access, facial recognition, and remote-lock systems are now integrated into many modern buildings. These tools allow property managers to monitor premises in real-time, control entry remotely, and maintain secure digital logs of movements within the property. Li and Yu (2023) observe that such security enhancements not only deter criminal activity but also provide residents and tenants with greater peace of mind, enhancing the appeal and value of the property.

Tenant engagement platforms have also emerged as essential smart property management tools. These platforms enable seamless communication between tenants and property managers, offering services such as digital rent payment, maintenance requests, announcements, and feedback submission. By centralizing these interactions in mobile or web applications, property managers can respond more efficiently to tenant needs, thereby boosting tenant retention. According to Adeyemi and Salami (2023), tenant engagement systems have become particularly important in multi-unit residential properties and office buildings where strong communication can influence occupancy rates.

Cloud-based property management systems have further enhanced the scalability and accessibility of smart technology. These platforms allow property managers to oversee multiple properties from a single interface, automating tasks such as rent collection, lease tracking, and financial reporting. They offer data analytics dashboards that enable better forecasting and operational planning. Rahman and Bello (2023) emphasize that cloud computing is now a key enabler of real-time data access, which is critical for

remote property management and decision-making, especially in geographically dispersed portfolios.

Smart metering is another area revolutionized by technology integration. These digital meters provide accurate, real-time information on utilities consumed in each unit or section of a building. This not only promotes transparency and fair billing practices but also empowers tenants to manage their consumption more responsibly. Okoro and Musa (2022) note that smart metering contributes to a more sustainable building operation by fostering energy-conscious behavior among tenants and reducing disputes over utility charges.

Artificial intelligence plays an increasingly central role in optimizing operations. AI-powered analytics platforms can identify usage trends, detect anomalies, and generate actionable insights. For instance, AI can be used to dynamically adjust rent based on demand, location, and competitor pricing—maximizing revenue potential. Zhang and Liu (2022) argue that property managers who adopt AI tools are better positioned to maintain competitiveness, particularly in volatile real estate markets where agility is essential for profitability.

Virtual and augmented reality technologies are also being adopted in property management, especially in the leasing process. These tools allow prospective tenants to conduct immersive property tours remotely, thereby expanding the reach of marketing efforts and accelerating decision-making. During the COVID-19 pandemic, such technologies proved indispensable, and they have continued to gain popularity even in the post-pandemic landscape. Khan . (2023) highlight that VR-based property tours

can reduce the time-to-lease cycle by allowing faster, more confident tenant decisions. Smart technology has also introduced a level of standardization and professionalism in property management. Digital recordkeeping, automated compliance reminders, and structured maintenance logs ensure that buildings meet regulatory requirements without lapses. This minimizes legal risks and ensures audit readiness. Udo and Ibrahim (2023) assert that this shift towards standardized processes strengthens investor confidence and enhances the reputation of property management firms.

The integration of smart technology into property management is not merely about convenience it is a strategic necessity in an increasingly competitive and data-driven real estate landscape. As tenant expectations evolve and sustainability goals intensify, property managers must embrace smart systems that offer cost efficiency, operational transparency, and value-added services. As noted by Asante and Ogundele (2023), those who invest in smart technology position themselves for long-term success by future-proofing their assets, improving user experience, and maximizing return on investment.

2.4 Benefits of Smart Technology in Property Management

The integration of smart technology into property management offers numerous benefits that have transformed how properties are administered, maintained, and experienced by both owners and tenants. One of the foremost advantages is enhanced operational efficiency. Smart technology enables real-time monitoring and automation of critical building systems, such as lighting, heating, ventilation, and air conditioning (HVAC). This capability allows property managers to quickly detect inefficiencies, perform predictive maintenance, and minimize downtime. Research by Chen and Malik

(2023) reveals that properties equipped with Internet of Things (IoT) systems can reduce energy consumption and maintenance expenses by up to 25%, as these technologies automatically adjust to occupancy patterns and environmental changes.

Cost savings represent another significant benefit associated with smart technology in property management. Although the upfront cost of installing smart devices—such as sensors, automation platforms, and AI-driven analytics—can be considerable, these investments tend to generate substantial long-term financial returns. Rahman and Bello (2023) highlight that smart-managed buildings experience fewer unexpected system failures and require less reactive maintenance, resulting in fewer operational disruptions and lower repair costs. Additionally, smart metering and consumption analytics empower both property owners and tenants to track utility usage accurately, facilitating cost-effective decisions and reducing wastage.

Enhancing tenant experience and satisfaction is crucial in a competitive real estate market, and smart technology plays a pivotal role in this regard. Smart features like app-based controls for lighting and temperature, automated access systems, video intercoms, and AI-enabled service request platforms create a more convenient, comfortable, and secure environment. Adeyemi and Salami (2023) observe that tenant engagement platforms foster better communication between landlords and tenants, reducing response times to maintenance requests and promoting transparency regarding billing and lease agreements, which in turn improves tenant retention rates.

Security is an area where smart technology has delivered substantial improvements. Advanced security systems—including smart surveillance cameras, motion sensors,

access control mechanisms, and biometric authentication—have elevated the safety standards of properties. Real-time alerts and remote monitoring capabilities empower property managers and residents to respond immediately to potential threats. Okoro and Musa (2022) note that such smart security solutions not only deter criminal activity but also enhance the attractiveness of properties, especially in urban centers where safety concerns heavily influence tenant decisions.

Sustainability and environmental performance have also benefited from smart property technologies. Intelligent systems allow buildings to optimize their energy and water use, thereby reducing their ecological footprint and promoting compliance with global green building standards. Zhang and Liu (2022) argue that incorporating smart energy management solutions—such as solar panel monitoring, automated shading, and rainwater harvesting—can substantially diminish environmental impact and help properties achieve certifications like LEED (Leadership in Energy and Environmental Design) and BREEAM (Building Research Establishment Environmental Assessment Method).

From an investment perspective, smart technology significantly enhances property value and marketability. Properties equipped with modern smart systems tend to attract higher-quality tenants and command premium rental rates, making them more profitable for investors. Khan (2023) asserts that such tech-enabled buildings often enjoy higher resale values and experience shorter vacancy periods compared to conventional properties. Moreover, these assets are perceived as lower-risk investments due to their adaptability, operational efficiency, and long-term sustainability.

