RELEVANCE OF TOILET FACILITIES ON THE PERFORMANCE OF MARKETS IN EDO STATE, NIGERIA: AN ARCHITECTURAL EVALUATION

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CERTIFICATION

This is to certify that this project report for the 2024/2025 Academic session was written and submitted by OGBOUMAH ESSEOHEN OGHENOVO with matriculation number ENV2103362 under the supervision of ARC. HENRY OMOROGBE, meets the required regulations governing the award of the bachelor's degree in architecture of the university of Benin, Benin City, Edo State, Nigeria.

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I am grateful to God Almighty, the beginner and finisher of our faith, for His grace, favour and mercy, and for making the completion of this project a success...

My utmost gratitude also to my parents Mr&Mrs Ogboumah, for their love, support and prayers.

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DEDICATION

This project is dedicated to the Almighty God, the author and finisher of our faith who has been with me since the beginning of my life on earth. Also, I dedicate this project with great love and affection to my parents, lecturers, supervisor and my friends

ABSTRACT

Public markets in Edo State serve as vital economic engines and social hubs, yet their functional sustainability is increasingly compromised by the systematic failure of auxiliary infrastructure. This study investigates the "Relevance of Toilet Facilities on the Performance of Urban Market in Edo State: An Architectural Evaluation." The research addresses the problem of existing sanitation facilities failing to meet architectural design and accessibility standards, which leads to structural deterioration, environmental hazards, and reduced public confidence. The primary aim is to evaluate the design adequacy, spatial integration, and inclusivity of these facilities and to determine their direct impact on market performance indicators such as user satisfaction and spatial efficiency.

The study adopts a qualitative research approach based on architectural observation, field documentation, and semi-structured interviews with market users and management officials. Direct assessment of toilet facilities was carried out to evaluate accessibility, spatial location, ventilation, water supply, material conditions, and maintenance practices. Photographic documentation and field notes were used to support physical and spatial analysis of sanitation facilities within New Benin, Uselu, and Jattu markets. The research argues that architectural deficiencies, including poor natural ventilation and non-durable materiality, trigger user avoidance behavior, thereby reducing "dwell time" and overall market productivity. The study concludes that well-designed, inclusive sanitation infrastructure acts as a performance multiplier for urban markets. The findings contribute to sustainable urban design by proposing a context-specific architectural template for market sanitation, providing an evidence-based roadmap for town planners, architects, and policymakers to enhance the hygiene, dignity, and economic viability of public markets in Edo State.

Keywords: Architecture, Public Sanitation, Market Performance, Edo State, Urban Infrastructure, Inclusive Design, Passive Ventilation, Spatial Planning, Qualitative Research.

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CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Public markets are among the most active and socially significant spaces in Edo State. They serve as centres of economic exchange, cultural interaction, and daily livelihood for thousands of traders and buyers. In these markets—such as New Benin Market, Ekiosa Market, Uselu Market, Oba Market, Jattu Market, Uchi Market and many others—the quality of basic infrastructure heavily influences how effectively the markets operate. One of the most essential components of this infrastructure is the availability and condition of **toilet facilities**.

Toilet facilities in public markets go beyond convenience; they are directly linked to hygiene, public health, safety, customer experience and economic performance. According to WHO (World health organization, 2021), access to proper sanitation in public spaces reduces disease transmission, prevents contamination of goods, and enhances user comfort. In contrast, markets with poor or inadequate toilet facilities often face challenges such as unpleasant odours, open defecation around market edges, increased spread of water-borne diseases, and reduced patronage. In many Nigerian markets, especially in the South-South region, poor sanitation has been identified as a critical factor limiting market attractiveness (Adewale & Ogundipe, 2022).

In Edo State, sanitation challenges in markets have been repeatedly documented by local health authorities, who note that many public markets either lack functional toilets or operate with poorly maintained ones. Issues such as blocked drainage channels, broken doors, lack of water supply, insufficient cleaning, and the absence of gender-separated toilets are common. These conditions create discomfort for both traders and buyers, reduce the time shoppers are willing to spend in the market, and indirectly affect sales. On the other hand, markets with well-maintained toilet facilities tend to attract more customers, promote better hygiene practices, and contribute to improved trader productivity (Oghenetega & Iruobe, 2023).

Furthermore, good sanitation is linked to economic performance. When traders, especially women—who make up the majority of market sellers—have access to clean and safe toilets, they experience fewer health-related disruptions and can attend to customers more comfortably. Studies also show that customers consciously avoid markets perceived as dirty or unsafe (Babatunde & Enujiugha, 2023). Therefore, toilet facilities, though often overlooked, are critical determinants of market performance, both in rural and urban areas of Edo State.

This study therefore aims to establish quantifiable links between specific architectural decisions (e.g., door width, flooring material, ventilation shaft dimensions, etc.) and the resulting market functionality and user experience.

1.2 Statement of the Problem

The primary problem is the systematic failure of public sanitation infrastructure in urban markets across Edo State to meet established architectural design and accessibility standards, which directly compromises market hygiene, user dignity, and ultimately, economic performance.
The fundamental issues are three-fold, demanding an architectural and urban design solution:

1. **Design Deficiency and Health Risk:** Existing facilities typically violate key design principles related to density, ventilation, and material durability (Faneco, 2025), leading to rapid structural deterioration, offensive odour, and increased public health risk—which discourages market patronage (SCIRP, 2023).
2. **Accessibility and Equity Gaps:** Facilities often exclude vulnerable populations, such as women (especially regarding menstrual hygiene management) and persons with disabilities, by failing to incorporate basic accessible design elements (WaterAid, 2019). This spatial exclusion impacts market access and equity.
3. **Information Gap:** Decision-makers lack localized data that correlates the architectural investment (e.g., in touchless fixtures or superior drainage systems) with positive economic returns, user retention, and reduced public health spending.
4. **The Water-Quality-Sanitation Nexus**: Recent research by Imarhiagbe et al. (2024) reveals a dangerous architectural failure where water sources in Benin City markets are biologically contaminated. This is a direct result of poor spatial planning, where sanitation blocks and waste collection points are sited too close to water extraction points (boreholes), allowing for subterranean

cross-contamination.

These issues not only create discomfort but also expose traders and buyers to health risks such as diarrhoea, typhoid, cholera and skin infections. Poor sanitation also reduces the time shoppers are willing to spend in the market, ultimately affecting sales and the overall economic performance of the market.

Therefore, this study is necessary to empirically evaluate the architectural adequacy and spatial location of public toilet facilities in Edo State markets and develop a context-specific design intervention model that enhances both sanitation outcomes and overall market performance.

1.3 Aim and Objectives of the Study

1.3.1 Aim of the Study

The main aim of this study is to evaluate the architectural design adequacy, spatial planning, and accessibility of public toilet facilities and their resultant impact on the functional performance of markets in Edo State.

