

**AN ASSESSMENT OF GEOGRAPHIC INFORMATION SYSTEMS (GIS) IN  
PROPERTY MANAGEMENT AMONG ESTATE SURVEYORS AND VALUERS IN  
BENIN CITY**

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**BENIN CITY**

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**FEBRUARY 2025**

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**RESEARCH PROJECT SUBMITTED TO THE DEPARTMENT OF ESTATE  
MANAGEMENT, FACULTY OF ENVIRONMENTAL SCIENCE, UNIVERSITY OF  
BENIN, BENIN CITY IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR  
THE AWARD OF BACHELOR OF SCIENCE (B.Sc.) DEGREE IN ESTATE  
MANAGEMENT**

**SUPERVISOR: PROFESSOR PETER SHAKEDE OGEDENGBE**

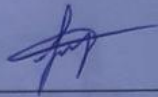
**FEBRUARY 2025**

**DECLARATION**

This is to declare that this study “AN ASSESSMENT OF GEOGRAPHIC INFORMATION SYSTEMS (GIS) IN PROPERTY MANAGEMENT AMONG ESTATE SURVEYORS AND VALUERS IN BENIN CITY” was carried out solely by **IKOYO ELOHOR NORA** with matriculation number **ENV1905949** 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 as being derived from other person(s) resources.

PROF. PETER OGBURN

(Supervisor)



Signature

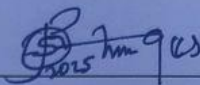
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Date

**CERTIFICATION**

This is to certify that this Research Project was written by **IKOYO ELOHOR NORA** of the department of Estate Management, Faculty of Environmental Sciences, University of Benin, Benin City, Edo State. It is adequate in scope and content for the award of Bachelor of Science (B.Sc.) Hons. Degree in Estate Management.

Matriculation Number: ENV

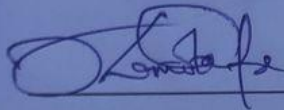
  
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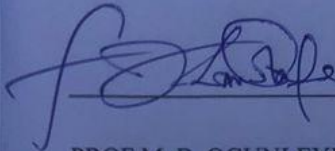
  
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07/04/2025  
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(External Supervisor)



## **EDICATION**

This research project is dedicated to God almighty, my parents Mr. and Mrs. Ikoyo.

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This project and the research that accompanied it would not have been achievable without the assistance, dedication, exceptional support, and unwavering commitment of numerous individuals. I would like to express my gratitude to my supervisor, Prof. P. Ogedengbe, whose enthusiasm and expertise have been a source of inspiration, ensuring that my work remained focused from the beginning to the conclusion of this project. I am also thankful to the Head of Department, Dr. Markson Komolafe, and the project coordinator, Mr. Alohan. My heartfelt appreciation extends to my lecturers, Mr. Pius Chima, Dr Chukwujeku and Dr Patience Iruobe, as well as the Technologists and all non-academic staff of the Department of Estate Management at the University of Benin. I am grateful to my friends Bliss, Elizabeth, Ochuwa, Naomi and Joy for their moral support, which has been instrumental in the success of this project.

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## ABSTRACT

The persistent use of manual methods in property management within Benin City, Edo State, Nigeria, poses significant challenges, including inefficiency, time consumption, and increased risk of inaccuracies. This study aims to investigate the applications of Geographic Information Systems (GIS) in enhancing estate management practices in Benin City by assessing the rate of adoption, identifying commonly used GIS tools and software, and exploring the challenges hindering the implementation of GIS technology. A descriptive survey research design was adopted, targeting all 66 registered estate surveying and valuation firms in Benin City using a total enumeration sampling technique. Data collection was carried out using structured questionnaires, which were analyzed using descriptive statistics, including frequency counts, percentages, means, and standard deviations. Findings indicate that GIS adoption in property management is low, with only 29.4% of firms reporting its use despite 88.24% of respondents being familiar with the technology. Most firms (70.6%) have not adopted GIS, and 96.1% of respondents disagreed that its use is widespread. Staff training on GIS remains limited, with 80.4% of respondents stating that their firms have not invested in such programs. However, 68.6% agree that the benefits of GIS are well understood, indicating that barriers to adoption are due to technical and financial constraints rather than a lack of awareness. ArcGIS and QGIS emerged as the most commonly used GIS software, but their utilization remains limited due to cost and inadequate technical knowledge. The study concludes that while awareness of GIS technology is high among property management professionals, its adoption is hindered by insufficient training and financial constraints. It recommends that estate management firms invest in staff training programs, collaborate with technology providers to access affordable GIS solutions, and adopt policies that encourage the integration of GIS into property management operations. Further research is recommended to explore the long-term impacts of GIS adoption on property valuation accuracy and client satisfaction.

## CHAPTER ONE

### INTRODUCTION

#### 1.1 Background to the Study

Technology plays a vital role in making information easily accessible and transforming various industries. As Porter and Heppelmann (2014) pointed out, technology is at the forefront of modern advancements, creating new opportunities and allowing for global connectivity. The real estate sector is no exception to the benefits of technology. The sector has benefited significantly from technological innovations such as Land Information Systems (LIS) and Geographic Information Systems (GIS) (Chukwuemeka, 2012). Geographic information system is a powerful tool for collecting, organizing, and analyzing geo-referenced data, making it invaluable for real estate transactions and professional practices.

The growth of the real estate sector in Nigeria has brought about increasing client sophistication and a demand for global best practices (Ogunba and Ajayi, 2007). Clients now expect access to comprehensive information and efficient services, which necessitates the adoption of advanced technologies like GIS. This technology not only enhances the efficiency and accuracy of estate management but also aligns with the global trend towards technological integration in professional services (Ullah *et al.*, 2018).

Geographic information system (GIS) technology is essential for estate management professionals in Nigeria to meet the rising demands of their clients and to remain competitive. Leveraging on GIS has the potential to help real estate practitioners improve their service delivery, from property management and valuation to property development and agency services.

GIS provides a comprehensive spatial analysis that supports better decision-making and enhances the overall efficiency of estate management processes (Omidipour *et al.*, 2020).

The real estate sector has been found to significantly contribute to the built environment and job creation. According to Abdychev *et al.*, (2018), global construction output is expected to nearly double by 2025, with sub-Saharan Africa being one of the fastest-growing regions. The real estate sector, as a vital part of this growth, continues to attract investment and demonstrate resilience as a valuable asset class. In many developing countries, construction activities account for a substantial portion of GDP and capital assets. This highlights the non-negotiable role of real estate in economic development.

Geographic information system (GIS) is fundamentally about location and space, making it an ideal tool for real estate transactions that also focus on these aspects. GIS facilitates the collection, assembly, and analysis of spatial information, and also provides the right information necessary for decision-making. Real estate management professionals can perform complex queries about property locations, sizes, and types, leading to more informed and efficient service delivery when the full adopted GIS.

In the last decade, estate surveying and valuation practices have evolved to reflect the trend towards technological integration. Traditional methods, such as manual documentation and physical property scouting, are being replaced by advanced technologies like property software, GPS, and artificial intelligence. GIS has proven to be reliable and efficient for property management, valuation, and investment analysis, providing reliable data and analytical capabilities that surpass conventional methods (Thrall, 1998).

Despite these advancements, many estate surveying and valuation firms in Nigeria still rely on manual processes, which are time-consuming and less efficient. The need for a systematic, automated approach to property valuation is evident, particularly for large-scale projects. GIS offers a solution by enabling spatial and non-spatial data collection and analysis, and as a result enhancing the accuracy and efficiency of property valuations (Eboy and Samat, 2014).

## **1.2 Statement of the Problem**

The persistent use of manual methods in property management within Benin, Edo State, Nigeria, has presented significant challenges. These traditional approaches are often cumbersome, time-consuming, and prone to inaccuracies, which can undermine the reliability and efficiency of valuation practices. Despite global advancements in technology, many estate management professionals in this region continue to rely on outdated techniques that fail to meet the increasing demands for precision and efficiency in the real estate sector.

Given the rapid growth of the real estate industry and the rising sophistication of clients who seek accurate and efficient services, the need for a more effective solution is evident. The continuous use of manual valuation methods not only hampers the productivity of estate surveyors and valuers but also limits their ability to provide high-quality, timely services to their clients.