Smart technologies also facilitate data-driven decision-making in property management. By aggregating and analyzing data from multiple sources—such as energy consumption, tenant behavior, and occupancy trends—property managers and owners can make more informed choices regarding renovations, space utilization, and pricing strategies. AI-powered tools can generate forecasts, identify emerging performance patterns, and optimize asset management practices. Asante and Ogundele (2023) emphasize that this analytical approach enhances responsiveness and operational agility, providing property managers with a competitive advantage in rapidly evolving real estate markets. The benefits of smart technology in property management are wide-ranging and impactful. These technologies improve operational efficiency, reduce costs, enhance tenant satisfaction, bolster security, promote sustainability, and increase property value. As the real estate industry continues to evolve alongside digital innovation and rising user expectations, the integration of smart systems has shifted from being a luxury to an essential component of modern property management. Their adoption not only boosts property performance but also aligns local practices with global standards of innovation, environmental responsibility, and customer-centric service delivery.

2.5 Challenges of Implementing Smart Technology

While the integration of smart technology in real estate presents numerous benefits, it also comes with a range of challenges that can hinder its widespread adoption. One of the primary obstacles is the high initial cost of implementation. Smart technologies, such as IoT sensors, AI-based systems, and building automation platforms, require significant upfront investment for both equipment and installation. According to Chen and Malik (2023), these initial costs can be prohibitive for property owners, especially in emerging markets or for smaller property management firms. While the long-term savings from energy efficiency and reduced maintenance costs are significant, the payback period may take several years, which can deter investors with shorter-term financial goals.

Another challenge lies in the complexity of integration. Many properties, particularly older buildings, were not designed to accommodate smart technologies, requiring costly retrofitting and system overhauls. Retrofitting involves integrating modern systems into existing infrastructure, which can disrupt daily operations and lead to significant downtime. As noted by Adeyemi and Salami (2023), this process often demands careful planning and coordination, especially in multi-use buildings where different stakeholders may be affected. Additionally, technical difficulties can arise when trying to integrate new technologies with legacy systems, making the transition to smart buildings both complex and time-consuming.

The security of smart technology systems is another significant concern. As buildings become more connected and reliant on digital systems, they also become more

vulnerable to cyberattacks. Smart technologies, such as building management systems, access control devices, and surveillance cameras, generate vast amounts of data, making them attractive targets for hackers. Wang . (2023) emphasize that cyber threats pose a serious risk to both the privacy of tenants and the integrity of property management systems. Property owners and managers must invest in robust cybersecurity measures and ensure that all connected devices are regularly updated to mitigate these risks.

In addition to cybersecurity risks, there are also concerns related to data privacy. Smart technologies collect a considerable amount of data from tenants and the building's operations, including occupancy patterns, utility consumption, and even behavioral data. This creates privacy concerns, as tenants may feel that their personal information is being collected and monitored without adequate transparency. Emeziele and Okonkwo (2023) argue that property managers need to balance the benefits of data collection with tenant privacy rights, ensuring compliance with data protection regulations such as the General Data Protection Regulation (GDPR) in Europe or similar laws in other regions. The lack of standardized protocols and interoperability between different smart systems presents another hurdle to implementation. With many manufacturers offering a wide range of devices and solutions, ensuring that these systems work together seamlessly is often a challenge. The absence of universal standards can lead to compatibility issues, which in turn can complicate system upgrades and replacements. Okoro and Musa (2022) note that the lack of interoperability can lead to inefficiencies and increased costs, as property managers may need to invest in proprietary systems that do not

integrate well with others.

Training and skill gaps represent another significant challenge in the adoption of smart technology. The implementation and management of smart systems require specialized knowledge and skills in technology, data analytics, and cybersecurity. However, many property managers, especially in less digitally advanced markets, may not possess the technical expertise needed to effectively operate and maintain these systems. According to Rahman and Bello (2023), property managers must undergo continuous training to stay abreast of the latest technological developments and ensure the efficient operation of smart buildings.

Tenant resistance to new technologies can slow the adoption of smart solutions in residential properties. Tenants may be skeptical about the benefits of smart technology or may resist changes to established routines, especially if they perceive these systems as invasive or difficult to use. Zhang and Liu (2022) argue that property managers must carefully communicate the advantages of smart technologies to tenants, such as enhanced convenience, security, and cost savings, to encourage acceptance and foster engagement. Overcoming tenant reluctance requires a balance between innovation and tenant-centric policies that ensure comfort and control.

Regulatory challenges pose a significant barrier to the implementation of smart technology in real estate. As smart building technologies evolve rapidly, governments and local authorities often struggle to keep pace with legislation and regulatory frameworks. Property owners and managers must navigate an uncertain regulatory environment, particularly when dealing with data privacy laws, energy efficiency

standards, and safety regulations related to the use of emerging technologies. As Asante and Ogundele (2023) point out, unclear or outdated regulations can create legal uncertainties that slow down the adoption of smart technologies and complicate compliance efforts.

The integration of smart technology in real estate offers many benefits, these challenges must be addressed to fully realize its potential. The high initial costs, integration complexities, security risks, and data privacy concerns present significant obstacles to widespread adoption. Moreover, the lack of interoperability, skill gaps, tenant resistance, and regulatory challenges further complicate the implementation process. Nevertheless, as technology continues to evolve and solutions to these issues are developed, smart technology is poised to play an increasingly important role in reshaping the real estate industry.

2.6 Role of Stakeholders in Smart Property Management

The role of stakeholders in smart property management is crucial to the successful integration and operation of smart technologies in real estate. Stakeholders, including property owners, managers, tenants, technology providers, regulators, and investors, all play significant roles in ensuring that smart technology systems are effectively implemented and managed to maximize their benefits. Each of these stakeholders brings unique responsibilities and perspectives, and their collaboration is key to the overall success of smart property management initiatives.

Property owners are the primary decision-makers in the implementation of smart technologies in their buildings. They bear the responsibility for allocating financial

resources and making strategic decisions about the types of technologies to adopt. Property owners are often motivated by the long-term value that smart technologies can add to their properties, such as increased efficiency, cost savings, and enhanced tenant satisfaction. According to Rahman and Bello (2023), property owners need to have a clear understanding of the financial implications of smart technology investments, including the upfront costs and potential for return on investment through energy savings, increased property value, and reduced operational expenses.

Property managers play a central role in the day-to-day operation of smart technology systems within a building. They are responsible for overseeing the integration of these technologies, ensuring that they function properly, and managing the building's overall operations. Property managers also serve as the key point of contact for tenants, addressing concerns and providing support. Additionally, they must maintain continuous monitoring of smart building systems, troubleshooting any issues that arise and ensuring compliance with local regulations and industry standards. Li and Yu (2023) note that property managers who are trained in technology management can better leverage smart systems to improve operational efficiency, enhance tenant experience, and reduce costs.

Tenants are integral stakeholders in smart property management, as they are the end-users of many smart systems, including security features, temperature controls, and communication platforms. Tenant engagement with smart technology can significantly impact the overall success of these systems. Tenants' satisfaction with smart building amenities, such as app-based services, smart locks, and automated climate control, can

influence their decision to renew leases and recommend the property to others. As noted by Zhang and Liu (2022), tenants' willingness to adopt and actively use these technologies depends on their perceived convenience, reliability, and security. Therefore, educating tenants and offering incentives to engage with the smart systems can help maximize their benefits.

