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RESEARCH ARTICLE

Monitoring Potential of Sustainable Investment of a Cemetery Land under the Urban Expansion in Ibadan, Nigeria

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Abstract

Rapid urban growth in Nigerian cities has intensified competition for land, resulting in critical deficiencies in burial infrastructure provision. In Ibadan, population increase, uncontrolled development, and poor integration of cemetery planning have led to the saturation of existing burial spaces, with limited consideration of the investment potential of cemetery land. This study evaluates the sustainable investment potential of cemetery land in Ibadan through an integrated analysis of demand, spatial capacity, and financial viability. A mixed-methods approach was adopted, combining household surveys across eleven local government areas, cemetery inventory and capacity assessment, demographic projections, and discounted cash-flow modelling. Findings indicate that approximately 75% of existing cemetery capacity has been utilised, signalling an emerging shortage of formal burial space. Household preference analysis reveals a gradual shift from informal and overstretched public burial grounds toward professionally managed private memorial parks. Financial appraisal of a representative peri-urban private cemetery development demonstrates positive net present values, benefit–cost ratios exceeding unity, and acceptable payback periods under multiple discount-rate scenarios, including conservative assumptions. The incorporation of a perpetual maintenance fund further enhances long-term operational sustainability beyond plot sell-out. The study concludes that, when strategically planned and properly structured, cemetery land can function as a viable real estate investment while supporting sustainable urban land-use management. Policy implications emphasise the need for formal recognition of cemetery land within urban planning frameworks in rapidly urbanising cities.

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1. INTRODUCTION

Nigeria's rapid urban expansion over the past two decades has intensified pressure on land resources, particularly in major cities like Ibadan, where population growth, migration, and socio-economic changes have reshaped peri-urban areas (Enoguanbhor *et al*, 2022; Adewoyin, Falegan & Adedire, 2025). As these areas are absorbed into the built environment, land uses that were once marginal or culturally defined-such as cemetery land-face increasing competition and encroachment. Ibadan, the largest metropolis in West Africa by landmass and Nigeria's third-largest city, currently has over 4.1 million residents and continues to expand in both size and density (Olaniyan, 2017).

Urban growth in Ibadan has often proceeded without adequate planning, leaving essential infrastructure, including formal burial sites, insufficiently provided for. Land scarcity, unregulated development, and demographic shifts have exposed cemeteries to informal occupation, neglect, and conversion to other uses

(Ayiti, 2024). While cemetery land forms part of the city's green infrastructure and cultural heritage, it is frequently overlooked in urban planning and investment strategies (Saeumel, Butenschoen, & Kreibig, 2023). Globally, cemeteries have been reimagined as multifunctional spaces that combine ecological, recreational, cultural, and heritage benefits in cities such as Jakarta, Berlin, and London (Xu, Ma, & Furuya, 2025; Ocón & Young 2024). In contrast, Nigerian urban cemeteries struggle to meet rising demand, facing overcrowding, inadequate maintenance, and persistent informal burial practices (Oyeleke & Oloukoi, 2024).

Despite these challenges, the economic and investment potential of cemetery land remains largely underexplored in Nigerian scholarship. Existing studies focus on environmental, cultural, or management aspects (Oyeleke & Oloukoi, 2024; Komolafe & Akinbogun, 2024), leaving a gap in understanding how cemetery land can contribute to sustainable urban development and real estate investment. Given Ibadan's complex land tenure system, diverse burial practices, and coexistence of formal and informal cemeteries, the city offers a critical context for examining this potential. This study addresses this gap by evaluating the sustainable investment potential of cemetery land in Ibadan. It examines current and projected demand for burial facilities, assesses the financial feasibility of cemetery development, and proposes strategies for integrating cemetery land into the urban land economy sustainably.

2. LITERATURE REVIEW

2.1 Global and Theoretical Perspectives on Cemetery Land as Urban Assets

Urban land economics and sustainable development theory provide a foundation for understanding cemeteries not just as burial spaces but as components of the broader urban landscape with environmental, social, and economic value. Urban land economics emphasizes how land values and investment potential are influenced by scarcity, accessibility, use, and regulatory context - all factors that affect cemetery land as cities densify and compete for limited space. Sustainable investment theory further expands the concept of value beyond financial return to include social well-being and environmental services, making it relevant for land uses like cemeteries that intersect cultural practice and urban land markets.

