The Sustainable Development Goals Synergy-Dissonance Framework: Evaluating Sustainable Urban Mobility in Lagos, Nigeria

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ABSTRACT

As African megacities contend with rapid urbanisation, aligning transport infrastructure with sustainability mandates remains a critical planning challenge. This paper introduces the Sustainable Development Goals Synergy-Dissonance Framework to evaluate the Lagos Bus Reform Initiative (BRI) in Nigeria using indicators for SDG 9 (infrastructure) and SDG 11 (inclusive urbanism). Using a mixed-methods analysis combining operational data (n = 120 routes), commuter surveys (n=1,000), and stakeholder interviews (n=15), the study assesses the BRI's contribution to sustainable mobility. The findings reveal a synergy-dissonance: while the Initiative aligns with SDG 9 through investments in resilient infrastructure and fleet modernisation, its contribution to SDG 11 remains nascent. The formal system's spatial concentration along major corridors and the incomplete integration of informal "danfo" operators create what is termed the "islands of formality": compartments of high-quality service surrounded by persistent informality. Survey data indicate positive safety perception (75% rate buses as safe), but spatial coverage deficits persist, with First/Last Mile routes achieving only 44.5% of planned deployment. Affordability perception (72% of the respondents find fares affordable) masks distributional concerns, as the survey sampled only BRI users, potentially excluding the poorest commuters. The framework identifies ways, through the Synergy Bridge spatial strategies, to expand feeder coverage, promote pro-poor financing, and integrate the informal sector. This paper contributes a replicable evaluative tool for Global South planners, suggesting that sustainable transport requires frameworks accounting for both technical efficiency and the socioeconomic relations of the urban poor.

KEY WORDS: Sustainable Urban Mobility; SDG 11.2; Bus Reform Initiative; Lagos; Paratransit Integration

1 INTRODUCTION

The Sustainable Development Goals (SDGs), adopted by all United Nations Member States in 2015, provide a comprehensive framework for aligning global development with environmental integrity, social inclusion, and economic prosperity (UN, 2015). For urban transport, two SDG goals are particularly salient. SDG 9 calls for building quality, reliable, sustainable and resilient infrastructure (Target 9.1) and adopting clean technologies (Target 9.4). SDG 11 demands, through Target 11.2, access to safe, affordable, accessible and sustainable transport systems for all, with special attention to vulnerable groups (UN-Habitat, 2022).

The challenge lies in achieving synergy: outcomes in which progress on one goal reinforces rather than undermines progress on the other (Holden *et al*., 2017; Nilsson *et al*., 2016). This tension is particularly acute in African cities, where rapid urbanisation, entrenched informal transport systems, and limited fiscal capacity create complex planning environments (Kumar and Barrett, 2008).

This paper examines the relationship between SDG 9 and SDG 11 through a case study of the Lagos Bus Reform Initiative (BRI) in Nigeria. Lagos presents a critical test case: a megacity of over 20 million people (Ogunkoya, 2025), a century of failed formal transport

schemes, an intensely ingrained informal "danfo" sector, and, currently, the most ambitious bus reform programme in sub-Saharan Africa (LAMATA, 2023). The BRI embodies the promise of SDG 9: modern buses, dedicated corridors, and professionalised operations. However, its contribution to SDG 11, inclusive, affordable mobility for all Lagosians, remains uncertain.

The Study introduces the SDG Synergy-Dissonance Framework as an analytical tool for diagnosing alignment between infrastructure development and social equity. Applying this framework to the Lagos case reveals a pattern of dissonance: strong performance on SDG 9 indicators coexists with significant deficits on key SDG 11 dimensions, creating what we term "islands of formality": pockets of high-quality service surrounded by persistent informality.

2. Literature Review

SDG 9 and Urban Transport Infrastructure

SDG 9's relevance to urban transport is multifaceted. Target 9.1 emphasizes quality, reliable, sustainable and resilient infrastructure that supports economic development and human well-being (UN, 2015). For bus-based public transport, this translates into dedicated bus lanes, engineered stations, maintained depots, and passenger information systems that meet international standards (Rodrigue, 2020; Cervero, 2013). Target 9.4 adds technological modernisation: cleaner fuels, electric vehicles, electronic ticketing, and intelligent transport systems (Gwilliam, 2013; Pojani, Stead, 2015).