This study is prompted by the necessity to explore and investigate the application of Geographic Information System (GIS) technology in the property management practice within Benin City. This study therefore aims to ascertain the adoption, commonly employed GIS tools and software, as well as the challenges and barriers faced with regards to adopting GIS technology in the real estate sector of Benin City.

### **1.3 Aim and Objectives**

The aim of this study is to investigate the applications of Geographic Information Systems (GIS) in enhancing estate management practices in Benin City. The specific objectives of this study include to:

- i. Examine the types of GIS tools and software commonly used by estate surveyors and valuers in Benin City
- ii. Ascertain the rate of adoption of GIS technology among estate surveyors and valuers in Benin City
- iii. Investigate the challenges and barriers faced by estate surveyors and valuers in adopting and implementing GIS technology

### **1.4 Research Questions**

The following research questions were raised to guide this study:

- i. What types of GIS tools and software are commonly used by estate surveyors and valuers in Benin City?
- ii. What is the current rate of adoption of GIS technology among estate surveyors and valuers in Benin City?
- iii. What are the main challenges and barriers faced by estate surveyors and valuers in Benin City when adopting and implementing GIS technology?

### **1.5 Scope of the Study**

This study is focused on investigating the applications of Geographic Information Systems (GIS) in enhancing property management practices within Benin City, Nigeria. Firstly, the study targets

estate surveyors and valuers operating within Benin City. This includes estate surveyors, valuers, property managers, and other related practitioners. The selection of this geographical area is based on its proximity to the researcher.

The research will explore the current rate of adoption of GIS technology among these professionals in property management. It will assess how widely GIS is being used in daily property management tasks and identify the level of integration into existing practices. In addition to adoption rates, the study will examine the specific types of GIS tools and software that are commonly employed by estate management professionals in Benin City. The study also seeks to identify the challenges and barriers that hinder the adoption and implementation of GIS technology. This involves investigating technical, financial, and organizational obstacles that estate management professionals encounter. The research will suggest potential solutions to overcome the identified challenges and barriers.

### **1.6 Significance of the Study**

The findings derived from this research hold substantial importance for estate management professionals, policymakers, academic researchers, and the broader community.

This study is of paramount importance to estate management professionals, including estate surveyors, valuers, and property managers. Investigating the adoption and application of GIS technology, the study provides valuable information on how these professionals can enhance their operational efficiency, accuracy, and overall service delivery. The identification of popular GIS tools and software, along with their practical applications, will help professionals gain understanding of the best practices and innovative techniques that can be integrated into their daily operations. Also, understanding the challenges and barriers to GIS adoption equips

professionals with the knowledge to address these issues, thereby facilitating smoother implementation and maximizing the benefits of this technology.

For policymakers and regulatory bodies, the study offers insights into the current state of technology adoption in the estate management sector. The research will show areas where support and intervention may be needed. Policymakers can then work towards creating an environment that promotes technological advancement and professional growth within the real estate industry.

The study also holds significant value for academic researchers and educators in the fields of estate management, geography, and information technology. The findings contribute to the existing body of knowledge on the application of GIS in real estate, providing a foundation for further research and exploration. Educators can utilize the insights from this study to develop curricula and training programs that equip future professionals with the necessary skills and knowledge to leverage GIS technology effectively.

The broader community and real estate clients stand to benefit from the enhanced services provided by estate management professionals who adopt GIS technology. Improved accuracy and efficiency in property valuation, land use planning, and asset management result in better decision-making and more reliable services. For clients, this means greater confidence in the transactions and investments they undertake, contributing to a more transparent and trustworthy real estate market. The overall development and modernization of the estate management sector can stimulate economic growth and attract investment, benefiting the community at large.

## 1.7 Brief Overview of the Study Area

Benin City is the capital of Edo State, Nigeria. It is a major urban center in southern Nigeria known for its historical and cultural significance. The city is located approximately 320 kilometers east of Lagos and 400 kilometers southwest of Abuja, and lies within the tropical rainforest zone, contributing to its lush greenery and agricultural productivity.

The city is renowned for its historical heritage, particularly the Benin Kingdom, with landmarks such as the Oba's Palace and the Benin Moat. Economically, Benin City is diverse, with key sectors including agriculture, manufacturing, trade, and services. The real estate sector is particularly vibrant, driven by the city's growing population and urbanization. This has increased demand for residential, commercial, and industrial properties, making estate management a critical component of the local economy.

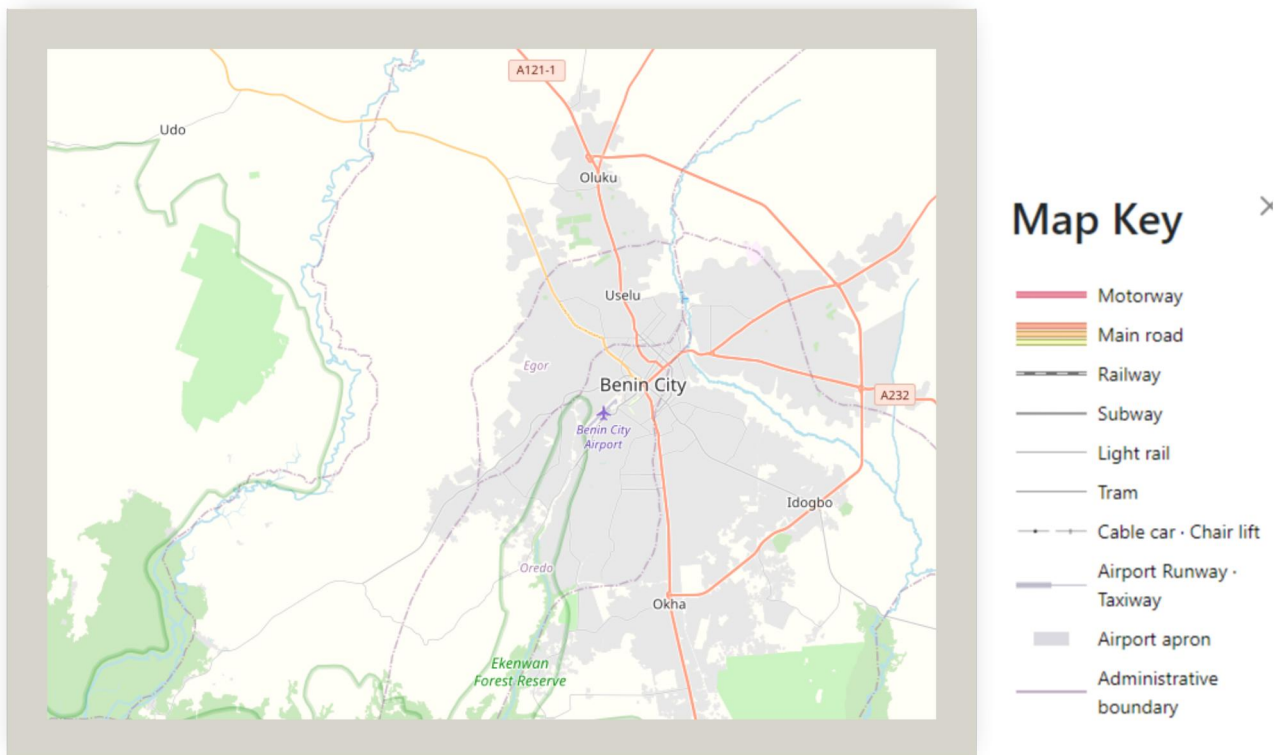


Figure 1: Map of Benin City

Source: Adapted From [openstreetmap.org](https://openstreetmap.org)

## **1.8 Definition of Terms**

**Adoption Rate:** The extent to which estate management professionals in Benin City are using GIS technology in their practices.

**Challenges and Barriers:** The obstacles and difficulties that estate management professionals face when trying to adopt and implement GIS technology. These can include technical issues, financial constraints, lack of training, and organizational resistance.

**Estate Management:** The professional practice of managing, valuing, and developing real estate properties. This includes tasks such as property management, property valuation, property development, and agency services.

**Geographic Information Systems (GIS):** A computerized system used for capturing, storing, analyzing, and managing data related to positions on the Earth's surface. In this study, GIS refers specifically to the technology and tools used by estate management professionals to enhance property management, valuation, and spatial analysis.

**Property Valuation:** The process of determining the market value of a real estate property. This involves assessing the property's worth based on various factors such as location, condition, and market trends.

**Real Estate Sector:** The economic sector that deals with the buying, selling, renting, and managing of land and buildings. This term includes all activities related to real estate transactions and property management.

