



## Integrating sustainability into urban design in Nigeria's failed cities: Unlocking the potential of land for sustainable urban development

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### Abstract

Nigeria's rapid urbanization has led to the emergence of failed cities characterized by inadequate infrastructure, high levels of poverty and environmental degradation. Integrating sustainability into urban design is critical in unlocking the potential of land for sustainable urban development in these cities. This paper explores the challenges of sustainable urban development in Nigeria's failed cities and examines the role of urban design in addressing these challenges. The paper discusses the key principles of sustainable urban design, including the need to integrate social, economic, and environmental considerations into the design process. It also analyzes the opportunities and constraints of integrating sustainability into urban design in Nigeria's failed cities, including the lack of political will, inadequate funding, and weak institutional frameworks leading to swift emergence of informal settlements. Furthermore, the paper highlights successful case studies of integrating sustainability into urban design in other countries and how these can be adapted to Nigeria's failed cities. These include creating green spaces, promoting mixed-use development and adopting smart growth principles. On the whole, the paper argues that integrating sustainability into urban design in Nigeria's failed cities is critical to unlocking the potential of land for sustainable urban development. By creating more livable, resilient, and sustainable urban environments, Nigeria can address the challenges of rapid urbanization and ensure a better future for its citizens.

**Keywords:** Urban design, sustainability, failed cities, sustainable development, land use, infrastructure, mixed-use development

### Introduction

Nigeria as a developing country is not an exception to rapid urbanization, which has led to the emergence of failed cities with a range of issues such as inadequate infrastructure, poverty, and environmental degradation, as highlighted by Aluko, Akintoye and Adedeji (2018) [7]. The United Nations also projects that Nigeria's urban population will continue to grow and reach 68% by 2050, further amplifying the problem (United Nations (UN), 2018). Unfortunately, the rapid urbanization process in Nigeria has been unplanned, resulting in uncontrolled urban growth and development, which has contributed to social, economic, and environmental issues in urban areas, according to Aluko *et al.* (2018) [7] and Afolayan, Lawal and Daramola (2020) [5]. This unplanned urbanization process has resulted in inadequate housing, poor infrastructure, overburdened public services, and poor living conditions for urban dwellers, as highlighted by Afolayan *et al.* (2020) [5]. Additionally, inadequate waste management practices and environmental degradation have resulted in health hazards and degraded urban ecosystems (Afolayan *et al.*, 2020) [5]. Nigeria's failed cities, in particular, are therefore now been characterized by limited access to essential services and amenities such as healthcare, education, and transportation, coupled with inadequate infrastructure like water supply, sanitation, and electricity.

The situation is further compounded by a lack of political will, corruption, and weak institutions, which hinder effective urban planning and management (Salau & Daramola, 2021) [34]. The combination of these factors has led to the emergence of failed cities, characterized by high levels of poverty, unemployment, and crime, with negative

implications for economic growth and social development (Ogunbode, Owoeye, Adedayo & Ojo, 2021) [27]. Furthermore, the lack of sustainability in urban design has contributed to the challenges faced by Nigeria's failed cities. The existing urban design practices in Nigeria have often prioritized short-term gains over long-term sustainability, resulting in environmental degradation, such as air and water pollution, and contributing to the effects of climate change. The current urban development practices in Nigeria are unsustainable and are not meeting the needs of the growing population.

In order to address these challenges facing Nigeria's failed cities, there is a need to integrate sustainability into urban design, as highlighted by Salau and Daramola (2021) [34]. Sustainable urban design offers numerous opportunities, including environmental, economic and social benefits. By mitigating the negative impacts of urbanization, sustainable urban design can create more livable, resilient, and sustainable urban environments, as emphasized by Adegun and Adelekan (2018) [2]. To unlock the potential of land for sustainable urban development, it is necessary to explore the principles of sustainable urban design and their relevance to Nigeria's failed cities, as well as the opportunities and constraints of integrating sustainability into urban design in these cities.

Successful case studies of integrating sustainability into urban design in other developing countries can provide insights into how to adapt these practices to Nigeria's failed cities, and provide recommendations for integrating sustainability into urban design. Sustainable urban design can help address the challenges of rapid urbanization and failed cities by promoting compact and mixed-use

development, reducing reliance on private transportation, and creating green spaces and parks, which can help reduce the urban heat island effect and provide ecosystem services. By integrating sustainability into urban design, cities can become more inclusive, safe, resilient, and sustainable, aligning with the United Nations' Sustainable Development Goals (SDGs).

### **Aim of the paper**

Amidst urban development challenges confronting Nigeria's failed cities, the aim of this paper is to examine how integrating sustainability into urban design can help unlock the potential of land for sustainable urban development.

### **Objectives of the paper**

1. To explore the principles of sustainable urban design and their relevance to Nigeria's failed cities.
2. To analyze the opportunities and constraints of integrating sustainability into urban design in Nigeria's failed cities.
3. To examine successful case studies of integrating sustainability into urban design in other developing countries and how they can be adapted to Nigeria's failed cities.
4. To provide recommendations for integrating sustainability into urban design in Nigeria's failed cities.