Globally, there is increasing scholarly recognition that cemeteries can function as multifunctional urban green spaces, contributing to ecosystem services and human well-being. Research has shown that cemeteries can serve as semi-natural habitats, enhancing local biodiversity, air quality, microclimate regulation, and recreational opportunities, while also preserving cultural heritage within the urban fabric. For example, Sallay *et al*. (2023) demonstrate that cemeteries in European cities provide a range of ecosystem services similar to public parks, including habitat for flora and fauna, climate regulation, and recreational space for residents - broadening their conceptualization beyond monofunctional burial grounds. Likewise, planning literature on cemeteries as green infrastructure highlights their potential to function as components of sustainable urban ecosystems, supporting both ecological and cultural objectives (McClymont & Sinnett, 2021)

This body of work suggests that cemeteries hold latent investment potential when framed as multifunctional assets rather than exclusively as sites for interment. However, much of this research is situated in developed country contexts where planning systems, regulatory frameworks, and resource availability differ significantly from those in many African cities. There is thus a need to interpret these theories within local urban complexities, especially where informal land use, diverse burial practices, and planning constraints prevail.

2.2 Investment in Private Cemeteries

Cemeteries occupy a distinctive niche within real estate investment literature because they are widely classified as special-purpose properties with highly constrained alternative uses. Level (1970) positions cemeteries among assets whose value is shaped less by open market competition and more by functional specificity, regulatory control, and long-term land-use commitment. This foundational framing remains relevant, as it explains why conventional valuation and investment models often struggle to capture the economic realities of cemetery developments. Unlike typical commercial or residential properties, cemetery land is effectively irreversibly committed, requiring long investment horizons and tailored appraisal approaches.

These structural characteristics are reinforced by later valuation studies that emphasise the atypical financial profile of cemetery assets. Mai (2008) notes that cemeteries generate revenue through phased burial plot sales over extended periods while simultaneously imposing perpetual maintenance obligations that persist beyond plot sell-out. This temporal divergence between income and expenditure complicates investment appraisal and challenges the applicability of standard capitalisation techniques. In the Nigerian context, Ojo (2017) further identifies limited transaction evidence, cultural sensitivities surrounding burial land, and weak institutional data as additional constraints affecting cemetery valuation and investment decision-making. Together, these studies underscore the need for cemetery-specific investment frameworks, particularly in emerging markets.

As the literature advances, attention shifts from conceptual classification toward identifying the determinants of cemetery value and investment performance. Iroham *et al*. (2022) provide empirical evidence from Nigeria showing that cemetery values are significantly influenced by location, accessibility, neighbourhood quality, environmental aesthetics, security, and management structure. Their findings suggest that, despite their specialised nature, cemeteries respond systematically to spatial and infrastructural attributes, aligning them more closely with urban land economics than previously assumed. This insight strengthens the case for analysing private cemeteries as economically responsive land uses rather than purely social or cultural spaces.

International studies further reinforce this position through the application of quantitative pricing models. Faye and Channac (2017), using a hedonic pricing approach in French cemeteries, demonstrate that burial plot prices vary significantly with proximity to urban centres, landscape quality, plot orientation, and perceived prestige. Their results confirm that demand for burial space reflects observable consumer preferences and amenity values, rather than being solely culturally determined. For private cemetery investors, this evidence highlights the strategic importance of site selection, design quality, and pricing differentiation in revenue optimisation.

Beyond market-driven attributes, some studies draw attention to non-financial dimensions of cemetery value, particularly in historic or culturally significant settings. Armstrong (2012) shows that heritage significance and symbolic meaning influence management strategies, funding mechanisms, and long-term sustainability in historic cemeteries. Similarly, Erkal and Ozhan (2014) demonstrate that vulnerability and conservation risks affect investment decisions in historic burial structures, suggesting that cemetery appraisals must incorporate physical deterioration and preservation costs alongside financial returns. While these studies focus largely on heritage contexts, they underline the broader principle that cemetery investment value is often shaped by factors extending beyond immediate market considerations.

The integration of cemeteries into expanding urban and peri-urban landscapes has also attracted growing scholarly attention. Ogungbemi *et al*. (2020) find that proximity to cemeteries in Ibadan can negatively affect neighbouring residential property values due to psychological perceptions and health concerns. Such externalities introduce potential planning resistance and reputational risk for private cemetery developments, particularly in rapidly urbanising fringe areas. Davies and Bennett (2016) situate these issues within broader urban planning discourse, describing cemeteries as evolving “deathscapes” competing for scarce urban land. They argue that inadequate long-term planning for burial spaces can generate land-use conflicts, reinforcing the importance of strategic location and policy alignment for sustainable cemetery investment.