**Spatial Data:** Information about the physical location and shape of objects on Earth, including their relationships to other objects. Spatial data is crucial in GIS for mapping and analyzing geographic information.

## **CHAPTER TWO**

### **LITERATURE REVIEW**

This chapter provides a review of existing literature relevant to the application of Geographic Information Systems (GIS) in estate management. This chapter examines the theoretical foundations, key concepts, and previous research findings that form the basis for understanding how GIS enhances estate management practices. It explores the evolution of GIS technology, its adoption in the real estate sector, and its role in improving decision-making, property valuation, and data management. Also, the review highlights the challenges and potential solutions identified in previous studies regarding the implementation of GIS in estate management.

#### **2.1 Geographic Information Systems (GIS)**

Geographic Information Systems (GIS) is a sophisticated integration of computer software and geographical data that facilitates the management, analysis, and visualization of spatial information (Breunig *et al.*, 2020). This technology includes a vast array of information about the location and geography of various entities and phenomena, along with the relationships between them. Leveraging GIS can help users interact with geographic information, thus, bringing about a comprehensive understanding and interpretation of spatial data. This interaction often takes the

form of maps, globes, reports, and charts, which collectively reveal patterns, relationships, and trends that are not immediately apparent through traditional data analysis methods.

The core functionality of GIS lies in its ability to analyze, view, question, and interpret spatial data in multifaceted ways (Osman, 2023). This capability makes GIS an invaluable tool across numerous industries, particularly in real estate and related fields. Recent advancements in GIS technology are significantly influencing these sectors, primarily driven by the practical application of academic research to meet the needs of practitioners. Historically, the real estate industry has always placed a high value on the concept of location (Robin, 2022). However, the integration of GIS into locational analysis has been relatively limited. Despite this, geographers have been utilizing GIS to explore and analyze phenomena critical to the real estate industry for several decades.

GIS technology inherently excels as a visual medium. It can effectively assist serious prospective buyers in targeting the right properties, browsing listings, viewing detailed maps, and selecting agents, all from the comfort of their homes. This visual and interactive capability of GIS not only enhances the efficiency of property searches but also improves decision-making processes by providing a clearer understanding of spatial relationships and environmental factors that impact real estate investments.

The potential of GIS to revolutionize locational analysis in real estate is profound. Integrating spatial data with other relevant information, can provide insights into market trends, property values, and demographic shifts (Droj *et al.*, 2024). This integration enables real estate professionals to make more informed decisions, optimize resource allocation, and develop strategic plans that are grounded in robust spatial analysis. As the technology continues to evolve, the adoption of GIS in the real estate sector is expected to grow, further cementing its role as a

critical tool for understanding and navigating the complexities of geographic information in an increasingly data-driven world.

## **2.2 Components of GIS-Based Corporate Real Estate Asset Management**

The application of Geographic Information Systems (GIS) in corporate real estate asset management involves integrating various data types and conducting spatial mapping and analysis to support informed decision-making. This study will consider four fundamental components of GIS-Based corporate real estate asset management: data types, spatial mapping, spatial analysis, and decision-making.

### **2.2.1 Data Types**

#### **Real Estate Data**

Real estate data is essentially the backbone of corporate real estate asset management. It includes information about properties within a portfolio such as location, size, condition, and usage (Mao *et al.*, 2017). This data is invaluable for spatial mapping and analysis, as GIS technology enables efficient visualization of real estate assets on maps, providing a clear spatial understanding of property distribution (Arbab *et al.*, 2018). Real estate data facilitates maintenance planning and resource allocation, helping decision-makers identify high-value properties, prioritize maintenance activities, and allocate resources where they are most needed (Cameron & Yao, 2017). Additionally, this data aids in risk mitigation through diversification by allowing managers to understand the characteristics and performance of real estate assets in different locations, thereby reducing risk by spreading investments across diverse geographical areas (Li & Kang, 2020).

#### **Demographic Data**

Demographic data includes information about the population in specific areas such as income levels, age distribution, education, and consumer behavior. It is essential for location suitability modeling (Fuerst *et al.*, 2015). This data is needed for making informed decisions about site selection. Asset managers can target specific markets based on the characteristics of the local population assessing the demographic composition of an area (Wu & Wu, 2017). Demographic data significantly inform market analysis, enabling businesses to identify emerging market trends, assess the impact of market forces on their real estate holdings, and make decisions about property acquisitions, leases, or divestments (Goodchild, 2019). Understanding demographic data helps in assessing location suitability based on the potential consumer base and market demand, guiding decisions on where to invest and tailoring real estate strategies to meet local population needs (Heikkila & Gordon, 2017).

### **Geographic Data**

Geographic data includes information related to the physical environment and spatial attributes of locations, such as transportation accessibility, proximity to infrastructure, and competitive properties (Bieker *et al.*, 2014). This data is instrumental in location suitability modeling, helping asset managers assess the suitability of different locations based on factors like transportation accessibility, proximity to suppliers and customers, and connections to transportation networks (Wang *et al.*, 2016). Geographic data also enriches market analysis by incorporating market conditions like historical property values, rental trends, and vacancy rates, providing insights into locations with appreciating property values and increasing demand, thereby guiding investment strategies (Levy & Schuck, 2016). Assessing transportation accessibility through geographic data is critical for real estate investment, as proximity to transportation hubs, road networks, and

public transit systems significantly impacts the success of commercial and mixed-use developments (Zhong *et al.*, 2019).

### **2.2.2 Spatial Mapping**

Spatial mapping in GIS-based corporate real estate asset management involves the visualization of real estate assets on maps, providing a clear spatial understanding of property distribution. This process leverages real estate, demographic, and geographic data to create detailed maps that highlight the location, size, and condition of properties within a portfolio. Spatial mapping enables asset managers to easily identify high-value properties, areas requiring maintenance, and regions with potential for investment. Managers can better assess the strategic value of different locations by visualizing properties in relation to demographic trends and geographic features, .

### **2.2.3 Spatial Analysis**

Spatial analysis uses GIS technology to examine the spatial relationships and patterns within real estate data. This component involves overlaying various data layers, such as demographic information, market conditions, transportation accessibility, and competitive properties, to perform comprehensive analyses. Spatial analysis helps asset managers identify optimal locations for property investments, assess market trends, and evaluate the impact of geographic factors on property values. This analysis supports location suitability modeling, enabling managers to make data-driven decisions about site selection, resource allocation, and portfolio optimization.

### **2.2.4 Decision Making**

The integration of GIS in corporate real estate asset management enhances strategic decision-making by providing spatially informed insights. Decision-makers can use spatial analysis to

identify underperforming assets, plan optimal locations for new developments, and forecast asset maintenance needs (Yang *et al.*, 2018). GIS-based decision-making supports cost-effective asset optimization, helping organizations make informed choices about property acquisitions, leases, and divestments.

Spatial analysis is a fundamental component of corporate real estate asset management, offering critical insights into location suitability, market trends, risk assessment, and accessibility to transportation infrastructure. By leveraging Geographic Information Systems (GIS), asset managers can overlay multiple spatial data layers, providing a comprehensive evaluation of potential investment locations (Wu & Wu, 2017).

### **Location Suitability Modeling**

Spatial analysis plays a pivotal role in location suitability modeling. This process involves integrating various spatial data layers, such as demographic information, market conditions, transportation accessibility, and competition. By overlaying these data layers, asset managers can gain a detailed understanding of the suitability of different locations for investment. This comprehensive evaluation helps in identifying optimal sites for development or acquisition, ensuring that investments are made in areas with the highest potential for return (Wu & Wu, 2017).

### **Market Trend Identification**

One of the significant advantages of spatial analysis is its ability to identify market trends. By visualizing historical property values, rental trends, and vacancy rates across different locations, asset managers can discern patterns and trends that are not immediately apparent through traditional analysis methods. This information is crucial for making timely decisions about

property acquisitions, divestments, and other asset management strategies. For instance, understanding which areas are experiencing rising property values or decreasing vacancy rates can guide strategic decisions to capitalize on emerging market opportunities (Levy & Schuck, 2016).

