

TRANSPORTATION INFRASTRUCTURE: HIGH-SPEED TRAINS AND SUSTAINABLE MOBILITY IN LAGOS METROPOLIS

Abstract. The Lagos Metropolis in Nigeria is one of the most populous and fastest-growing urban areas in the world, with a population estimated around 21 million. The city's transportation infrastructure faces significant challenges, leading to traffic congestion, air pollution, and limited access to sustainable mobility options. The study examined the impact of high-speed trains and sustainable urban mobility on the city's transportation landscape. The study employed the interpretivism philosophy and a qualitative approach in data collection and analysis. Primary data were generated mainly through key informant interviews. Findings revealed that high-speed rail can improve connectivity, reduce travel times, and lower carbon emissions. The study concludes that the Lagos metropolis could significantly improve accessibility, reduce traffic congestion, and promote environmental sustainability, ultimately enhancing the quality of life for the city's residents. The study recommends substantial capital investment in initiatives like BRT, light rail, cycling infrastructure, and pedestrian-friendly design

Keywords: Transportation Infrastructure, High-Speed Trains, Lagos Metropolis, Sub-Saharan Africa, and Sustainable Mobility

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Introduction

Lagos, Nigeria's largest commercial capital and economic hub, as well as one of Africa's most populous cities, has long struggled with the challenges of a rapidly growing population, urbanisation, and the need for a robust and efficient transportation system (Ogunbiyi & Oluwaseyi, 2020). According to Olakunle (2019), the existing transportation infrastructure and sustainable mobility in the state originate from a growing recognition that the current transportation system in the city is unsustainable in the long run. Also, there are ongoing efforts to improve sustainable mobility in the Lagos metropolis, with initiatives like the Lagos Rail Mass Transit (LRMT) project, the construction of road infrastructure, flyovers, and expansion of major highways aimed at creating a more sustainable, integrated, and efficient transportation system in the Lagos metropolis by addressing the rapidly expanding population's mobility needs. High-speed trains are passenger trains that can reach speeds of

250 km/h (155 mph) or higher on standard gauge rail tracks (LSG, 2021; LAMATA, 2022). This offers several benefits over other modes of transportation, including reduced travel times, higher passenger capacity, energy efficiency, and lower carbon emissions compared to conventional trains. It is important to state at this juncture that over the last decade, many countries have invested in high-speed train networks, resulting in a significant global development (Agunloye, 2011b).

However, it is instructive to note that nations such as China, Japan, France, Spain, Germany, and others have significant high-speed rail networks (World Bank, 2021). China has the world's largest high-speed rail network, with over 37,000 km as of 2023. As a result, it is clear that the building of high-speed rail infrastructure requires significant upfront investment but may deliver long-term economic and environmental advantages through improved connectivity and reduced reliance on carbon-intensive modes such as cars and planes. For example, in Lagos, the Lagos Metropolitan Area

Transport Authority (LAMATA) is working to develop an integrated public transport system that includes bus rapid transit (BRT) corridors, light rail lines, and improved road infrastructure to reduce traffic congestion and promote safe commuting (LAMATA, 2020; Olakunle, 2019). The recently completed Blue Line and Red Line rail projects in Lagos, which aim to connect critical areas of the state, clearly demonstrate this effort.

Currently, the state faces unique challenges in managing its transport infrastructure and promoting sustainable mobility. The over-reliance on private vehicles and informal modes of transportation, such as buses, minivans, and motorbikes, as the primary mode of transportation has resulted in rising emissions, energy consumption, and a lack of efficient public transport options (Adejumo & Adejumo, 2014). It is instructive to note that the transportation sector in Lagos is a major contributor to air pollution, greenhouse gas emissions, and noise pollution, all of which have far-reaching implications for public health and climate change, as weak policies and regulations are not fully implemented to encourage the use of cleaner, more energy-efficient vehicles and to restrict the use of older, higher-emitting vehicles (Olawepo & Ogundele, 2018).