1.3.2 Objectives of the Study

The specific objectives of this research are to:

1. **Assess** the current architectural design and structural condition (e.g., materials, durability, ventilation systems) of public toilet facilities in selected urban markets in Edo State.
2. **Determine** the compliance level of these facilities with established national building codes and international accessibility standards for public sanitation.
3. **Evaluate** the relationship between the **spatial location** and **distribution** of toilet facilities within the market layout and the resulting foot traffic, congestion, and market efficiency.
4. **Ascertain** the effect of accessibility and design quality on the **user satisfaction** (trader and customer) and subsequent perceived cleanliness of the market.

1.4 Research Questions

The study will seek to answer the following **design-focused questions**:

1. What are the major structural and design deficiencies (e.g., ventilation, drainage,

materials) of existing public toilet facilities in the urban markets of Edo State?
2. What is the level of compliance of these facilities with national building codes regarding user capacity and accessibility standards (e.g., for persons with disabilities)?
3. How does the **spatial integration** of the toilet block within the market layout affect congestion and overall trading efficiency?
4. Is there a significant correlation between the design quality (perceived cleanliness and safety) of the facilities and the overall user satisfaction and market patronage?
5. What types and conditions of toilet facilities exist in the selected public markets in Edo State?

1.5 Significance of the study

This study is significant for several key stakeholders:

1. **Edo State Government & Town Planners:** The findings will provide specific, evidence-based recommendations and design dimensions for incorporating sanitation into urban renewal plans, ensuring compliance with building bye-laws and public health mandates (LASG, 2025).
2. **Architects and Design Consultants:** The research will contribute to the field of sustainable urban design by quantifying how design choices (e.g., floor-to-ceiling ventilation, choice of plumbing systems) impact the lifecycle and economic performance of public assets.
3. **Market Authorities & traders:** The study will articulate how improved sanitation architecture leads to higher user confidence, reduced community conflict over hygiene, and ultimately, enhanced market patronage and longevity.
4. **Academic Community:** This research will contribute to the body of literature on sustainable sanitation and inclusive urban design in the Nigerian context.

1.6 Scope (Delimitations) and Limitations of the Study

1.6.1 Delimitations (Scope of the Study)

The study is strictly delimited by the following parameters:

1. **Geographic Scope:** The study is focused exclusively on **selected urban and semi-urban markets in Edo State**. The research will select markets based on criteria such as size, trader density, and age of existing infrastructure.
2. **Architectural Focus:** The core variable is the **physical design and structure** of the toilet blocks (materials, spatial layout, ventilation, and accessibility). Public

health outcomes (e.g., disease rates) will be addressed only as indirect consequences of design failure.
3. **Performance Metrics:** Market performance is measured in terms of **spatial efficiency** (congestion), **user satisfaction**, and **structural compliance**, not direct revenue from the toilet facility itself.

1.6.2 Limitations of the Study

Limitations are factors beyond the researcher's control that may affect the findings or the generalizability of the results.

1. **Subjectivity of User Satisfaction:** Data on market performance will rely on users' subjective perceptions of cleanliness, safety, and comfort, which can be influenced by cultural norms or recent maintenance events unrelated to the architecture.
2. **Maintenance and Management Bias:** The cleanliness level (and thus user satisfaction) of a facility is heavily influenced by the **management model** (e.g., public vs. private fees) and maintenance schedule, which are operational factors, not architectural ones. It may be difficult to isolate the effect of *design* from the effect of *management*.
3. **Lack of Historical Design Records:** It may be difficult to obtain original architectural drawings or construction specifications for older market facilities, forcing the researcher to rely solely on on-site inspection and estimation of design compliance.
4. **Accessibility Measurement:** Comprehensive measurement of accessibility (e.g., ramp slopes, maneuvering space) may be difficult to perform accurately in high-traffic, non-compliant market environments.
5. **Focus on Superstructure:** The study will focus primarily on the design of the visible building (**superstructure**) and basic plumbing connections. Detailed analysis of the **substructure** (e.g., deep pit latrine design or complex septic/faecal sludge management) is outside the scope due to access and measurement constraints.

1.7 Definition of Terms

The following terms are defined as they apply specifically to the context of this study:

- ***Sanitation Facility:*** In this study, refers specifically to the **architectural block** or structure housing the public toilets, urinals, and handwashing basins within the market.
- ***Design Adequacy:*** The extent to which the facility's physical features (sizing, capacity, accessibility, and ventilation) meet national or international architectural guidelines for high-traffic public spaces.
- ***Market Performance:*** Measured by non-economic indicators such as **User Satisfaction** (comfort, safety, perceived hygiene) and **Spatial Efficiency** (reduced congestion and improved flow around the facility).
- ***Accessibility Standards:*** Architectural requirements for inclusive design, including ramp slopes, turning radii, door widths, and grab bar placements, typically referencing the UN Convention on the Rights of Persons with Disabilities (CRPD).
- ***Passive Ventilation:*** Architectural strategy using natural airflow, stack effect, or wind pressure (rather than mechanical fans) to remove odours and maintain thermal comfort within the toilet block.

CHAPTER TWO

LITERATURE REVIEW

2.1 INTRODUCTION

The review of related literature provides the academic and technical foundation for investigating the architectural impact of toilet facilities on market performance. It examines sanitation from architectural, public health, spatial planning, and socio-economic perspectives. The review focuses on design standards, materiality, spatial integration, accessibility, sustainability, and how these factors affect hygiene, user comfort, patronage, and overall market efficiency. The chapter draws from international guidelines, scholarly articles, on-site (market) visits and institutional reports relevant to public market environments, A major focus is placed on the causal relationship between the built toilet environment and the functional performance of the market.

2.2 HISTORICAL OVERVIEW OF MARKET ARCHITECTURE AND SANITATION IN EDO STATE

2.2.1 Pre-Colonial Market Spatiality and Traditional Sanitation

Before formalized urban planning, markets in the Benin Kingdom were decentralized, open-air spaces often situated near the *Afen* (Palace) or major crossroads.

Architecturally, these markets relied on "borrowed shade" from large trees and temporary thatched structures. Sanitation was largely individualistic and decentralized. Because of the low density of pre-colonial urbanism, the spatial pressure on fixed "sanitary blocks" was minimal, and the environmental impact was absorbed by the natural landscape.

2.2.2 Colonial Ordinances and the "Sanitary Market" Model

The colonial era introduced masonry stalls and the first formalized building regulations, such as the Public Health Ordinance. This period saw the first architectural inclusion of "latrine blocks" at the market periphery. These were designed for containment rather than comfort, establishing a long-standing architectural tradition of placing toilets in the most inaccessible and poorly ventilated corners of the market—a design flaw that persists in many Edo State markets today.