### **Risk Assessment and Mitigation**

Spatial analysis is instrumental in assessing risks associated with environmental factors, zoning regulations, and other external variables. By analyzing spatial data, decision-makers can proactively identify and mitigate potential risks. For example, spatial analysis can highlight areas prone to environmental hazards, such as flooding or earthquakes, allowing asset managers to avoid high-risk investments. Additionally, understanding local zoning regulations and compliance requirements helps ensure that investments are legally sound and less likely to encounter regulatory issues. This proactive approach to risk management is essential for maintaining the stability and profitability of a real estate portfolio (Dong *et al.*, 2016).

### **Transportation Accessibility**

Accessibility to transportation infrastructure is a critical factor in real estate investment, particularly for commercial properties. Spatial analysis enables the evaluation of the proximity of properties to transportation hubs, road networks, and public transit systems. Properties with excellent transportation access tend to attract more tenants and buyers, leading to higher returns on investment. By analyzing spatial data related to transportation accessibility, asset managers can make informed decisions about where to invest, ensuring that properties are well-connected and conveniently located for potential users (Zhong *et al.*, 2019).

### **Strategic Planning and Decision Making**

Overall, spatial analysis enhances strategic planning and decision-making processes in corporate real estate asset management. By providing a detailed and comprehensive view of various factors influencing real estate investments, spatial analysis allows asset managers to make data-driven decisions that optimize portfolio performance. Whether it's selecting suitable investment locations, identifying market trends, assessing risks, or evaluating transportation accessibility, spatial analysis provides the necessary insights to make informed and strategic decisions.

### **2.3 The Need for Geographic Information Systems (GIS) in Estate Management**

Estate property management is an inherently complex process that primarily involves dealing with locations and geographical areas extensively, making it inherently spatial in nature (Paul *et al.*, 2019). As a specialized area within the real estate industry, property management has evolved into a managerial science that requires both communication skills and technical expertise for dynamic decision-making (Palm, 2018). Traditionally, property managers have relied on manual methods for property records and management, a practice that has persisted for decades (Abidoye *et al.*, 2019). However, this manual approach is filled with numerous challenges.

One of the primary issues with the manual method of property management is the inefficiency in information retrieval. Babalola and Kardam (2011) highlighted that retrieving information manually is a time-consuming process, often taking days to locate and access the required data. Also, long-term usage of physical records can lead to their mutilation and damage, compromising the integrity of vital property information. Another significant drawback of the manual system is the difficulty in information sharing among users. In an era where timely and accurate information exchange is crucial, the manual system falls short, creating bottlenecks in the management process.

Manual property administration has been reported to be inefficient, time-consuming, and prone to abuses. Chiemelu and Onwumere (2013) pointed out that some property managers exploit the inefficiencies of the manual system to siphon revenues generated from property transactions. This inefficiency necessitates the development of an integrated property or land information system to enhance transparency and efficiency in property management.

The persistence of these problems associated with the manual or paper-based system points out to the urgent need for a comprehensive and automated solution (Akeh and Mshelia, 2018). Geographic Information System (GIS) is one such automated approach that holds promise in addressing these challenges. GIS integrates spatial data and property information, facilitating efficient data retrieval, management, and sharing among stakeholders.

GIS offers a transformative approach to estate management by providing a centralized platform for storing, analyzing, and visualizing property data. This system enhances the accuracy and speed of information retrieval, reducing the time and effort required to access property records. Through the digitalization of property information, GIS minimizes the risk of data loss or damage associated with physical records. The ability to share information seamlessly among users enhances collaboration and decision-making processes, making GIS an ideal solution.

### **Conceptual Review of Geographic Information Systems (GIS) in Asset Management**

Geographic Information Systems (GIS) have fundamentally transformed asset management by providing spatial insights and enhancing data-driven decision-making processes. In asset management, GIS significantly enhances the efficiency of mapping and monitoring assets, leading to better maintenance planning and resource allocation. Arbab *et al.*, (2018) and Deakin & Al-shamma'a (2015) emphasized that GIS integration with asset management systems leads to

cost savings and improved asset performance. GIS provides a detailed spatial representation of assets, and as a result helps managers allocate resources more effectively, ensuring timely maintenance and reducing downtime.

In the real estate sector, GIS facilitates comprehensive location analysis and site selection. Bieker et al. (2014) and Laarabi et al. (2017) illustrated that GIS assists in identifying optimal locations for real estate investments by considering factors such as accessibility, demographics, and market trends. The spatial visualization capabilities of GIS enable real estate managers to assess property portfolios holistically, aiding in strategic decision-making and risk management. GIS technology allows for the overlay of various data layers, such as demographic information, market conditions, transportation accessibility, and competitive properties, providing a multi-faceted view of potential investment locations.

However, despite its transformative impact, GIS implementation in asset management faces challenges, including data quality and integration complexities (Alshehri & Eastman, 2016; Gu *et al.*, 2018). Ensuring accurate and up-to-date spatial data is necessary for effective asset management, and addressing these challenges should be a priority for future research. Enhancing GIS capabilities to manage large datasets and integrate diverse data sources will further improve its utility in asset management.

Location analysis is a critical component of real estate asset management, and GIS has revolutionized this process. As Wyly *et al.*, (2009) noted, location analysis involves assessing geographic areas to make informed investment decisions, optimize property portfolios, and mitigate risks. GIS excels in this by overlaying spatial data layers, allowing asset managers to gain comprehensive insights into potential investment locations. For example, GIS tools can

assess demographic compositions, targeting specific markets based on income levels, age distribution, and consumer behavior (Fuerst *et al.*, 2015).

In addition to demographics, market conditions are essential in location analysis. Heikkila & Gordon (2017) demonstrated that GIS enables asset managers to incorporate market data, such as historical property values, vacancy rates, and rental trends, into their assessments. The visual representation of market data over time helps identify locations with appreciating property values and increasing demand, guiding investment strategies and portfolio management decisions.

Transportation accessibility is another fundamental aspect of location analysis. GIS provides the means to analyze proximity to transportation hubs, roads, and public transit systems (Zhao *et al.*, 2019). For commercial and mixed-use developments, easy access to transportation can significantly impact the success and profitability of an investment. GIS also facilitates competitive property analysis, enabling asset managers to examine existing properties and developments in a chosen area, evaluating their strengths and weaknesses (Zhang & Oh, 2012). This information aids in assessing market saturation and potential competition for tenants or buyers.

Spatial analysis has become an indispensable tool in real estate asset management, enabling stakeholders to make data-driven decisions regarding property investments, portfolio optimization, and risk assessment (Chen *et al.*, 2018). GIS allows asset managers to perform a wide range of spatial analyses, including location suitability assessments. GIS overlays spatial data on factors like demographics, market conditions, transportation accessibility, and competition. This helps asset managers gain insights into optimal locations for property investments (Wu & Wu, 2017). This information leads to more successful investment decisions and increased returns.

Market trend identification is another vital application of spatial analysis. Levy & Schuck (2016) note that asset managers use GIS to visualize historical property values, rental trends, and vacancy rates, identifying areas with appreciating property values or increasing demand. This knowledge helps in timing property acquisitions, divestments, and other portfolio management strategies. GIS also allows asset managers to assess the geographic distribution of their assets, reducing the concentration of assets in a single location and mitigating risks associated with local economic downturns, regulatory changes, or environmental factors (Li & Kang, 2020).

Effective decision-making in GIS-based asset management is necessary for optimizing corporate real estate portfolios. Li *et al.*, (2017) argued that GIS empowers decision-makers by providing spatially informed insights. Decision-makers can use spatial analysis to identify underperforming assets, plan optimal locations, and forecast asset maintenance needs (Yang *et al.*, 2018). Integrating GIS with asset management enhances strategic decision-making and supports cost-effective asset optimization (Dong *et al.*, 2016).

## **2.4 Empirical Review**

The role of Geographic Information Systems (GIS) in estate management has garnered significant attention over recent years, particularly in Nigeria and across Africa. The empirical findings from various studies conducted illustrate the transformative potential of GIS in this field. Oluwunmi *et al.* (2022) investigated the perception of estate surveyors and valuers (ESVs) regarding big data in property marketing in Lagos, Nigeria. The study, based on 55 analyzed questionnaires, revealed that big data enables real estate firms to execute targeted marketing strategies and match demand with supply, thereby reducing fraud due to the availability of reliable data. The conclusion drawn was that big data is a valuable addition to the toolkit of real estate practitioners, especially in property marketing, and its adoption is highly recommended.