SDG 11 and Inclusive Urban Mobility

SDG 11 positions transport within the broader project of urban sustainability. Target 11.2 calls for access to safe, affordable, accessible, and sustainable transport systems for all (UN-Habitat, 2022). Each term carries a specific meaning: safety from accidents and crime (Beukes *et al*., 2011); affordability that does not impose undue household burden (Rodrigue *et al*., 2025); Carruthers *et al*., 2005); accessible infrastructure for persons with disabilities (Rickert, 2021); environmental sustainability (Holden *et al*., 2017); and universal access regardless of income, location, gender, or ability (Peters, 2013; Uteng, Lucas, 2017).

Interdependence of SDG 9 and SDG 11

While analytically distinct, SDG 9 and SDG 11 are interdependent (Nilsson *et al*., 2016; ICSU, 2017). SDG 9 enables SDG 11: without adequate infrastructure, transport cannot achieve the scale required for inclusive mobility (Geurs, van Wee, 2004). SDG 11 orients SDG 9: infrastructure investment, left to its own logic, may concentrate on high-demand corridors where returns are greatest, leaving peripheral areas underserved (Bocarejo, Oviedo, 2012; Delmelle, Casas, 2012).

Methodology

Study Setting

The Lagos Bus Reform Initiative (BRI), launched in 2017 by the Lagos Metropolitan Area Transport Authority (LAMATA), represents a strategic effort to formalise and integrate public transport across Nigeria's largest metropolis. The system operates through three structured service tiers: dedicated Bus Rapid Transit (BRT) corridors running on segregated infrastructure; Standard Routes operating on mixed-traffic roads with regulated schedules and fares; and First/Last Mile feeder services designed to connect residential neighbourhoods to main transit corridors. Despite over eight years of formal-sector expansion, the informal transport sector, comprising minibuses ("danfos"), midibuses (koropes), and motorcycle taxis (okadas), continues to play a dominant role in urban mobility. As of June 2025, informal operators still accommodate approximately 45% of all motorised trips in the Lagos metropolitan area (LAMATA, 2023), underscoring the persistent gap between formal transit supply and the mobility demands of the city's rapidly growing population, which exceeds 20 million inhabitants.

Data Collection

Operational data were obtained from LAMATA on Peak Vehicle Requirement (PVR) and Average Daily Buses Deployed (ADBD) across all three service tiers, providing quantitative measures of services, coverage and deployment shortfalls for 120 planned routes (LAMATA, 2025). Commuter survey data were collected from 1,000 Bus Reform Initiative (BRI) system users through a purposive sampling strategy designed to capture diverse perspectives across the three service tiers (BRT corridors, Standard Routes, and First/Last Mile feeder services). The number of planned routes included

in the sampling frame was obtained from LAMATA's operational report (LAMATA, 2025), which documents 120 formalised routes under the BRI as of June 2025. To ensure representativeness across the network, 17 terminals were purposively selected based on route type (trunk, standard, feeder) and passenger volume (high, medium, low). The sample of 1,000 respondents was distributed across these 17 terminals proportionally to their estimated daily ridership, with a minimum of 50 responses per terminal to enable within-terminal analysis. This distribution was feasible because the average terminal served approximately 350–1,500 daily boardings during the survey period, and data collection occurred over six months (January to June 2025), allowing survey teams to return to high-traffic terminals on multiple days and shifts. Surveys were administered face-to-face at terminals, and perception of accessibility, affordability, safety, and service quality were measured on a five-point Likert scale (Ogunkoya, 2025).

Stakeholder interviews (n = 15) captured institutional perspectives across four categories: LAMATA officials (n = 4), bus operating company managers (n = 5), transport union leaders (n = 3), and policymakers (n = 3). Sample size was determined by thematic saturation, whereby interviews ceased when no new codes or themes emerged from consecutive interviews (Guest *et al*., 2006).

Data Analysis

Quantitative data were analysed using descriptive statistics in SPSS v27. Specifically, frequencies and percentages were used to summarise respondents' distribution across service tiers, terminals, and socio-economic categories (e.g., gender, occupation). Mean scores and standard deviations were calculated for each Likert-scale item (accessibility, affordability, safety, service quality) to compare average perception across the three service tiers and to identify which dimension received the highest or lowest ratings. Cross-tabulations were used to examine differences in satisfaction levels across terminal types (e.g., high-volume vs low-volume terminals). No inferential statistical tests were applied, as the study aimed to describe rather than explain causal relationships

The SDG Synergy-Dissonance Framework
Framework Structure

Drawing on the analysis above, the study proposes the SDG Synergy-Dissonance Framework as an analytical tool for evaluating urban transport interventions against the dual imperatives of infrastructure development and social inclusion. The dynamic relationship between these goals and the ways toward integrated sustainability is conceptualised in Figure 1

The framework comprises four quadrants, defined by performance on SDG 9 and SDG 11 indicators: Quadrant I (Synergy): High SDG 9, High SDG 11 infrastructure investments that are both technically advanced and socially inclusive (Cervero, 2013; Rodrigue *et al*, 2025).

