



(Picture source: *Fichier:Chapa tra-ic jam in Maputo (9717216968).jpg* — Wikipedia, no date)

An Economic Case for Investing in Walking and Public Transport Infrastructure -A Maputo Case Study

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This third-year research project, undertaken for modules CEGE0017 and CEGE0018: *Civil Engineering 3rd Year Project 2024/25*, is submitted in partial fulfilment of the requirements for the BEng in Civil Engineering at University College London.

DECLARATION & PERSONAL STATEMENT

The project has been carried out by Nelson Cosme

The author has read and understood the College's policy regarding plagiarism and the submission of coursework. The authors confirms that, except for commonly understood ideas and concepts, or where specific reference is made to the work of other authors, the contents of this report are their own work. This dissertation is presented in pages including bibliography and appendices. It contains approximately 9566 words, 8 figures and 9 tables.

Signature:



Date: 11/04/2025

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Abstract

Urban Mobility systems in Sub-Saharan Africa face severe challenges driven by rapid urbanisation, underinvestment, and dependence on informal transport networks. These dynamics hinder accessibility, reinforce socio-economic inequalities, and increase vulnerability to climate risks. This research project investigates the economic case for investing in walking and public transport infrastructure in Sub-Saharan Africa cities, using Maputo, Mozambique, as a case study. It evaluates whether public investment patterns align with sustainable urban mobility principles, defined here as transport strategies that are environmentally responsible, socially inclusive, and economically viable.

Using a mixed-methods approach combining semi-structured interviews with key stakeholders and policy document analysis, the research explores barriers and opportunities for transitioning toward SUM. The findings reveal a persistent misalignment between sustainability and actual investment, with funding still disproportionately favouring road infrastructure and car-centric development. Institutional fragmentation, fiscal constraints, and socio-cultural biases toward private car ownership further obstruct progress. Despite these challenges, emerging initiatives in the region such as multimodal integration, climate finance instruments, and innovative financing methods highlight potential pathways for reform.

This study argues that SUM should be reframed not merely as an environmental goal, but as a catalyst for inclusive economic growth, resilience, and equity. It concludes with policy recommendations aimed at strengthening institutional capacity, improving financing strategies, and promoting culturally relevant, context-specific mobility solutions. To support this, it also proposes a small policy brief for policymakers, stakeholders, and local actors in Maputo. Ultimately, sustainable transport investments in cities like Maputo can unlock broader development outcomes and contribute meaningfully to global climate, economic resilience, and equity goals.

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Abbreviations

Afdb	African Development Bank
BRT	Bus Rapid Transit
GHG	Greenhouse Gas
GDP	Gross Domestic Product
JICA	Japan International Cooperation Agency
NMT	Non-motorised transport
PPP	Public-Private Partnership
SDGs	Sustainable Development Goals
SSA	Sub-Saharan Africa
SUM	Sustainable Urban Mobility
UN	United Nations
UN-Habitat	United Nations Human Settlements Programme
WB	World Bank

Glossary

Active Travel

Forms of transport that involve physical activity, primarily walking and cycling, often promoted for their health, environmental, and cost benefits.

Bus Rapid Transit (BRT)

A high-quality bus-based transit system that delivers fast, comfortable, and cost-effective services through dedicated lanes, priority at intersections, and efficient boarding systems.

Car-Centric Development

Urban development models that prioritise private vehicle use over public or non-motorised transport (NMT), often leading to congestion, pollution, and spatial inequality.

Climate Finance

Funding from public, private, or international sources aimed at supporting mitigation and adaptation strategies to address climate change, including low-carbon urban transport.

Collective Transport

Transport modes shared by multiple users, including buses, minibuses (e.g., chapas), trains, and shared taxis, typically offering more affordable mobility options.

Donor Dependency

A condition in which governments rely heavily on international aid or concessional finance for development projects, often limiting domestic policy autonomy.

Fiscal Space

The budgetary capacity of a government to allocate resources without compromising fiscal sustainability, typically constrained in low-income countries by debt obligations.

Green Bonds

Fixed-income financial instruments designed to fund projects that have positive environmental or climate benefits, including sustainable transport infrastructure.

Institutional Fragmentation

A condition where overlapping or poorly coordinated government agencies hinder efficient planning, decision-making, and implementation of public policies.

Land Value Capture

A financing mechanism in which governments recover a portion of increased land value resulting from infrastructure investment to fund development projects.

Minibuses (Chapas)

Informal or semi-formal shared transport vehicles widely used in SSA cities like Maputo, often unregulated but vital for urban mobility.

Multimodal Integration

The coordination of different transport modes (e.g., walking, cycling, buses, rail) into a unified system that allows for seamless, efficient travel.