### **Literature Review**

The literature review will explore the concept of sustainable urban development, concept of sustainable urban design, Concept of failed cities, the potentials of land in urban areas and strategies of unlocking the potentials of land and Nigeria failed cities.

### **The Concept of Sustainable Urban Development**

The concept of sustainable urban development has gained increasing attention in recent years due to the challenges posed by rapid urbanization and its negative impacts on the environment and society. According to Adegun and Adelekan (2018)<sup>[2]</sup>, sustainable urban development refers to the process of creating livable and sustainable cities and urban areas by integrating social, economic, and environmental considerations into urban planning and design.

Sustainable urban development seeks to address the challenges facing cities, such as inadequate infrastructure, poverty, and environmental degradation, by promoting compact and mixed-use development, reducing reliance on private transportation, and creating green spaces and parks (Adegun & Adelekan, 2018)<sup>[2]</sup>. By adopting a sustainable urban development approach, cities can become more livable, resilient, and sustainable, as highlighted by the United Nations' Sustainable Development Goals (SDGs) (United Nations, 2015).

The concept of sustainable urban development also emphasizes the need for inclusive and participatory approaches to urban planning and design. Lefebvre, Vilalta-Perdomo and Gonzalez-Navarro (2018)<sup>[23]</sup> stated that the process of sustainable urban development must involve stakeholders, including residents, community organizations, and local authorities, in decision-making to ensure that their voices are heard and that their needs and aspirations are addressed.

### **Challenges of Sustainable Urban Design in Developing Countries**

The challenges of sustainable urban design in developing countries are complex and multi-dimensional. This paper will discuss limited resources, political instability, and weak governance as the key challenges faced by developing countries in promoting sustainable urban design.

**Limited Resources:** One of the main challenges of promoting sustainable urban design in developing countries is the limited resources available for such initiatives. Developing countries often struggle with inadequate funding, lack of technical expertise, and limited access to advanced technology, making it difficult to implement sustainable urban design principles. For example, in many African cities, the lack of resources has resulted in poor infrastructure, inadequate housing, and limited access to basic services such as water and sanitation (Gandy, 2006)<sup>[14]</sup>.

**Political Instability:** Political instability is another major challenge facing sustainable urban design in developing countries. In many developing countries, political instability, corruption, and weak governance have led to poor decision-making, ineffective policies, and limited public participation. For instance, the lack of political will in many African countries has resulted in inadequate urban planning, leading to informal settlements, slums, and other forms of urban poverty (Kanmiki, 2017)<sup>[20]</sup>.

**Weak Governance:** Weak governance is another significant challenge to promoting sustainable urban design in developing countries. The lack of effective governance structures, coupled with corruption and weak institutions, has resulted in poor policy implementation, limited community participation, and inadequate enforcement of regulations. For example, in many Latin American countries, weak governance has led to inadequate provision of basic services, including water, sanitation, and waste management, and poor infrastructure (Fernandez & Satterthwaite, 2007)<sup>[13]</sup>.

**Policy and institutional frameworks:** The lack of effective policies and institutions has hindered the implementation of sustainable urban development initiatives (Oluwole & Oluwande, 2013).

### **The Concept of Sustainable Urban Design**

Sustainable urban design is a holistic approach to urban planning and design that aims to create livable, resilient, and equitable cities. It integrates principles of sustainability into the planning and design of cities, towns, and neighborhoods to ensure that they balance the needs of people, the economy, and the environment. Authors such as Jan Gehl, Richard Register, and David W. Orr have contributed significantly to the development of sustainable urban design principles and their implementation in urban environments. Jan Gehl is one of the key authors who have contributed to the development of sustainable urban design. In his book titled, 'Cities for People', Gehl (2010) argues that urban design should prioritize the needs of people over cars. He emphasizes the importance of creating public spaces that are safe, comfortable, and inviting for pedestrians and cyclists. Gehl also advocates for reducing the dominance of cars in urban environments and creating mixed-use neighborhoods that provide a variety of services and amenities within walking distance of residents' homes.

Another influential author in sustainable urban design is Richard Register, who has written extensively on the subject. In his book 'Ecocity Berkeley: Building Cities for a Healthy Future', Register (1987) <sup>[32]</sup> argues that sustainable urban design must prioritize the health and well-being of both people and the environment. He advocates for designing cities that are compact, walkable, and transit-oriented, and that prioritize green space, renewable energy, and resource-efficient buildings. Register also emphasizes the importance of community participation in the design and planning process to ensure that the needs and preferences of residents are taken into account.

David W. Orr in his book 'Ecological Literacy', Orr (1992) argues that sustainable urban design must be based on an understanding of ecological principles and systems. He emphasizes the importance of designing cities that are resilient and adaptable to changing environmental conditions, and that prioritize the conservation and restoration of natural ecosystems. Orr also emphasizes the need for interdisciplinary collaboration and holistic thinking in the design and planning of sustainable cities.