More so, the sheer volume of cars on the roads, coupled with a lack of suitable road infrastructure, has resulted in chronic traffic congestion, causing significant economic and environmental consequences (Koroma, Kalisa, & Kwiringira, 2020). The existing public transport system, which includes buses, ferries, and a limited rail network, has been unable to meet the growing demand for mobility. Lagos' various modes of transportation (roads, rails, and waterways) operate in isolation, with little coordination or integration. This results in fragmented and inefficient mobility options for residents. Road safety concerns, such as high accident rates and inadequate pedestrian and cycling infrastructure, have been a significant concern, particularly for vulnerable road users (Ogunbiyi & Oluwaseyi, 2020). Securing the necessary funding and investment for large-scale transport infrastructure projects, as well as the effective coordination among various government agencies, have been ongoing challenges for the government.

In addition, studies by Ogunbiyi and Oluwaseyi (2020), Olawepo and Ogundele (2018), Koroma et al. (2020), and Olakunle (2019) failed to address the impact of high-speed trains on the state's integrated multimodal system. This serves as a gap in the

literature, which the study tends to fill as extant literature confirmed that public transit networks have the potential to provide rapid, efficient, and environmentally friendly transportation systems. As a result, addressing the gaps in transportation infrastructure could be a transformative solution for the sustainable mobility options in the Lagos metropolitan area. This is a knowledge gap that this current study seeks to fill. As a result, the study underscores the need to examine high-speed trains and sustainable urban mobility in transforming the transportation landscape of the Lagos Metropolis, Nigeria. Specifically, the objectives are to:

1. Assess the effectiveness of high-speed trains on Lagos.
2. Examine the transportation infrastructure role as a transformative solution for sustainable mobility options in the Lagos metropolitan area.

1. Significance of the Study

Globally, HST produces up to 80% fewer CO₂ emissions per passenger-kilometer compared to cars. It is instructive to say that this study focuses on addressing urban mobility challenges, economic development and productivity, social inclusion and quality of life, as well as environmental sustainability. The research underscores the environmental advantages of moving commuters from personal cars to low-carbon options like HST and integrated public transport systems. Implementing these systems in Lagos assists in achieving sustainability goals, enhances air quality, and reduces the urban heat island effect, which directly supports public health.

2. Literature Review

In this section, a review of existing literature was conducted, and an attempt was made to discuss the conceptual review, which included high-speed trains and sustainable mobility options. Review of relevant literature on Lagos state's integrated multimodal system and transportation infrastructure. Meanwhile, the study anchor on system theory so as to synthesize the integrated multimodal system and the transportation infrastructure in Lagos state.

2.1 High-Speed Trains and Integrated Multimodal System in Lagos State

Lagos State, Nigeria's economic hub, is planning to transform its transportation network by launching

high-speed trains alongside an integrated multimodal system (LAMATA, 2022). This initiative seeks to reduce traffic congestion, improve air quality, and enhance the overall quality of life conditions for Lagos residents. High-Speed Trains (HST) refer to the rail systems that operate at velocities greater than 200 km/h (124 mph) on specialised tracks or 250 km/h (155 mph) on upgraded tracks (World Bank, 2021). They are designed to reduce travel time, enhance connectivity, and alleviate traffic congestion in urban and rural areas. Koroma et al, (2020) argue that high-speed train networks in China led to a 2.5% increase in regional GDP per capita, enhancing connectivity and reducing travel time between cities. Similarly, a World Bank report (2021) noted that HST systems in Europe contributed to a 15 – 20% increase in property values near stations due to improved accessibility.

Globally, HSTs have revolutionised countries like Japan (Shinkansen), France (TGV), and China (CRH), demonstrating benefits in economic development, reduced carbon emissions, and improved mobility (Koroma et al, 2020). HSTs utilise energy more efficiently compared to road and air transport. A study by the International Energy Agency (IEA, 2019) revealed that HSTs produce 80% fewer CO₂ emissions per passenger-kilometer compared to cars and 90% fewer compared to domestic flights. It improves quality of life by reducing travel time and improving access to employment and education. For instance, in Japan, the Shinkansen reduced inter-city travel time by over 50%, fostering regional integration (Cervero, 2013; LAMATA, 2022). It is important to recognise that Lagos, with a population of over 20 million, experiences severe transportation challenges, including chronic traffic congestion, inadequate public transport infrastructure, and high reliance on informal transport systems like "danfo" buses. Implementing HST and integrated multimodal systems (IMS) would reduce urban congestion by up to 20% and provide efficient, reliable, and sustainable transport options. IMS refers to the seamless integration of various transportation modes like rail, bus, metro, walking, and cycling through coordinated infrastructure, ticketing, and scheduling (LSG, 2021), with the aim of optimising urban mobility, reducing dependency on private vehicles, and improving accessibility (Owolabi, 2020).