In addition to location-related risks, the long-term cost structure of cemetery operations plays a critical role in investment viability. Milewska *et al*. (2024) demonstrate that cemetery maintenance costs are recurrent, cumulative, and frequently underestimated, even in well-regulated public systems. Although their study focuses on public cemeteries, the implications for private investment are clear: failure to adequately account for perpetual care obligations can erode long-term financial performance. This aligns with Mai (2008) argument that sustainable cemetery investment requires explicit financial provisioning through endowment funds or maintenance reserves.

Cemetery investments are also embedded within the broader funeral and death-care industry, which influences demand stability and revenue potential. Waithaka (2001) characterises the funeral industry as exhibiting relatively inelastic demand and cultural inevitability, attributes that may enhance the resilience of

cemetery investments across economic cycles. However, regulatory constraints, land acquisition challenges, and capital intensity remain significant barriers that can affect profitability if not carefully managed.

Finally, legal and regulatory risks remain central to cemetery investment outcomes. Carland and Carland (2006) illustrate how eminent domain and compulsory acquisition can disproportionately affect special-purpose properties whose value is closely tied to designated use. For cemetery developments, partial land acquisition or rezoning can significantly disrupt long-term operational and financial plans, highlighting the importance of secure tenure and planning certainty.

The literature indicates that private cemetery investment is shaped by a complex interaction of specialised property characteristics, location-driven demand, perpetual maintenance obligations, urban externalities, and regulatory risk. While valuation and pricing studies are relatively well developed, there remains a clear gap in project-based financial feasibility analyses that integrate discounted cash flow modelling with urban planning and risk assessment, particularly in rapidly urbanising developing regions.

3. RESEARCH METHODOLOGY

3.1 Research Design

This study adopted a mixed-methods research design. Quantitative data were gathered through a structured household questionnaire to capture burial preferences and willingness-to-pay for cemetery services, while spatial and documentary data were sourced to assess land availability, existing cemetery conditions, and land suitability across the eleven local government areas (LGAs) of the study area. The combined approach allowed the study to evaluate (i) Current Cemetery Stock and Carrying Capacity in Ibadan Metropolis, (ii) land constraints and environmental suitability for new burial sites, (iii) household-level burial preferences and demand trends, and (iv) the economic feasibility of developing modern, sustainable cemeteries.

3.2 Study Area and Population

The study covered the Ibadan metropolis, including eleven Local Government Areas (LGAs) in the Greater Ibadan Area. The LGAs were selected to capture both core urban zones and rapidly expanding peri-urban areas, where opportunities for cemetery development are most significant. Urban core LGAs are Ibadan North, Ibadan North-East, Ibadan North-West, Ibadan South-East, and Ibadan South-West; and peripheral LGAs are Akinyele, Egbeda, Ido, Lagelu, Oluyole, Ona Ara. Going by the 2006 national population census, these local governments had a combined population of 3,538,451. A projected population to year 2025 using 3.35% per year gave 6,629,000.

3.3 Sample Frame

The sample frame was based on household populations estimated from LGA population projections. The baseline population data were obtained from the National Population Commission (NPC, 2006) and projected to 2025 using exponential population growth techniques. Household populations were estimated by dividing the projected population by the average household size of 4.9 persons per household, consistent with NPC/NBS urban household statistics. This provided the basis for calculating a statistically representative household sample across the eleven LGAs.

3.4 Sample Size Determination

The sample size was calculated using Cochran's (1977) formula for large populations:
The sample size was calculated using Cochran's (1977) formula for large populations:

$$n_0 = \frac{Z^2 p(1-p)}{e^2}$$

Where:

- $Z = 1.96$(95% confidence level)
- $p = 0.5$(maximum variability assumption)
- $q = 1 - p = 0.5$
- $e = 0.05$(margin of error)

Substituting the values yielded $n_0 = 384$, which was used as the total sample size.

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3.5 Sample Allocation and Sampling Procedure

A proportional allocation approach distributed the 384 households across the eleven LGAs based on their projected household populations for 2025. This ensured that each LGA was represented according to its share of the total households.