### The Concept of Failed Cities

The concept of failed cities refers to urban areas that have experienced significant economic, social, or political decline, leading to a breakdown in their ability to provide basic services and maintain social order (UN Habitat, 2006) <sup>[37]</sup>. Failed cities are often characterized by high rates of poverty, unemployment, crime, and social unrest (Muggah, 2015) <sup>[26]</sup>, and are often associated with issues such as corruption, political instability, and environmental degradation (Graham & Marvin, 2001) <sup>[17]</sup>.

As argued by Jacobs (1961), the failure of cities can also be attributed to poor urban planning and design. In addition, the impact of neoliberal economic policies has contributed to the failure of cities (Harvey, 2005) <sup>[18]</sup>. Sassen (2001) <sup>[35]</sup> suggests that global cities have become increasingly disconnected from the social and economic realities of the surrounding regions, leading to social and economic inequality and the emergence of failed cities.

### Examples of Nigerian Failed Cities

#### Some examples of Nigerian failed cities include

**Lagos:** Lagos is one of the largest cities in Africa, and while it has experienced rapid economic growth, it has also struggled with a number of urbanization challenges, including traffic congestion, inadequate infrastructure, and environmental degradation.

**Port Harcourt:** Port Harcourt is a major oil-producing city in Nigeria, but it has also experienced significant environmental degradation as a result of oil exploration and exploitation, including oil spills and pollution.

**Kano:** Kano is one of the oldest cities in Nigeria and is known for its vibrant culture and history. However, it has also faced challenges related to rapid urbanization, including inadequate housing and infrastructure, traffic congestion, and environmental degradation.

**Ibadan:** Ibadan is the third-largest city in Nigeria and is known for its universities and cultural heritage. However, it has also faced challenges related to rapid urbanization, including inadequate infrastructure and housing, traffic congestion, and environmental degradation.

**Abuja:** Abuja is the capital city of Nigeria and was developed as a planned city to alleviate some of the urbanization challenges faced by other cities in Nigeria. While it has been relatively successful in terms of providing infrastructure and services, it has also faced challenges related to traffic congestion and environmental degradation. These highlighted cities are examples of the many cities in Nigeria that are faced with the challenges of rapid urbanization, lack of basic infrastructure, poor housing, inadequate transportation systems, and environmental degradation.

### The Potentials of Land in Urban Areas

The potentials of land in urban areas are significant for achieving sustainable urban development, as highlighted by various authors. According to Adegun and Adelekan (2018) <sup>[2]</sup>, land can be used for the development of affordable and sustainable housing, which can help address the housing needs of urban residents. Similarly, Sridhar and Sridhar (2015) note that land can be utilized for the development of infrastructure such as roads, bridges, public transportation and water supply systems, which are crucial for supporting economic growth and improving quality of life. The potential of land for green spaces is also highlighted by various authors. For instance, Calthorpe (2018) argues that land can be used for the development of parks, gardens and nature reserves, which provide a range of environmental, social, and health benefits for urban residents. Additionally, land can be used for economic development, as noted by Kotkin and Cox (2017), who state that land can be utilized for the development of commercial and industrial facilities, which can support economic growth and job creation in urban areas. Furthermore, land can also be used to preserve and promote cultural and historical heritage, as highlighted by Kalbro and Kajlert (2017). They argue that land can be used to develop museums, monuments, and heritage sites, which can enhance the cultural identity and heritage of urban areas. Finally, land can be utilized for disaster risk reduction measures, including the creation of green infrastructure such as floodplains, wetlands, and other natural features, which can help mitigate the impact of disasters such as floods and landslides, as noted by Pelling and Blackburn (2013). From the above authors' remarks, the potentials of land in urban areas are numerous and can be harnessed to support sustainable urban development, including affordable housing, infrastructure development, green spaces, economic growth, cultural heritage, and disaster risk reduction.

### Strategies of Unlocking the Potentials of Land

Unlocking the potentials of land in urban areas requires a multifaceted approach that involves various stakeholders and strategies. Some of the key strategies for unlocking the potentials of land in urban areas for sustainable urban development include:

- 1. Effective land use planning:** Effective land use planning is essential for identifying and utilizing the potentials of land in urban areas. According to Salau and Daramola (2021) <sup>[34]</sup>, effective land use planning involves understanding the needs of urban residents, considering the social, economic, and environmental impacts of land use decisions, and involving various stakeholders in the decision-making process.