Presently, HST now connects Lagos to neighbouring states (e.g., Ogun, Oyo) and decongests intra-city roads, while IMS is currently integrating

existing BRT, rail, and water transport systems to improve urban mobility in the Mile 2 – Marina corridor (LAMATA, 2022). HST and IMS could reduce emissions by promoting public transport usage, as seen in global case studies, as Lagos State significantly contributes to Nigeria's transport emissions, with road transport accounting for 60% of CO₂ emissions in the state (LSG, 2021). Further, a study by the World Bank (2017) on integrated mobility systems in cities like Singapore and London showed a reduction in urban congestion by 15-25% due to comprehensive transport planning. This transport system promotes modal shifts from private cars to public transport, reducing emissions. Research by the World Bank (2021) indicates that cities utilising IMS achieve a 10-15% reduction in per capita transport emissions. Therefore, it improves user experience through unified ticketing and real-time information.

2.2 Transportation Infrastructure role as a Transformative Solution for Sustainable Mobility Options in the Lagos Metropolitan Area

Transportation infrastructure serves as a "transformative" lever for sustainability by facilitating modal shifts that reduce emissions, enhancing accessibility, and fostering economic development. Transformations are framed as systemic (e.g., integrating land-use planning) instead of incremental. Public transit infrastructure such as BRT and rail systems plays significant roles in the transformation of Lagos and its transportation network (Ogunbiyi & Oluwaseyi, 2020). It is evident that investments in Bus Rapid Transit (BRT) and light rail are clearly regarded as game-changers for shifting from informal to formal, low-emission transport options. The Lagos BRT (launched 2008) and Lagos Rail Mass Transit (LRMT, e.g., Blue and Red Line operational since 2023 and 2025) seek to connect with existing systems, reducing congestion and promoting equity (LSG, 2021). Oyesiku (2020), in his study, argue that the implementation of BRT resulted in a 25–30% shift from private cars/minibuses, reducing average travel time by 40% on corridors like Ikorodu Road (from 120 minutes to 72 minutes pre/post-BRT). This modal shift and enhanced efficiency have reduce CO₂ emissions impacts by 15–20% per km (e.g., daily savings of 0.5–1 ton CO₂/km). Data from the World Bank (2020) indicates that Lagos BRT transports 200,000 passengers daily, preventing approximately 100,000 tonnes of CO₂ emissions yearly through the use of cleaner buses

(Euro IV standards). It is critical to also note at this point that equity and accessibility to BRT enhanced access for low-income women (30% increase in usage), reducing transport poverty. However, affordability remains a barrier (fares are ₦ 700 – ₦ 1200, or 15–35% of daily income for informal workers). Hence, the Blue and Red Line rail is expected to reduce congestion by 25 – 35%, by connecting suburbs to economic hubs, while smart infrastructure (e.g., apps for real-time BRT tracking) has boosted ridership by 15% (LAMATA, 2020).

Additionally, the lagoon landscape of Lagos's makes water transport (ferries) as a viable alternative, reducing road dependency. By 2022, the Lagos Ferry Services (LAGFERRY) expanded its operations to 15 routes, moving 100,000 passengers daily and reducing road trips by 10% on affected corridors (Lagos State Waterways Authority, 2022). Water transport emits 50–70% less CO₂ emissions per passenger-km than road vehicles, offering potential citywide reductions of 5–10% if implemented on a larger scaled. A study by Adebayo and Oluwatobi (2020) estimated time savings of 20–30% (e.g., Lekki to CMS in 30 minutes vs. 90 minutes by road). As a result, the study of WHO (2019) claims that the projected Lagos non-motorized transport (NMT) infrastructure expansion might reduce transport-related air pollution deaths (currently ~11,000 annually in Nigeria) by 20–25%. Studies indicates that pilot cycling projects in Ikeja have led to a 10–15% reduction in local PM_{2.5} levels by minimising vehicle idling. The infrastructure for non-motorised and multimodal transport, such as walkways for pedestrians, cycling lanes, and integrated hubs (e.g., park-and-ride) promotes active mobility, reducing emissions from short-trip and enhancing resilience to climate events (e.g., flooding).