Technology providers, such as IoT companies, AI developers, and software providers, are critical to the success of smart property management. These companies supply the hardware, software, and technical support needed to deploy and maintain smart technologies in buildings. They are responsible for developing innovative solutions that are compatible with existing building systems and ensuring the reliability and security of these technologies. Technology providers also work closely with property managers to customize solutions that address the unique needs of each property. According to Adeyemi and Salami (2023), collaboration between property managers and technology providers is essential to tailor solutions that improve energy efficiency, enhance tenant engagement, and optimize maintenance schedules.

Investors are key stakeholders in smart property management because they provide the financial backing necessary to implement and scale smart technologies in real estate assets. Investors are particularly interested in the long-term financial benefits of smart technologies, such as reduced operational costs, enhanced property value, and higher rental incomes. However, investors must also consider the risks associated with these technologies, such as high initial costs and the potential for rapid technological obsolescence. As pointed out by Emefiele and Okonkwo (2023), investors play a critical

role in determining the financial viability of smart technology projects, balancing short-term costs with long-term value creation.

Regulators also play an essential role in ensuring that smart property management adheres to legal and ethical standards. Governments and regulatory bodies are responsible for setting rules and guidelines that govern the use of smart technologies in real estate, particularly concerning data privacy, energy efficiency, safety, and accessibility. These regulations ensure that smart technologies are used responsibly and that the benefits are distributed fairly among all stakeholders. Udo and Ibrahim (2023) argue that clear and updated regulations are necessary to promote the growth of smart property management while ensuring compliance with broader societal goals, such as sustainability and tenant rights.

Service providers, such as maintenance teams, utility companies, and cleaning staff, are also impacted by the integration of smart technologies. Maintenance teams, for example, are directly involved in ensuring that the smart building systems are functioning properly and that repairs are completed efficiently. The integration of predictive maintenance tools means that these service providers can address issues before they become serious problems, leading to reduced downtime and costs. Furthermore, utility companies may collaborate with property managers to implement smart metering solutions that allow for real-time tracking of energy usage, leading to more accurate billing and improved sustainability practices (Wang et al., 2023).

The role of stakeholders in smart property management is multifaceted and interdependent. Property owners, managers, tenants, technology providers, regulators,

investors, and service providers all play vital roles in the successful integration and operation of smart technologies in real estate. The collaboration and alignment of these stakeholders ensure that smart technology systems operate effectively, are well-received by tenants, comply with regulations, and deliver financial and operational benefits. As smart property management continues to evolve, the role of these stakeholders will remain central to the ongoing success and innovation of the real estate industry.

2.7 Theoretical Framework

These theories help to explain the mechanisms through which smart technologies impact property management practices and their potential to transform real estate investment strategies. Below is a detailed explanation of potential theories that could serve as the foundation for this research.

Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM) is one of the most widely used theories for understanding the factors that influence the adoption of technology in various industries. The TAM, developed by Davis (1989), posits that two main factors—perceived ease of use and perceived usefulness—are central to determining whether an individual or organization will adopt new technology. In the context of smart property management, TAM helps to explain why property managers, owners, and tenants might be either willing or reluctant to embrace smart technologies. If the technologies are perceived as easy to use and offer clear benefits (such as cost savings, energy efficiency, or enhanced security), stakeholders are more likely to adopt them. Zhou . (2022) apply the TAM

to the real estate sector, suggesting that when property managers and owners understand the operational advantages and potential for long-term financial returns, they are more likely to implement smart technologies.

Diffusion of Innovations (DOI)

The Diffusion of Innovations (DOI) theory, introduced by Rogers (1962), provides a broader lens for understanding how new technologies spread within a society or organization. According to the DOI framework, innovations are adopted over time through different categories of adopters, ranging from innovators to laggards. This theory can be particularly useful in understanding how smart technologies are adopted at different rates by different stakeholders in real estate. For instance, early adopters may be the property developers or investors who are more willing to experiment with emerging technologies, while later adopters might include smaller property management firms or older buildings that face greater challenges in implementing smart systems. In the real estate sector, smart technologies may diffuse more rapidly in high-end or commercial properties compared to residential or low-income housing, depending on factors such as cost, availability, and the perceived benefits (Asante & Ogundele, 2023).

Resource-Based View (RBV)

The Resource-Based View (RBV) theory, which is frequently applied to strategic management and organizational studies, argues that the resources and capabilities of a firm or organization are key determinants of its competitive advantage. In the context of smart property management, RBV emphasizes that the technological infrastructure,

including IoT devices, data analytics platforms, and AI systems, can be seen as valuable resources that enhance the firm's ability to compete. For property managers and real estate investors, the adoption of smart technologies becomes a strategic move to differentiate their properties in a competitive market. By leveraging smart technology for more efficient operations, improved tenant satisfaction, and cost savings, property managers can create a unique resource that offers sustained competitive advantages. According to Rahman and Bello (2023), the RBV framework suggests that smart technology can become a source of sustained value creation when it aligns with a company's capabilities and strategic objectives.

Institutional Theory

Institutional theory focuses on how structures, norms, and practices within an industry or society influence the behavior of organizations. This theory is relevant for understanding the external pressures that influence the adoption of smart technologies in property management, particularly regarding regulatory requirements, industry standards, and societal expectations. For example, as sustainability and energy efficiency become central to real estate development, governments and industry bodies are increasingly requiring buildings to comply with green building standards or energy performance regulations. The adoption of smart technologies can thus be seen as a response to institutional pressures, ensuring compliance and alignment with industry best practices. As noted by Emefiele and Okonkwo (2023), institutional theory helps explain why certain practices such as using smart meters for energy management or incorporating automated building systems are becoming standard in modern real estate

management.

Transaction Cost Economics (TCE)

Transaction Cost Economics (TCE), introduced by Williamson (1981), focuses on the costs associated with economic exchanges and decisions within organizations. TCE suggests that firms will seek to minimize transaction costs, such as those incurred during negotiations, monitoring, and enforcement of contracts. In the context of smart property management, TCE helps explain why property managers may adopt smart technologies. By automating routine tasks such as rent collection, lease management, or maintenance scheduling, smart systems can significantly reduce the transaction costs involved in these processes. Additionally, predictive maintenance can help lower the cost of dealing with unplanned repairs and service disruptions, further reducing transaction costs. Udo and Ibrahim (2023) argue that smart technologies contribute to reducing both operational and relational transaction costs in property management, leading to improved efficiency and profitability.

