

Research Article

Identifying the Nature of Highway Motel Design: Evolution, Characteristics, and Future Trends

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Abstract

This rapid urbanization, coupled with the increasing demand for roadside hospitality, poses significant challenges for conventional highway motels, which often rely on basic designs, limited facilities, and inconsistent service standards. Modern highway motels have emerged as a promising alternative to traditional roadside accommodations, offering innovative design strategies to meet the evolving needs of travelers. The growing global population and increased road travel are placing unprecedented pressure on existing highway hospitality systems to provide comfort, convenience, and sustainability. Traditional motel designs, which rely on uniform layouts and minimal amenities, are increasingly unsustainable in the face of rising traveller expectations, environmental concerns, and evolving travel patterns. The challenge is further compounded by inefficiencies and environmental impacts, such as high energy consumption and poor waste management practices, associated with conventional motel operations. This study adopts a qualitative approach to investigate the evolution, characteristics, and design strategies of highway motels and their potential to align with future trends in the hospitality industry. The research methodology employed includes a comprehensive review of existing studies on motel design, sustainable architecture, and traveler preferences to identify best practices and lessons that can be applied to Nigerian and global contexts. Highway motels represent a transformative approach to addressing the pressing challenges of urbanization, increased road travel, and environmental sustainability. By leveraging innovative systems such as modular construction, energy-efficient designs, and smart technology, modern motels maximize operational efficiency, reduce environmental impact, and enhance guest experiences. Their integration into highway networks not only optimizes traveler satisfaction but also contributes to economic growth, sustainable tourism, and community engagement.

Keywords

Design Evolution, Highway Motels, Hospitality Trends Sustainable Architecture, Urbanization

1. Introduction

Highway motels have long been integral to the hospitality industry, serving as essential components of travel infrastructure and accommodating the needs of road travelers. Since their inception in the early 20th century, highway motels have played a crucial role in providing affordable and

accessible lodging options for motorists, thus contributing to domestic and international tourism [7]. The revival of highway motels in recent years has coincided with the growing demand for personalized and comfortable lodging experiences, as many travellers seek both convenience and nostalgia.

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These establishments have evolved to meet contemporary demands by incorporating innovative design features and offering more customized services. As a result, highway motels have become more than just places to sleep overnight; they are now destinations in their own right [8]. The significance of motels has grown as they adapt to meet contemporary demands through innovation and enhanced guest services.

Technological advancements have greatly influenced the evolution of highway motels, redefining the guest experience and operational efficiencies. One of the most notable innovations is the integration of smart technologies, including Internet of Things (IoT)-enabled devices. These devices allow travelers to control room settings, such as lighting, temperature, and entertainment, through mobile applications, providing a level of convenience and customization previously unavailable in traditional motels [9]. Additionally, technologies such as virtual reality and augmented reality are being experimented with in select motels to offer immersive experiences that enhance guest engagement. These innovations, while still emerging, point to a shift toward more interactive and experiential stays in motels. Smart technologies not only improve guest satisfaction but also enable motel owners to optimize operations, reduce costs, and enhance security features, offering a seamless stay for modern travelers [1].

Sustainability has become a critical aspect of highway motel design and operation, particularly in response to growing environmental awareness among travelers. Eco-friendly practices, such as the use of energy-efficient lighting, water-saving fixtures, and waste reduction strategies, have become standard in many modern motels [9]. The integration of renewable energy sources, including solar panels and wind energy, is becoming increasingly popular as a way to reduce the carbon footprint of motels and lower operational costs. Not only do these practices meet the growing demand for environmentally conscious travel options, but they also present an opportunity for motels to distinguish themselves in an increasingly competitive market [10]. Moreover, green certifications such as LEED (Leadership in Energy and Environmental Design) have become important benchmarks for motels seeking to demonstrate their commitment to sustainability, with some establishments even adopting circular economy principles, such as the use of recycled materials in construction [3].

The impact of the COVID-19 pandemic has further reshaped traveler behavior, leading to increased demand for accommodations that prioritize cleanliness, safety, and the ability to maintain social distancing. This shift has placed motels at the forefront of the lodging industry, as their design typically includes direct-to-room access with minimal shared spaces, making them ideal for travelers seeking to reduce their exposure to common areas. As a result, motels have seen a resurgence in popularity, especially for road trips and long-distance travel [6]. The pandemic has underscored the

importance of flexibility in motel operations, such as contactless check-ins, enhanced cleaning protocols, and improved sanitation measures to ensure a safe and comfortable stay for guests [5]. These health-conscious innovations have reshaped the expectations for guest experiences in motels, solidifying their place as a preferred accommodation option in the post-pandemic era.

In emerging markets such as Nigeria, the development of well-designed highway motels is essential to supporting economic growth, tourism, and regional development. With road networks expanding and greater mobility becoming possible for both domestic and international travelers, the need for modern, sustainable highway motels has never been more apparent. The Lagos-Ibadan Expressway, for example, serves as a key corridor for economic activity and tourism but lacks sufficient modern, eco-friendly motels to serve the increasing number of travelers using the route [2]. Implementing sustainable design principles-such as energy-efficient infrastructure,

2. Literature Review

Design of highway motels has evolved significantly over the past century, reflecting shifts in traveler expectations, technological innovations, and environmental concerns. This literature review explores the historical development, current trends, and future directions in highway motel design. It examines key factors such as technological integration, sustainability, market demands, and regional considerations that influence the design and operation of motels, particularly in emerging markets.