Ayedun *et al.*, (2022) explored the application of GIS in valuation practice in Port Harcourt, Nigeria. This study involved 74 estate surveying and valuation firms and found that while there is high awareness of GIS benefits, its practical application remains low. The willingness to adopt GIS is contingent on better understanding and training, suggesting that targeted educational programs could significantly enhance valuation practices.

Akinola *et al.*, (2021) assessed ICT usage in estate surveying and valuation in Lagos Island, Nigeria. Data from registered estate firms indicated a positive correlation between ICT adoption and improved service delivery. The study highlighted that familiarity with real estate software was high, but there were barriers to adopting more advanced technologies, suggesting a need for curriculum adjustments in academic institutions to include comprehensive ICT training.

Asiyanbola (2018) evaluated GIS/Remote Sensing awareness among public servants in Ibadan, Nigeria. The study, which surveyed 101 public servants, showed a high level of interest and awareness of GIS benefits, though practical usage was hindered by financial constraints, lack of time, and insufficient technical knowledge. This indicates that overcoming these barriers could lead to more effective use of GIS in environmental professions.

Akeju *et al.*, (2021) investigated mobile technology awareness and usage among real estate firms in Ikeja, Lagos State. The study found a high level of awareness, but adoption was limited to basic applications like social media and Google Maps. The findings imply that increasing awareness and training on more advanced mobile applications could improve service delivery in real estate practices.

Akeh and Mshelia (2018) addressed inefficiencies in property record-keeping using GIS technology in Lagos. Their qualitative analysis demonstrated that GIS significantly improved the

accuracy and accessibility of property records, suggesting that broader GIS implementation could streamline operations in property management. Abbot (2018) conducted a comparative analysis of GIS applications in urban land administration in East Africa, specifically in Nairobi and Kampala. The study found that GIS improved land registration and property taxation, leading to increased revenue. However, it emphasized the need for investment in data quality and skilled personnel to maximize GIS benefits.

Arbab *et al.*, (2018) explored GIS in estate management for spatial mapping and analysis through a literature review and case studies from various African cities. The study highlighted that GIS-enabled spatial mapping enhances visualization and strategic planning, indicating its essential role in efficient estate management and resource allocation.

## **2.5 Gap in Literature**

The literature review presents various studies that examine the role of Geographic Information Systems (GIS) in estate management, revealing the transformative potential of GIS across different aspects of real estate practice, including property marketing, valuation, and land administration. However, a significant gap in the literature exists, as these studies primarily focus on awareness and perception, with limited exploration of the actual application and integration of GIS in daily estate management practices. While studies like those by Ayedun *et al.* (2022) and Akinola *et al.* (2021) emphasize the barriers to adoption, such as lack of training and technical knowledge, there is a noticeable absence of research specifically addressing how these barriers can be effectively overcome to enhance GIS adoption in estate management. Additionally, there is limited empirical evidence on the practical benefits of GIS in improving efficiency, accuracy, and decision-making in estate management in Benin City, creating a need for further

investigation into its application in this region. This study seeks to fill this gap by exploring the practical applications of GIS in estate management practices in Benin City, Nigeria.

### **Summary of Literature Review**

The literature review explored the application of Geographic Information Systems (GIS) in estate management, emphasizing how this technology enhances real estate practices through improved data management, decision-making, and property valuation. The chapter begins by introducing GIS as a sophisticated tool that integrates computer software with geographical data, providing insights into spatial relationships that traditional data analysis methods may overlook. GIS helps real estate professionals analyze market trends, property values, and demographic shifts through visualizing spatial data through maps and charts. This help in improving strategic decision-making.

The review further discussed the evolution of GIS technology and its adoption in the real estate industry. While location analysis has long been valued in real estate, the integration of GIS in the sector has been relatively limited. However, advancements in GIS are now playing a significant role in property searches, enabling users to browse listings and view detailed maps from anywhere. As a visual and interactive tool, GIS has the potential to revolutionize locational analysis by integrating various data sources, enabling professionals to optimize resource allocation and develop strategic plans grounded in spatial analysis.

The review highlighted key components of GIS-based corporate real estate asset management: data types (real estate, demographic, and geographic), spatial mapping, spatial analysis, and decision-making. Real estate data provides essential information on property characteristics, while demographic data aids in location suitability modeling by offering insights into the

population and market trends. Geographic data, including proximity to infrastructure and transportation, further enriches the analysis by helping professionals assess location suitability and market conditions.

Spatial mapping and analysis are central to GIS applications in estate management. These tools allow asset managers to visualize property distributions and assess the spatial relationships between various factors, such as demographics and transportation access. This comprehensive evaluation supports informed decisions about site selection, investment strategies, and risk management. GIS also enhances transportation accessibility assessments, critical for commercial and mixed-use developments, ensuring properties are well connected to transportation networks.

The literature review also emphasized the growing need for GIS in estate management, especially given the inefficiencies of traditional, manual methods. Manual property records are time-consuming to retrieve, susceptible to damage, and challenging to share among users. GIS addresses these issues by offering a centralized platform for storing and analyzing property data, improving accuracy, speed, and collaboration among stakeholders. It also supports the transition to more transparent and efficient property management systems.

## **CHAPTER THREE**

### **RESEARCH METHODOLOGY**

#### **3.1 Introduction**

This chapter outlines the research methodology employed in this study, which investigates the applications of Geographic Information Systems (GIS) in enhancing property management practices in Benin City. The methodology adopted is aimed at providing a systematic approach to

collecting and analyzing data relevant to the objectives of this study. This chapter is structured to provide an overview of the research design, study population, sample size determination, sampling techniques, data collection methods, reliability of data, and the techniques and instruments of data analysis.

### **3.2 Research Design**

The research design adopted for this study is a descriptive survey design. This design is selected because it allows for the collection of data that describes the current state of GIS adoption and application in property management practices within Benin City. The descriptive survey design is appropriate as it facilitates the gathering of information from a broad population. This will help in analyzing the extent of GIS usage, identify challenges, and suggest possible solutions for improving property management practices.

### **3.3 Study Population**

The population of this study comprises estate surveying and valuation firms practicing within Benin City. These firms have professionals like estate surveyors and valuers, property managers, and other real estate practitioners who utilize GIS in their daily operations. The choice of this population is based on their direct involvement in property management activities, making them relevant respondents for understanding the current state and impact of GIS in the field. There are 66 registered practicing estate surveyor and valuation firms in Benin City (NIESV Heads of Practice, Edo State, 2024).

### **3.4 Sampling Techniques and Sample Size Determination**

In this study, the sampling technique employed is the total enumeration method, also known as a census sampling approach. This technique involves including the entire population of interest in

the research without selecting a subset. In this case, the population comprises 66 estate surveying and valuation firms in Benin City, all of which were considered for inclusion in the study.

The decision to use the total enumeration method is based on the relatively small and manageable size of the population. With only 66 firms, it was deemed feasible and practical to include all in the sample, thus ensuring comprehensive data collection and minimizing potential biases associated with sampling. This approach allows the study to achieve a higher degree of accuracy, as the views, practices, and characteristics of every firm in the population are considered, eliminating the possibility of overlooking relevant data that may occur when only a subset is used.

### **3.5 Data Collection Methods**

Data for this study will be collected through the use of structured questionnaires. The questionnaire is designed to elicit responses relevant to the objectives of the study, covering areas such as the rate of GIS adoption, types of GIS tools used, challenges faced in implementing GIS, and potential solutions to these challenges. The questionnaire will contain questions with 4-point Likert scale structure of strongly agree, agree, disagree and strongly disagree. The questionnaire will capture quantitative data for statistical analysis.

### **3.6 Reliability of Data**

To ensure the reliability of the data collected, a pilot study will be conducted. The pilot study will involve administering the questionnaire to a small, representative sample. The feedback from the pilot study will be used to refine the questionnaire, ensuring clarity, relevance, and effectiveness

in capturing the necessary data. Cronbach's Alpha will be used to test the reliability of the questionnaire, with a coefficient of 0.7 or higher indicating acceptable reliability.

### 3.7 Techniques and Instruments of Data Analysis

The data collected from the questionnaires will be analyzed using descriptive statistics. Descriptive statistics, such as frequencies, percentages, and mean scores, will be used to summarize the data and provide an overview of the responses.

The Statistical Package for the Social Sciences (SPSS) software will be used to facilitate the data analysis process. SPSS is chosen for its robustness and ability to handle large datasets, ensuring that the analysis is accurate and comprehensive.