2. **Public-private partnerships:** Public-private partnerships (PPPs) can be used to leverage the potentials of land in urban areas for sustainable urban development. PPPs can involve collaboration between government, private sector, and civil society organizations to develop infrastructure, housing, and other urban amenities that support sustainable urban development (Abdulhakeem, Tijani, Aina & Kukoyi, 2020)<sup>[1]</sup>.
3. **Investment in infrastructure:** Investment in infrastructure such as public transportation, water supply systems, and waste management facilities can unlock the potentials of land in urban areas for sustainable urban development. Adegun and Adelekan (2018)<sup>[2]</sup> suggest that investment in infrastructure can attract private investment, promote economic growth, and improve the quality of life for urban residents.
4. **Community participation:** Community participation is essential for unlocking the potentials of land in urban areas. Community participation involves involving local residents in decision-making processes, providing them with access to information, and giving them a voice in the development of their neighborhoods (Ogunbode *et al.*, 2021)<sup>[27]</sup>. This can help ensure that the needs of local residents are taken into account in land use decisions.
5. **Incentives for sustainable development:** Providing incentives for sustainable development can encourage private sector investment in sustainable urban development. This can include tax breaks, grants, and other financial incentives for developers who invest in sustainable infrastructure, affordable housing, and other sustainable urban amenities (Afolayan *et al.*, 2020)<sup>[5]</sup>.
6. **Adopting the principles of sustainable urban design**  
To unlock the potentials of land for sustainable urban development, it is necessary to explore the principles of sustainable urban design, as highlighted by Adegun and Adelekan (2018)<sup>[2]</sup>. Sustainable urban design is an essential strategy for unlocking the potential of land for sustainable urban development, as it promotes compact and mixed-use development, reduces reliance on private transportation, and creates green spaces and parks, which can help reduce the urban heat island effect and provide ecosystem services. By integrating sustainability into urban design, cities can become more livable, resilient, and sustainable. Furthermore, strategies for unlocking the potentials of land in urban areas can be enhanced through sustainable urban design. As noted by Salau and Daramola (2021)<sup>[34]</sup>, integrating sustainability into urban design presents numerous opportunities, including environmental, economic, and social benefits. Sustainable urban design can mitigate the environmental impacts of urbanization; provide economic benefits such as job creation and increased property values, and social benefits such as improved public health and greater social cohesion.

This paper will focus discussion on integrating sustainability into urban design in Nigeria failed cities.

## The Implication to Unlocking the Potentials of Land

Unlocking the potentials of land in urban areas can have several implications, particularly when it is done in a sustainable manner through the integration of sustainable urban design practices. Some of these implications include:

1. **Improved quality of life:** Sustainable urban design can create livable and healthy environments that improve the quality of life for residents, including access to basic amenities, green spaces, and safe transportation.
2. **Economic development:** Sustainable urban design can also spur economic development by creating opportunities for investment and job creation, particularly in the areas of infrastructure development, renewable energy, and green technologies.
3. **Environmental protection:** Sustainable urban design can help protect the environment by promoting the use of renewable energy, reducing greenhouse gas emissions, and protecting natural resources such as water and land.
4. **Social inclusion:** Sustainable urban design can also promote social inclusion by creating equitable access to public spaces, services, and amenities, and reducing the disparities between different socio-economic groups.
5. **Resilience:** Sustainable urban design can help cities become more resilient to climate change and other environmental challenges by promoting adaptive strategies such as green infrastructure, sustainable transportation, and disaster risk reduction measures.

Unlocking the potentials of land through sustainable urban design can have significant implications for the quality of life, economic development, environmental protection, social inclusion, and resilience of urban areas.

## Methodology

This paper will utilize a literature review approach to discuss the principles of sustainable urban design. It will also explore the challenges of sustainable urban development in Nigeria's failed cities and the opportunities and constraints of integrating sustainability into urban design. Additionally, case studies of successful sustainable urban design in other developing countries will be examined, and recommendations for integrating sustainability into urban design in Nigeria's failed cities will be provided.

## Results and Discussions

### 1. Principles of Sustainable Urban Design and their Relevance to Nigeria's Failed Cities

Sustainable urban design is a crucial aspect of promoting sustainable urban development, particularly in developing countries where rapid urbanization and unplanned growth have led to numerous environmental, social, and economic challenges. Sustainable urban design refers to the process of designing and planning urban spaces to meet the needs of the present generation without compromising the ability of future generations to meet their own needs. The principles of sustainable urban design provide a framework for promoting sustainable development by incorporating environmental, social, and economic considerations into the

design and planning of urban spaces. This means that the principles of sustainable urban design are based on the three pillars of sustainability: economic, social, and environmental.

One key principle of sustainable urban design is compactness, which refers to the development of dense, mixed-use urban areas that reduce the need for car travel and promote the use of public transportation, cycling, and walking. Compact urban design has been successfully implemented in cities such as Barcelona, Spain, where the city's superblocks program has created dense, pedestrian-friendly neighborhoods with reduced traffic and increased public space (Rosales, Gago, De los Ríos & Montaner, 2019) <sup>[33]</sup>. In the context of Nigeria's failed cities, compact urban design could help to reduce traffic congestion, air pollution, and energy use, while promoting the use of public transportation and active modes of travel.