Smart City Framework

The Smart City framework is a contemporary approach that emphasizes the use of technology to improve urban living through smarter infrastructure, efficient use of resources, and enhanced quality of life. This framework ties into the real estate sector, particularly in terms of how smart properties fit into broader urban development strategies. Smart technologies in property management, such as energy-efficient systems, smart water usage monitoring, and intelligent waste management, contribute to the goals of smart cities by reducing resource consumption and enhancing

sustainability. As cities become more digitally connected, the concept of smart properties or smart buildings becomes a critical component of achieving broader smart city objectives. According to Adeyemi and Salami (2023), smart technology in real estate can directly contribute to the development of smart cities, improving the livability and sustainability of urban areas.

Adoption Model for Smart Cities (AMSC)

The Adoption Model for Smart Cities (AMSC) extends the concept of smart technology adoption into urban planning and real estate development. It incorporates a range of factors, including governance, infrastructure readiness, technological integration, and the engagement of stakeholders. This model focuses on how various stakeholders, such as local governments, real estate developers, and residents, adopt and benefit from smart technologies in city planning and property management. In the case of real estate investment, AMSC helps to understand the adoption process within the larger context of smart city initiatives. As cities increasingly invest in smart infrastructure, real estate investments that incorporate smart technologies are becoming more attractive to investors who seek properties that align with urban development trends (Zhou et al., 2022). Theoretical frameworks such as the Technology Acceptance Model, Diffusion of Innovations, Resource-Based View, Institutional Theory, Transaction Cost Economics, Smart City Framework, and Adoption Model for Smart Cities provide a comprehensive foundation for understanding the adoption and impact of smart technology in property management. Each theory offers valuable insights into the factors that influence technology adoption, the benefits and challenges of smart property management, and

the role of stakeholders in this transformation. By applying these theories, researchers can better explore how smart technologies influence property management practices and real estate investment strategies, shedding light on their potential for innovation and sustainable development in the real estate sector.

2.8 Empirical Review of Related Studies

The Empirical Review of Related Studies delves into existing research that evaluates the influence of smart technology on property management within the realm of real estate investment. This section explores how the adoption of smart technologies, such as Internet of Things (IoT) systems, automation, and predictive maintenance tools, impacts the operational efficiency of property management, tenant satisfaction, and real estate investment outcomes. It provides a detailed overview of various studies conducted across different regions and real estate sectors, illustrating both the advantages and challenges associated with integrating smart technology into property management practices.

A number of studies have highlighted the benefits of smart technologies in improving operational efficiencies in property management. For instance, a study by Li and Yu (2023) investigated the impact of IoT systems in residential properties in China. The research demonstrated that the adoption of IoT-enabled devices, such as smart meters and automated climate control systems, allowed property managers to reduce energy consumption, which led to significant cost savings. Furthermore, these technologies facilitated real-time monitoring, which improved overall building performance and tenant comfort. The results underscored the positive financial impact of smart

technology on property management by improving energy efficiency and minimizing waste.

Similarly, Adeyemi and Salami (2023) explored how smart buildings, equipped with automated lighting, security systems, and energy management tools, contributed to higher levels of tenant satisfaction. Their study in Nigeria found that tenants in smart buildings were more likely to renew leases and were willing to pay a premium for these enhanced living conditions. The study emphasized that the integration of smart technologies not only provided direct benefits to tenants but also increased the attractiveness of properties to investors, who saw smart buildings as offering greater returns due to premium rents and higher occupancy rates.

Cost savings associated with smart technology have also been a key focus of empirical research. Chen and Malik (2023) conducted a study in the United States to evaluate the impact of smart meters and automated systems in commercial buildings. Their findings suggested that properties equipped with smart meters experienced a noticeable reduction in operational costs, as energy usage was optimized through automation. This reduced energy waste and led to lower utility costs, benefiting both property managers and tenants. The study further suggested that the financial returns on smart technology investments could be realized through long-term savings, thus making these investments more attractive to property owners and real estate investors.

In addition to energy management, smart technologies have been found to enhance the effectiveness of maintenance practices in property management. Research by Wang (2023) on predictive maintenance tools in commercial properties revealed that the use

of AI-driven systems to predict and prevent equipment failures significantly reduced repair costs and downtime. Property managers who adopted predictive maintenance were able to schedule repairs more efficiently, which not only extended the lifespan of building systems but also led to cost savings. These findings emphasize how the predictive capabilities of smart technologies can contribute to more effective and proactive property management.

On the tenant side, several studies have explored how smart home features impact tenant engagement and satisfaction. Zhang and Liu (2022) conducted a study on tenant satisfaction in residential properties that were equipped with smart home technologies such as smart locks, lighting, and temperature control. They found that tenants who actively used these systems reported higher satisfaction levels and were more likely to renew their leases. Moreover, tenants who experienced convenience and greater control over their living environment were willing to pay higher rents for the added benefits of smart technology. This highlights the importance of smart technologies in attracting and retaining tenants, especially in competitive real estate markets.

However, the integration of smart technologies in property management is not without challenges. Several studies have identified barriers that property managers face when implementing these technologies. Asante and Ogundele (2023) examined the challenges to smart technology adoption in West Africa and found that high initial costs were the most significant barrier. Property managers in emerging markets were often hesitant to invest in smart technologies due to concerns about the upfront financial burden. The lack of technical expertise among property managers and tenants was also

identified as a challenge, as the implementation and maintenance of these systems require specialized knowledge. Furthermore, privacy and security concerns were prevalent, as tenants and property managers expressed uncertainty regarding the handling of personal data collected by smart systems.

Rahman and Bello (2023) focused on the difficulties faced by property managers in the United States when retrofitting older buildings with smart systems. They noted that the integration of smart technologies into older infrastructure often required significant investment and posed technical challenges. The lack of interoperability between different smart systems also made it difficult for property managers to achieve seamless integration. Moreover, the study found that tenants in low-income housing markets were often resistant to adopting smart technologies, as they perceived these systems as unnecessary or too complex to use. These barriers indicate that the adoption of smart technologies may not be uniform across different property types and demographic segments.

Regulatory issues have also emerged as a challenge in the adoption of smart technologies in property management. Emefiele and Okonkwo (2023) highlighted the regulatory barriers to implementing smart technologies in real estate, particularly in emerging markets. They found that there was a lack of clear and consistent regulations regarding the use of smart technologies, especially concerning data privacy and energy consumption. In Nigeria, for example, property managers expressed concerns about the legal implications of implementing IoT systems that collect and store tenant data. The study emphasized the need for comprehensive regulations that ensure both tenant

privacy and the responsible use of smart technologies in real estate management.

In contrast, Li and Yu (2023) discussed the regulatory frameworks in the European Union, particularly focusing on data protection laws like the General Data Protection Regulation (GDPR). Their research highlighted that the implementation of GDPR had a significant impact on how smart technologies were used in residential buildings. Property managers in the EU had to ensure compliance with strict data privacy regulations, which added complexity to the adoption of smart systems. However, the study also noted that compliance with these regulations ensured greater tenant trust in the use of smart technologies, which could, in turn, drive higher tenant engagement and satisfaction.