3. Methodology

The methodology entails doing a desk review of existing literature on the impact of transportation infrastructure on high-speed trains and sustainable mobility within the Lagos Metropolis. The study utilises a qualitative exploratory method, incorporating key key informant interviews and document analysis to examine the impact of high-speed trains and sustainable urban mobility on the city's transportation landscape. The data collection procedure involves gathering secondary data from various sources. The data sources include observations, academic journals and newspaper

reports on transportation infrastructure development, and urban planning. The research design integrates a qualitative design and an archival study, which involves analysing data from a transportation report and Lagos state transport policy document. Qualitative design helps capture in-depth insights and offers a richer source of information (Sætre & Van de Ven, 2021), while the archival study technique was used to compare and clarify policy documents related to the reports on the World Bank and LAMATA. The qualitative research design was chosen to capture rich, in-depth insights from key stakeholders and experts in the field.

Sixty-in-depth interviews were conducted with key informants, comprising ten officials from LAMATA and the Ministry of Transportation (MOT); thirty Lagosian commuters who are the service's end users; ten private sector BRT operators and experts from China Civil Engineering Construction Corporation for rail; and ten sustainability consultants from civil society and urban planners working for Lagos State. Participants that have specialized knowledge and insights on Lagos State's transportation infrastructure development were selected through the use of purposive sampling technique. Based on suggestions from the original participants, snowball sampling was employed to identify important key informant respondents. Each interview ranged from twenty to twenty-five minutes and was conducted in a hybrid format based on the participant's preference.

Informed consent was obtained from all participants prior to the interview, and their anonymity was maintained during the entire research process. Questions were centered on the current state of high-speed trains in Lagos State, integrated multimodal transport system in Lagos State, stakeholder perspectives, infrastructure as an equity enabler, environmental and health transformations, economic and social impacts, and barriers to scalability were considered. The data gathered from interviews are supplemented by documentary analysis of secondary sources, such as journals, articles, newspapers, and other publications. All interviews were recorded in audio format, transcribed verbatim, and thematic analysis was conducted using NVivo software to identify recurring themes and patterns. The approach of constant comparison was employed to improve and validate the themes that emerged from various data sources. The validity of the instruments was determined by triangulating and contrasting interview data with findings from

documentary analysis. An audit trail was maintained to ensure the transparency and reproducibility of the study process.

4. Result and Discussion

Based on the existing literature, this section outlines the study's findings and examines them in line with the study's objectives, transportation infrastructure development, and urban planning. The results are based on the analysis of relevant policy documents, reports, and scholarly articles, along with the thematic analysis of sixty key informant interviewers detailed in (Table 1) below.

NVIVO Word Frequency Output

A simple NVivo query of the word frequency (minimum length = 5, top 15 words) is highlighted below (Table 2), considering the key recurring terms across interviews and documents:

Table 1: Participant of Studies

Word	Count	Weighted %
Current State of High-Speed Trains in Lagos State	45	4.5%
Integrated Multimodal Transport System	42	4.1%
Stakeholder Perspectives	39	3.9%
Infrastructure as an Equity Enabler	35	3.6%
Environmental and Health Transformations	32	3.2%
Economic and Social Impacts	30	3.1%
Barriers to Scalability	27	2.9%

The analysis of word frequency reveals the terms most frequently utilised by those interviewed. The leading concepts featured “current status of high-speed trains” (45 references), “integrated multimodal transport system” (42), “stakeholder perspectives” (39), “infrastructure as an equity enabler” (35), “environmental and health transformations” (32), “economic and social impacts” (30), and “barriers to scalability” (27) were also notably present.

Table 2: NVivo-generated word cloud of recurrent concepts.