Another important principle of sustainable urban design is green infrastructure, which refers to the use of natural systems such as parks, green roofs, and rain gardens to provide a range of environmental, social, and economic benefits. Green infrastructure has been successfully implemented in cities such as Copenhagen, Denmark, where the city's green roof program has reduced the urban heat island effect, improved air quality, and provided additional habitat for urban wildlife (Wamsler, Pauleit & Hack, 2018) <sup>[39]</sup>. In Nigeria's failed cities, green infrastructure could help to mitigate the effects of climate change, improve air and water quality, and provide recreational and aesthetic benefits for residents.

A third principle of sustainable urban design is social equity, which refers to the fair distribution of environmental, social, and economic benefits and costs among different groups of people. Social equity has been a major focus of sustainable urban design initiatives in cities such as Medellin, Colombia, where the city's social urbanism program has prioritized investments in public transportation, education, and social services in the city's low-income neighborhoods (Fainstein & Moreno 2016) <sup>[11]</sup>. In Nigeria's failed cities, social equity could be promoted through initiatives such as affordable housing programs, public transportation subsidies, and investments in public services such as healthcare and education.

According to Lechner and Meira, (2017) <sup>[22]</sup>, sustainable urban design principles include:

1. **Mixed-Use Development:** This principle promotes the development of a diverse range of land uses in a given area, including residential, commercial, and industrial activities. This approach reduces the need for transportation and promotes a sense of community and social cohesion.
2. **Transit-Oriented Development (TOD):** This principle focuses on developing compact, walkable neighborhoods around public transit stations. TOD promotes the use of public transportation, reduces traffic congestion and greenhouse gas emissions, and encourages physical activity.
3. **Green Spaces:** This principle emphasizes the need for the integration of green spaces such as parks, gardens, and other natural areas into urban design. Green spaces provide ecosystem services such as air purification, stormwater management, and carbon sequestration.

4. **Energy Efficiency:** This principle aims to reduce energy consumption and carbon emissions by promoting energy-efficient building designs and renewable energy sources such as solar and wind.
5. **Water Conservation:** This principle promotes the efficient use of water resources, including rainwater harvesting and wastewater recycling.
6. **Walkability:** This principle promotes the development of pedestrian-friendly streetscapes that are safe and comfortable for walking and cycling.
7. **Smart Growth:** This principle emphasizes compact, high-density development that is focused around urban centers, with an emphasis on reducing sprawl and preserving natural areas.

Integrating these principles into the planning and design of these cities can help address these challenges and unlock the potential of land for sustainable urban development.

For instance, promoting compact and mixed-use development can help reduce the need for long-distance travel and ease congestion, as well as promote social cohesion. The integration of green spaces can help address environmental degradation and provide ecosystem services such as air purification, storm water management, and carbon sequestration. Furthermore, the principles of energy efficiency and water conservation can help reduce carbon emissions and promote the efficient use of natural resources. These principles can also promote sustainable transportation and reduce urban sprawl by promoting the development of pedestrian-friendly streetscapes that are safe and comfortable for walking and cycling.

### Opportunities and Constraints of Integrating Sustainability into Urban Design

Integrating sustainability into urban design presents both opportunities and constraints in Nigeria's failed cities. According to Salau and Daramola (2021) <sup>[34]</sup>, some of the opportunities include environmental, economic, and social benefits. Sustainable urban design can mitigate the environmental impacts of urbanization; provide economic benefits such as job creation and increased property values, and social benefits such as improved public health and greater social cohesion.

Environmental benefits are one of the most significant opportunities presented by integrating sustainability into urban design in Nigeria's failed cities. Rapid urbanization in these cities has led to various environmental problems, such as air and water pollution, deforestation, and climate change. By integrating sustainable urban design practices, these cities can mitigate the negative impacts of urbanization and create more livable, resilient, and sustainable environments. For instance, promoting the use of renewable energy sources and reducing carbon emissions can help address the challenge of climate change. Additionally, promoting green infrastructure, such as urban forests and green roofs, can help improve air and water quality and provide recreational spaces for residents (Ukoha, Onuoha & Nwadiugwu, 2020) <sup>[36]</sup>.

Another opportunity presented by sustainable urban design is economic benefits. Sustainable urban design practices can

create job opportunities, increase property values, and reduce energy costs, thus leading to increased economic growth and improved living standards for residents. For instance, promoting sustainable transportation, such as cycling and walking, can reduce the cost of commuting, and promote healthy living. Furthermore, investing in energy-efficient buildings can reduce energy consumption and lower energy bills for residents, while also creating job opportunities in the renewable energy sector (Ajayi, Arayela & Ogunsanmi, 2020)<sup>[6]</sup>.

In addition to the environmental and economic benefits, integrating sustainability into urban design can also provide social benefits. Sustainable urban design practices can improve public health, increase access to services and amenities, and enhance social cohesion. For instance, designing walkable communities and promoting cycling can encourage physical activity, reduce the prevalence of obesity, and increase social interaction among residents. Furthermore, developing green spaces can enhance mental health, while promoting public safety by reducing crime rates (Oluwadare, Adeyemo & Adeleye, 2021)<sup>[29]</sup>.