2.1. Historical Development of Highway Motels

The history of highway motels is deeply intertwined with the rise of automobile travel and the expansion of road infrastructure, particularly in the early to mid-20th century. Highway motels emerged as a distinct type of roadside accommodation, catering to the growing number of road travelers seeking a convenient, affordable place to rest during long-distance journeys. The early 20th century witnessed the dawn of the automobile age, which fundamentally changed the way people traveled. Prior to the mass production of automobiles, long-distance travel was often slow and arduous, relying on trains, buses, or boats. However, the widespread adoption of cars during the 1920s and 1930s revolutionized personal mobility, allowing people to travel greater distances at their own pace [7, 4].

As automobiles became more affordable and accessible, the need for roadside accommodations grew. Initially, travelers relied on inns, small hotels, or boarding houses located in towns and cities. However, as people began to travel more frequently along highways, a new type of accommodation emerged: the motel (short for "motor hotel"). The first motels were designed with the needs of automobile travelers in mind,

offering convenient, affordable, and accessible accommodations along major highways [7]. Unlike traditional hotels, which required guests to park in distant lots or rely on public transport, motels offered the novel feature of direct access to individual rooms from the parking lot, allowing guests to drive up to their rooms and unload their luggage with ease [4].

2.2. The Rise of Motels in the 1920s and 1930s

The first motels began to appear in the United States in the late 1920s, particularly in California, a state that would become a hub for motels due to its extensive highway system and growing tourism industry [4]. The first true motel is often credited to be the Motel Inn in San Luis Obispo, California, which opened in 1925. It featured a simple design with a series of small cabins arranged around a central parking area, offering guests easy access to their rooms directly from their vehicles [7]. This new concept of providing automobile-oriented accommodations quickly gained popularity, and soon after, motels began to sprout along highways, particularly near major routes such as Route 66, which connected Chicago to Los Angeles [7, 10].

During the 1930s, motels continued to evolve in terms of design and functionality. Many early motels were simple, functional structures with minimal amenities. The design was typically one-story, with small cabins or individual rooms that were often arranged in a "motor court" layout around a central parking lot. These early motels were characterized by their convenience and affordability, providing basic accommodations for travelers who were often just passing through [7, 3]. Motels were particularly popular during the Great Depression, when affordable travel options were in high demand, offering a practical solution for families and individuals who were traveling on limited budgets [4].

2.3. Post-war Expansion: The Golden Age of Motels (1940s-1960s)

The period following World War II marked the beginning of what is often referred to as the "Golden Age" of motels, as automobile ownership and long-distance travel surged in the United States and many other countries. The completion of the Interstate Highway System in the 1950s, particularly in the United States, was a major factor in the growth of motels. The interstate highways allowed for faster, more efficient travel, and motels became an essential part of the travel experience, offering a convenient resting point for motorists [7, 5].

By the 1950s and 1960s, motels were widespread along major highways, especially in the western United States, where car culture was particularly strong. This period saw the emergence of iconic motel chains, such as Motel 6, which was founded in 1962 and became known for its affordable rates and no-frills accommodations. During this time, motels adopted a standardized design, with features like neon signs, direct room access from parking areas, and basic amenities

such as air conditioning and televisions [7, 4]. The simplicity and affordability of motels made them a popular choice for budget-conscious travelers, including families on road trips, business travelers, and seasonal tourists [4].

2.4. Decline and Transformation: The Motel Industry in the 1970s and 1980s

While the post-World War II era was the heyday for motels, the industry began to face challenges in the 1970s and 1980s. The growing popularity of interstate travel, combined with the rise of chain hotels and air travel, led to a decline in the prominence of roadside motels. Many travelers began opting for larger, more luxurious hotels that offered more services and amenities, and the rise of hotel chains like Holiday Inn and Best Western began to overshadow the independent motels that had once dominated the roadside accommodation market [7, 5].

2.5. Contemporary Trends and the Future of Highway Motels (2000s-Present)

In the 21st century, motels have experienced a resurgence in certain regions due to changing consumer preferences, particularly among budget-conscious travelers and road trip enthusiasts. While motels may no longer dominate the accommodation landscape, they continue to hold a significant place in the hospitality industry, especially in markets where cost-effective lodging options are in high demand [5]. The contemporary motel has embraced new trends, which according to [11] includes eco-friendly design, smart technology, and sustainability initiatives. This appeals to a new generation of travelers who value efficiency, convenience, and environmental responsibility [3, 1].

Motels today are adopting innovative technologies, such as keyless check-in systems, mobile apps, and smart room features that allow guests to control their environment via smartphones or voice commands [1]. Moreover, the growing emphasis on environmental sustainability has led many motels to incorporate green building materials, solar power, and water-saving technologies to reduce their ecological footprint and attract environmentally conscious guests [3].