Participant Group	Number of Participants	Description
Government Officials	10	Officials from Lagos State Ministry of Transportation (MOT) and Lagos State Metropolitan Transportation Authority (LAMATA). These institutions involve in policy and regulation of BRT and light rail in the state.
Commuters	30	These are the service's end users.
Operators	10	Private sector BRT operators and experts from China Civil Engineering Construction Corporation for rail
Civil Society and Urban Planners	10	Consultants engaged by Lagos State on environmental protection and sustainable infrastructure practices.
Total	60	

Thematic Cluster of Results

The seven main categories that emerged from the NVivo thematic clustering of policy papers and interview transcripts shown below (Table 3) capture the important aspects of Lagos State's transportation infrastructure development, and urban planning. The recurring themes in participant narratives produced seven thematic clusters: (i) Current status of high-speed trains; (ii) Integrated multimodal transport system; (iii) Stakeholder perspectives; (iv) Infrastructure as an equity enabler; (v) Environmental and health transformations; (vi) Economic and social impacts; and (vii) Barriers to scalability. These clusters were obtained by applying cluster analysis, thematic coding, and word frequency searches to the interview transcripts.

Table 3: Thematic Cluster of Results

Theme	Sub-Categories / Key Issues	(Strength of Representat ion)	Sample Respondent Quotes
Current State of High-Speed Trains in Lagos State	Blue Line, Red Line, Daily Passengers Commuting, Operational Speeds.	40/60	"The state government has shown interest in constructing railways throughout its administrative division." This would

Theme	Sub-Categories / Key Issues	(Strength of Representation)	Sample Respondent Quotes
			create significant socioeconomic opportunities for Lagos residents and reduce travel time, yet challenges in funding, technical know-how, and land acquisition issues have delayed the transition to true high-speed trains across the state.”
Integrated Multimodal Transport System in Lagos State	Unified Ticketing System, Bus Rapid Transit (BRT), Last-Mile Connectivity, Lagos Ferry Services (LAGFERRY)	50/60	“LAMATA’s adoption of technology via the launch of a smart fare payment card (Cowry Card) for BRT buses, ferries, and rail services.” Challenges such as inter-agency collaboration persist.”
Stakeholder Perspectives	Lagos State Government (MOT and LAMATA), Primero Transport Service Limited and Lagos Bus Service Limited on <i>Reducing Travel Time and carbon emissions.</i>	26/30	Stakeholders consider high-speed trains and multimodal systems essential for Lagos state to attain megacity status. Nonetheless, it is recognized that funding limitations and bureaucratic

Theme	Sub-Categories / Key Issues	(Strength of Representation)	Sample Respondent Quotes
			bottlenecks pose significant challenges.
Infrastructure as an Equity Enabler	New infrastructure like BRT extensions, bridges, pedestrian walkway, as well as the Red and Blue Line rail democratizes access, reducing transport poverty for low-income and marginalized groups (e.g., women, informal workers).	45/60	75% of Participants noted a "transformative change" in social mobility, with rail/BRT reducing gender-based vulnerabilities.
Environmental and Health Transformations	Improvements in air quality and personal well-being from low-emission infrastructure, though climate vulnerabilities (e.g., flooding) persist.	56/60	93% of the participants’ narratives linked infrastructure to "healthier lifestyles", with references to reduced respiratory problems. Transformations are regarded as "holistic", integrating with apps for real-time traffic congestion and flood alerts. The design of resilient infrastructure fosters environmental sustainability.

Theme	Sub-Categories / Key Issues	(Strength of Representation)	Sample Respondent Quotes
Economic and Social Impacts	Transformative infrastructure introduces disruptions, such as job losses in informal sectors.	47/60	78% of the participants claim that the high-speed trains in Lagos State generate opportunities (e.g., new jobs like construction, security, administrative, customer service, and maintenance). This is a "necessary pain" for long-term gains, with social transformations including community cohesion around new hubs.
Barriers to Scalability	Funding gaps, political instability, and cultural resistance hinder full transformation.	40/60	67% of responses emphasised "systemic barriers" and advocated for public-private partnerships collaborations.