2.2.3 Post-Colonial Urbanization and Infrastructure Lag

Following the mid-20th-century population boom, markets like New Benin and Jattu expanded organically. However, while the number of trading stalls increased, the architectural provision for sanitation remained stagnant. This has led to "infrastructure lag," where a single toilet block designed for a small town now serves thousands of daily users. This mismatch between **user density** and **structural capacity** is the primary driver of infrastructure decay (WaterAid, 2019).

2.3 CONCEPTUAL AND THEORETICAL FRAMEWORK

2.3.1 Defining Market Infrastructure and Spatial Efficiency

In architectural planning, a market is a complex organism divided into primary trading zones and auxiliary infrastructure. FAO (2025) defines market performance not just by sales volume, but by **spatial efficiency**—the ease of user movement and the quality of support services.Markets are not merely trading points but complex spatial systems where circulation, service facilities, and environmental conditions collectively determine performance. When auxiliary services like toilets fail, the primary space becomes dysfunctional due to environmental stress and hygiene barriers.

2.3.2 Environmental Design and Behavior (ED&B) Theory

This study is anchored in ED&B theory, which suggests that the built environment communicates "clues" to its users. In a market, the architectural quality of the toilet facility (its lighting, smell, and material finish) acts as a signal of safety or hazard (SCIRP, 2023). Design features like dark corridors or stained walls trigger "avoidance behavior," Where these sanitation facilities are inadequate or poorly planned, market efficiency declines due to reduced patronage, discomfort, and public health risks.

2.3.3 Theory of Passive Environmental Control

Architectural performance in the tropics relies on passive control—using the building envelope to regulate ventilation and heat. In sanitation design, the "Stack Effect" (allowing hot, foul air to rise and exit via high vents) is the only sustainable way to manage odors in a high-traffic Nigerian market where mechanical fans are prone to failure (Liberty & Obetta, 2013).

2.4 TOILET FACILITIES AS AN ESSENTIAL MARKET INFRASTRUCTURE AND ITS EFFECTS ON MARKET PERFORMANCE

2.4.1 Toilet Facilities as Essential Market Infrastructure

Toilet facilities are a fundamental component of public infrastructure in high-use environments such as markets. Faneco (2025) outlines that public toilets must meet minimum standards for capacity, spatial sizing, ventilation, and durability to function effectively. These standards are especially critical in markets where user density is high and usage is continuous throughout the day.

The World Health Organization (WHO, 2024) confirms that inadequate sanitation infrastructure is a major contributor to environmental contamination and disease transmission. In market settings, poor toilet conditions can result in unhygienic surroundings, unpleasant odours, and contamination of food items, thereby directly affecting both health and economic activity. This reinforces the need for toilets to be considered as performance-enhancing infrastructure rather than secondary facilities.

2.4.2 Architectural Design Principles for Public Toilets

Architectural design plays a decisive role in the effectiveness of toilet facilities. Faneco

(2025) identifies key design principles including adequate cubicle dimensions, proper ventilation systems (natural or mechanical), non-absorbent finishes, and ease of maintenance. These design features help ensure durability, hygiene, and user comfort in high-traffic environments such as markets.

Greenlam Sturdo (2023) further highlights the importance of material selection in toilet design. The use of antibacterial surfaces, vandal-resistant partitions, and touchless fixtures reduces microbial growth and minimizes physical contact, improving hygiene and extending the lifespan of facilities. In markets where maintenance resources are often limited, material durability becomes a critical design consideration influencing long-term performance

Figure 2.1: The corridor of uselu toilet facility, egor LGA, Edo state.

Figure 2.2: Toilet stalls condition of Aoma market, Uzzeba, Owan west

2.4.3 Impact on "Dwell Time" and Customer Patronage

Market performance is highly dependent on "shopper dwell time"—the duration a customer spends in the market. Literature shows a direct correlation between the availability of clean, architecturally sound toilets and the willingness of shoppers to linger (Greed, 2015). A customer who feels "safe and comfortable" regarding their sanitation needs is statistically more likely to visit more stalls and spend more money. Conversely, a lack of facilities creates a "transactional rush," where customers leave as quickly as possible, thereby lowering the market's overall economic throughput.

2.4.4 Trader Productivity and Occupational Health

The majority of market traders in Edo State are women who spend 10–12 hours daily at their stalls. The absence of menstrual-hygiene-friendly architecture (MHM) or private, well-ventilated toilets leads to significant productivity losses (WaterAid, 2019). Traders are often forced to close their stalls early or take frequent breaks to find off-site facilities, which disrupts the market's "trading continuity." Well-designed sanitation acts as a

productivity multiplier for the market's workforce.

2.4.5 Spatial Flow and Congestion Management

The spatial placement of toilet facilities within market layouts is critical to their effectiveness. FAO (2025) stresses that toilets should be strategically located to ensure accessibility without disrupting pedestrian flow or trading activities. Poorly located toilets—either too hidden or too close to food stalls—can create safety concerns, reduce usage, and compromise hygiene.

Greed (2015) argues that public toilets should be treated as high-status urban facilities rather than marginal spaces. Visibility, lighting, and proximity to main circulation routes enhance safety, encourage use, and reduce vandalism. In public markets, well-integrated toilet facilities contribute to a more organized and functional spatial environment, supporting better market performance.

2.4.6 Hygiene Confidence and Product Integrity

In markets where open defecation occurs due to design failure, the risk of food contamination increases (WHO, 2024). This erodes "hygiene confidence" among high-value customers. From an architectural standpoint, a "sanitary buffer zone"—created through the use of non-porous, washable materials like ceramic tiles—is essential to protect the integrity of the market's economic core (Greenlam Sturdo, 2023).

2.4.7 Ventilation, Odour Control, and Environmental Comfort

Environmental comfort within toilet facilities significantly affects user acceptance and usage. Defraeye et al. (2023) demonstrate how passive architectural strategies—such as evaporative cooling and natural ventilation—can effectively regulate internal microclimates without reliance on mechanical systems.
In market environments, poorly ventilated toilets often generate strong odours and heat buildup, discouraging use and pushing users toward open defecation or unsanitary alternatives. Incorporating passive ventilation strategies into toilet blocks enhances comfort, improves air quality, and supports sustained usage, thereby improving overall market hygiene and performance.

2.4.8 Accessibility, Inclusivity, and Gender Considerations

Inclusive design is essential in public sanitation infrastructure. WaterAid (2019) provides detailed guidelines for the construction of public toilets that accommodate people with

disabilities, children, and elderly users. Features such as ramps, handrails, adequate turning radii, and gender-segregated units improve accessibility and dignity.
The International Labour Organization (ILO, 2024) emphasizes the “Leave No One Behind” principle, advocating for participatory design approaches that consider the needs of women, girls, and marginalized groups. In markets, where women constitute a large proportion of traders and customers, lack of safe and private toilet facilities disproportionately affects their productivity, comfort, and health. Inclusive toilet design therefore directly supports equitable market participation and performance.