Table 3.1: Summary of Analytical Tools to be Adopted

| S/N | OBJECTIVES  | ANALYTICAL METHOD   |
|-----|---|---|
| 1   | Ascertain the rate of adoption of GIS technology among estate surveyors and valuers in Benin City                         | Frequency Count, Percentages, Mean and Standard Deviation |
| 2   | Examine the types of GIS tools and software commonly used by property management professionals in Benin City              | Frequency Count, Percentages, Mean and Standard Deviation |
| 3   | Investigate the challenges and barriers faced by estate surveyors and valuers in adopting and implementing GIS technology | Frequency Count, Percentages, Mean and Standard Deviation |

The mean of the Likert Scale was interpreted using the following key in table 3.2

Table 3.2: Interpretation for Likert Scale mean

| Ranges | Remark |
|--------|--------|
|        |        |

|             |                   |
|-------------|-------------------|
| 3.50 – 4.50 | Strongly Agree    |
| 2.50 – 3.49 | Agree             |
| 1.50 – 2.49 | Disagree          |
| 1.00 – 1.49 | Strongly Disagree |

**CHAPTER FOUR**  
**DATA PRESENTATION AND ANALYSIS**

#### **4.1 Preamble**

In this chapter, the analysis and interpretation of collected data is carried out. The data that were analyzed and interpreted includes those that assesses the demographic information of the respondents and those that directly relate to the study's objectives.

66 questionnaires submitted, however only 51 questionnaires were filled and return. The response/return rate was therefore 77.3%.

#### **4.2 Demographic Information of Respondents**

This section provides insights into the demographic characteristics of the respondents, including their positions in the firms, years of practice, age, educational qualifications, and familiarity with GIS technology. By analyzing these variables, the study gains an understanding of the background of the professionals who participated in the survey and their exposure to GIS in property management.

**Table 4.1:** Demographic Information of Respondents

| Parameter                               | Sub-division           | Frequency | Percentage |
|---|------------------------|-----------|------------|
| Position in the Firm                    | Manager                | 15        | 29.41%     |
|   | Junior Estate Surveyor | 12        | 23.53%     |
|   | Senior Estate Surveyor | 23        | 45.10%     |
|   | President              | 1         | 1.96%      |
| Number of Years in Practice             | Less than 5 Years      | 5         | 9.80%      |
|   | 5-10 Years             | 18        | 35.29%     |
|   | 11-15 Years            | 19        | 37.25%     |
|   | Above 15 Years         | 9         | 17.65%     |
| Age of Respondent                       | 20-30 Years            | 3         | 5.88%      |
|   | 31-40 Years            | 22        | 43.14%     |
|   | 41-50 Years            | 21        | 41.18%     |
|   | Above 50 Years         | 5         | 9.80%      |
| Educational Qualification               | OND                    | 5         | 9.80%      |
|   | HND/Bachelor's Degree  | 41        | 80.39%     |
|   | Masters' Degree        | 4         | 7.84%      |
|   | Doctorate              | 1         | 1.96%      |
| Are you familiar with GIS               | Yes                    | 45        | 88.24%     |
|   | No                     | 6         | 11.18%     |
| Does your firm use GIS in its operation | Yes                    | 36        | 70.6%      |
|   | No                     | 15        | 29.4%      |

#### Researcher's Field Survey, 2025

The demographic profile of the respondents indicates a well-distributed mix of property management professionals. Senior estate surveyors constitute the largest proportion (45.10%), followed by junior estate surveyors (23.53%) and managers (29.41%). This suggests that the study sample includes a balanced representation of both experienced and mid-level professionals in the field. In terms of work experience, the majority of respondents (37.25%) have been in practice for 11-15 years, followed closely by those with 5-10 years (35.29%). This indicates that most participants have substantial experience in property management, which enhances the reliability of their responses.

The age distribution shows that the majority (43.14%) fall within the 31-40 years bracket, with 41.18% aged 41-50 years. This implies that most respondents are in their active professional years. Regarding educational qualifications, 80.39% hold at least an HND or a Bachelor's degree,

while 7.84% possess a Master's degree. Only a small fraction (1.96%) has attained a Doctorate, which suggests that most professionals operate with undergraduate-level education.

Familiarity with GIS is relatively high, with 88.24% of respondents indicating awareness of the technology, suggesting that GIS is not an entirely new concept among property management professionals. However, the actual usage of GIS in property management firms is low, with only 29.4% confirming its application in their operations. This indicates that while awareness is widespread, practical implementation is still developing, with a notable portion (70.6%) of firms yet to integrate GIS into their processes.

### **4.3 Current Rate of Adoption of GIS Technology among Property Management Professionals**

This section examines the extent to which property management professionals and firms in Benin City have adopted GIS technology. The results focus on the level of agreement among respondents regarding the implementation of GIS, the increase in its use, and the understanding of its benefits.

**Table 4.2:** Rate of Adoption of GIS Technology

| Variables  | Frequency (Percentage) |            |            |                | Mean | Std. Deviation | Remark   |
|--|------------------------|------------|------------|----------------|------|----------------|----------|
|  | Strongly Disagree      | Disagree   | Agree      | Strongly Agree |      |                |          |
| Our firm has adopted GIS technology in property management operation                                 | 6 (11.8%)              | 30 (58.8%) | 15 (29.4%) | 0 (0.0%)       | 2.18 | 0.63           | Disagree |
| A significant number of property management firms in Benin City are actively using GIS               | 2 (3.9%)               | 47 (92.2%) | 2 (3.9%)   | 0 (0.0%)       | 2    | 0.32           | Disagree |
| GIS adoption in property management is increasing rapidly in Benin City                              | 0 (0.0%)               | 46 (90.2%) | 5 (9.8%)   | 0 (0.0%)       | 2.1  | 0.3            | Disagree |
| Our firm has invested in staff training to enhance GIS usage in property management.                 | 0 (0.0%)               | 41 (80.4%) | 10 (19.6%) | 0 (0.0%)       | 2.2  | 0.4            | Disagree |
| The benefits of using GIS in property management are well understood by professionals in Benin City. | 3 (5.9%)               | 13 (25.5%) | 35 (68.6%) | 0 (0.0%)       | 2.63 | 0.67           | Agree    |

Researcher's Field Survey, 2025

Table 4.2 reveals a general consensus that the adoption of GIS in property management is low. Specifically, 58.8% of respondents disagree that their firms have adopted GIS technology, while only 29.4% agree. This indicates that a significant portion of property management firms in Benin City have not yet integrated GIS into their operations. Similarly, 92.2% of respondents disagree that a significant number of property management firms actively use GIS, reinforcing the notion that adoption is limited. Also, 90.2% disagree that GIS adoption is increasing rapidly in Benin City, indicating that the technology is not gaining widespread traction. Regarding staff training, 80.4% of respondents disagree that their firms have invested in enhancing GIS skills, suggesting a lack of institutional support for capacity building. This may further contribute to the slow adoption rate. However, 68.6% of respondents agree that the benefits of GIS are well understood among professionals, indicating that the primary barriers to adoption are not due to a lack of awareness but may stem from other challenges such as cost or technical expertise.

#### 4.4 Types of GIS Tools and Software Commonly Used

This part of the analysis explores the specific GIS tools and software being employed by property management firms. It assesses the use of both proprietary software, such as ArcGIS, and open-source tools like QGIS.

**Table 4.3:** Types of GIS Tools and Software Commonly Used

| Variables  | Frequency (Percentage) |           |           |                | Mean | Std. Deviation | Remark   |
|--|------------------------|-----------|-----------|----------------|------|----------------|----------|
|  | Strongly Disagree      | Disagree  | Agree     | Strongly Agree |      |                |          |
| Our firm uses GIS software for property mapping and analysis   | 0 (0.0)                | 41 (80.4) | 10 (19.6) | 0 (0.0)        | 2.2  | 0.4            | Disagree |
| We regularly use GIS software such as ArcGIS, QGIS, or similar tools in our work.  | 8 (15.7)               | 42 (82.4) | 1 (2.0)   | 0 (0.0)        | 1.86 | 0.41           | Disagree |
| Free and open-source GIS software (e.g., QGIS) is more commonly used by property management professionals than proprietary software. | 0 (0.0)                | 39 (76.5) | 12 (23.5) | 0 (0.0)        | 2.24 | 0.43           | Disagree |
| Our firm prefers proprietary GIS software such as ArcGIS due to its advanced features.   | 1 (2.0)                | 40 (78.4) | 0 (0.0)   | 0 (0.0)        | 2    | 0.14           | Disagree |
| The use of GIS tools for property management has increased in Benin City.  | 1 (2.0)                | 37 (72.5) | 13 (25.5) | 0 (0.0)        | 2.24 | 0.48           | Disagree |

Researcher's Field Survey, 2025

Table 4.3 indicates low utilization of GIS software across the surveyed firms. Specifically, 80.4% of respondents disagree that their firms use GIS for property mapping and analysis, and 82.4% disagree that they regularly employ software such as ArcGIS or QGIS. This suggests that even among firms familiar with GIS, regular use is minimal. Additionally, 76.5% of respondents disagree that open-source GIS software is more commonly used, while 78.4% disagree that proprietary software like ArcGIS is preferred. This reflects a general lack of engagement with both free and commercial GIS platforms. Also, 72.5% of respondents disagree that the use of GIS tools has increased in Benin City, further reinforcing the observation that adoption remains

stagnant. These findings suggest that despite awareness of GIS benefits, practical implementation remains limited due to various constraints.