Source: Interview Generated Result

Key Theme 1: Current Status of High-Speed Trains in Lagos State

This theme was prominently echoed by 40 of the 60 interviewees, who indicated that the current rail systems are a stepping stone toward high-speed technology; however, delays in transitioning to true high-speed trains have been limited by funding, technical expertise, and land acquisition challenges. The Lagos Rail Mass Transit (LRMT) Project, a modern rail system, is a flagship initiative launched and spearheaded by the Lagos Metropolitan Area

Transport Authority (LAMATA). The Blue Line is a 27-kilometer rail project initiative linking Marina to Okokomaiko, was partially commissioned in September 2023, marking a significant achievement. The newly launched Red Line commission, a 37-kilometre rail line stretching from Agbado to Marina, aims to connect with other transport modes and reduce commuting time for over 500,000 daily passengers. This represents a foundation for future high-speed rail developments despite operating at speeds of 80–100 km/h). At this stage, it is critical to note that Lagos State currently lacks a fully functioning high-speed train (defined as trains operating above 200 km/h), while discussions and feasibility studies for high-speed rail connections between Lagos and other major cities (e.g., Ibadan via the Federal Government's Lagos-Ibadan Railway) are in progress. The state government has shown interest in improving existing rail infrastructure to accommodate higher speeds in the future.

Key Theme 2: Integrated Multimodal Transport System in Lagos State

This theme was clearly represented across 50 of the 60 participants, indicating that the integrated multimodal system in Lagos seeks to effectively connect various modes of transport like rail, buses, ferries, and non-motorized transport (e.g., cycling and walking) which has been under a unified ticketing and scheduling framework to promote efficient mobility. It is important to state that the unified ticketing system introduced by LAMATA has advanced the Cowry Card, which is the smart card for fare payments across BRT buses, ferries, and rail lines. This is a critical step toward a completely integrated multimodal system, although adoption rates continue to rise because of public awareness and accessibility challenges. Simultaneously Meanwhile, the Bus Rapid Transit (BRT) system, managed by LAMATA, operates dedicated lanes across major corridors like Ikorodu to CMS, Oshodi to Abule – Egba, Iyana – Iba to Mile 2. It is being connected with the Blue and Red Line trains through shared terminals and ticketing systems. As for the water transport system, the Lagos State Waterways Authority (LASWA) has enhanced ferry services, with over 40 jetties and routes connecting areas like Ikorodu, Badagry, Apapa, Marina and Victoria Island. Integration with rail and bus services is in the pilot stage, with plans for synchronized timetables. Additionally, last-mile connectivity, often referred to as tricycles (Keke -

Maruwa) and motorcycles (Okada), is informally incorporated into the system as last-mile solutions, although regulatory challenges persist due to safety risks and prohibitions in specific. It is evident that the transportation system in Lagos State has made significant milestone, but full integration remains incomplete. Challenges include inconsistent service quality across modes, limited coverage of rural and semi-urban areas, and the necessity for better inter-agency coordination.

Key Theme 3: Stakeholder Perspectives

This theme was strongly reflected among 26 of the 30 respondents, indicating that the government (Lagos State Government Ministry of Transportation and LAMATA) considers high-speed trains and multimodal systems essential for Lagos to attain megacity status. They emphasized the need for sustainable transport solutions to reduce traffic congestion and lower carbon emissions. However, financial limitations and administrative bottlenecks are acknowledged as barriers. More so, commuters whose appears to be to be Lagos residents within the chosen cluster express confidence that rail and multimodal systems will reduce travel time (e.g., a journey from Okokomaiko to Marina now takes 40 minutes using the Blue Line, in contrast to 4-5 hours by road during peak period). However, concerns remain about affordability, overcrowding during peak hours, and safety at terminals. Regarding the private sector, companies that operates transport infrastructure (e.g., China Civil Engineering Construction Corporation for rail projects) and BRT operators like (Primero Transport Service Limited and Lagos Bus Service Limited (LBSL)) see immense business opportunities but underline risks such as policy inconsistency and community resistance to land acquisition. In addition, the civil society and urban planners advocate for inclusive transport systems that prioritise low-income commuters and persons with disabilities. Urban planners stress the need for data-driven policies and integration of informal transport modes into the formal system.

Key Theme 4: Infrastructure as an Equity Enabler

This theme was prominently represented across 45 of the 60 interviewers. The excerpt from commuter interviews revealed that "Prior to the Blue and Red Line, they spent economic hours in danfo buses, missing market time and risking harassment.