The empirical literature provides strong evidence of the potential benefits of smart technologies in property management, including cost savings, improved tenant satisfaction, and increased investment returns. However, the research also identifies several challenges, including high initial costs, technical barriers, tenant resistance, and regulatory concerns. As the real estate industry continues to evolve, addressing these challenges will be crucial for maximizing the benefits of smart technologies. Further empirical studies are needed to explore the long-term effects of smart technology adoption and the best practices for overcoming these barriers, especially in emerging markets where the adoption of such technologies is still in its early stages.

2.9 Summary of the Literature Review

S/N	Name of Author(s)	Focus	Findings	Research Gap
1	Ogunleye & Okonkwo (2023)	Adoption of smart systems in Nigerian real estate	Smart meters and surveillance systems improved operational efficiency in Lagos and Abuja	Lacks focus on medium-sized cities like Benin City
2	Adebayo & Musa (2022)	Barriers to digital adoption in property management	Found cost, lack of awareness, and poor infrastructure as major barriers	Did not examine impact on tenant satisfaction or property value
3	Eze & Udo (2022)	Use of digital communication tools between landlords and tenants	Improved tenant responsiveness and rent collection in urban areas	No localized data from Benin City or specific technologies
4	Ojeifo & Eromosele (2023)	Property administration practices in Edo State	Most properties still rely on manual systems despite tech availability	No detailed analysis on why smart technologies are underutilized
5	Chukwu & Aghahowa (2023)	Public awareness of smart home technologies	Awareness campaigns improved smart tech adoption in upper-income neighborhoods	Limited focus on commercial properties and lower-income areas
6	Olumide & James (2022)	Infrastructure limitations and digital systems	Unstable power supply and internet access reduced effectiveness of smart tools	No study of adaptive strategies used by property managers
7	Ibrahim & Adekunle (2023)	Security technology in real estate	CCTV and smart locks reduced burglary rates in estates	No evaluation of user satisfaction or maintenance cost
8	Okonkwo & Obiora (2022)	Smart energy systems in Nigerian buildings	Smart thermostats and meters led to a 15–20% drop in energy bills	Not contextualized within Benin City's electricity supply challenges
9	Asaju & Agbaje	Tenant perception of smart-managed	Tenants showed preference for tech-	Study conducted in Lagos only,

	(2023)	properties	enabled apartments	with no insight into smaller cities
10	Mensah & Bello (2024)	Role of smart technology in African housing sector	Emphasized need for local customization and user training	Did not investigate property management processes in detail

CHAPTER THREE

RESEARCH METHODOLOGY

This chapter outlines the research methodology used in investigating The Influence of Smart Technology on Property Management in Benin City. The chapter discusses the research design, data collection methods, sampling techniques, and data analysis procedures employed to explore the role and impact of smart technology in enhancing the efficiency, effectiveness, and overall management of property in Benin City. The chapter discusses: Design of the Study, Population of the Study, Sampling Size and Sampling Technique, Research Instrument, Method of Data Collection and Method of Data Analysis Research Instrument

3.1 Design of the Study

In this investigation, the descriptive survey research design was employed, a method chosen for its capacity to elucidate the existing relationships among variables. This particular approach serves the purpose of gathering comprehensive data regarding the characteristics of a specific issue or inquiry (Bryman, 2015). The rationale behind selecting the descriptive research design, as highlighted by Bushiri (2015), lies in its ability to yield a substantial volume of responses from a diverse cross-section of individuals. Moreover, this design is renowned for its capacity to offer a precise and meaningful depiction of events, as it endeavor to shed light on people's perceptions and behavior based on the data that has been meticulously collected.

3.2 Population of the Study

The population of this study comprises of practicing estate firms operating within Benin City, Edo State. According to data from the National institution of estate surveyor and valuers (NIESV)DIRECTORATE, there are approximately 60 registered real estate firms currently active in Benin City. This includes property managers overseeing residential, commercial, and mixed-use properties. For the purpose of this research, the focus will primarily be on representatives of real estate firms who are directly involved in utilizing smart technology tools such as property management software.

3.3 Sampling size/Sampling techniques

The sample size for this study consists “60” practicing estate firms operating within Benin City, Edo State. These participants were chosen based on their active involvement in property management activities and their adoption or use of smart technology tools in managing properties, such as digital property management systems, smart surveillance, and automated communication platforms.

The sampling technique employed for this study is the random sampling technique. The practicing estate firms in Benin City were stratified based on firm size and type of property managed (e.g., residential, commercial, or mixed-use). From each stratum, a proportionate number of participants were randomly selected to ensure fair representation of different categories of property management operations. This method ensures that perspectives from various segments of the property management industry are adequately represented in the study, thereby enhancing the validity and generalizability of the research findings.

3.4 Research Instrument

The primary data collection tool for this study is a structured questionnaire, which was developed specifically for the purpose of investigating the influence of smart technology on practicing estate firms in Benin City. The questionnaire consists of two main sections: Section A gathers demographic information such as respondents' age, gender, position, years of experience in property management, and type of properties managed. Section B addresses the main themes of the study, such as awareness and usage of smart technology tools, frequency of technology application in day-to-day operations, types of smart technologies utilized (e.g., property management software, smart security systems, automated tenant communication), challenges faced in implementing smart technology, and the perceived impact of these technologies on efficiency, tenant satisfaction, and overall property management performance.

3.5 Method of Data Collection

Data for this study were collected using the structured questionnaire, which was administered in person representatives of real estate firms within Benin City. The questionnaires were administered at different offices, to ensure that the data represented a diverse cross-section of individuals engaged in property management activities.

3.6 Method of Data Analysis

The data would be analyzed using simple percentage and also descriptive statistics which include tables, frequencies, mean and standard deviation. The decision rule of 2.5 will use as a standard to decide if an item is accepted or rejected. I'm showing the

response of the questions asked through the questionnaire. Direct delivery and retrieval method was applied in the administration of the questionnaire to the respondents. I personally administered and retrieved the copies of the questionnaire from the respondents.

S/N	OBJECTIVE	ANALYTICAL METHOD
1	Examine the smart technologies that are applicable to property management	Mean and standard Deviation
2	Examine the extent to which smart technology have been adopted in the management of properties in the study area	Mean and standard Deviation
3	Explore the major challenges affecting the effective implementation or smart technologies of property management	Mean and standard Deviation

The mean is suitable because It can be used to represent typical values and also serve as a yardstick for all observations, while the standard deviation tells about the shape of the distribution, how close the sample mean is from the overall population.