Quadrant II (Infrastructure Bias): High SDG 9, Low SDG 11, technical modernisation without inclusive access, creating an "island of formality" (Wood, 2015; Rizzo, 2017). This reflects the SDG framework's emphasis on measurable infrastructure outputs over qualitative inclusion and locally specific mobility justice (Zwitter *et al*., 2025; Utena and Lucas, 2017).

Quadrant III (Equity Deficit): Low SDG 9, Low SDG 11; neither modern nor inclusive, where informal transport dominates without adequate regulation (Gwilliam, 2013; Kumar & Barrett, 2008).

Quadrant IV (Inclusion Aspiration): Low SDG 9, High SDG 11, equity goals without infrastructural foundation (Pojani and Stead, 2015; Uteng and Lucas, 2017).

Operationalising the Framework

To apply the framework, the study develops a set of indicators for each SDG, derived from the official targets and adapted to the context of bus reform (UNSDG, 2022; ICSU, 2017).

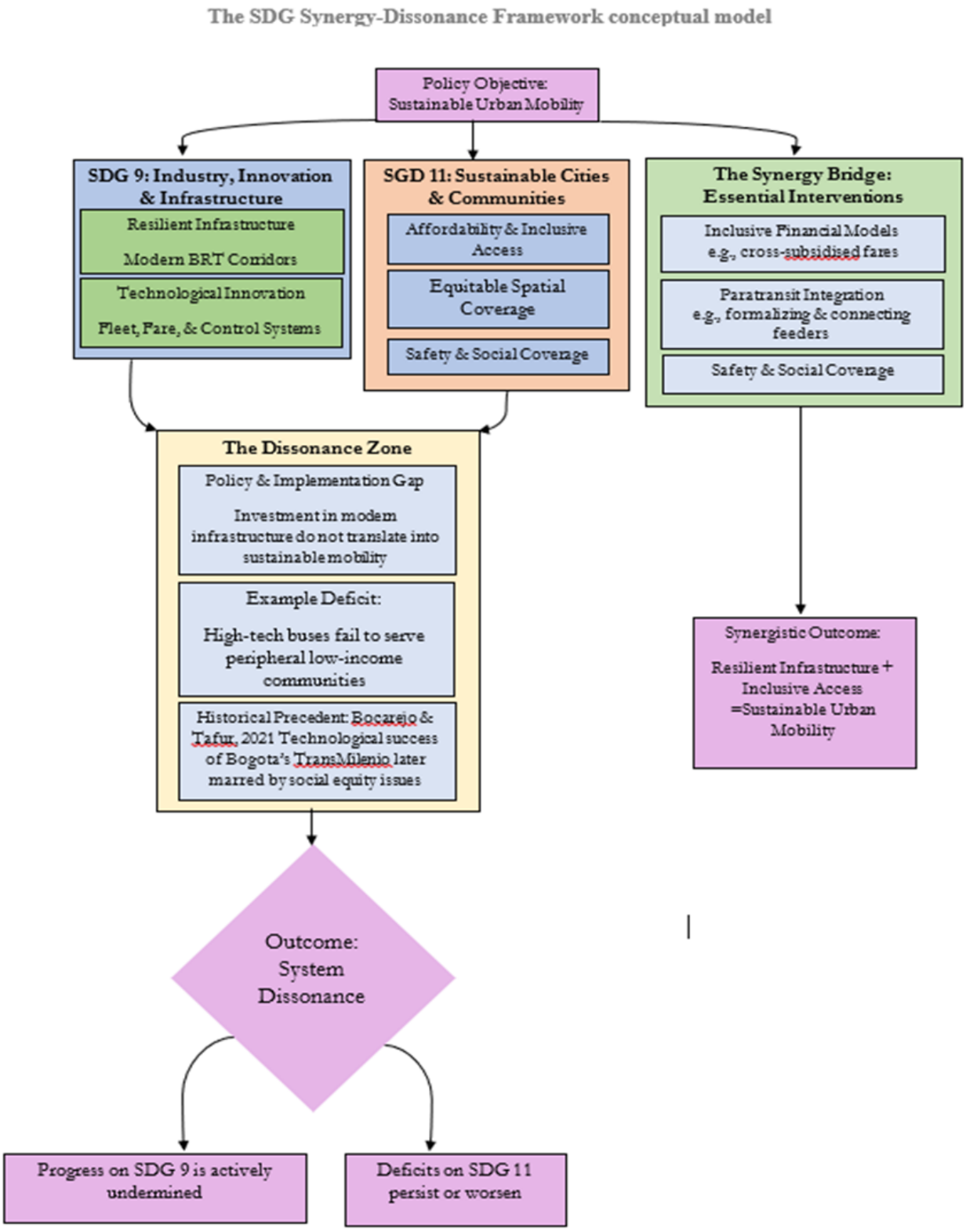

Figure 1. The SDG Synergy-Dissonance Framework
Source: Authors' Conceptualisation