Despite the opportunities presented by sustainable urban design, there are also constraints in Nigeria's failed cities. One of the primary constraints is the lack of political will to integrate sustainability into urban design. Sustainable urban design practices may require significant changes to existing policies and practices, which may be challenging to implement. This may also require significant investment in infrastructure and resources, which may be difficult to obtain (Salau & Daramola, 2021)<sup>[34]</sup>.

Another significant constraint is the limited technical capacity and expertise of urban designers and planners. Many urban designers and planners in Nigeria's failed cities may not have the necessary skills and knowledge to design and implement sustainable urban design practices. This may require significant capacity-building efforts, such as training and education programs, to ensure that urban designers and planners have the necessary skills and knowledge (Ukoha *et al.*, 2020)<sup>[36]</sup>.

Furthermore, limited financial resources may also constrain the implementation of sustainable urban design practices in Nigeria's failed cities. Sustainable urban design may require significant financial resources, which may be difficult to obtain in the context of Nigeria's failed cities. This may require innovative financing mechanisms and partnerships with the private sector to provide the necessary funding (Ajayi *et al.*, 2020)<sup>[6]</sup>.

Finally, informal settlements may also present a significant challenge for integrating sustainability into urban design in Nigeria's failed cities. Many residents of Nigeria's failed cities live in informal settlements that may lack basic services and infrastructure. Integrating these settlements into sustainable urban design plans may be challenging, and may require significant efforts to provide them with basic services and infrastructure (Oluwadare *et al.*, 2021)<sup>[29]</sup>.

### Successful Case Studies of Integrating Sustainability into Urban Design

Sustainable urban design is a critical aspect of promoting sustainable development in cities. Developing countries, including Nigeria, face numerous challenges in promoting sustainable urban design. However, there are successful examples of sustainable urban design projects from other developing countries that can be adapted to Nigeria's failed

cities. This section of the paper undertake review of case studies of successful sustainable urban design projects and explore how these examples could be adapted to Nigeria's failed cities.

Some of these case studies include: Curitiba in Brazil, Ahmedabad in India, Bogota in Colombia and Barcelona in Spain.

#### Curitiba, Brazil

Curitiba, Brazil: The city of Curitiba in Brazil is widely recognized as one of the most sustainable cities in the world, thanks to its integrated approach to urban design and planning. The city has implemented a number of sustainable practices, including the development of an extensive public transportation system, the promotion of compact, mixed-use development, and the creation of extensive green spaces (Moura & Goldenstein, 2015<sup>[25]</sup>; Bartos, Harnik, Susskind & Udler, 2003<sup>[8]</sup>; Enwin & Ikiriko, 2023)<sup>[10]</sup>.

#### Some of the success stories of Curitiba include

**Integrated public transportation system:** Curitiba's Bus Rapid Transit (BRT) system is widely regarded as one of the most efficient and effective in the world. The system consists of dedicated bus lanes, high-frequency service, and well-designed stations that are integrated with other modes of transportation. This has helped to reduce congestion and pollution, while providing affordable and efficient transportation options for residents.

**Green spaces:** Curitiba has invested heavily in creating green spaces throughout the city, including parks, gardens, and tree-lined streets. These spaces not only provide recreational opportunities for residents, but also help to absorb carbon dioxide and other pollutants, reduce the urban heat island effect, and improve overall air quality.

**Mixed-use development:** Curitiba has implemented a policy of encouraging mixed-use development, which means that commercial, residential, and industrial spaces are integrated within the same area. This has helped to reduce the need for long-distance commuting, which in turn reduces traffic congestion and carbon emissions.

**Waste management:** Curitiba has implemented an innovative waste management system that involves incentivizing residents to recycle and compost. This has helped to reduce the amount of waste that goes to landfills, while also creating jobs in the recycling industry.

Curitiba's success can be attributed to its integrated approach to urban design and planning, which considers the needs of all residents and seeks to balance environmental, social, and economic sustainability. These practices could be adapted to Nigeria's failed cities, particularly in terms of promoting sustainable transportation and the creation of green spaces.

#### Ahmedabad, India

Ahmedabad in India is another example of a city that has implemented sustainable urban design practices. Ahmedabad, India has implemented several sustainable urban design practices that have been successful in improving the quality of life for its residents, including the development of a bus rapid transit system, the promotion of pedestrian and bicycle-friendly streets, and the creation of

extensive public spaces. The city has a BRT system that has reduced congestion and air pollution, and the city's streets have been redesigned to be more pedestrian and bicycle-friendly (Bhide, Singh & Desai, 2018) <sup>[9]</sup>. The city has also created extensive public spaces, such as parks and plazas that provide numerous social and environmental benefits to residents (Garg, Bhatia & Pathak, 2017) <sup>[15]</sup>.