#### 4.5 Challenges and Barriers to Adoption and Implementation of GIS Technology

In this section, the study identifies the key challenges faced by property management professionals in adopting GIS technology. These barriers include the high cost of software, lack of technical expertise, and difficulties in integrating GIS with existing practices.

**Table 4.4:** Challenges and Barriers to Adoption and Implementation of GIS Technology

| Variables   | Frequency (Percentage) |           |           |                | Mean | Std. Deviation | Remark         |
|---|------------------------|-----------|-----------|----------------|------|----------------|----------------|
|   | Strongly Disagree      | Disagree  | Agree     | Strongly Agree |      |                |                |
| The high cost of GIS software and tools is a major barrier to their adoption  | 0 (0.0)                | 4 (7.8)   | 7 (13.7)  | 40 (78.4)      | 3.71 | 0.62           | Strongly Agree |
| Lack of technical expertise among property management professionals hinders the effective use of GIS.               | 0 (0.0)                | 0 (0.0)   | 23 (45.1) | 28 (54.9)      | 3.55 | 0.5            | Agree          |
| There is limited awareness of the potential benefits of GIS in property management                                  | 0 (0.0)                | 46 (90.2) | 5 (9.8)   | 0 (0.0)        | 2.1  | 0.3            | Disagree       |
| Our firm faces challenges in integrating GIS with existing property management practices.                           | 0 (0.0)                | 7 (13.7)  | 42 (82.4) | 2 (3.9)        | 2.9  | 0.38           | Agree          |
| Government policies and regulations do not sufficiently encourage the use of GIS in property management.            | 0 (0.0)                | 26 (51.0) | 25 (49.0) | 0 (0.0)        | 2.49 | 0.5            | Disagree       |
| Access to reliable GIS data sources is a significant challenge for property management professionals in Benin City. | 0 (0.0)                | 9 (17.6)  | 35 (68.6) | 7 (13.7)       | 2.96 | 0.54           | Agree          |

Researcher’s Field Survey, 2025

Table 4.4 highlights the key challenges faced by property management professionals in Benin City regarding the adoption and implementation of Geographic Information System (GIS) technology. One of the most significant barriers identified is the high cost of GIS software and tools, with 78.4% of respondents strongly agreeing and 13.7% agreeing with this assertion (Mean

= 3.71, SD = 0.62). This indicates that financial constraints play a critical role in limiting the widespread adoption of GIS in property management practices. Another major challenge is the lack of technical expertise among property management professionals. A combined 100% of respondents agreed (45.1%) or strongly agreed (54.9%) that insufficient technical knowledge hinders the effective use of GIS (Mean = 3.55, SD = 0.50). This suggests that even when firms can afford GIS tools, the absence of adequately trained personnel to operate these systems remains a critical issue. The claim that there is limited awareness of the potential benefits of GIS in property management was widely rejected by respondents. A substantial 90.2% disagreed with this statement (Mean = 2.1, SD = 0.3), indicating that most professionals are aware of the advantages offered by GIS. This implies that the problem lies not in awareness but in practical implementation due to other structural and operational barriers.

The difficulty in integrating GIS with existing property management practices was also highlighted as a notable challenge. Approximately 82.4% of respondents agreed, while 3.9% strongly agreed (Mean = 2.9, SD = 0.38). This suggests that firms may face technical and procedural difficulties when attempting to align GIS technology with their established workflows. Government policies and regulations do not appear to be a significant impediment to GIS adoption. A majority of 51.0% of respondents disagreed with the assertion that regulatory frameworks discourage GIS use (Mean = 2.49, SD = 0.50). This indicates that external policy environments are not viewed as a major barrier, suggesting that internal organizational and financial factors are more influential in shaping GIS adoption. Finally, access to reliable GIS data sources was identified as another significant challenge. Approximately 68.6% of respondents agreed, while 13.7% strongly agreed (Mean = 2.96, SD = 0.54). This suggests that even when firms adopt GIS technology, they may struggle to obtain accurate and comprehensive data

required for effective property management. The relatively high mean value further emphasizes the importance of improving data availability and accessibility to facilitate more efficient GIS implementation.

## **CHAPTER FIVE**

### **SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS**

#### **5.1 Summary of Findings**

This study offers an in-depth exploration of the level of awareness, extent of adoption, perceived benefits, and the challenges faced in utilizing GIS technology for property management. One of the most striking findings from the study is the high level of awareness regarding GIS technology among estate surveyors and valuers. A substantial majority of respondents demonstrated familiarity with the concept and recognized its relevance to modern property management. This indicates that GIS technology is no longer perceived as an emerging innovation but rather as a valuable tool that can significantly improve the efficiency and accuracy of property-related processes. The widespread awareness suggests that estate management professionals understand the critical role that spatial data and geospatial analysis play in enhancing decision-making, property evaluation, and asset management.

The study also shows the various practical applications of GIS technology in property management. Respondents highlighted that GIS facilitates the accurate mapping of properties, enables better visualization of spatial relationships, and supports comprehensive property analysis. These capabilities are essential for tasks such as property valuation, site selection, land use planning, and the monitoring of property performance over time. Also, GIS enhances the ability to track property histories, identify patterns in property usage, and forecast future trends. Estate surveyors and valuers recognize that these applications provide a competitive advantage by allowing for more precise and data-driven decision-making.

Another significant finding is the perceived value of GIS technology in improving operational efficiency. The respondents acknowledged that GIS streamlines property documentation processes, reduces human error, and allows for faster data retrieval. This is particularly important in large-scale property management where handling vast amounts of spatial data manually can be time-consuming and prone to inaccuracies. Through leveraging GIS, estate surveyors and valuers can manage large property portfolios more effectively, ensure accurate record-keeping, and provide better services to clients. Additionally, GIS supports improved client communication by providing visual representations of property data that are easy to interpret and understand.

Despite these recognized benefits, the study reveals several critical barriers to the adoption and effective use of GIS technology. One of the most prominent challenges is the high cost of implementation. Many respondents cited financial constraints as a major obstacle, noting that the acquisition of GIS software, hardware, and necessary infrastructure requires significant capital investment. This financial burden is particularly challenging for small and medium-sized firms, which may lack the resources to invest in advanced technological tools. The cost of regular software updates, data acquisition, and system maintenance further compounds this issue, making it difficult for many estate surveyors to sustain the use of GIS technology over time.

In addition to financial barriers, the study identifies a lack of technical expertise as a major impediment to GIS adoption. While estate surveyors and valuers are aware of GIS and its potential, many lack the specialized knowledge and skills required to operate GIS software effectively. This skills gap limits their ability to fully integrate GIS into their daily workflows and undermines the technology's potential to transform property management practices. The findings suggest that even when GIS tools are available, their effective use is often hindered by inadequate training and insufficient understanding of advanced geospatial analysis techniques.

This highlights a pressing need for professional development programs to equip estate management practitioners with the necessary competencies to leverage GIS technology effectively.

Another significant barrier to GIS adoption revealed by the study is the challenge of integrating GIS with existing property management practices. Many estate surveyors reported difficulties in aligning GIS technology with their current operational frameworks. This lack of integration stems from the absence of standardized procedures and best practices for incorporating GIS into estate management processes. Without clear guidelines, firms are often reluctant to overhaul established workflows to accommodate new technologies. The study suggests that unless integration challenges are addressed, GIS adoption will remain fragmented and inconsistent, preventing firms from realizing the full benefits of geospatial technology.