Table 1: SDG 9 Indicators

Indicator	Target Reference	Operationalisation
Infrastructure quality	9.1	Presence of dedicated lanes, engineered stations, and maintained depots (Rodrigue, 2020)
Fleet modernisation	9.4	Proportion of fleet using clean technologies (CNG/ electric); vehicle age profile (Gwilliam, 2013)
Technological innovation	9.5	Electronic fare collection; real-time information; intelligent transport systems (Pojani, Stead, 2015)
Infrastructure resilience	9.1	System's ability to maintain service during disruptions; maintenance capacity (Cervero, 2013)

Table 2: SDG 11 Indicators	Target Reference	Operationalisation
Spatial coverage	11.2	Proportion of population within 500m of formal service; network density (Geurs, van Wee, 2004; Delmelle, Casas, 2012)
Affordability	11.2	Fare as percentage of daily minimum wage; fare-to-income ratio ((Rodrigue *et al*., 2025); Carruthers *et al*., 2005)
Accessibility for vulnerable groups	11.2	Universal design features; accessible vehicles and stations; targeted fare concessions (Rickert, 2021; Peters, 2013)
Safety	11.2	Accident rates, crime incidence, perceived safety (Beukes *et al*., 2011)
Informal sector integration	11.2	Proportion of informal operators formally integrated; livelihood protection for displaced workers (Behrens *et al*., 2016; Ferro, Behrens, 2015; Golub *et al*., 2009)

The Synergy Bridge Concept

The framework introduces the Synergy Bridge, which represents the policy and institutional mechanisms required to transition from operational dissonance (Quadrants II, III, or IV) to synergy (Quadrant I) (Nilsson *et al*., 2016; ICSU, 2017). This bridge comprises five key pillars: Integrated Planning, Pro-Poor Financing, Inclusive Governance, Adaptive Implementation, and Accountability Structures.

RESULTS

SDG 9 Performance

Infrastructure Quality: The BRI has delivered dedicated BRT corridors, modern terminals, and engineered bus stops along Ikorodu-TBS and Oshodi-Abule Egba corridors. This infrastructure represents a marked improvement over informal operations, which were conducted at roadside stops with on-street loading and congestion (LAMATA, 2023). The establishment of maintenance depots in Majidun and Oshodi further enhances fleet management capacity. Plate 1 illustrates the BRI's investment in new fleets and engineered facilities, while Plate 2 represents the informal system that the BRI aims to reform.

Fleet Modernisation: Over 800 modern buses have been introduced, with exploratory compressed natural gas initiatives signalling intent toward cleaner technologies (Gwilliam, 2013; Pojani, Stead, 2015).

Technological Innovation: The deployment of the Cowry Card electronic fare system represents a significant technological advancement, reducing boarding times and enabling systematic collection of passenger data (Plate 3). Additionally, Intelligent Transport Systems, including real-time passenger information displays at major terminals, are being progressively rolled out across the network (Rodrigue, 2020)

Plate 1. A modern BRT bus at the TBS terminal.

Source: LAMATA 2021.**Plate 2. On-street loading by Danfo operators and related traffi**

congestion at Idumota.
Source: (reprinted from Lagos Bus Reform Report, 2017, with permission).

Plate 3. Cowry Card electronic fare medium and onboard bus validator

Source: LAMATA, 2023

Infrastructure Resilience: Dedicated BRT corridors provide operational resilience by enabling bus movement independent of general traffic congestion (Plate 4). However, lane violations by unauthorised vehicles remain a persistent enforcement challenge (Hidalgo, Gutiérrez, 2013). Furthermore, maintenance capacity, encompassing spare parts availability and technical expertise, continues to represent a significant vulnerability for long-term system reliability (Cervero, 2013).

Plate 4. Dedicated BRT corridor at Owode Onirin, Lagos.
Source: LAMATA, 2023.