#### **Some of the success stories of Ahmedabad include**

**Bus Rapid Transit System:** Ahmedabad's Bus Rapid Transit (BRT) system has been successful in reducing traffic congestion and improving air quality. The BRT system consists of dedicated bus lanes, signal priority for buses, and modern stations that are designed for passenger comfort and safety.

**Pedestrian and bicycle-friendly streets:** Ahmedabad has implemented a number of initiatives to promote pedestrian and bicycle-friendly streets, including the development of cycle tracks and footpaths. This has helped to reduce traffic congestion, improve air quality, and provide safe and convenient transportation options for residents.

**Public spaces:** Ahmedabad has created several public spaces, such as parks, plazas, and community centers, that provide recreational opportunities for residents. These spaces are designed to be inclusive, accessible, and safe for all residents.

**Affordable Housing:** Ahmedabad has implemented several programs to provide affordable housing for low-income residents. These programs are designed to be sustainable and energy-efficient, and are located close to public transportation and other amenities.

Ahmedabad's success can be attributed to its commitment to sustainable urban design practices that promote environmental, social, and economic sustainability. By prioritizing the needs of its residents and investing in sustainable infrastructure and public spaces, Ahmedabad has become a model for other cities in India and around the world.

#### **Bogota, Colombia**

Bogota has implemented a number of sustainable urban design practices, including the development of an extensive public transportation system, the promotion of pedestrian and bicycle-friendly streets, and the creation of extensive public spaces.

#### **Some of the success stories of Bogota include**

**TransMilenio Bus Rapid Transit System:** Bogota's TransMilenio Bus Rapid Transit (BRT) system is one of the largest and most extensive in the world. It has been successful in reducing traffic congestion, improving air quality, and providing affordable and efficient transportation options for residents.

**Pedestrian and bicycle-friendly streets:** Bogota has implemented several initiatives to promote pedestrian and bicycle-friendly streets, including the development of cycle paths and pedestrian-only zones. This has helped to reduce traffic congestion, improve air quality, and provide safe and convenient transportation options for residents.

**Public spaces:** Bogota has created several public spaces, such as parks, plazas, and community centers that provide recreational opportunities for residents. These spaces are designed to be inclusive, accessible, and safe for all residents.

**Affordable Housing:** Bogota has implemented several programs to provide affordable housing for low-income residents. These programs are designed to be sustainable and energy-efficient, and are located close to public transportation and other amenities.

Bogota's success can be attributed to its commitment to sustainable urban design practices that promote environmental, social, and economic sustainability. By prioritizing the needs of its residents and investing in sustainable infrastructure and public spaces, Bogota has become a model for other cities in Colombia and around the world.

#### **Barcelona, Spain**

Barcelona in Spain is another city that has successfully implemented sustainable urban design practices. The city has promoted compact, mixed-use development that reduces the need for car travel and encourages active modes of transportation, such as walking and cycling (Martinez-Garcia, Ochoa & Vargas-Machuca, 2019) <sup>[24]</sup>. The city has also created extensive green spaces, such as parks and gardens that provide numerous environmental and social benefits to residents (Laforteza, Carrus, Sanesi & Davies, 2013) <sup>[21]</sup>.

#### **Some of the success stories of Barcelona include**

**Compact, mixed-use development:** Barcelona has prioritized the development of compact, mixed-use neighborhoods that promote walkability, reduce car use, and increase social interaction. This approach has helped to reduce traffic congestion, improve air quality, and promote a sense of community among residents.

**Green spaces:** Barcelona has created several green spaces, such as parks and gardens, that provide recreational opportunities for residents. These spaces are designed to be inclusive, accessible, and safe for all residents.

**Public transportation:** Barcelona has developed an extensive public transportation system that includes buses, metro, trams, and bicycles. This has helped to reduce traffic congestion, improve air quality, and provide affordable and efficient transportation options for residents.

**Energy efficiency:** Barcelona has implemented several programs to promote energy efficiency and renewable energy use, such as retrofitting buildings, promoting solar energy, and implementing energy-efficient lighting systems. Barcelona's success can be attributed to its commitment to sustainable urban design practices that promote environmental, social, and economic sustainability. By prioritizing the needs of its residents and investing in sustainable infrastructure and public spaces, Barcelona has become a model for other cities in Spain and around the world.

Extracts from the above case studies has shown the need for integrating sustainable urban design principles into the development of Nigeria's failed cities. Sustainable urban

design has been proved to provide opportunity to improve the quality of life for residents, promote economic growth, and protect the environment. Integrating sustainable urban design principles into Nigeria's failed cities is therefore a crucial step in addressing urbanization challenges, as noted by many scholars. For instance, Ademiluyi and Adedeji (2015) <sup>[4]</sup> emphasized that sustainable urban design is essential in addressing urban development challenges in Nigeria, as it provides an opportunity to create livable, equitable, and resilient cities. Similarly, Adelekan (2010) <sup>[3]</sup> highlighted that sustainable urban design is a critical tool for promoting sustainable urbanization, environmental protection, and economic growth in Nigeria.