As the hospitality landscape continues to evolve, motels are finding new ways to adapt and thrive. The rise of staycations, the resurgence of road trip culture, and a desire for more personalized and unique travel experiences may shape the future of motels, ensuring that they remain an important part of the road travel experience for generations to come [10, 1].

2.6. Technological Innovations in Motel Design

Technological advancements have profoundly transformed the motel industry, introducing a broad spectrum of innovations that enhance guest experiences, improve operational efficiency, and contribute to sustainability efforts. With the

rise of tech-savvy travelers and the increasing importance of operational sustainability, motels are adopting state-of-the-art technologies to remain competitive, meet guest expectations, and reduce costs. This section explores key technological innovations shaping the future of motel design, including smart technologies, automation, sustainability-focused systems, and augmented and virtual reality (AR/VR).

2.7. Automation and Artificial Intelligence (AI)

Automation and artificial intelligence (AI) have reshaped how motels operate and interact with guests. Automated systems have reduced the need for human intervention, leading to greater efficiency and improved customer service. One notable example is the use of self-check-in kiosks, which allow guests to bypass the front desk and check in without waiting [1]. Many motels also offer mobile check-in, where guests can complete the booking process and access their rooms via smartphones, further enhancing convenience and minimizing physical interactions [6].

AI-powered systems are also transforming guest service operations. Virtual assistants and AI-powered chatbots are now being widely used in motels to assist guests in making inquiries, booking services, and receiving recommendations [1]. These AI-driven solutions provide 24/7 support and help reduce the workload of staff, allowing for faster response times and more personalized guest service [5]. AI is also being used to manage inventory and track customer preferences, creating a more efficient, personalized experience for guests [10].

Dynamic pricing strategies powered by AI are also becoming common in motels. By analyzing external factors such as demand, weather, and local events, AI systems adjust room prices in real-time to optimize occupancy and profitability [5]. For example, AI-based revenue management systems use predictive analytics to forecast demand fluctuations and adjust room rates accordingly, ensuring competitive pricing while maximizing revenue [9].

2.8. Contactless Technology and Digital Services

The demand for contactless services has surged, particularly in the wake of the COVID-19 pandemic. As a result, motels are increasingly adopting digital solutions that allow guests to interact with services and facilities without physical contact. Contactless check-in and keyless entry have become standard in many motels, where guests can access their rooms via a smartphone app or digital key, bypassing the front desk entirely [1, 9]. These contactless systems enhance convenience for guests while maintaining safety and hygiene standards.

In addition to check-in services, digital technologies are enhancing in-room experiences. Smart TVs, voice-controlled assistants, and interactive entertainment systems have become common in motel rooms, offering guests a range of media

options at their fingertips [10]. Additionally, in-room tablets or mobile apps allow guests to control room services such as temperature, lighting, and housekeeping requests, without having to directly interact with staff, further improving convenience [3].

Mobile ordering services and digital concierge systems also contribute to the guest experience by enabling guests to request room service, book transportation, or find local attractions all via their smartphones [9]. These digital services streamline operations and reduce staff workload, allowing for more efficient service delivery.

2.9. Security and Surveillance Technologies

Security is a top priority for motels, and advanced surveillance and security technologies are playing a critical role in ensuring guest safety. One such innovation is the use of electronic locks and mobile keyless entry systems. These systems provide greater security by allowing access only to authorized guests while reducing the risk of key duplication (1). Furthermore, mobile key systems allow guests to check in and access their rooms through their smartphones, offering an added layer of convenience while maintaining security.

In addition to locking systems, motels are increasingly employing AI-driven surveillance systems to enhance security. For example, CCTV cameras integrated with AI can analyze video feeds in real-time, detecting unusual activity or potential threats and alerting security personnel automatically [9]. AI-based systems can also monitor and manage crowd behavior in common areas, ensuring that safety protocols are followed and helping to mitigate risks [10].

Cybersecurity has also become increasingly important in motels as digital technologies become more prevalent. With guest data being stored online and payment transactions conducted electronically, motels must invest in robust cybersecurity measures to protect sensitive information from theft or cyberattacks [3]. Advanced encryption and secure payment systems are now standard in many motels, ensuring that guest data is safe and privacy is protected.

2.10. Augmented and Virtual Reality (AR/VR)

Although still emerging in the motel sector, augmented reality (AR) and virtual reality (VR) technologies are beginning to make their mark on the hospitality industry. These technologies offer guests unique and immersive experiences that enhance the overall stay. For example, motels can use VR to provide virtual tours of local attractions or interactive experiences that highlight local culture and landmarks [10]. Some motels are exploring the use of VR for in-room entertainment, offering guests interactive and immersive experiences such as virtual gaming, 360-degree movies, or virtual fitness classes [9].

AR technologies can also enhance the guest experience by providing interactive navigation and real-time information.

For instance, guests can use AR-enabled smartphones to view details about the motel's amenities or navigate to points of interest in the surrounding area [10]. Additionally, AR can help guests find personalized recommendations for dining, activities, or local tours, further improving their stay.