Table 3. Geographic Coverage of the Lagos Bus Reform Initiative (2025)

Scheme/Route	**Peak Vehicle Requirement (PVR)**	**Average Daily Buses Deployed (ADBD)**	**Coverage Ratio (%)**
Ikorodu-TBS BRT	245	164	66.9
Oshodi-Abule Egba BRT	184	87	47.3
LBE BRT	34	20	58.8
Total BRT	**463**	**271**	**58.5**
Standard Routes	446	242	54.3
FLM Routes	337	150	44.5

These figures reveal significant spatial coverage deficits (Geurs, van Wee, 2004; Delmelle, Casas, 2012). Even on the best-performing corridor (Ikorodu-TBS), coverage falls short of planned requirements by one-third. The FLM scheme, critical for connecting neighbourhoods to the trunk network, achieves less than half of the planned deployment (Salazar Ferro *et al*., 2015). Large areas, particularly low-income and peripheral neighbourhoods, remain effectively unserved, constituting transport deserts (Lucas, 2012; Bocarejo, Oviedo, 2012).

Affordability: Survey data indicate 72% of respondents perceived BRI fares as affordable or very affordable (mean 3.86/5). However, this finding requires objective interpretation. The survey sampled only current BRI users, who represent a subset of Lagos commuters, likely those for whom the formal system is already accessible and financially viable. This sampling frame excludes the poorest commuters who remain entirely dependent on informal transport.

Consistent with this distributional concern, stakeholder interviews revealed that BRI fares, while competitive for longer trunk journeys, are typically higher than informal alternatives for short trips and feeder connections. The current fare structure lacks targeted concessions for the poorest users, with reduced fares limited to students and seniors (Rodrigue *et al*., 2025).

Accessibility for Vulnerable Groups: While newer stations include some universal design features, implementation is inconsistent (Rickert, 2021). Many BRT stations lack full accessibility for persons with disabilities or older adults (Peters, 2013). FLM services using standard-sized buses struggle to navigate narrow streets in dense neighbourhoods, limiting access where formal coverage is most needed (Uteng, Lucas, 2017). Concessions exist for students and seniors, but coverage is incomplete.

Safety: Safety perception was positive: 75% of respondents rated buses and terminals as safe or very safe (mean 3.88/5). This contrasts with perceived risks of the informal sector (Beukes *et al*., 2011). However, safety is compromised by crowding, 58% reported terminals as crowded or overcrowded, and 53% reported similar conditions on buses (Peters, 2013).

Informal Sector Integration: This dimension reveals the most significant deficit (Behrens *et al*., 2016; Ferro & Behrens, 2015). The BRI's approach has been primarily replacement rather than integration (Rizzo, 2017; Wood, 2015). While some *danfo* operators have been incorporated through cooperatives or employment, the majority have been displaced or continue to operate on unserved routes (Golub *et al*., 2009; Schalekamp and Behrens, 2020). Former drivers have often transitioned from informal entrepreneurship to unemployment, raising questions about social sustainability (Rizzo, 2017).

Diagnosing Dissonance

Based on the findings, the Lagos BRI occupies Quadrant II (Infrastructure Bias) of the SDG Synergy -Dissonance Framework: strong performance on SDG 9 indicators coexists with significant deficits in key SDG 11 dimensions (Wood, 2015; Rizzo, 2017). This pattern produces what the "islands of formality": pockets of high-quality modern service on major corridors (Ikorodu-TBS, Oshodi-Abule Egba), surrounded by persistent informality in the vast territories the formal network does not adequately serve (Salazar Ferro *et al*., 2015; Ferro, Behrens, 2015).

DISCUSSION

Mechanisms of Dissonance

Investment Prioritisation: Investing in high-demand corridors is rational for project financing, but it systematically underinvests in areas with the greatest coverage deficits (Bocarejo & Oviedo, 2012; Delmelle & Casas, 2012). This reflects findings from Bogotá's TransMilenio, where trunk corridors received priority while feeder routes remained underdeveloped (Bocarejo, Tafur, 2021; Hidalgo, Gutiérrez, 2013).

Political Economy of Space: Securing a dedicated right-of-way on major corridors required intense political negotiation with property owners, businesses, and transport unions, the process that consumed significant political capital and delivered visible, high-profile infrastructure. Extending services into peripheral areas faces less visible but equally entrenched barriers: land tenure complexity, street network morphology designed for pedestrian rather than vehicular movement, and the political power of informal operators have historically monopolised these routes.

Critically, the current configuration of "islands of formality" serves identifiable interests. Property owners along formalised corridors benefit from increased land values. Formal bus operating companies secure profitable

long-haul contracts. Political actors claim credit for modernisation without bearing the fiscal cost of subsidising unprofitable feeder routes. Meanwhile, informal operators retain control of peripheral areas, preserving their economic base even as they are displaced from prime corridors. This alignment of interests creates a powerful constituency for maintaining the two-tier system, helping explain why dissonance persists despite official commitment to universal access (Rizzo, 2017).