Access to reliable and comprehensive GIS data also emerged as a critical concern. Estate surveyors and valuers reported difficulties in obtaining high-quality spatial data necessary for effective property management. Accurate and up-to-date geospatial data is essential for generating meaningful insights, but the lack of centralized data repositories and limited access to public GIS databases pose significant challenges. This data scarcity not only limits the accuracy of analyses but also undermines confidence in the use of GIS for decision-making. The findings emphasize that without reliable data sources, the utility of GIS technology in property management will remain constrained.

Interestingly, the study found that government regulations and policies do not constitute a major barrier to GIS adoption. While some respondents acknowledged the existence of regulatory frameworks, the majority did not perceive these policies as significant obstacles. This suggests that the regulatory environment in Benin City is relatively neutral or supportive regarding the use

of GIS technology in property management. Instead, internal organizational factors, such as cost and technical expertise, are the primary determinants of GIS adoption. This finding is significant because it indicates that estate surveyors and valuers have the autonomy to adopt GIS technology if these internal challenges are effectively addressed.

The study further indicates that there is a growing interest among estate surveyors and valuers in advancing their technological capabilities. Many respondents expressed a willingness to adopt GIS if provided with adequate resources and training. This positive disposition toward GIS adoption suggests that with the right interventions, such as financial assistance, technical training, and improved data accessibility, the barriers currently hindering GIS implementation can be mitigated.

## **5.2 Conclusion**

This study has provided a comprehensive understanding of the current state of GIS adoption, the perceived benefits, and the challenges hindering effective implementation. The findings indicate that while estate surveyors and valuers in Benin City acknowledge the transformative potential of GIS technology, its widespread adoption is hampered by barriers such as high implementation costs, lack of technical expertise, integration difficulties, and limited access to reliable data.

The study establishes that GIS technology offers significant advantages for property management, including improved accuracy in property valuations, enhanced spatial data visualization, and better decision-making capabilities. These benefits are widely recognized by professionals, suggesting a strong willingness to embrace GIS if the existing challenges can be mitigated. These findings highlight that estate surveyors and valuers are aware of how GIS can improve operational efficiency, reduce errors, and facilitate more precise property monitoring and analysis.

However, the study also reveals that financial constraints constitute a major impediment to GIS adoption. The high cost of acquiring GIS software and maintaining associated hardware remains beyond the reach of many firms, particularly small and medium-sized enterprises. Additionally, the lack of technical expertise among estate surveyors limits their ability to effectively utilize GIS tools, indicating a need for specialized training and capacity building.

Integration challenges also emerged as a significant concern, as many firms find it difficult to align GIS technology with their existing property management practices. This suggests that without standardized guidelines for incorporating GIS, many firms will continue to struggle with effective implementation. Also, the lack of reliable GIS data sources further exacerbates the problem, as accurate and comprehensive data is crucial for the success of GIS applications.

The study found that government regulations and policies do not pose substantial obstacles to GIS adoption. This indicates that external regulatory frameworks are relatively supportive or neutral, leaving internal organizational factors as the primary barriers to implementation.

While the benefits of GIS technology are well understood by estate surveyors and valuers, practical adoption is limited by financial, technical, and operational challenges. Addressing these challenges through targeted interventions, including financial support, technical training, and improved data accessibility, is essential for promoting the broader use of GIS in property management.

### **5.3 Recommendations**

To enhance the adoption and implementation of GIS in property management, the following recommendations are proposed:

- Property management firms should invest in regular training programs to improve the technical expertise of professionals in GIS applications.
- Government agencies should introduce policies and incentives that encourage the adoption of GIS technology in property management.
- Professional bodies in the property management sector should collaborate with educational institutions to incorporate GIS training into property management curricula.
- Property management firms should explore cost-effective GIS solutions, including open-source software, while also seeking financial support to acquire advanced proprietary tools.
- Stakeholders should establish partnerships with GIS data providers to ensure easy access to high-quality spatial data for property management purposes.
- Firms should gradually integrate GIS into their daily operations, adopting a phased approach to facilitate smooth transition from traditional methods to technology-driven practices.
- More public awareness campaigns should be conducted to educate property management professionals on the benefits and practical applications of GIS in their field.
- Government and private institutions should provide financial grants and support schemes to encourage small and medium-sized property management firms to invest in GIS technology.

- Property management firms should implement research and development initiatives to explore innovative ways of utilizing GIS for property valuation, mapping, and urban planning.
- Collaboration between property management professionals, policymakers, and GIS experts should be strengthened to develop strategies for overcoming barriers to GIS adoption.

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## **APPENDIX I**

### **RESEARCH QUESTIONNAIRE**

Department of Estate Management  
Faculty of Environmental Science,  
University of Benin, Benin City,  
Edo State.

Dear Respondent,

I am a student of the aforementioned department and I'm conducting research on: **“LEVERAGING GEOGRAPHIC INFORMATION SYSTEMS (GIS) AMONG ESTATE SURVEYORS AND VALUERS IN PROPERTY MANAGEMENT”**. Kindly express your opinion by ticking and filling the most option on each of the respective items. All opinions and responses will be treated with strict confidentiality and they are meant for academic purpose only.

Yours Faithfully,

### **SECTION A**

## DEMOGRAPHIC INFORMATION

**INSTRUCTION: Please tick (√) and fill the necessary appropriate information**

- Name of firm: \_\_\_\_\_
- Position in the firm: Manager  Senior Estate Surveyor  Junior Estate Surveyor  GIS Specialist  Other (please specify): \_\_\_\_\_
- Number of years in practice: Less than 5 years  5-10 years  11-15 years  Above 15 years
- Age of respondent: 20-30 years  31-40 years  41-50 years  Above 50 years
- Educational qualification: OND  HND/Bachelor's degree  Master's degree  Doctorate
- Are you familiar with Geographic Information Systems (GIS)? Yes  No
- Does your firm currently use GIS technology in its operations? Yes  No

## SECTION B

**INSTRUCTION: Please tick (√) the appropriate response**

**INSTRUCTION:** Tick the appropriate response: SA = Strongly Agree, A = Agree, D = Disagree, SD = Strongly Disagree

| S/N | Items   | SA | A | D | SD |
|-----|---|----|---|---|----|
|     | <b>Current Rate of Adoption of GIS Technology among Property Management Professionals</b> |    |   |   |    |
| 1   | Our firm has adopted GIS technology in property management operation                      |    |   |   |    |
| 2   | A significant number of property management firms in Benin City are actively using GIS    |    |   |   |    |
| 3   | GIS adoption in property management is increasing rapidly in Benin City                   |    |   |   |    |
| 4   | Our firm has invested in staff training to enhance GIS usage in property management.      |    |   |   |    |
| 5   | The benefits of using GIS in property management are well understood by                   |    |   |   |    |

|    |  |  |  |  |  |
|----|--|--|--|--|--|
|    | professionals in Benin City.   |  |  |  |  |
|    | <b>Types of GIS Tools and Software Commonly Used</b>   |  |  |  |  |
| 6  | Our firm uses GIS software for property mapping and analysis   |  |  |  |  |
| 7  | We regularly use GIS software such as ArcGIS, QGIS, or similar tools in our work.  |  |  |  |  |
| 8  | Free and open-source GIS software (e.g., QGIS) is more commonly used by property management professionals than proprietary software. |  |  |  |  |
| 9  | Our firm prefers proprietary GIS software such as ArcGIS due to its advanced features.   |  |  |  |  |
| 10 | The use of GIS tools for property management has increased in Benin City.  |  |  |  |  |
|    | <b>Challenges and Barriers to Adoption and Implementation of GIS Technology</b>  |  |  |  |  |
| 11 | The high cost of GIS software and tools is a major barrier to their adoption   |  |  |  |  |
| 12 | Lack of technical expertise among property management professionals hinders the effective use of GIS.                                |  |  |  |  |
| 13 | There is limited awareness of the potential benefits of GIS in property management   |  |  |  |  |
| 14 | Our firm faces challenges in integrating GIS with existing property management practices.  |  |  |  |  |
| 15 | Government policies and regulations do not sufficiently encourage the use of GIS in property management.                             |  |  |  |  |
| 16 | Access to reliable GIS data sources is a significant challenge for property management professionals in Benin City.                  |  |  |  |  |