2.11. Sustainability in Motel Design

Sustainability in motel design has evolved as a critical response to both environmental imperatives and growing consumer demand for eco-conscious services. Motels, especially those catering to highway travelers, are high consumers of energy, water, and materials, placing a significant burden on local resources. As a result, implementing sustainable practices not only reduces environmental footprints but also aligns with the growing traveler preference for eco-friendly accommodations [10].

In the context of highway motels, which often serve as essential infrastructure for long-distance travelers, sustainable design is increasingly essential for meeting operational goals while addressing environmental challenges. Below, we discuss the key elements contributing to sustainable motel design, focusing on energy efficiency, water conservation, renewable energy, sustainable materials, and waste management, which are driving the motel industry toward a greener future.

2.12. Energy Efficiency and Renewable Energy

Energy consumption is a primary concern in the design of motels, as they often rely heavily on heating, cooling, lighting, and electrical appliances. As energy prices increase and environmental awareness grows, motels are shifting to energy-efficient technologies to reduce costs and carbon emissions. For instance, LED lighting systems, which consume 75% less energy and last 25 times longer than traditional incandescent bulbs, are becoming standard in eco-conscious motels [3]. Additionally, smart thermostats have been widely implemented in motel rooms, allowing guests to control room temperatures based on occupancy, reducing unnecessary energy use during off-peak hours [9].

Beyond lighting and HVAC systems, the incorporation of renewable energy sources has become integral to motel sustainability. Solar panels, which have become a prominent feature in motel design, offer a renewable source of energy, reducing dependence on fossil fuels. The installation of photovoltaic panels on motel rooftops helps generate clean energy, thereby lowering both operational costs and carbon emissions [10]. In regions with high solar potential, this technology enables motels to achieve energy self-sufficiency, and excess energy can even be sold back to the grid, contributing to the local energy economy [1]. In some motels, other renewable energy sources, such as wind turbines and geothermal energy systems, are also explored to diversify energy sources and further reduce environmental impact [3].

2.13. Sustainable Materials and Construction Practices

Sustainable materials are a core component of environmentally friendly motel design. Traditional construction materials like concrete and steel are energy-intensive and contribute to the depletion of natural resources. Sustainable alternatives, such as recycled steel, bamboo, and reclaimed wood, are increasingly favored for their lower environmental impact. Bamboo, for example, is a renewable material with a fast growth rate, making it a sustainable substitute for traditional hardwood [1]. Recycled steel and reclaimed wood help reduce the demand for new resources, while also diverting waste from landfills [3]. In addition to the materials used, motels are adopting green building certifications, such as LEED (Leadership in Energy and Environmental Design), to guide their construction practices. LEED certification requires motels to meet high standards for energy efficiency, water conservation, and sustainable material use. Motels that achieve LEED certification can use this as a marketing tool to attract eco-conscious travelers while demonstrating their commitment to sustainability [10].

Modular construction is another trend in motel design that promotes sustainability. By constructing prefabricated modules off-site and assembling them at the final location, modular construction minimizes waste, reduces transportation emissions, and shortens construction timelines. The modular approach also ensures more precise control over environmental factors such as energy use and material waste, resulting in more sustainable outcomes [9].

2.14. Waste Reduction and Recycling

Waste management plays a vital role in sustainable motel design. Hotels and motels generate large quantities of waste from food, packaging, linens, and guest amenities. To mitigate the environmental impact, motels are increasingly adopting recycling programs and waste reduction strategies. Recycling stations for paper, plastic, and glass are now common in motels, making it easy for guests and staff to dispose of waste responsibly. Additionally, motels are eliminating single-use plastics, replacing disposable straws, cups, and toiletries with biodegradable or reusable alternatives such as bamboo, glass, and metal [6].

Food waste is another significant issue in motel sustainability. Many motels are adopting composting practices to recycle food scraps into nutrient-rich compost, which can be used for landscaping. Composting reduces the amount of organic waste that ends up in landfills while providing valuable resources for the property's outdoor areas [3]. Furthermore, some motels partner with local food banks and charities to donate excess food, thereby reducing waste and contributing to community welfare [1].

2.15. Technological Integration and Consumer Expectations

Technological integration is a key factor in the development of highway motels, especially in emerging markets where consumer expectations are evolving rapidly. As mobile technology becomes ubiquitous, travelers increasingly expect seamless digital experiences during their stay. Mobile check-ins, contactless payments, and online room bookings are now seen as standard services in hospitality [2]. In emerging markets, the adoption of such technologies is transforming the way highway motels operate, offering greater convenience for both customers and service providers.

2.16. Cultural Sensitivity in Motel Design and Services

Cultural sensitivity in motel design and services is crucial to the success of highway motels in emerging markets. As these markets are often diverse in terms of culture, language, and traditions, understanding the local customs and expectations is essential for attracting guests [9]. In countries like Nigeria and India, where family-centered and community-oriented values are prominent, motels that cater to family groups, offer communal spaces, and reflect local design aesthetics are more likely to succeed. This cultural alignment helps motels resonate with local customers, creating a more welcoming and memorable experience.