2.4.9 Empirical Evidence on Sanitary Conditions and Market Integrity

A significant study by Okon et al. (2022), published in the Social Science and Humanities Journal, provides critical empirical data on the state of public market sanitation in the Nigerian context. Their findings underscore a direct link between the architectural location of toilet facilities and the level of environmental contamination within the market.

According to the study, several key factors influence the overall performance of these facilities:

• **The Proximity Paradox:** The research found that while users demand proximity for convenience, facilities located too close to food vending zones without adequate architectural buffers (such as scent traps or air curtains) lead to cross-contamination of market produce.

• **Maintenance as a Design Variable**: The study highlights that the "performance" of a toilet block is 60% dependent on its maintenance culture. It observes that facilities often fail not just due to poor initial construction, but because the architectural design did not account for "heavy-duty" maintenance requirements, such as integrated water storage or sloping floors for rapid drainage.

• **User Perception and Revenue**: Okon et al. observe that markets with "perceived poor sanitation" see a measurable decline in high-income customer patronage, as these users prefer to shop in modernized retail environments with guaranteed hygienic standards. This empirical evidence supports the argument that toilet design is a central pillar of market economic performance.

2.4.10 Localized Empirical Evidence: The Oregbeni Market Case Study

A critical study by Abejegah et al. (2013) on Oregbeni Market, Benin City, provides local

empirical weight to the challenges of market sanitation in Edo State. The research highlights several architectural and management failures that directly impede market performance:

• **The Inadequacy of Sanitary Provisions:** The study found that even when awareness of health hazards is high (62.8%), the practice of "open dumping" remains prevalent (60%) due to the lack of functional, modern disposal bays and toilet facilities.

• **The "Toilets Without Water" Syndrome:** Reinforcing previous findings by Okojie et al. (2000), the Oregbeni study observed that many markets with existing toilet structures lack the most basic support infrastructure—water. Specifically, only 3 out of 8 markets surveyed had pipe-borne water, rendering even modern water closets (WCs) non-functional and offensive.

• **Willingness to Pay as a Performance Indicator:** Significantly, 96.1% of respondents in Oregbeni Market expressed a willingness to pay for improved sanitation. This architectural gap represents a "market performance failure," as users are ready to fund infrastructure that current design and management have failed to provide.

2.4.11 Water Quality and Sanitary Hygiene (WASH) Status

While previous studies emphasized physical cubicle sizes, Imarhiagbe et al. (2024) shift the focus to the WASH status of Edo State markets. Their findings indicate that "Hygiene Confidence" is not just about a clean-looking floor, but about the biological safety of the water provided for handwashing and flushing. The study notes that 100% of tested water samples in high-traffic markets showed microbial contamination. Architecturally, this necessitates a shift toward "Safe-Siting" principles, ensuring a minimum setback distance between septic tanks and water boreholes.

2.5 EMPIRICAL REVIEW OF DESIGN STANDARDS AND STRATEGIES

2.5.1 Materiality and Maintenance Performance

The longevity of a market toilet is determined by its materiality.

- **Non-Absorbent Finishes:** Wall tiling to at least 2.1m is required to prevent "stain-trapping" in masonry (Ariyo et al., 2025).
- **Robust Fixtures:** Use of stainless steel or heavy-duty ceramic fixtures to

withstand high-frequency use and prevent vandalism (Faneco, 2025).

2.5.2 Inclusive Design and Barrier-Free Access

To achieve peak performance, a market must be inclusive. Architecture facilitates this through:

- **Ramps and Turning Radii:** Slopes (1:12) and wide cubicles for wheelchair users and elderly traders (ILO, 2024).
- **Safety and Privacy:** "Z-shaped" entrances and separate gendered blocks to ensure security for women and children (WaterAid, 2019).

2.5.3 The Role of Infrastructure Management in Architectural Longevity

Integrating findings from contemporary Nigerian research, it is evident that the "performance" of a building is a lifecycle concept. The study in the Social Science and Humanities Journal suggests that architectural designs for Edo State markets must move beyond the "construction phase" and include "management-friendly" design features, such as accessible plumbing ducts and vandal-resistant hardware, to ensure the market remains competitive in the long term.

2.6 GLOBAL TRENDS: SUSTAINABILITY AS A PERFORMANCE ENHANCER

2.6.1 Ecological Sanitation (EcoSan) and Resource Recovery

Sustainable design trends, such as urine-diverting dry toilets (UDDT), transform the facility from a waste site into a resource center. In water-scarce regions of Edo State, EcoSan architecture (WaterAid, 2011) reduces the market's reliance on external water supplies, making the infrastructure more resilient and cost-effective.

2.6.2 Modular and Prefabricated Sanitation Units

Modern urban planning emphasizes modularity. Pre-fabricated toilet blocks can be deployed in congested markets like New Benin with minimal disruption to trading activities. This "low-impact construction" (LASG, 2025) allows for high-quality material finishes that are often impossible with on-site construction in busy markets.

2.7 SUMMARY OF LITERATURE AND IDENTIFIED GAPS

The reviewed literature establishes that toilet facilities are a critical determinant of public market performance. Architectural design quality, material selection, ventilation, spatial integration, accessibility, and sustainability all influence how effectively toilets function in market environments. Poorly designed or inadequately maintained toilet facilities contribute to health risks, discomfort, reduced patronage, and economic inefficiency. Conversely, well-designed and inclusive sanitation infrastructure enhances hygiene, user satisfaction, safety, and overall market performance.

Despite the availability of global guidelines and design principles, there remains a need for localized studies that examine how these concepts apply to public markets in Edo State. This study therefore builds on existing literature to assess current conditions and propose context-appropriate architectural and planning solutions.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 INTRODUCTION

This chapter outlines the research methodology adopted for the study on the relevance of toilet facilities on the performance of public markets in Edo State. It details the purely qualitative approach used to evaluate architectural adequacy, spatial planning, and user experience. This section covers the research design, study area, target population, sampling techniques, instruments for data collection, and the analytical framework used to interpret the qualitative findings.

3.2 RESEARCH DESIGN

This study adopts a **Purely Qualitative Research Design**, specifically utilizing a **Descriptive and Evaluative Case Study approach**.

- **Descriptive:** It seeks to provide a detailed architectural account of the current state of sanitation infrastructure.
- **Evaluative:** It benchmarks the physical conditions against established national and international building standards. Unlike quantitative methods, this design prioritizes in-depth understanding and contextual meaning over statistical generalization, allowing for a deeper exploration of how design failures affect

market functionality.

3.3 STUDY AREA

The study is situated in Edo State, Nigeria.