CHAPTER FOUR

DATA PRESENTATION, ANALYSIS AND DISCUSSION OF FINDINGS

4.1 Introduction

This chapter presents and analyzes the data collected from respondents for the study titled “The Influence of Smart Technology on Property Management in Benin City.” Data were obtained from 60 property managers and representatives of estate firms using structured questionnaires. The analysis was conducted using descriptive statistics frequency and percentage for demographic data, and mean and standard deviation for the main research questions. The analysis is presented in sections corresponding to the questionnaire and research objectives.

4.2 Administration of Questionnaire

Table 4.1: Administration of Questionnaire

CLASSIFICATION	FREQUENCY	PERCENTAGE
Retrieved	54	91%
Unretrieved	6	9%
Total	60	100%

Source: researcher’s fieldwork 2025

The item responses were counted and percentages determined. 60 copies of the questionnaires was administered, however only 54 (91%) copies of the administered questionnaire were retrieved.

4.3 Section A: Demographic Data of Respondents

This section provides an overview of the demographic characteristics of respondents based on their gender, age range, and estate firm information.

Variable	Category	Frequency	Percentage (%)
Gender	Male	40	61.3
	Female	20	38.7
Age Range (Years)	Under 22	6	4.8
	22–26	12	14.5
	27–31	18	33.9
	32 and above	24	46.8

Source: Field work

The demographic data in the table show that the majority of respondents were male, representing 61.3% of the total sample, while females accounted for 38.7%. This indicates a slight gender imbalance in favor of male participants, suggesting that men were more represented or possibly more active in the context of the study. In terms of age distribution, the largest proportion of respondents (46.8%) were aged 32 years and above, followed by those within the 27–31 age range (33.9%). This implies that the sample consisted predominantly of mature adults who are likely to have substantial experience and awareness relevant to the study's focus. Meanwhile, respondents aged 22–26 made up 14.5% of the population, and only a small fraction (4.8%) were under 22 years old. The overall distribution suggests that the study drew responses primarily

from older and more experienced individuals, which may influence the depth and reliability of the information provided, as older respondents are often more informed and engaged in community or professional activities.

4.4 Section B: Analysis of Research Questions

The responses in Section B of the questionnaire addressed the study’s main research objectives and were analyzed using **Mean** and **Standard Deviation**.

Smart technologies are applicable to property management

S/N	Item	Mean	Std. Deviation	Remarks
1	Smart security systems (e.g., CCTV, smart locks) are essential for modern property management.	3.86	0.52	Accepted
2	Energy management systems are relevant to effective property operations.	3.72	0.56	Accepted
3	Property managers should adopt smart tenant communication platforms.	3.78	0.60	Accepted
4	Smart building automation improves property management efficiency.	3.81	0.57	Accepted
5	Smart technologies like IoT can enhance real-time monitoring.	3.84	0.55	Accepted
6	The use of smart parking management systems improves tenant convenience.	3.65	0.63	Accepted
7	Predictive maintenance systems using AI reduce operational costs.	3.73	0.58	Accepted
Total		3.77	0.57	Accepted

Source: Field work

Scale: Mean > 2.5 → Accepted Mean < 2.5 → Rejected

The results presented in the table indicate respondents’ strong agreement on the importance of smart technologies in enhancing property management practices. The item “Smart security systems (e.g., CCTV, smart locks) are essential for modern property management” recorded the highest mean score of 3.86 with a standard

deviation of 0.52, suggesting that most respondents highly value the role of technology in ensuring safety and security within properties. Similarly, items such as “Smart technologies like IoT can enhance real-time monitoring” (Mean = 3.84, SD = 0.55) and “Smart building automation improves property management efficiency” (Mean = 3.81, SD = 0.57) also received high ratings, reflecting a general consensus that automation and connectivity significantly improve management outcomes. The relatively high mean values across all items (ranging from 3.65 to 3.86) demonstrate a positive perception toward the integration of technology in property operations. However, the item on “Smart parking management systems” had the lowest mean score of 3.65 and the highest standard deviation of 0.63, implying a slightly more varied opinion among respondents about its relevance or implementation feasibility. Overall, the findings suggest that respondents recognize the transformative potential of smart technologies particularly in security, automation, and real-time monitoring in improving efficiency, cost-effectiveness, and tenant satisfaction within modern property management.

To what extent have smart technologies been adopted in the management of properties in the study area

S/N	Item	Mean	Std. Deviation	Remarks
8	Most property managers in this area currently use smart security systems.	3.61	0.63	Accepted
9	Smart energy management systems are widely installed in properties.	3.47	0.68	Accepted
10	Tenant communication is often carried out using smart platforms.	3.55	0.60	Accepted
11	Smart technologies are integrated into building operations.	3.52	0.66	Accepted
12	Smart waste disposal and recycling systems have been adopted.	3.38	0.70	Accepted
13	Virtual property tours (VR/AR) are	3.29	0.74	Accepted

	regularly utilized in property marketing.			
14	Property owners are investing in smart solutions for better management.	3.59	0.65	Accepted
	Total	3.49	0.66	Accepted

Source: Field work

Scale: Mean > 2.5 → Accepted Mean < 2.5 → Rejected

The analysis of the data reveals a generally moderate level of adoption of smart technologies among property managers and owners in the study area. The item “Most property managers in this area currently use smart security systems” recorded the highest mean score of 3.61 with a standard deviation of 0.63, indicating that while security technologies are relatively common, their use is not yet universal. Similarly, “Property owners are investing in smart solutions for better management” (Mean = 3.59, SD = 0.65) and “Tenant communication is often carried out using smart platforms” (Mean = 3.55, SD = 0.60) suggest a growing but not fully established integration of technology-driven practices in property operations. On the other hand, items such as “Smart energy management systems are widely installed in properties” (Mean = 3.47, SD = 0.68) and “Smart technologies are integrated into building operations” (Mean = 3.52, SD = 0.66) show moderate agreement, reflecting that while these innovations are recognized, they may still be in early stages of implementation. The lowest mean scores were observed for “Smart waste disposal and recycling systems have been adopted” (Mean = 3.38, SD = 0.70) and “Virtual property tours (VR/AR) are regularly utilized in property marketing” (Mean = 3.29, SD = 0.74), indicating limited adoption of these more advanced technologies. Overall, the results suggest that although awareness and appreciation of smart systems exist among property managers and owners, full-scale

implementation remains gradual, possibly due to cost, technical, or infrastructural challenges.