3. Research Method

The descriptive research approach was used in this study because it was the best fit for the project's goals. This analysis method reveals what information is significant and correct about the study topic or the problem of applying findings to produce a fair and appropriate reduction. Visual inspection and the use of an observation checklist were used to conduct the research. A case study entails the investigation of a case study model [8]. The case study method has become a popular method of architectural research (8).

3.1. Data Type and Sources

To achieve the purpose of this study with the

above-mentioned objectives, primary and secondary data sources were analysed to collect the various data used during the study.

3.1.1. Primary Data

This is data that an investigator collects for the first time for a specified purpose. Basic data is 'pure' in the sense that it is unprocessed and unaltered. A visual survey with the help of pictures and a well-designed viewing schedule was used as the primary data source during the case studies. Nature for the design of the motel was recognized, and cooling techniques used in many highway motels to achieve thermal comfort were also observed.

3.1.2. Secondary Data

They are data that have been sourced from a source that has collected it in the first place. This signifies that some researchers or investigators have already collected this type of information in the past, and it is available in either published or unpublished form.

Secondary map data (region, region, and domain) were gathered for this study, and the literature was read to define the research project's in-depth theoretical underpinning. The data gathered serves as a foundation, principles, and flexibility for observing, planning, and constructing the planned highway motel in order to discover a little cooler inside space.

3.2. Population of Study

The population of the study will entail highway motel located within Nigeria to design a highway motel with the application of passive security strategies.

The most basic sampling strategy is simple random sampling; in which we select a set of participants (a sample) for research from a larger group (a population). Each person is chosen at random, and everyone in the population has an equal chance of being included in the sample. Every sample of a certain size has the same chance of being chosen. During the investigation, a simple random sampling procedure was utilized to select 16 samples at random. The motel were chosen with care, and the observation schedule was applied to all thirteen samples at the same time. Table 1 depicts the sample sizes and location.

Table 1. Sample size and location.

S/N	CASE STUDIES	LOCATION
1	MPT TOURIST MOTEL IWA	NATIONAL HO1WAY12. PIAORA. MAPHYA PRAPESH 466674
2	KAMA IFWCHA EA	IOC Jim.EE RETAL5 OUTLET NH-48, UPAPUEA CHANNARA YA-PATTANA HAS5AN PISTRKT

S/N	CASE STUDIES	LOCATION
	CARRIGAN MOTEL	6600 OCEAN AVENUE, WILPWOOP CREST. NEW JERSERY
4	HIGHWAY 99	AAKHOL. OUARAT
\$	LONVILB MOTEL	LINCOINVILLE, MAINE
6	CALISTO6A WVE L0P6E ANP SPA	NAPA VALLEY. CALIEORMA
7	XÜM Mk^NW ííHEIGHTS	CHILLIANAVLA. PIELA POYS SCHOa ROAP. RAMKHAT. UTTA-RATCHANP 265646
S	SOFREIRAS ALENTE JO COUNTRY MOTEL	ALENTE JO REGION OE PORWAL
9	MIKAPO MtMI NIDRIA LIMITEP	12. UYO STREET. RUMUOMASI. PORT MARCOLA 600IO2, RIVERS
IO	STOPOVER MOTEL	INTERNATIONAL ARPORT ROAP. IKE JA. LASOS
II	SANPACOMOTEL	RAPINSEYIN MAPA-LA. SULEJA. NI6ER STATE
12	POYA. PIRP MOTEL	OWO AVENLT. IJAPO ESTATE. AKLRE
15	LOVE ANP PEACE INTERNATIONAL MOTEL	Km4.16O0A EXPRESSWAY. ONPO STATE
14	KS MOTEL LIMITEP	OUEEN ELIZAPETH LI ROAP. ORITA MERA. IPAPAN. OYO STATE
Lb	STAR ROYAL MOTEL	KITEPI ROAP. KAMPALA
16	LIMIT MOTEL	60PW1N /WEY WAY. ORE SAPELE ROAP^ENIN EP ¿

3.3. Data Collection

3.3.1. Number of Rooms

Motel room counts vary by size: small (5-20), medium (21-35), or large (36+), directly impacting operations and revenue. Therefore, to determine these characteristics, the number of room in the selected highway motel was critically observed. As seen in Figure 1, 25% of the highway motel had 5-20 rooms, 37.5% had 21-35 rooms, 37.5% had 36 above. It can be deduced that 21-35 and 36 above had larger rooms while 5-20 rooms have smaller rooms.

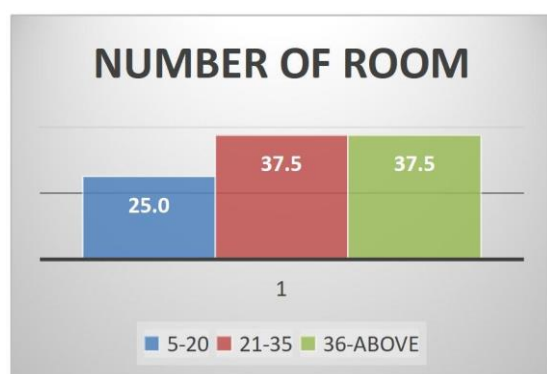


Figure 1. Number of Room.