The proportional allocation formula:

$$\text{Sample for LGA} = \frac{\text{Households in LGA}}{\text{Total Households}} \times 384$$

Table 1. Estimated household populations and allocated sample sizes:

LGA	Projected 2025 Households	Allocated Sample (n)
Ibadan North	327,755	93
Ibadan North-East	126,327	36
Ibadan North-West	58,367	16
Ibadan South-East	101,837	29
Ibadan South-West	108,367	31
Akinyele	80,816	23
Egbeda	122,041	34
Ido	44,694	13
Lagelu	56,531	16
Oluyole	280,816	80
Ona Ara	45,306	13
Total	1,353,857	384

3.6 Data Collection

Data for this study were obtained from two principal sources. The first source consisted of a household survey conducted using structured questionnaires administered to a scientifically determined sample of 384 households. The instrument elicited information on residents' burial preferences, their anticipated interest in alternative burial options, and their levels of price sensitivity. A total of 236 completed questionnaires were retrieved, representing a 68 percent response rate, which is considered acceptable in view of the cultural sensitivity surrounding death-related issues. The survey employed stratified random sampling to ensure that households from all Local Government Areas were proportionally represented.

The second source comprised secondary data and expert-derived information. Cemetery inventories, land availability statistics, and infrastructure accessibility were obtained from municipal records, cemetery administrative offices, and direct field reconnaissance. Financial parameters required for the modeling exercise, including initial capital outlay, operating costs, and projected revenue streams, were sourced through consultations with relevant professionals such as urban planners, estate managers, and cemetery administrators. Population projections and mortality statistics were drawn from authoritative demographic publications, including reports from the National Population Commission (NPC) and the United Nations.

3.7 Data Analysis

The study employed four interrelated analytical components. First, demographic analysis was conducted using population and mortality projections to estimate the volume of future burial demand. Second, a comprehensive assessment of cemetery capacity was undertaken, involving evaluation of available land area, current occupancy levels, and physical suitability in order to determine the potential for future cemetery development or expansion. Third, market demand analysis was carried out using data from the household survey, which were subjected to descriptive statistical techniques to identify prevailing burial preferences as well as anticipated shifts in demand for alternative burial options. Finally, financial viability analysis was performed through the computation of Discounted Cash Flow (DCF), Net Present Value (NPV), Benefit–Cost Ratio (BCR), Internal Rate of Return (IRR), and Discounted Payback Period. Across multiple investment scenarios, relying on both market evidence and expert-derived inputs to inform the underlying cost and revenue assumptions.

3.8 Validity and Reliability

Instrument validity was assured through the pretesting of the questionnaires, which enabled refinement of the items to ensure both relevance and cultural appropriateness for respondents. Reliability was established using Cronbach's alpha, which was applied to the scales measuring burial preferences and price sensitivity to confirm internal consistency and stability of the responses.

4. Data Analysis and Results

4.1 Current Cemetery Stock and Carrying Capacity in Ibadan Metropolis

This section examines the existing cemetery stock and their carrying capacity in Ibadan metropolis with the aim of establishing whether current burial infrastructure can sustainably meet present and near-future demand. Data for this section are based on secondary administrative records and field cemetery inventories obtained from municipal records, cemetery management offices, and direct field reconnaissance across the metropolitan area.

Table 2. Existing Cemetery Stock and Utilization Levels in Ibadan Metropolis

Cemetery Type	Number	Total Area (Ha)	Capacity (Plots)	Occupancy Rate
Public	8	145	58,000	78%
Private	12	89	35,600	65%
Religious	25	156	62,400	82%
Family/Community	45	234	93,600	71%
Total	90	624	249,600	75%

Table 2 presents an inventory of cemetery infrastructure across the Ibadan metropolis, revealing both the scale of existing burial land consumption and the intensity of utilisation. A total of 90 cemeteries were identified, collectively occupying 624 hectares and providing an estimated 249,600 burial plots, of which approximately 75 percent are already occupied. This level of utilisation suggests that the cemetery system in Ibadan is approaching functional saturation.

Public cemeteries, which constitute only eight sites, account for 145 hectares and exhibit a high occupancy rate of 78 percent. Given their mandate to serve the general population, particularly households that cannot afford private burial options, this utilisation level signals a looming capacity constraint. Once occupancy exceeds roughly 80 percent, operational flexibility declines sharply, limiting the ability to accommodate sudden increases in burial demand or public health emergencies.