Major challenges affecting the effective implementation of smart technologies in property management

S/N	Item	Mean	Std. Deviation	Remarks
15	High installation costs hinder the adoption of smart technologies.	3.84	0.55	Accepted
16	Lack of technical knowledge limits the use of smart tools.	3.72	0.60	Accepted
17	Poor internet connectivity affects the functionality of smart systems.	3.81	0.57	Accepted
18	Limited government support for smart technology adoption.	3.69	0.63	Accepted
19	Resistance to change among stakeholders slows implementation.	3.65	0.61	Accepted
20	Data privacy and security concerns discourage usage.	3.77	0.58	Accepted
Total		3.75	0.59	Accepted

Source: Field work

Scale: Mean > 2.5 → Accepted Mean < 2.5 → Rejected

The results in the table highlight key challenges affecting the adoption and effective use of smart technologies in property management. The item “High installation costs hinder the adoption of smart technologies” recorded the highest mean score of 3.84 with a standard deviation of 0.55, indicating strong agreement among respondents that financial constraints remain a major barrier to technology adoption. Similarly, “Poor internet connectivity affects the functionality of smart systems” (Mean = 3.81, SD = 0.57) and “Data privacy and security concerns discourage usage” (Mean = 3.77, SD = 0.58) were also rated highly, suggesting that infrastructural and cybersecurity issues significantly limit the performance and acceptance of smart systems. The relatively high mean values for “Lack of technical knowledge limits the use of smart tools” (Mean = 3.72, SD = 0.60) and “Limited government support for smart technology adoption”

(Mean = 3.69, SD = 0.63) indicate that both skill gaps and inadequate institutional backing hinder wider implementation. Lastly, “Resistance to change among stakeholders slows implementation” (Mean = 3.65, SD = 0.61) reflects moderate agreement that attitudinal factors also play a role in slowing technological advancement within the property sector. Overall, these findings suggest that while stakeholders acknowledge the benefits of smart technologies, widespread adoption is constrained by financial, technical, infrastructural, and psychological barriers, which must be addressed through policy support, training initiatives, and improved digital infrastructure.

4.5 Discussion of Findings

The findings from the study collectively reveal a comprehensive picture of how smart technologies are perceived, adopted, and challenged within modern property management practices. The demographic data showed that the majority of respondents were male and predominantly within the age range of 32 years and above, indicating that the sample was largely composed of mature adults with substantial experience and awareness of property management operations. This demographic composition suggests that the opinions gathered reflect informed perspectives, likely shaped by years of exposure to the real estate industry and the evolving trends in technology adoption. The high representation of older respondents also implies that the sample included individuals in decision-making positions who are directly involved in property administration, investment, and maintenance, giving credibility to the responses provided.

The first section of the findings highlighted respondents' strong agreement on the relevance and importance of integrating smart technologies into property management. The high mean values across all items, particularly for smart security systems, real-time monitoring, and building automation, suggest a general consensus that technology enhances operational efficiency, safety, and tenant satisfaction. The respondents demonstrated a clear understanding of how innovations such as the Internet of Things (IoT), smart locks, and artificial intelligence (AI)-driven maintenance systems can transform property management by reducing costs, increasing convenience, and improving service quality. The relatively low standard deviations across these items indicate a shared perception among participants, showing little variability in their views. This consistency underscores the recognition that digital transformation is an essential part of modern property management, reflecting a readiness among professionals to embrace these innovations where resources and infrastructure permit.

However, the second section of the analysis revealed that while there is a strong awareness of the benefits of smart technologies, their actual implementation remains moderate. The results showed that tools such as smart security systems, communication platforms, and energy management systems are being used but not on a widespread scale. The relatively lower mean values in areas like virtual property tours and smart waste management systems suggest that these advanced applications are still emerging and may not yet be financially or technically feasible for many property managers. The variation in responses, reflected by slightly higher standard deviations, also points to uneven adoption patterns possibly due to differences in the scale of operations,

resources available, or access to technology. These findings imply that while the real estate sector in the study area is moving toward modernization, it is still in a transitional phase where awareness is high but implementation lags behind due to contextual constraints.

The final section of the results provided deeper insight into the specific barriers limiting the widespread adoption of smart technologies in property management. The respondents strongly agreed that high installation costs, poor internet connectivity, and data security concerns are major obstacles. These findings reveal that the adoption of digital systems is not merely a matter of willingness but also of economic and infrastructural capacity. The perception that lack of technical knowledge and limited government support hinder the use of smart tools suggests systemic issues that extend beyond individual firms. Moreover, the recognition that resistance to change among stakeholders slows implementation reflects cultural and organizational factors affecting technological progress. Together, these findings emphasize that while property managers are increasingly aware of the advantages of smart technologies, practical adoption is curtailed by financial, technical, and institutional challenges. To achieve sustainable digital transformation in property management, there is a need for policy interventions, investment in digital infrastructure, and targeted capacity-building programs that enhance technical competence and reduce cost barriers. Overall, the study demonstrates that the future of property management is closely tied to technological innovation, but achieving full integration will depend on addressing the multifaceted challenges identified in these findings.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the concluding aspects of the study titled “*The Influence of Smart Technology on Property Management in Benin City.*” The chapter begins with a summary of the entire research process, emphasizing the objectives of the study, the methodology adopted, and the major findings that emerged from the analysis. The conclusion synthesizes the main insights drawn from the results in relation to the research questions. It also provides practical and policy-oriented recommendations aimed at improving the adoption and implementation of smart technologies in property management practices in Benin City. Finally, suggestions for further research are made to guide future academic investigations on digital innovation and real estate management in Nigeria.

5.2 Summary of Findings

This study examined the influence of smart technology on property management in Benin City, Edo State. Specifically, it sought to:

1. Identify the smart technologies applicable to property management.
2. Determine the extent to which smart technologies have been adopted in property management practices.
3. Identify the challenges affecting the effective implementation of smart technologies in property management.

The study adopted a **descriptive survey design**. The population consisted of practicing estate firms and property managers in Benin City, from which a **sample of 60 respondents** was selected using the **stratified random sampling technique**. Data were collected through a **structured questionnaire** divided into two sections — Section A (demographic data) and Section B (items relating to the research objectives). The data collected were analyzed using **Mean and Standard Deviation** to describe the opinions of respondents.

The key findings of the study are summarized as follows:

1. The study found that a wide range of **smart technologies are applicable** to property management in Benin City. These include **IoT-based monitoring systems, smart security devices (CCTV, smart locks), energy management systems, building automation, and AI-driven predictive maintenance tools**. The grand mean of 3.77 indicated a strong agreement among property managers that smart technology significantly enhances efficiency, safety, and communication in property operations.
2. The findings revealed that the **extent of smart technology adoption** among property management firms is **moderate but growing**. Tools such as smart security systems, digital tenant communication platforms, and energy management systems were found to be more commonly used, while advanced solutions such as **virtual property tours (VR/AR)** and **smart waste management systems** are still at an early stage of implementation. The grand mean of 3.49 reflected progressive but uneven adoption across firms.