3.3.2. Number of Floors

Most highway motels maintain one- or two-story designs, optimizing guest accessibility while meeting safety and cost-efficiency requirements, there is need to examine the number of floors available. As seen in Figure 2, 18.8% of the highway motel examined had a one floor, 43.8% had two floors, 37.5% had a range of three floors above. Therefore, it can be deduced that for the efficient design of a highway motel. There is a need to have two floors in the design of a highway motel.

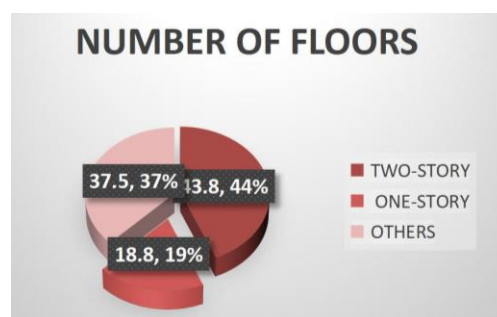


Figure 2. Number of Floor.

3.3.3. Provision of Restaurant

Highway motels increasingly incorporate compact restaurants to boost guest satisfaction and ancillary revenue. The

results from Figure 3 showed that 81.3% of the examined highway motels provided restaurants, while 18.8% did not provide them. It can be deduced that restaurants should be provided in designing the highway motel.

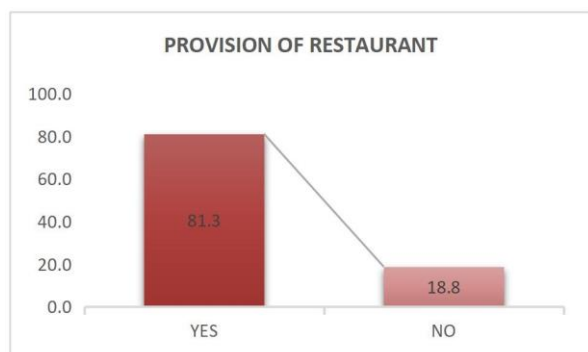


Figure 3. Provision of restaurant.

3.3.4. Provision of Recreational Facilities

Strategic recreational facilities like pools and gyms enhance highway motels' competitiveness and guest retention. As seen in Figure 4, 25% of the examined highway motels provided outdoor recreational facilities, 44% provided indoor recreational facilities, 19% provided both indoor and outdoor, while 12% did not provide them. It can be deduced that indoor recreational facilities should be provided in designing the highway motel.

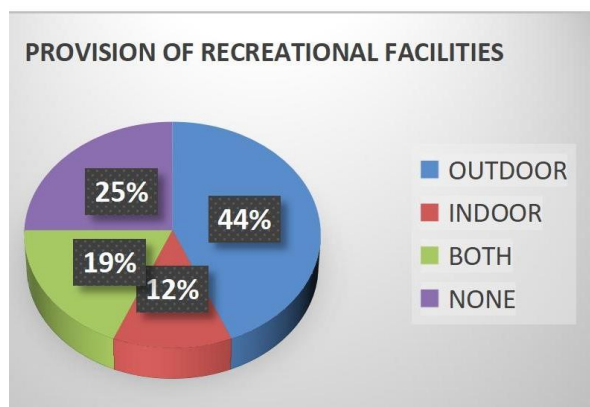


Figure 4. Provision of restaurant.

3.3.5. Provision of Laundry

Highway motels increasingly incorporate on-premises laundry facilities to enhance guest convenience while addressing operational and security needs, there is a need to examine the provisions of laundry. The results from Figure 5 showed that 56% of the examined highway motels provided laundry, while 44% did not provide them. It can be deduced that laundry should be provided in designing the highway

motel.



Figure 5. Provision of laundry.

3.3.6. Provision of Vehicle Service

Highway motels often integrate on-site vehicle services-such as car washes, basic maintenance, or EV charging stations-to cater to travelers' needs while enhancing revenue streams, there is a need to examine the provisions of vehicle service. The results from Figure 6 showed that 81% of the examined highway motels provided vehicle service, while 19% did not provide them. It can be deduced that vehicle service should be provided in designing the highway motel.

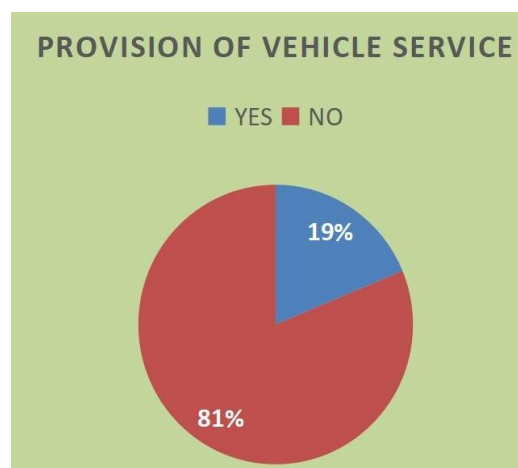


Figure 6. Provision of vehicle service.

3.4. Assessment of Passive Security in Highway Motel

The second objective of this study is to assess passive security strategies in highway motel design. These strategies were obtained through literature and then variables related to passive security strategies were examined using an observation checklist to assess existing highway motel. The variables

that were examined was discussed under the following headings.