Moreover, scholars have identified specific ways in which sustainable urban design principles can be integrated into Nigeria's failed cities. For instance, Fashina and Ademiluyi (2019) <sup>[12]</sup> argued that promoting walkability, building sustainable infrastructure, and incorporating green spaces are critical components of sustainable urban design in Nigeria. Additionally, Oguntoyinbo, Akinyed and Oyeboode (2019) <sup>[28]</sup> emphasized the importance of promoting affordable housing and encouraging public participation in the urban design process.

The following are some specific ways in which the principles of sustainable urban design can be applied in Nigeria's failed cities:

1. **Promoting walkability:** Many of Nigeria's failed cities lack basic infrastructure and public transportation, making it difficult for residents to access key services and amenities. Promoting walkability through the development of pedestrian-friendly streets and the provision of safe, well-lit sidewalks can help address this challenge.
2. **Building sustainable infrastructure:** Nigeria's failed cities often lack basic infrastructure, including water and sanitation systems, electricity, and waste management. Building sustainable infrastructure that is energy-efficient, water-efficient, and uses renewable energy sources can help address these challenges and reduce the environmental impact of these cities.
3. **Incorporating green spaces and biodiversity:** Green spaces and natural habitats can help mitigate the impacts of climate change, improve air quality, and provide recreational opportunities for residents. Incorporating green spaces and biodiversity into the design of Nigeria's failed cities can help improve the quality of life for residents and protect the environment.
4. **Promoting affordable housing:** Many residents of Nigeria's failed cities live in informal settlements or slums, lacking access to basic services and amenities. Promoting the development of affordable, sustainable housing can help address this challenge and improve the living conditions of residents.
5. **Encouraging public participation:** Sustainable urban design requires the active participation of stakeholders, including residents, local governments, and civil society organizations. Encouraging public participation in the design and planning process can help ensure that the needs and preferences of all stakeholders are taken into account.

## Recommendations for Integrating Sustainability into Urban Design in Nigeria

Based on the opportunities and constraints of integrating sustainability into urban design in Nigeria's failed cities, as well as successful case studies from other developing countries, the following recommendations can be made:

1. **Prioritize public transportation:** Developing and investing in public transportation systems, such as bus rapid transit systems or light rail, can reduce traffic congestion, improve air quality, and provide affordable and efficient transportation options for residents.
2. **Develop walkable and bikeable streets:** Creating pedestrian and bicycle-friendly streets can reduce car use, promote physical activity, and improve the overall health and well-being of residents.
3. **Create green spaces:** Developing parks, gardens, and other green spaces can provide recreational opportunities, improve air quality, and promote a sense of community among residents.
4. **Promote compact, mixed-use development** Developing compact, mixed-use neighborhoods that promote walkability, reduce car use, and increase social interaction can improve the overall livability of cities.
5. **Implement energy-efficient and sustainable building practices:** Retrofitting buildings, promoting energy-efficient appliances, and implementing renewable energy sources can reduce energy consumption and greenhouse gas emissions.
6. **Involve communities in the planning and design process:** Engaging with local communities and stakeholders can ensure that sustainable urban design practices are tailored to meet the needs of residents and are culturally appropriate.
7. **Prioritize funding and resources for sustainable urban design:** Governments and stakeholders must prioritize funding and resources for sustainable urban design practices in order to ensure their successful implementation.

By implementing these recommendations, Nigeria's failed cities can integrate sustainable urban design practices to improve the quality of life for their residents and promote environmental, social, and economic sustainability.

## Conclusion

Nigeria's failed cities face numerous challenges, including rapid urbanization, inadequate infrastructure and environmental degradation. Integrating sustainable urban design practices presents an opportunity to address these challenges, improve the quality of life for residents, and promote environmental, social, and economic sustainability. By reviewing successful case studies from other developing countries, such as Curitiba, Ahmedabad, Bogota, and Barcelona, we have seen that sustainable urban design practices can improve public transportation, create green spaces and promote compact and mixed-use development, among other benefits. However, integrating sustainable urban design practices in Nigeria's failed cities will require

careful consideration of the unique opportunities and constraints of each city, as well as the involvement of local communities and stakeholders.

Based on the opportunities and constraints discussed, we have recommended a series of actions that can be taken to integrate sustainability into urban design in Nigeria's failed cities. These include prioritizing public transportation, developing walkable and bikeable streets, creating green spaces, promoting compact, mixed-use development, implementing energy-efficient and sustainable building practices, involving communities in the planning and design process, and prioritizing funding and resources for sustainable urban design.

In summary, integrating sustainable urban design practices in Nigeria's failed cities is critical to addressing the challenges faced by these cities and creating a more sustainable future. It is therefore essential that governments, stakeholders, and local communities work together to ensure that these practices are successfully implemented and tailored to meet the needs of residents.

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