Religious cemeteries display the highest occupancy rate (82 percent) despite covering a larger land area (156 hectares). This reflects both cultural preferences for faith-based burial grounds and the limited capacity expansion options available to religious institutions operating within dense urban neighbourhoods. Private cemeteries, although fewer in number and land coverage, show a comparatively lower occupancy rate of 65 percent, largely due to higher plot prices and selective access, which restrict usage to specific income groups.

Family and community cemeteries are the most numerous, accounting for 45 locations and 234 hectares of land. However, their dispersed nature, informal management structures, and variable planning standards limit their effectiveness as a strategic solution to metropolitan burial needs. While their average occupancy rate of 71 percent appears moderate, many of these sites are spatially fragmented and environmentally vulnerable, reducing their long-term sustainability. Overall, the data indicate that Ibadan's cemetery system is characterised by high land consumption with declining functional capacity, particularly within public and religious cemeteries. The aggregate occupancy level of 75 percent suggests that without deliberate policy intervention and land-use planning, the metropolis faces an impending shortage of formal burial space.

The findings are consistent with broader urban burial studies in rapidly urbanising cities, which identify cemetery land as one of the most spatially inefficient and poorly planned urban land uses (Francis, Kellaher & Neophytou, 2005; Rugg, 2013). In many African cities, cemetery provision has historically been reactive rather than anticipatory, resulting in facilities that become encircled by urban growth and constrained from expansion (Oyeleke & Oloukoi, 2024).

High occupancy levels in public cemeteries have been linked to socio-economic pressures, cultural norms favouring in-ground burial, and weak integration of cemetery planning into urban master plans (Kwami, 2021). The Ibadan case reflects these dynamics, where population growth has outpaced the systematic allocation of land for burial purposes.

4.2 Household Burial Preferences and Implications for Private Cemetery Demand in Ibadan

Understanding household burial preferences is essential for assessing the demand-side viability of private cemetery investment in Ibadan. As urban expansion intensifies land scarcity, traditional burial arrangements-particularly family or community plots- are becoming increasingly constrained. To examine evolving burial preferences and their implications for market uptake, a household survey was conducted across the eleven local government areas of the Ibadan metropolis.

A structured questionnaire was administered to 384 households, of which 236 valid responses were retrieved, representing a response rate of 68%. The response level reflects the cultural sensitivity

associated with death-related topics while remaining adequate for exploratory demand assessment. The survey captured information on current burial practices as well as preferred burial options for future use, providing insight into emerging behavioural shifts relevant to private cemetery development.

Table 3. Household Burial Preferences and Future Interest

Burial Place / Land Type	Current Practice (n)	Current Practice (%)	Preferred Choice (n)	Preferred Choice (%)
Public Cemeteries (Government-owned)	99	41.9	76	32.2
Religious Cemeteries (Church/Mosque-owned)	50	21.2	50	21.2
Family / Community Burial Land	45	19.1	26	11.0
Private Memorial Parks	27	11.4	67	28.4
Private Individual Burial Plots	12	5.1	14	5.9
Other Formal Burial Grounds	3	1.3	3	1.3
Total	236	100.0	236	100.0

The results, summarised in Table 3, indicate that public cemeteries currently dominate burial practice, accounting for 41.9% of responses, followed by religious cemeteries (21.2%) and family or community burial land (19.1%). These patterns reflect longstanding cultural norms, inherited land arrangements, and the historical prominence of publicly provided burial spaces within the city. However, when respondents were asked about preferred burial options, a clear reorientation becomes evident. Preference for public cemeteries declines to 32.2%, while interest in private memorial parks increases markedly from 11.4% of current usage to 28.4% of stated preference. This shift suggests a growing openness to professionally managed, commercial cemetery facilities, particularly those offering better maintenance, security, and long-term plot protection.

Preferences for family or community burial land also decline significantly in the preferred-choice category, reflecting increasing difficulty in sustaining such arrangements under conditions of urbanisation, land fragmentation, and tenure insecurity. Religious cemeteries maintain a relatively stable share between current practice and preferred choice, indicating continued cultural relevance but limited scope for large-scale expansion. Other formal burial grounds remain marginal in both usage and preference, underscoring their niche role in the broader burial landscape of Ibadan.