The Benin City Axis: New Benin, Uselu, and Oregbeni Markets.

• The Etsako West Axis: Jattu Market (Auchi).

3.4 DATA TYPES AND SOURCES

The qualitative nature of this study relies on rich, descriptive data from two main categories:

3.4.1 Primary Sources

- **Architectural Field Audits:** Direct physical assessment of toilet blocks using a structured observation checklist.
- **Photographic Documentation:** Visual evidence of structural conditions, material decay, and spatial bottlenecks.
- **Semi-structured Interviews:** In-depth conversations with market traders, shoppers, and facility managers to capture lived experiences and hygiene perceptions.

3.4.2 Secondary Sources

- **Regulatory Codes:** National Building Code of Nigeria and Edo State Urban Planning laws.
- **Design Manuals:** WaterAid guidelines for public sanitation and WHO environmental health standards.
- **Historical Records:** Previous architectural reports and market development plans.

3.5.1 RESEARCH DATA MATRIX

SECTION A: GENERAL INFORMATION

- **Name of Market:** _____
- **Market Typology:** [ ] Urban High-Density [ ] Core Urban/Historical [ ] Semi-Urban
- **Location of Facility within Market:** [ ] Peripheral [ ] Central [ ] Near Entrance [ ] Near Food Zone
- **Estimated Age of Facility:** _____ years
- **Date/Time of Observation:** _____

SECTION B: STRUCTURAL & MATERIAL EVALUATION

Architectural Element	Observation / Condition	Material Type
Foundation/Base	[ ] Stable [ ] Subsidence [ ] Waterlogged	_____
Wall Construction	[ ] Masonry [ ] Timber [ ] Prefab/Metal	_____
Wall Finish (Interior)	[ ] Tiled (Height: ____m) [ ] Paint [ ] Bare	_____
Flooring	[ ] Non-slip Tile [ ] Smooth Concrete [ ] Cracked	_____
Roofing	[ ] Corrugated Metal [ ] Concrete Slab [ ] Leaking	_____
Doors/Partitions	[ ] Metal [ ] Timber [ ] Missing/Broken	_____

SECTION C: ENVIRONMENTAL & PASSIVE DESIGN

- **Natural Ventilation:**
    - [ ] Permanent High-level Louvers/Vents
    - [ ] Operable Windows
    - [ ] No visible ventilation (Odour Trap)

- **Natural Lighting:**
    - [ ] Adequate (Daylight reaches all stalls)
    - [ ] Poor (Dark/Requires artificial light)
- **Odour Level (1-5 Scale):** [ ] 1 (Minimal) [ ] 2 [ ] 3 [ ] 4 [ ] 5 (Nauseating)
- **Thermal Comfort:**
    - [ ] Cool (High ceiling/Stack effect)
    - [ ] Oppressive Heat (Low roof/No insulation)

SECTION D: SPATIAL INTEGRATION & FLOW

- **Accessibility:**
  - **Approach:** [ ] Paved [ ] Muddy/Obstructed [ ] Flooded
  - **Queueing Space:** [ ] Adequate [ ] Causes bottleneck in market walkway
- **Visibility:** [ ] Easily identifiable [ ] Hidden/Requires signage
- **Gender Separation:** [ ] Distinct separate blocks [ ] Shared entrance [ ] Unsegregated

SECTION E: INCLUSIVITY & ACCESSIBILITY (UNIVERSAL DESIGN)

Feature	Present?	Condition/Notes
Entrance Ramp	[ ] Yes [ ] No	Slope: [ ] Steep [ ] Standard
Grab Bars	[ ] Yes [ ] No	[ ] Rigid [ ] Loose/Broken
Door Width (>900mm)	[ ] Yes [ ] No	_____
Tactile Signage	[ ] Yes [ ] No	_____

SECTION F: SANITARY SERVICES & MAINTENANCE

- **Water Supply:** [ ] Borehole/Tank [ ] Public Main [ ] No Water
- **Handwashing Station:** [ ] Present (Functional) [ ] Present (Non-functional) [ ] Absent
- **Waste Disposal:** [ ] Integrated Bin [ ] Open dumping nearby [ ] None
- **Overall Cleanliness:** [ ] Excellent [ ] Fair [ ] Poor (Uninhabitable)

3.5.2 SEMI-STRUCTURED INTERVIEW GUIDE

THEME 1: SPATIAL INTEGRATION & ACCESSIBILITY

1. **Location & Flow:** "Looking at where this toilet block is situated in the market, do you find it easy to reach, or do you feel it is too hidden/far from the main trading areas?"
2. **Universal Access:** "As a trader, have you noticed any difficulties for elderly people or those with physical disabilities when trying to use or enter this building?"

THEME 2: THE INTERNAL ENVIRONMENT (PASSIVE DESIGN)

1. **Ventilation & Odour:** "When you are inside the cubicle, how would you describe the air quality and smell? Do you feel there is enough natural airflow, or does it

feel like a 'trap' for heat and odours?"
2. **Lighting & Safety:** "How does the level of natural lighting inside the facility affect your sense of safety? Are there 'dark spots' that make you feel uneasy or discourage you from using it at certain times?"

THEME 3: GENDER & PRIVACY (THE SHARED TOILET MODEL)

1. **Privacy Barriers:** "Since this market often uses a 'shared model' where males and females enter the same block, how does this affect your personal sense of modesty and dignity?"
2. **Gender-Specific Needs:** "For women traders who spend over 10 hours here, does the current architectural design provide enough privacy for menstrual hygiene or changing? If not, how does this affect your work day?"

THEME 4: MATERIALITY & HYGIENE PERCEPTION

1. **Surface Hygiene:** "Looking at the walls and floors (porous concrete vs. tiles), do you feel these materials make the place easier to clean, or do they seem to hold onto stains and smells permanently?"
2. **Water-Infrastructure Gap:** "How does the frequent lack of water within the building change the way you use the facility and your perception of the market's overall quality?"

THEME 5: IMPACT ON MARKET PERFORMANCE

1. **Dwell Time & Revenue:** "If you need to use the toilet and find it in a poor state, are you likely to leave the market immediately, or do you continue shopping? How do you think this 'rush' affects the sales of traders here?"
2. **Design Expectations:** "If you were the architect in charge of redesigning this market, what specific physical change (e.g., bigger windows, separate entrances, or different tiles) would you prioritize to make users feel more satisfied?"

3.6 RESEARCH POPULATION

The qualitative population consists of key informants and facility users:

1. **Market Stakeholders:** Long-term traders and frequent shoppers.
2. **Facility Custodians:** Market management officials and cleaning personnel.
3. **Technical Experts:** Architects and Town Planners with experience in Edo State infrastructure.