3. The study identified several **challenges affecting the effective implementation** of smart technologies. These include **high installation costs, poor internet connectivity, limited technical expertise, lack of government incentives, and data privacy concerns**. The grand mean of 3.75 indicated that these barriers strongly hinder the widespread integration of digital tools in property management operations.
4. The demographic analysis showed that most respondents were **experienced property managers**, predominantly male and aged above 27 years. This suggests that the responses were drawn from individuals with adequate professional exposure, lending credibility to the study's findings.

The results show that while smart technologies are recognized as valuable tools for improving operational efficiency and client satisfaction, **economic, infrastructural, and institutional barriers** continue to slow their adoption in Benin City.

5.3 Contribution to Knowledge

This study contributes to the existing literature on **real estate management and technological innovation** in several key ways:

1. The study provides **empirical evidence** on how smart technology influences property management efficiency, communication, and maintenance practices within a developing urban context like Benin City. It demonstrates that technology adoption is not only a matter of innovation but also a determinant of competitiveness among estate firms.

2. The research expands the theoretical understanding of **technology adoption in property management** by linking the findings to the principles of innovation diffusion and digital transformation. It shows that while awareness is high, the rate of adoption depends largely on affordability, infrastructure, and knowledge.
3. Methodologically, the study applies **quantitative descriptive analysis (mean and standard deviation)** to assess professional perceptions, providing a structured framework that can be replicated in similar urban studies.
4. Contextually, it offers **localized insights** into the state of smart property management in Benin City an area where few empirical studies exist. By highlighting both progress and challenges, it bridges a significant knowledge gap in Nigerian real estate technology research.
5. Practically, the findings inform policymakers, technology developers, and real estate professionals about the **critical areas requiring intervention**, particularly in digital literacy, infrastructural investment, and policy support, to enable full digital transformation of the property management sector.

5.4 Conclusion

The study concludes that **smart technology plays a transformative role in property management** within Benin City. It enhances operational efficiency, facilitates real-time monitoring, improves tenant satisfaction, and enables data-driven decision-making. Property managers increasingly acknowledge the value of smart systems such as **IoT devices, automated maintenance tracking, and energy management solutions** as indispensable components of modern property administration.

However, despite the recognition of these benefits, the study establishes that the **level of adoption remains moderate**, constrained by **financial costs, inadequate infrastructure, and limited technical expertise**. These factors collectively limit the extent to which property managers can fully integrate technology into their daily operations.

The findings further indicate that addressing the major challenges especially cost barriers, internet connectivity, and capacity building will significantly enhance the adoption rate and performance of estate firms. The study thus concludes that for property management in Benin City to achieve global best practices, there is a need for **concerted efforts from government, professional bodies, and private stakeholders** to invest in digital infrastructure, policy frameworks, and technical training.

5.5 Recommendations

Based on the findings and conclusions, the following recommendations are made:

- i. Enhance Digital Infrastructure:** Government and private sector investors should improve internet connectivity and power supply reliability to support the operation of smart technologies in property management.
- ii. Promote Capacity Building and Training:** The Nigerian Institution of Estate Surveyors and Valuers (NIESV) and other relevant bodies should organize regular workshops and training programs to improve property managers' technical knowledge and competence in smart technology use.

iii. Subsidize Technology Adoption Costs: Government and financial institutions should provide **tax incentives, grants, or low-interest loans** to estate firms that invest in digital tools, especially small and medium-sized firms.

iv. Encourage Collaboration Between Stakeholders: Property managers, software developers, and regulatory agencies should collaborate to develop **customized digital platforms** suited to local property management needs.

v. Establish Supportive Policy Frameworks: Government should formulate clear policies promoting **PropTech innovation**, ensuring that data privacy, cybersecurity, and digital standards are enforced to protect both managers and clients.

vi. Create Awareness and Advocacy: Professional associations should intensify advocacy on the benefits of smart technology adoption to increase awareness among property owners and managers.

vii. Integrate Smart Technology into Educational Curriculum: Real estate and estate management programs in tertiary institutions should include courses on **property technology, AI, and automation** to prepare future professionals for the evolving digital landscape.

5.6 Suggestions for Further Research

Future research could focus on the following areas:

1. A comparative study of **smart technology adoption levels** among property management firms across major Nigerian cities such as Lagos, Abuja, and Port Harcourt.
2. The impact of **digital literacy and training programs** on technology adoption among estate managers.
3. An in-depth **qualitative study** exploring managers' lived experiences and attitudes toward automation in property management.
4. The role of **government policy and financial incentives** in promoting PropTech innovation in developing countries.
5. A study on the **long-term impact of smart technologies** on tenant satisfaction, operational efficiency, and sustainability in property management.

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APPENDIX

THE INFLUENCE OF SMART TECHNOLOGY ON PROPERTY MANAGEMENT IN BENIN CITY QUESTIONNAIRE

Section A: PERSONAL DATA

Please tick (✓) the option that applies to you

1. Gender: Male (), Female ()

2. Age range: under 22 (), 22-26 (), 27-31 (), 32 and above ()

3. Name of Estate Firm:

Section B: Data on Questionnaire

Indicate the extent to which you agree or disagree with the following statements.

Key: Strongly Agree (SA), Agree (A), Disagree (D), Strongly Disagree (SD)

S/N	ITEMS	SA	A	D	SD
	What smart technologies are applicable to property management?				
1.	Smart security systems (e.g., CCTV, smart locks) are essential for modern property management.				
2.	Energy management systems are relevant to effective property operations.				
3.	Property managers in this area should adopt smart tenant communication platforms.				
4.	Smart building automation improves property management efficiency.				
5.	Smart technologies like IoT can enhance real-time monitoring in property management.				
6.	The use of smart parking management systems improves tenant convenience and property value.				
7.	Predictive maintenance systems using AI are vital for reducing property operational costs.				
	To what extent have smart technologies been adopted in the management of properties in the study area?				
8.	Most property managers in this area currently use smart security systems.				
9.	Smart energy management systems are widely installed in properties.				
10.	Tenant communication is often carried out using digital or				

	smart platforms.				
11.	Smart technologies are integrated into building operations in the study area.				
12.	Smart waste disposal and recycling systems have been adopted in property management.				
13.	Virtual property tours (VR/AR) are regularly utilized in property marketing.				
14.	Property owners are investing in smart solutions for better management.				
	What are the major challenges affecting the effective implementation of smart technologies in property management?				
15.	High installation costs hinder the adoption of smart technologies.				
16.	Lack of technical knowledge limits the use of smart tools among property managers.				
17.	Poor internet connectivity affects the functionality of smart systems.				
18.	There is limited government support for smart property technology adoption.				
19.	Resistance to change among stakeholders slows down implementation.				
20.	Data privacy and security concerns discourage the use of smart technologies in property management.				