Financial Constraints: The FLM scheme operates with the lowest coverage ratio (44.5%) because it is the least financially viable (Carruthers *et al*., 2005). Serving low-density, low-income areas requires subsidy, yet the fiscal framework for cross-subsidisation from profitable corridors to unprofitable feeders remains underdeveloped (Rodrigue *et a*l, 2025; Gwilliam, 2013).

Integration Capacity: Integrating the informal sector requires institutional capacity for negotiation, monitoring, enforcement, and support that exceeds what even well-resourced agencies can muster (Behrens *et al*., 2016; Ferro and Behrens, 2015). The process is slow, contentious, and incomplete, mirroring challenges in Ghana's Aayalolo BRT (Asimeng, 2021) and South Africa's MyCiTi (Schalekamp, Behrens, 2020).

Gender Dimensions of Dissonance: The BTI's monitoring framework lacks gender-disaggregated data, a significant gap given SDG 11.2's attention to vulnerable groups. The trunk-oriented, schedule-fixed model poorly accommodates women's travel patterns trip chaining, caregiving responsibilities and, off-peak travel. Future reforms should prioritise gender-sensitive data collection and women's representation in transport governance. (Uteng & Lucas, 2017).

Implications for Sustainable Urban Mobility

The Lagos case offers cautionary lessons for urban transport reformers across the Global South (Pojani and Stead, 2015; Kumar and Barrett, 2008). Technical modernisation, however impressive, does not automatically deliver inclusive outcomes (Wood, 2015; Rizzo, 2017). This finding aligns with broader patterns in SDG implementation, where synergies between goals cannot be assumed but must be actively cultivated (Kuc-Czarnecka *et al*., 2023). Without deliberate attention to the social and spatial dimensions of sustainability, infrastructure investment may produce modern yet exclusionary systems that reinforce rather than reduce urban inequality (Lucas, 2012; Uteng and Lucas, 2017).

The concept of "islands of formality" contributes to understanding hybrid governance arrangements in Global South cities, where formal and informal systems coexist in complex, often unequal relationships (Behrens *et al*., 2016; Ferro and Behrens, 2015). This extends scholarship on urban fragmentation and enclave development (UN-Habitat, 2022; Salazar Ferro *et al*., 2015).

Building the Synergy Bridge

The Synergy Bridge concept offers pathways toward integrated sustainability (Nilsson *et al*., 2016; ICSU, 2017). For Lagos, this requires spatial strategies that aggressively expand FLM coverage through smaller, more manoeuvrable vehicles and by franchising existing danfo operators to preserve informal-sector flexibility while ensuring quality standards (Geurs and van Wee, 2004; Behrens *et al*., 2016). Social policies must implement pro-poor fare subsidies funded through cross-subsidisation, conduct accessibility audits with organisations of persons with disabilities, and address crowding through dynamic scheduling (Rodrigue *et a*l, 2025; Rickert, 2021). Economic mechanisms should establish dedicated urban mobility funds that combine fare revenue, value capture, and climate finance, with performance-based contracting linking operator remuneration to outcomes for both SDG 9 and SDG 11 (Gwilliam, 2013; ICSU, 2017). Governance arrangements must formalise informal sector engagement through permanent consultative mechanisms, include low-income community representatives, and publicly report disaggregated performance data (Behrens *et al*., 2016; UNSDG, 2022).

CONCLUSIONS

This paper introduced the SDG Synergy-Dissonance Framework as an analytical tool for evaluating urban transport interventions against the dual requirements of infrastructure development (SDG 9) and inclusive urbanism (SDG 11). Applying the framework to the Lagos Bus Reform Initiative reveals pronounced dissonance: strong performance in infrastructure modernisation coexists with significant deficits in spatial coverage, affordability, accessibility, and integration with the informal sector

(LAMATA, 2023; Ogunkoya, 2025).

This outcome, "islands of formality" in a sea of persistent informality, directly contradicts SDG 11.2's demand for universal access to sustainable transport. It demonstrates that technical modernisation does not automatically deliver inclusive outcomes. Without deliberate attention to social and spatial dimensions, infrastructure investment may produce modern yet exclusionary systems that strengthen urban inequality.

The Synergy Bridge concept offers pathways forward: spatial strategies that expand formal coverage to peripheral areas, social policies that ensure affordability, economic mechanisms that cross-subsidise equity, and governance arrangements that include informal operators and marginalised users. For Lagos, the task is not to abandon impressive infrastructure achievements but to build the synergy bridge that connects them to inclusive outcomes.