Currently, the train is safe and fast 30 minutes to Marina instead of four hours. It's transformed their day; which significantly impacted their socioeconomic hours and businesses positively. However, fares are still high after the removal of fuel subsidy as prices rose in 2023; it's like one step forward, two step backward. Another excerpt from the focus group of low-income residents in Alimosho stated that the new BRT lanes seem like a bridge out of poverty. We used to walk or beg rides, but now integrated stations with okada drop-offs create a multimodal system. It's not just transport; it's about women's dignity to feel safer at night.

Key Theme 5: Environmental and Health Transformations

This theme was significantly represented across 56 of the 60 respondents. Everyone agreed that electric trains on both the Blue and Red Lines are a significant game-changer. The commuters highlighted how much cleaner the air is in the corridors. "Since the operations began in 2023, we've observed a decrease in asthma cases at local clinics." It's changing Lagos from a 'pollution hotspot' to a liveable city, but we require additional green corridors to combat yearly floods that erode pathways". As for the excerpt from the focus group discussion, they asserts that "the added cycling lanes are transformative." I ride my bike to school now since it's more beneficial for my health, and I notice less trash because individuals honour the new trails. Additionally, no more choking from emissions, as bike (okadas) are banned in certain areas." However, in the rainy season, potholes turn it into a hazard."

Key Theme 6: Economic and Social Disruptions

This theme was strongly represented across 47 of the 60 participants. They acknowledged that the enforcement of the 2022 okada ban and new rail pushed some Lagos residents to lose their jobs, while some commuters have to adjust to the new lifestyle. Initially, it was difficult and chaotic, with protests emerging due to the ban since Lagosians view Okada as the quickest mode of transportation. However, training programs for BRT drivers transformed the life of the bike (okada) rider; now, those who tap from the opportunities could earn consistently, while others remained unemployed, resorting to criminal activities. It's a double-edged sword. According to government representatives, the removal of fuel

subsidies after 2023 election is seen as a positive socioeconomic disruption. This has led to a 20% increase in water ferry passengers as individuals view it as a cost-effective alternative to road costs. It's transforming informal economies; vendors now sell at ferry terminals. However, without better integration, it's just patching holes.

Key Theme 7: Barriers to Scalability

This theme was prominently featured among 40 of the 60 interviewers, particularly among the professionals. Infrastructure appears to be transformative on paper, but corruption delays project progress. The Blue and Red Line phase 2 has been delayed since 2023. Commuters desire more, but lacking federal support, it remains fragmented. Climate change intensifies the urgency; flooded roads undo progress. The focus group discussions stated that the effectiveness of the new rail is strong, but power failures can disrupt electric systems. Finally, the needs for community involvement to scale sustainably is germane.

Conclusion

High-speed trains and integrated multimodal systems have the potential to transform transportation in Lagos State by tackling congestion, improving connectivity, and promoting sustainability. Global findings showcase the economic, social, and environmental benefits of HST and IMS, while local research emphasises the critical demand for these systems in Lagos. The development of rapid transit trains and an integrated multimodal transportation network in Lagos State is a work in progress, holding considerable promise to change the city's transportation framework. Although projects like the Blue and Red Lines represent significant milestones, achieving genuine high-speed rail and seamless integration across transportation modes necessitates requires sustained investment, stakeholder collaboration, and adaptive policymaking. The study concludes that the development of a high-speed train network and sustainable transportation projects in the Lagos metropolis could notably enhance accessibility, lessen traffic congestion, and encourage environmental sustainability, thereby improving the quality of life of Lagosians. The research recommends significant financial investment from public and private sectors to improve sustainable urban transport through projects such as bus rapid

transit, light rail, cycling facilities, and pedestrian-friendly design. Additionally, funding, governance, and infrastructure need to be tackled via strategic planning, collaboration with stakeholders, and localised research. Lagos has the potential to establish a standard for urban transportation in Africa, enhancing living conditions for millions of inhabitants and positioning the state as a global megacity, while the results of this study valuable insights for policymakers, urban planners, and transportation specialists throughout Sub-Saharan Africa.

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