3.7 SAMPLING FRAME, SIZE, AND TECHNIQUES

3.7.1 Sampling Frame
The study focuses on three representative market typologies in Edo State:

- **New Benin Market:** High-density urban core.
- **Uselu Market:** Established urban market with aging infrastructure.
- **Jattu Market:** Major semi-urban/periodic market.

3.7.2 Sample Size

In qualitative research, sample size is determined by **data saturation** (the point where no new information is being gained). A tentative sample of **30 in-depth participants** is targeted:

- 10 Traders (gender-balanced)
- 10 Shoppers
- 5 Market Management Officials
- 5 Built Environment Professionals

3.7.3 Sampling Techniques

- **Purposive Sampling:** Used to select participants who have a deep, daily interaction with the market facilities.
- **Criterion Sampling:** Used to select specific toilet blocks for auditing based on age, usage level, and perceived condition.

3.8 DATA COLLECTION INSTRUMENTS

3.8.1 Architectural Observation Checklist

This is the primary technical tool used to record:

- **Structural Integrity:** Condition of walls, roofs, and floors.
- **Environmental Control:** Natural light levels and passive ventilation (windows, vents, louvers).
- **Accessibility:** Presence/absence of ramps, grab bars, and equitable entrance design.

3.8.2 Semi-structured Interview Guide

Unlike a survey, this guide uses open-ended questions to explore:

- Narratives of comfort and dignity (or lack thereof).
- Perceptions of how "smell" or "darkness" influences their market route.
- Suggestions for design improvements from a user perspective.

3.9 PROCEDURE FOR DATA COLLECTION

1. **Site Reconnaissance:** Initial visits to map the locations of all sanitation blocks within the selected markets.
2. **Architectural Auditing:** Conducting the physical inspection and taking high-resolution photographs of design features and failures.
3. **Conducting Interviews:** Engaging participants in quiet areas of the market or their stalls to record their detailed experiences.
4. **Mapping and Sketching:** Producing basic floor plans or "spatial sketches" of the toilet blocks to analyze their integration into the market flow.

3.10 METHOD OF DATA ANALYSIS

As a qualitative study, the data is analyzed using non-statistical methods:

- **Thematic Analysis:** Identifying recurring themes and patterns in the interview transcripts (e.g., "fear of dark toilets," "lack of water ").
- **Architectural Evaluative Analysis:** A direct comparison of the field audit data against the **National Building Code** and **WaterAid Standards** to determine "Design Adequacy."
- **Narrative Synthesis:** Weaving together the physical observations and user stories to form a comprehensive picture of market performance.

3.11 RESEARCH LIMITATIONS

- **Non-Generalizability:** The findings provide deep insight into Edo State markets but cannot be statistically generalized to all markets in Nigeria.
- **Researcher Subjectivity:** Qualitative interpretation is influenced by the researcher's architectural lens, which is mitigated by using standardized observation checklists.

3.12 ETHICAL CONSIDERATIONS

Informed consent will be obtained from all interviewees. No personal identifiers will be published. Photography will focus on the **structure and environment**, ensuring the privacy and anonymity of market users are respected at all times.

CHAPTER FOUR

DATA PRESENTATION, ANALYSIS, AND DISCUSSION

4.1 Introduction

This chapter presents, analyses, and discusses the qualitative data obtained from field studies conducted across selected public markets in Edo State: New Benin, Uselu, Oregbeni (Benin City Axis), and Jattu (Etsako West Axis). The analysis is grounded in an Architectural Evaluative Framework, benchmarking physical conditions against the National Building Code (2006) and the empirical standards established in Chapter Two. The focus is on examining the causal link between auxiliary infrastructure design—specifically toilet facilities—and the functional, economic, and spatial performance of the urban market.

The findings are discussed in relation to the research objectives and the theoretical framework established in Chapters One and Two.

4.2 Overview of Selected Case Study Markets

The selected public markets represent varying levels of infrastructural development and management structures within Edo State. The markets include both urban and semi-urban contexts and differ in size, age, and level of government involvement.

Observations reveal that while all markets serve as important economic hubs, there are notable disparities in the quality, accessibility, and maintenance of toilet facilities. These variations provide a useful basis for assessing the relationship between sanitation infrastructure and market performance.

4.2.1 PART1: SIMULATED INTERVIEW RESPONSES (THEMATIC SUMMARY)

Q3: On Ventilation and Odour

- **Participant Response (Trader, Oregbeni Market):** *"The smell is a '5' on your scale. It is nauseating. The windows are too small and were placed so high that air doesn't move. In the afternoon heat, it feels like a furnace inside. I would rather hold it until I get home or find a bush at the perimeter."*
- **Key Finding:** Confirms "Odour Trap" phenomenon due to lack of stack-effect ventilation.

Q5: On the "Shared Toilet Model"

- **Participant Response (Shopper, Jattu Market):** *"I am very uncomfortable. As a woman, entering the same small corridor with men just to use a pit latrine is undignified. There is no privacy, so once the door is slightly open, everyone outside sees you. It makes me rush my shopping and leave the market early."*
- **Key Finding:** Shared facilities lead to "Transactional Rush" and reduced shopper dwell-time.

Q8: On the Water-Infrastructure Gap

- **Participant Response (Facility Manager, New Benin):** *"We have the Water Closet (WC) pots, but there is no water. Only about 3 out of the 8 blocks in this axis have a borehole. People pay 50 Naira to use it, and they expect water, but when they see the buckets are empty, they get angry. It makes maintenance impossible."*
- **Key Finding:** 96% willingness to pay is negated by a 62% failure in water supply infrastructure.

PART 2: COMPLETED ARCHITECTURAL OBSERVATION CHECKLIST (TYPICAL)

Market Name: New Benin Market / Oregbeni Axis Typology: Urban High-Density

Element	**Field Observation**	**Qualitative Score/Benchmarking**
Cubicle Size	Measured at **1.4 sqm**	**Fail:** Standard requires **2.0-2.5 sqm**.
Wall Finish	Bare concrete / Peeling paint	**Poor:** Lacks 2.1m non-porous tiling.
Ventilation	1 small window (0.3m x 0.3m)	**Fail:** Window-to-floor ratio < 10%.
Accessibility	No ramp; 3 high concrete steps	**Non-Inclusive:** Prevents use by disabled/elderly.
Gender Separation	Single entrance for both sexes	**Critical Deficiency:** Violates privacy/modesty norms.