For the broader SDG project, the Lagos case demonstrates that goals are not self-implementing. The relationship between SDG 9 and SDG 11 is not automatically synergistic; it must be actively constructed through policy design, institutional capacity, and political commitment. The SDG Synergy-Dissonance Framework provides a tool for diagnosing when such construction is needed and charting ways toward integrated sustainability.

Framework Replicability

The SDG Synergy-Dissonance Framework is designed for application beyond Lagos. Cities across the Global South, including Nairobi with its BRT proposals, Accra with its Aayalolo system, and Dar es Salaam with its paratransit reforms, face comparable tensions between infrastructure modernisation and social inclusion. These cities can adapt this framework to uncover misalignments and develop context-specific pathways toward synergy. The framework's emphasis on informal-sector integration and distributional outcomes addresses a critical gap in conventional transport evaluation, offering planners a tool to ensure that the pursuit of technical efficiency does not reproduce or deepen existing inequalities. Future research should apply the framework comparatively across multiple cities to refine its indicators and develop typologies of transition pathways in diverse institutional contexts.

REFERENCES

Asimeng, E. T. (2021). Bus rapid transit implementation in African cities with incumbent paratransit operators: Lessons from Accra. *Urban, Planning and Transport Research, 9*(1), 534–548. https://doi.org/10.1080/21650020.2021.2000485

Behrens, R., McCormick, D., & Mfinanga, D. (Eds.). (2016). *Paratransit in African cities: Operations, regulation and reform*. Routledge. https://doi.org/10.4324/9781315849515

Beukes, E. A., Vanderschuren, M. J. W. A., & Zuidgeest, M. H. P. (2011). Context sensitive multimodal road planning: A case study in Cape Town, South Africa. *Journal of Transport Geography, 19*(3), 452–460. https://doi.org/10.1016/j.jtrangeo.2010.08.014

Bocarejo, J. P., & Oviedo, D. R. (2012). Transport accessibility and social inequities: A tool for identification of mobility needs and evaluation of transport investments. *Journal of Transport Geography, 24*, 142–154. https://doi.org/10.1016/j.jtrangeo.2011.12.004

Bocarejo, J. P., & Tafur, L. E. (2021). The evolution of TransMilenio and its impact on urban mobility in Bogotá. *Transportation Research Part A: Policy and Practice, 152*, 200–217. https://doi.org/10.1016/j.tra.2021.08.008

Carruthers, R., Dick, M., & Saurkar, A. (2005). *Affordability of public transport in developing countries* (Transport Paper No. TP-3). World Bank. https://documents.worldbank.org/en/publication/documents-reports/documentdetail/958451468315848375/affordability-of-public-transport-in-developing-countries

Cervero, R. (2013). Bus rapid transit (BRT): An efficient and competitive mode of public transport (Working paper). University of California, Berkeley. https://escholarship.org/uc/item/4sn2f5wc

Delmelle, E. C., & Casas, I. (2012). Evaluating the spatial equity of bus rapid transit-based accessibility patterns in a developing country: The case of Cali, Colombia. *Transport Policy, 20*, 36–46. https://doi.org/10.1016/j.tranpol.2011.12.001

Ferro, P. S., & Behrens, R. (2015). From direct to trunk-and-feeder public transport services in the Global South: A case study of Cape Town's MyCiTi. *Research in Transportation Economics, 48*, 175–183. https://doi.org/10.1016/

j.retrec.2014.09.038

Ferro, P. S., Muñoz, J. C., & Behrens, R. (2015). Trunk and feeder services regulation: Lessons from South American case studies. *Case Studies on Transport Policy, 3*(2), 264–270. https://doi.org/10.1016/j.cstp.2014.10.002

Geurs, K. T., & van Wee, B. (2004). Accessibility evaluation of land-use and transport strategies: Review and research directions. *Journal of Transport Geography, 12*(2), 127–140. https://doi.org/10.1016/j.jtrangeo.2003.10.005

Golub, A., Balassiano, R., Araújo, A., & Ferreira, E. (2009). Regulation of the informal transport sector in Rio de Janeiro, Brazil: Welfare impacts and policy analysis. *Transportation, 36*(5), 601–616. https://doi.org/10.1007/s11116-009-9215-y

Guest, G., Bunce, A., & Johnson, L. (2006). How many interviews are enough? An experiment with data saturation and variability. *Field Methods, 18* (1), 59–82. https://doi.org/10.1177/1525822X05279903