Taken together, these findings point to a gradual but meaningful shift in household burial preferences away from informal or overstretched public systems toward structured, privately managed burial environments. This trend aligns with previous studies documenting changing burial practices in rapidly urbanising African cities, where land scarcity, maintenance challenges, and rising socio-economic differentiation increasingly shape burial decisions (Opoko, & Adeboye, 2021; Rugg, 2013; Francis, Kellaher, & Neophytou, 2005).
Although the survey did not directly elicit monetary willingness-to-pay values, the observed preference shift toward private memorial parks provides a strong proxy indicator of emerging demand for fee-based cemetery services. Households favouring family or community burial plots are less likely to incur direct costs due to inherited land arrangements, whereas respondents expressing preference for private memorial parks demonstrate openness to formalised burial options that inherently involve plot acquisition and ongoing maintenance charges. From an investment perspective, this behavioural shift lends empirical support to the sales phasing and pricing assumptions adopted in the financial appraisal. In particular, the increasing preference for private memorial parks underpins the assumed gradual absorption of burial plots over time and supports the feasibility of periodic price escalation as urban expansion intensifies and peri-urban land becomes increasingly scarce.

4.3 Financial Viability Analysis of Potential Cemetery Land Investment

This section evaluates the financial viability of developing a modern private cemetery within the peri-urban fringe of Ibadan using a discounted cash-flow (DCF) appraisal framework. Cemetery development represents a specialized real estate investment characterized by high upfront capital costs, phased plot sales over time, and ongoing operational and maintenance obligations. Explicit consideration of the time value of money and long-term sustainability is essential, particularly given the finite nature of burial plots and the need for post-development maintenance.

The appraisal is undertaken for a representative private cemetery development, with performance evaluated under alternative discount-rate scenarios to assess sensitivity to variations in capital costs and perceived investment risk.

4.3.1 Project Assumptions and Cash-Flow Structure

The project is based on a hypothetical 15-acre cemetery accommodating 6,000 burial plots, accounting for internal roads, walkways, and landscaped buffers. Annual plot absorption is set at 300 plots per year (i.e. 5% of total capacity), implying a 21-year operational horizon until full plot exhaustion. The assumed annual absorption rate of 5% is consistent with observed uptake patterns in emerging private memorial parks in peri-urban Nigerian cities, where demand grows gradually due to cultural adaptation and affordability constraints. The initial selling price per plot is ₦350,000, with incremental increases of ₦100,000 every four years to reflect rising land scarcity, inflation, and demand for formal burial facilities. Annual operating and maintenance (O&M) costs are assumed to be 20% of annual plot-sale revenue, reflecting a revenue-linked cost structure.

An initial capital outlay of ₦600 million is incurred in Year 0, covering land acquisition, site preparation, infrastructure development, and pre-operational expenses. Annual net cash flow is computed as plot-sale revenue minus O&M, while Year 0 reflects the initial investment. To ensure long-term post-sale maintenance, a portion of the 20% O&M allocation is assumed to be invested in a perpetual maintenance fund, with proceeds covering cemetery upkeep after all plots are sold.

4.3.2 Discount-Rate Scenarios and Appraisal Criteria

Project performance is evaluated under three discount-rate scenarios: 10%: Favorable financing conditions and lower perceived investment risk, 12%: Benchmark rate, reflecting prevailing real estate expectations in Nigeria, and 14%: Conservative scenario, capturing higher capital costs and risk. The evaluation employs three standard criteria: Net Present Value (NPV) which is the sum of discounted net cash flows less initial investment, Benefit-Cost Ratio (BCR), that is, the present value of benefits divided by present value of costs, Internal Rate of Return (IRR) - the discount rate at which NPV equals zero, and Discounted Payback Period which shows the year in which cumulative PV turns positive.

4.3.3 Discounted Cash-Flow Results

The discounted cash-flow analysis derives annual net cash flows by subtracting operating and maintenance costs, set at 20% of revenue, from annual plot-sale revenues. While plot sales remain constant at 300 plots per year, revenue increases periodically every four years to account for rising land scarcity and inflationary adjustments, creating a gradually increasing net cash-flow profile over the project horizon.

Applying the discount factors corresponding to the three selected rates (10%, 12%, and 14%) to this consistent cash-flow stream reveals the time-dependent financial performance of the investment. At the benchmark discount rate of 12%, cumulative discounted cash flows initially remain negative, reflecting the substantial upfront capital outlay of ₦600 million in Year 0. Over the first several years, discounted net inflows partially offset this investment, reducing the cumulative negative position and demonstrating the gradual recovery of the initial outlay.