Parking Areas Visible

Parking areas should remain fully visible from reception and staff areas to deter criminal activity. As seen in Figure 7, 88% of highway motels that were examined have a visible parking area, while 12% of the highway motel parking area are not visible. The results from the analysis implied that the parking area should be visible in order to archive passive security.

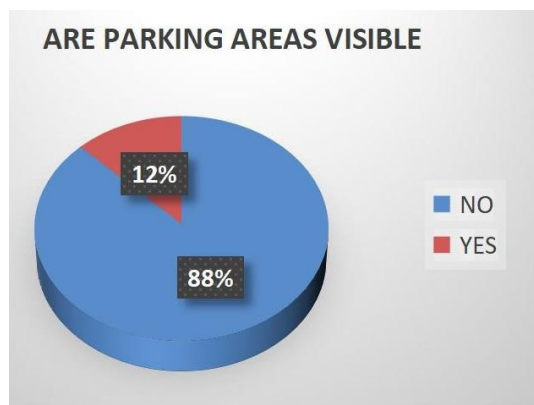


Figure 7. Parking area visibility.

4. Recommendations

Based on this research's findings, several recommendations can guide the evolution of highway motel design to meet contemporary challenges and future demands. These recommendations aim to improve operational efficiency, enhance the guest experience, foster sustainability, and ensure that highway motels remain relevant in an evolving hospitality landscape.

4.1. Incorporating Sustainable Design Practices

Highway motels must evolve to meet the growing emphasis on sustainability. As environmental concerns become more pressing, it is recommended that motel developers adopt green building practices, including energy-efficient lighting, renewable energy sources like solar panels, and energy-saving insulation. Additionally, water conservation techniques, such as low-flow plumbing fixtures and rainwater harvesting systems, should be incorporated into the design [10]. These changes will not only reduce operating costs but also align motels with global sustainability goals, attracting eco-conscious travelers. Sustainable design should also extend to the materials used in construction. Local, renewable materials should be prioritized over those that have a significant environmental footprint, contributing to both sustainability and regional economic development. In addition, implementing green roofs and urban agriculture could help

motels further reduce their environmental impact and contribute to local food security [1].

4.2. Adapting to Technological Advancements

With technological innovations reshaping the hospitality industry, highway motels should adopt smart technologies to improve both operational efficiency and guest experience. The implementation of the Internet of Things (IoT) to monitor and control heating, lighting, and air conditioning can improve energy efficiency and reduce costs. Smart room systems that allow guests to control room settings through mobile apps or voice assistants can further enhance customer satisfaction [3].

Highway motels should embrace automation in their operations. Automated check-in and check-out processes can streamline guest interactions, reduce wait times, and improve overall convenience. This is particularly important in high-traffic areas where efficiency is critical to customer retention and satisfaction [2]. Furthermore, digital concierge services and virtual reality (VR) can be used to enhance the guest experience, offering remote interaction with motel services and creating immersive environments for travelers.

4.3. Enhancing Design Flexibility for Diverse Customer Needs

As highway motels cater to a diverse range of customers-ranging from business travelers to tourists and long-distance truck drivers-design flexibility is essential. The future design of highway motels should include customizable room configurations that can cater to varying guest preferences. For example, modular room designs that can be easily adapted for solo travelers, families, or larger groups can increase the motel's appeal to a wider demographic [9].

Moreover, the integration of multi-functional public spaces within the motel, such as co-working areas, dining options, and relaxation zones, will cater to the evolving needs of guests. Highway motels could design areas that foster both social interaction and individual workspaces, thus appealing to the growing trend of digital nomads and remote workers [1]. This also includes providing high-speed internet and efficient workspaces to accommodate business travelers and long-term stays.

4.4. Cultural Sensitivity and Local Integration in Design

To ensure that highway motels cater to the specific cultural preferences and aesthetic values of their surroundings, it is important to incorporate culturally sensitive design features. This includes using local architecture, art, and materials that reflect regional culture and traditions, which can enhance the guest experience and make the motel more appealing to local patrons [2]. For example, in countries like Nigeria, incorpo-

rating indigenous art and locally sourced materials into motel design can create a unique identity for the motel, setting it apart from competitors.

Culturally appropriate services, such as food offerings that reflect local tastes and dietary preferences, can also enhance the guest experience. Ensuring that the motel's design and services are aligned with local customs helps foster a sense of community and makes the establishment more appealing to local customers.

4.5. Promoting Safety and Security Features

Safety and security will continue to be of paramount importance for highway motels. To address these concerns, it is recommended that motels invest in advanced security systems, including surveillance cameras, smart locks, and 24-hour security personnel. The motel's physical design should prioritize guest safety, with well-lit parking areas, secure access points, and emergency exits clearly marked [9].

Furthermore, motels can implement health and safety measures, particularly in response to global health concerns such as pandemics. Contactless check-ins, cleaning protocols, and in-room sanitation options can reassure guests about their health and safety during their stay [3].