Gwilliam, K. (2013). Cities on the move: Ten years after. *Research in Transportation Economics, 40* (1), 3–18. https://doi.org/10.1016/j.retrec.2012.06.032

Hidalgo, D., & Gutiérrez, L. (2013). BRT and BHLS around the world: Explosive growth, large positive impacts and many issues. *Research in Transportation Economics, 39*(1), 8–13. https://doi.org/10.1016/j.retrec.2012.05.018

Holden, E., Linnerud, K., & Banister, D. (2017). The imperatives of sustainable development. *Sustainable Development, 25*(3), 213–226. https://doi.org/10.1002/sd.1647

International Council for Science. (2017). *A guide to SDG interactions: From science to implementation*. https://council.science/publications/a-guide-to-sdg-interactions-from-science-to-implementation/

Kuc-Czarnecka, M., Markowicz, I., & Sompolska-Rzechuła, A. (2023). SDGs implementation, their synergies, and trade-offs in EU countries: Sensitivity analysis-based approach. *Ecological Indicators, 146*, Article 109888. https://doi.org/10.1016/j.ecolind.2023.109888

Kumar, A., & Barrett, F. (2008). *Stuck in traffic: Urban transport in Africa*. World Bank. https://openknowledge.worldbank.org/handle/10986/6460

Lagos Metropolitan Area Transport Authority. (2023). *Compendium 2013–2023*. Lagos State Government.

Lucas, K. (2012). Transport and social exclusion: Where are we now? *Transport Policy, 20*, 105–113. https://doi.org/10.1016/j.tranpol.2012.01.013

Nilsson, M., Griggs, D., & Visbeck, M. (2016). Policy: Map the interactions between Sustainable Development Goals. *Nature, 534*(7607), 320–322. https://doi.org/10.1038/534320a

Ogunkoya, S. A. (2025). *Performance assessment of bus reform schemes for sustainable mobility in Lagos State: Lessons and way forward* (Doctoral thesis, Lagos State University). Lagos State University Institutional Repository.

Oviedo, D., Sabogal, O., Villamizar Duarte, N., & Chong, A. Z. W. (2022). Perceived liveability, transport, and mental health: A story of overlying inequalities. *Journal of Transport & Health, 27*, Article 101513. https://doi.org/10.1016/j.jth.2022.101513

Peters, D. (2013). *Gender and sustainable urban mobility*. UN-Habitat.

Pojani, D., & Stead, D. (2015). Sustainable urban transport in the developing world: Beyond megacities. *Sustainability, 7*(6), 7784–7805. https://doi.org/10.3390/su7067784

Rickert, T. (2001). *Mobility for all: Accessible transportation around the world*. Health and Welfare Ministries, General Board of Global Ministries.

Rizzo, M. (2017). *Taken for a ride: Grounding neoliberalism, precarious labour, and public transport in an African metropolis*. Oxford University Press. https://doi.org/10.1093/oso/9780198794240.001.0001

Rodrigue, J. P. (2020). *The geography of transport systems* (5th ed.). Routledge. https://doi.org/10.4324/9780429346323

Rodrigue, L., Badami, M. G., & El-Geneidy, A. (2025). Evaluating the effects of fare characteristics on fare equity: A scoping review. *Journal of Public Transportation, 27*, Article 100140. https://doi.org/10.1016/j.jpubtr.2025.100140

Schalekamp, H., & Behrens, R. (2020). Engaging the paratransit sector in the development of public transport reform in South Africa: A critique of the MyCiTi model. *Research in Transportation*

Economics, 83, Article 100112. https://doi.org/10.1016/j.retrec.2020.100112

United Nations. (2015). *Transforming our world: The 2030 agenda for sustainable development* (A/RES/70/1).

UN-Habitat. (2022). *Global report on urban planning and sustainable mobility*.

United Nations Statistics Division. (2022). *Sustainable development goals indicators: Global indicator framework*. https://unstats.un.org/sdgs/indicators/indicators-list/

Uteng, T. P., & Lucas, K. (Eds.). (2017). *Urban mobilities in the global south*. Routledge. https://doi.org/10.4324/9781315265094

Wood, A. (2015). The politics of policy circulation: Unpacking the relationship between South African and South American cities in the adoption of bus rapid transit. *Antipode, 47*(4), 1062–1081. https://doi.org/10.1111/anti.12135

Zwitter, A., Bloch, C., Ellis, G., Hecht, R., Hernandez, A., Hoffman, W., Rickles, D., Sukhomlinova, V., & Ura, K. (2025). Human flourishing: An integrated systems approach to development post-2030. *Earth System Governance, 23*, Article 100236. https://doi.org/10.1016/j.esg.2025.100236