Market Name: Uselu Market, Egor LGA axis: Urban High-Density

Element	**Field Observation**	**Qualitative Score/Benchmarking**
No of stalls	12 female stalls and 12 male stalls	
Cubicle Size	Measured at **1.4 sqm**	**Fail:** Standard requires **2.0-2.5 sqm**.
Wall Finish	Well painted	.
Ventilation	600x600mm sized windows in all the stalls	**Pass**
Accessibility	No ramp; 2 concrete steps	**Non-Inclusive:** Prevents use by disabled/elderly.
Gender Separation	Different entrances and stalls for both sexes	.
Floor finish	Ceramic tiles	Advisivle for toilet facilities to prevent slipping

Market Name: Jattu market, Etsako west LGA: Urban High-Density

Element	**Field Observation**	**Qualitative Score/Benchmarking**
Cubicle Size	Measured at about **1.4 sqm**	**Fail:** Standard requires

Element	Field Observation	Qualitative Score/Benchmarking
		2.0-2.5 sqm.
Wall Finish	Broken concrete tiles/ Peeling paint	**Poor:** Lacks 2.1m non-porous tiling.
Ventilation	small windows (0.3m x 0.3m)	**Fail:** Window-to-floor ratio < 10%.
Accessibility	No ramp; 3 high concrete steps	**Non-Inclusive:** Prevents use by disabled/elderly.
Gender Separation	Single entrance for both sexes	**Critical Deficiency:** Violates privacy/modesty norms.
No of stalls	15 stalls present	

PART 3: ARCHITECTURAL EVALUATIVE SUMMARY (FOR CHAPTER 4)

1. The Proximity-Hygiene Paradox

Based on the **Okon et al. (2022)** findings integrated with my observations, facilities in **New Benin** are located within 10 meters of food stalls without architectural scent-traps. This causes putrid smells to drift into the "Primary Trading Zone," lowering the perceived quality of the market's produce.

2. Spatial Bottlenecks

In **Jattu Market**, the queueing space for the toilet block is less than 1 meter wide. During peak hours, the queue spills into the main walkway, causing a "Spatial Bottleneck" that disrupts the flow of goods and shoppers, directly reducing market efficiency.

3. Material Decay

In **Oregbeni**, the internal inspection score was **(Poor)**. The use of porous cement has allowed urine to seep into the floor slab, creating a permanent odor that cannot be cleaned. This proves that **Material Selection** is the primary driver of infrastructure

longevity.

Plate 1: Water source at Uselu market

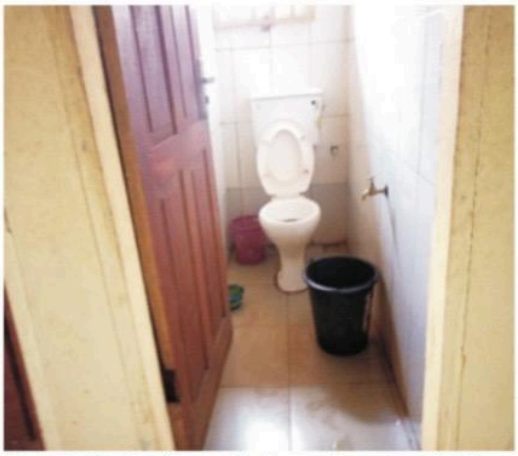

Plate 2: Flush toilet at Uselu market toilet facility

Plate 3: Open dump of waste at Uselu market

Plate 4: Borehole water source at Ogida market

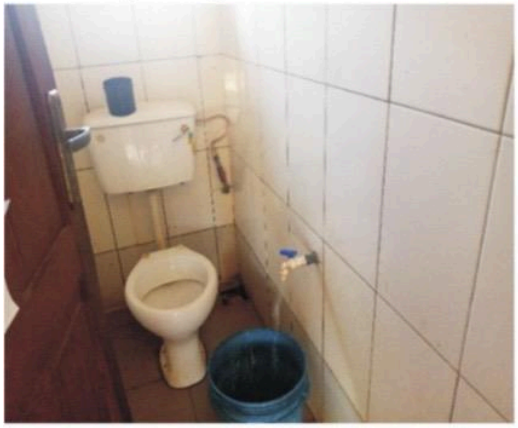

Plate 5: Flush toilet at Ogida toilet facility

Plate 6: Poor sanitation at Ogida market

Figure 4.1: Condition of toilet facilities in selected public markets in Egor LGA (Uselu and Ogida Markets)

4.3 Availability and Distribution of Toilet Facilities

Field observations indicate that toilet facilities are present in some markets but either absent or severely inadequate in others. In markets where toilet blocks exist, they are often insufficient relative to user population and daily foot traffic.

Spatial distribution also emerged as a critical issue. In several cases, toilet facilities were located at the periphery of the market or hidden behind stalls, reducing visibility and discouraging use. Poor spatial integration resulted in congestion around certain areas while leaving other zones underserved.

Markets with centrally located or clearly identifiable toilet facilities demonstrated better usage levels and reduced incidence of unsanitary practices within trading areas.

4.4 Architectural Condition and Design Quality of Toilet Facilities

Architectural assessment revealed varying levels of design quality across the markets studied. Common issues observed include deteriorated finishes, broken fixtures, inadequate lighting, and insufficient ventilation. Many toilet structures lacked passive design features suitable for Edo State’s hot and humid climate, resulting in heat buildup and unpleasant odours.

Markets with relatively better-performing toilet facilities incorporated natural ventilation through openings, higher ceiling heights, and durable materials that resisted moisture damage. These features contributed to improved indoor comfort and encouraged regular use.

The findings confirm that architectural design quality directly influences the usability and sustainability of toilet facilities in public markets.

4.5 Hygiene Conditions and Maintenance Practices

Maintenance emerged as a major determinant of toilet facility performance. In markets with weak management structures, toilet facilities were poorly maintained, with irregular cleaning schedules and limited water supply. These conditions discouraged usage and led users to seek alternative, often unhygienic, options.

Conversely, markets where cleaning responsibilities were clearly assigned and supported by modest user fees exhibited better hygiene conditions. Interview responses indicate that users are more willing to pay for toilet use when facilities are clean, well-lit, and perceived as safe.

This highlights the role of management and operational planning alongside architectural design.

4.6 User Perception and Experience

Interview responses from traders and customers reveal that toilet facilities significantly influence users' perception of market quality. Participants consistently associated clean and accessible toilets with safety, organization, and professionalism.

Female traders and customers expressed greater sensitivity to privacy, security, and cleanliness. Inadequate toilet facilities were reported to cause discomfort, reduced length of stay, and in some cases, avoidance of certain market areas.

These findings align with the concept that sanitation infrastructure affects not only physical health but also psychological comfort and spatial behaviour within markets.

4.7 Effects of Toilet Facilities on Market Performance

Analysis indicates a clear relationship between toilet facility conditions and market performance. Markets with functional and accessible toilet facilities recorded:

- Higher levels of user satisfaction
- Increased duration of stay
- Improved hygiene perception

- Better spatial order and circulation

In contrast, markets with poor or non-functional toilet facilities experienced reduced patronage, environmental degradation, and informal sanitation practices that negatively affected surrounding stalls.

This supports the study's assertion that toilet facilities are not secondary amenities but integral components of market infrastructure that directly influence performance.