4.6. Optimizing Space Utilization

As urban sprawl continues, available space for new developments may become limited, especially in high-density areas. Highway motels should focus on optimizing space utilization through vertical design. Multi-story buildings with compact room designs can accommodate more guests while reducing the land footprint required for the motel [10]. This is particularly relevant in congested urban environments, where real estate costs are high, and efficient space usage is critical.

Additionally, outdoor areas, such as roof gardens and terraces, can be utilized to provide recreational space, offering guests a pleasant environment to relax. These spaces can also be used for small events or business gatherings, maximizing the use of the available land.

4.7. Planning for Future Expansion and Adaptability

Given the rapid pace of technological change and shifting consumer expectations, highway motels must design facilities that are adaptable and ready for future upgrades. Modular construction techniques, which allow for the easy addition or reconfiguration of rooms and amenities, can ensure that motels are prepared to meet evolving needs without significant disruption to operations [1]. Flexible design choices will enable motels to quickly integrate emerging technologies or services as they become available, ensuring that they remain competitive in a fast-changing market.

Moreover, motels should design with scalability in mind,

allowing for easy expansion as demand increases, especially in high-traffic areas. This ensures that the motel can respond to fluctuations in customer volume, whether due to tourism peaks or business-related demand.

5. Conclusion

The evolution of highway motel design reflects a dynamic response to the ever-changing demands of the hospitality industry and the broader societal shifts, such as increased urbanization, technological advancements, and a growing emphasis on sustainability. Highway motels, once simple roadside rest stops, have now transformed into multi-functional spaces that serve a diverse range of travelers, from business professionals to leisure tourists. As this research highlights, the characteristics of highway motels have evolved significantly, and future trends are focused on adapting to the increasing importance of sustainability, technology, and social responsibility. This study underscores the critical need for highway motels to embrace sustainable design practices, which include energy-efficient infrastructure, the use of renewable resources, and water conservation measures. The incorporation of smart technologies to optimize operations, enhance guest experiences, and reduce environmental footprints is also essential for staying competitive in an increasingly technology-driven market. Moreover, flexibility in design is paramount to accommodate diverse customer needs and ensure motels can adapt to regional, cultural, and demographic variations.

Future trends in highway motel design should also prioritize safety, security, and guest satisfaction. These factors will remain critical as motels serve travelers on the move, providing them with a safe haven for rest and relaxation. Additionally, motels should integrate local culture and community engagement in their designs to foster a sense of belonging and connect with their surrounding environments. By doing so, motels not only improve their appeal to customers but also contribute positively to local economic development.

Ultimately, the future of highway motels lies in their ability to innovate while remaining grounded in the principles of sustainability, adaptability, and customer-centricity. Developers must continue to integrate cutting-edge technologies and design strategies that align with both global trends and regional needs. As the highway motel industry evolves, those that remain flexible, forward-thinking, and attuned to the changing needs of travelers and the environment will lead the way in shaping the future of highway hospitality.

Conflicts of Interest

The authors declare no conflicts of interest

References

- [1] Adegoke, A., Ojo, O., & Salami, R. (2022). Technology and sustainability in the Nigerian hospitality industry. *Journal of Hospitality and Technology*, 18(4), 205-217.
- [2] Adeniyi, L. A., Olayiwola, A. M. (2025). Evaluation of socio-economic and environmental conditions of slum dwellers towards sustainable healthy environment. *J Housing and the Built Environ* 40, 335-354
<https://doi.org/10.1007/s10901-024-10171-0>
- [3] Olusola Folorunso (2024)Technological innovations in the hospitality industry and its impacts on the customers' decision making *Journal of Management and Social Science Research* 5(3):51-63 <https://doi.org/10.47524/jmssr.v5i3.52>
- [4] Muhammad A. F; (2023) A bibliometric review on knowledge management in tourism and hospitality: past, present and future trends. *International Journal of Contemporary Hospitality Management* 11 35(6): 2178-2201.
<https://doi.org/10.1108/IJCHM-03-2022-0381>
- [5] Gursoy, D., & Chi, C. G. (2021). The post-COVID-19 traveler experience: New trends and insights. *International Journal of Hospitality Management*, 92, 102693.
<https://doi.org/10.1080/19368623.2020.1788231>
- [6] Hotel Executive. (2023). New Trend: Roadside Motels are Back and Thriving. Retrieved from <https://www.hotelexecutive.com>
- [7] Jakle, J. A., Sculle, K. A., & Rogers, D. L. (2021). *The Motel in America*. Johns Hopkins University Press.
- [8] Oluigbo S. N... (2018). Human Behaviour In Complex Buildings: A Systematic Review of Organisational Communication And Spatial Configuration Studies in Healthcare Settings *Proceedings of The Aarches National Conference*, 243.
- [9] Thrillist. (2024). What's the Difference Between a Hotel and a Motel? Retrieved from <https://www.thrillist.com>
- [10] Upper Delaware Inn. (2023). The Role of Innovation in Motel Hospitality. Retrieved from <https://upperdelawareinn.com>
- [11] Zhang, X., & Wu, Y. (2020). Sustainable building design: Addressing energy efficiency and environmental impacts. *Energy and Buildings*, 210, 109734.