By Year 12, cumulative discounted cash flows become positive, indicating that the discounted payback period is approximately twelve years. This milestone marks the point at which all discounted costs have been recovered, and the project begins generating net financial benefits. The periodic revenue increases ensure that cash flows continue to grow over time, which not only strengthens the overall net present value but also contributes to the accumulation of the perpetual maintenance fund.

The perpetual maintenance fund, funded from a portion of the 20% O&M allocation, accumulates capital over the 21-year sales horizon. Investment returns from this fund are projected to cover ongoing maintenance costs after all plots have been sold, ensuring the cemetery's long-term operational sustainability. This integration of revenue-linked operating costs and fund accumulation demonstrates that the project can meet both immediate and future maintenance obligations without relying on new plot sales.

Table 4. Summary Investment Performance under Alternative Discount Rates

Discount Rate Scenario	NPV (₦ million)	Benefit-Cost Ratio	IRR (%)	Discounted Payback (years)	Decision
10% Low hurdle	401.4	1.67	16.3	11	Strongly viable
12% Base case	253.0	1.42	16.3	12	Viable
14% High hurdle	136.2	1.23	16.3	13	Marginal but viable

The financial appraisal demonstrates that the proposed cemetery development is viable across all discount-rate scenarios, with positive net present values and benefit-cost ratios exceeding unity. Even under conservative assumptions (14% discount rate), the project remains profitable, highlighting its resilience to higher capital costs and investment risk. The cumulative discounted cash flows turn positive within a reasonable timeframe, indicating recovery of the initial investment and the generation of net benefits thereafter.

The integration of a perpetual maintenance fund, funded from a portion of the 20% revenue allocation for operating and maintenance costs, ensures that the cemetery can be sustainably maintained after plot sales are exhausted. This mechanism aligns with international best practices and regulatory expectations, providing confidence in the project's long-term operational and financial sustainability.

5.0 CONCLUSION

This study concludes that private cemetery development in peri-urban Ibadan is financially viable, resilient to variations in capital costs, and capable of sustaining long-term maintenance obligations through appropriate financial structuring. The discounted cash-flow analysis confirms that cemetery land, despite its finite nature, can function as a profitable real estate asset when phased sales, periodic price adjustments, and revenue-linked operating costs are properly integrated.

Beyond financial performance, the findings highlight the strategic importance of cemetery planning within rapidly urbanising cities, where traditional burial spaces are increasingly constrained. The incorporation of a perpetual maintenance fund addresses a critical concern in cemetery management-post-sale upkeep-thereby aligning private investment incentives with long-term public and environmental interests. By ensuring long-term maintenance without additional land consumption, private cemeteries contribute to both financial sustainability and sustainable urban land management.

This study is subject to certain limitations. The financial appraisal is based on a hypothetical development scenario and relies on assumptions regarding plot absorption rates, pricing adjustments, and investment returns on maintenance funds. While these assumptions are grounded in prevailing market conditions and best practices, actual outcomes may vary depending on macroeconomic fluctuations, regulatory changes, and cultural dynamics.

Future research could extend this analysis by incorporating longitudinal operational data from existing private cemeteries, exploring alternative financing and governance models for perpetual maintenance funds, or comparing cemetery investment performance across different Nigerian cities or cultural contexts. Further investigation into environmental and ecological dimensions of cemetery land use would also enrich understanding of its role in sustainable urban development.

6.0 RECOMMENDATIONS

Based on the findings of this study, several recommendations are advanced. Private investors and developers should adopt revenue-linked operating and maintenance structures and establish perpetual maintenance funds to ensure long-term sustainability and regulatory compliance. This approach enhances investor confidence and safeguards the quality of cemetery environments beyond the plot-sale phase.

Urban planners and local planning authorities should formally recognise private cemeteries as an integral component of peri-urban land-use planning. Zoning frameworks and development control regulations should explicitly accommodate cemetery land uses, particularly in metropolitan fringes where land availability and accessibility can be balanced effectively.

Regulatory agencies should develop or strengthen guidelines governing cemetery development and perpetual maintenance funds, drawing on international best practices. Such frameworks would protect consumers, ensure continuous upkeep, and promote transparency in cemetery operations.

Finally, future private-public partnerships may be explored to leverage private sector efficiency in cemetery provision while ensuring alignment with broader urban sustainability and public health objectives.

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