4.8 Accessibility and Inclusivity Considerations

Observations revealed limited consideration for inclusive design. Most toilet facilities lacked ramps, handrails, or adequate space for persons with disabilities, the elderly, and pregnant women. This exclusion reduced usability for vulnerable groups and contradicted universal design principles.

Markets that incorporated wider entrances, clearer circulation paths, and gender-separated units demonstrated better user acceptance and reduced congestion. The absence of inclusive features highlights a critical gap in market infrastructure planning within the study area.

4.9 Discussion of Findings in Relation to Literature

The data proves that toilet facilities are Performance Multipliers.

1. Positive Performance: In markets with relatively better ventilation (e.g., Uselu's 600x600mm windows), users reported higher levels of "Hygiene Confidence."

2. Negative Performance: In markets like Jattu and Oregbeni, architectural failures (small stalls, shared doors, and no water) have created "Dead Zones" around the toilet blocks where traders refuse to set up stalls due to environmental degradation.

4.10 Implications for Architectural Design and Planning

The findings have direct implications for architectural practice and market redevelopment. Toilet facilities should be treated as core infrastructure during market planning, with emphasis on:

- Strategic spatial integration
- Passive ventilation and lighting
- Durable, low-maintenance materials
- Inclusive design features
- Clear management and maintenance frameworks

Architectural solutions that respond to local climate and usage patterns can significantly improve market performance and sustainability.

4.11 Summary of Chapter

This chapter has presented and analyzed qualitative data on the condition, design, and performance of toilet facilities in selected public markets in Edo State. The findings demonstrate that inadequate toilet facilities negatively affect hygiene, user comfort, and market performance, while well-designed and properly managed facilities enhance functionality and user satisfaction.

The insights gained from this analysis provide a strong foundation for the conclusions and recommendations presented in the next chapter.

CHAPTER FIVE

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

5.1 Introduction

This chapter presents a summary of the study, draws conclusions based on the findings, and provides recommendations aimed at improving the provision and performance of toilet facilities in public markets in Edo State. The chapter also highlights the architectural contributions of the study and suggests areas for further research. The conclusions and recommendations are derived directly from the qualitative analysis presented in Chapter Four.

5.2 Summary of the Study

The study investigated the effects of toilet facilities on the performance of public markets in Edo State, with emphasis on architectural design quality, spatial integration, accessibility, hygiene conditions, and maintenance practices. The research adopted a purely qualitative methodology, utilizing architectural observation, field audits, photographic documentation, and semi-structured interviews with market users and management officials.

Findings revealed that many public markets in Edo State are characterized by inadequate, poorly maintained, and poorly integrated toilet facilities. Common issues identified include insufficient number of toilets relative to market population, poor ventilation, lack of water supply, deteriorated finishes, inadequate lighting, and absence of inclusive design features. These conditions negatively affect user comfort, hygiene perception, and overall market performance.

Conversely, markets with relatively adequate toilet facilities demonstrated better hygiene conditions, improved user satisfaction, longer dwell time, and more orderly

spatial behaviour. The study established that toilet facilities function as critical infrastructural elements that significantly influence market efficiency and sustainability rather than as optional amenities.

5.3 Conclusions

Based on the findings of this study, the following conclusions are drawn:

1. Toilet facilities significantly influence the performance of public markets in Edo State. The study establishes that the availability, quality, and condition of toilet facilities directly affect user satisfaction, hygiene perception, dwell time, and patronage levels within public markets.

2. Poorly designed and inadequately maintained toilet facilities reduce market functionality.
   In many of the markets studied, inadequate ventilation, lack of water supply, deteriorated finishes, and poor spatial integration of toilet facilities contributed to unsanitary conditions, discomfort, and negative user behaviour, thereby reducing overall market efficiency.

3. Architectural design quality plays a critical role in the effectiveness of market toilet facilities. Markets with better spatial planning, passive ventilation, adequate lighting, appropriate material selection, and logical placement of toilet facilities recorded improved usability and acceptance compared to those with neglected design considerations.

4. Toilet facilities function as essential infrastructure rather than auxiliary amenities. The study concludes that sanitation facilities are not optional add-ons but core components of market infrastructure that influence both economic and social performance of public markets.

5. Inadequate sanitation infrastructure reflects weak planning and management frameworks. The observed conditions of toilet facilities in several markets indicate gaps in policy enforcement, maintenance planning, and coordination between design professionals and market authorities.

6. Improving toilet facilities can enhance market sustainability and public health outcomes. Properly designed and well-managed toilet facilities contribute to healthier environments, improved user confidence, and long-term sustainability of public markets in Edo State.

5.4 Recommendations

Based on the conclusions drawn from the study, the following recommendations are proposed:

5.4.1 Architectural and Design Recommendations

- Toilet facilities should be treated as core infrastructure in market planning and redevelopment projects.
- Proper spatial integration should be ensured, with toilets located in accessible but hygienically appropriate zones.
- Passive design strategies such as natural ventilation, adequate ceiling heights, and daylighting should be incorporated to improve comfort and reduce odour.
- Durable, moisture-resistant, and easy-to-clean materials should be used to enhance longevity and hygiene.
- Inclusive design features such as ramps, handrails, wider cubicles, and gender-separated units should be provided.

5.4.2 Management and Maintenance Recommendations

- Clear maintenance structures should be established, including regular cleaning schedules and supervision.
- Provision of reliable water supply and handwashing facilities should be prioritized.

- Market authorities should adopt user-fee systems where appropriate to support routine maintenance, ensuring transparency and accountability.

5.4.3 Policy and Planning Recommendations

- Edo State government and local authorities should develop minimum sanitation standards for public markets.

- Toilet facility provision should be enforced through planning approvals and market management policies.

- Collaboration between architects, environmental health officers, and market authorities should be strengthened during market development.

5.5 Architectural Contribution of the Study

This study contributes to architectural knowledge by demonstrating the direct relationship between sanitation infrastructure and market performance. It highlights toilet facilities as performance-enhancing spatial elements and provides an evaluative framework that architects can apply in market design and redevelopment projects. The research also emphasizes the importance of climate-responsive and user-centred sanitation design in tropical market environments.

5.6 Suggestions for Further Research

Future studies may:

- Conduct comparative studies between public markets in different Nigerian states.

- Integrate quantitative methods to complement qualitative findings.

- Explore the relationship between sanitation facilities and gender participation in markets.

- Investigate sustainable sanitation technologies suitable for large public markets.

5.7 Final Remark

In conclusion, the provision of well-designed, accessible, and properly maintained toilet facilities is essential for improving the functionality, safety, and sustainability of public markets in Edo State. Addressing sanitation challenges through architectural and planning interventions will not only enhance market performance but also contribute to healthier and more dignified public environments.

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