Non-Motorised Transport (NMT)

Transport modes that do not require motorised power, including walking, cycling, and other human-powered means.

Public-Private Partnership (PPP)

A contractual arrangement between a public agency and a private sector entity to deliver infrastructure or services, with shared risks and rewards.

Sustainable Development Goals (SDGs)

A universal set of 17 goals established by the United Nations to address global challenges like poverty, inequality, and climate change by 2030.

Sustainable Urban Mobility (SUM)

Transport systems that are environmentally friendly, socially inclusive, and economically viable, promoting active and collective transport over car dependency.

Transport-Oriented Development

Urban planning strategy that concentrates housing, jobs, and services around public transport nodes to encourage sustainable travel behaviour.

1 Introduction

As cities across the Global South experience rapid growth, urban mobility emerges as a critical challenge. The combination of rapid urbanisation, underinvestment in infrastructure, and reliance on informal transport networks has severely constrained accessibility, limiting equitable development, and deepening socio-economic disparities. Addressing these challenges requires a shift toward Sustainable Urban Mobility (SUM), which prioritises active and collective travel modes like walking, cycling, and public transport. In this study, SUM is defined as a set of transport strategies that are environmentally responsible, socially inclusive, and economically viable. Such investments have significant potential to promote inclusive economic growth, reduce environmental impact, and align urban development with global sustainability goals, including the United Nation's Sustainable Development Goals (SDGs) and the Paris Agreement.

This project seeks to evaluate the economic case for investing in walking and public transport infrastructure in Sub-Saharan African (SSA) cities with a focus on Maputo. It is guided by the hypothesis that public authorities in cities like Maputo continue to invest disproportionately in car-oriented urban development, potentially undermining the shift toward more inclusive and sustainable mobility systems. Through this lens, the research will explore how sustainable investments can address infrastructure deficits, enhance mobility, and foster resilience against climate and socio-economic risks.

The study is guided by the following research questions:

1. To what extent are public investments in Maputo aligned with sustainable urban mobility objectives?
2. What are the socio-economic implications linked with investments in active travel and public/collective transport versus car-oriented developments in Sub-Saharan African cities such as Maputo?

The research will focus on analysing transport infrastructure investments and gathering stakeholder insights on SUM. By investigating barriers and opportunities for SUM, this study aims to provide insights that inform policies, attract investment, and drive a sustainable transition for cities in the Global South. Ultimately, this research seeks to demonstrate how investments in sustainable transport can not only mitigate urban challenges but also serve as a tool for equitable, inclusive, and climate-resilient development.

2 Literature Review

2.1 Global Context

2.1.1 Importance of Sustainable Development

Sustainable development is the practice of meeting present needs while ensuring future generations can meet theirs, balancing environmental, social, and economic priorities (Elliott, 2012). It emphasises the need to align human progress with environmental preservation, whilst considering equity between generations and addressing key challenges. Central to this approach is the maintenance of what is referred to as the “stock of quality-of-life assets” (Holmberg and Sandbrook, 2019), which refers to the essential resources and systems that sustain the well-being of societies, such as clean water, fertile soil, and healthy ecosystems. Consequently, taking a proactive approach to preserve these resources, and foster progress aligned with sustainable development is essential.

However, to achieve substantial outcomes sustainable development must transition from theoretical frameworks to practical implementation. Policies based on sustainable development principles can empower populations, improve their quality of life, and open pathways for economic growth (Beckerman, 2017).

2.1.2 Sustainable Development Goals

Established by the United Nations in 2015, the Sustainable Development Goals (SDGs), act as a comprehensive guide for tackling critical challenges like poverty, inequality, and climate change while fostering growth and environmental sustainability. With 17 goals (see Figure 1) and 169 targets, the aim of the SDGs is to address global challenges comprehensively, ensuring progress in areas like economic development don't come at the cost of environmental preservation or social equity (United Nations, 2015).

SDG 11, for example, focuses on building inclusive, safe, resilient, and sustainable cities, emphasising SUM as a strategic pathway to align urban development with sustainable practices. Furthermore, urban mobility directly impacts multiple SDGs, including health (SDG3), economic growth (SDG8), and climate action (SDG13), highlighting its critical role in achieving SDGs. Nevertheless, the SDGs require localised strategies to succeed. Sustainable mobility solutions must consider regional cultural, economic, and infrastructural contexts to support environmental sustainability while enhancing access to essential services and opportunities (Allen, Metternicht and Wiedmann, 2018).



Figure 1: The 17 Sustainable Development Goals (Source: The 17 Sustainable Development Goals Established by the UN - Google Search, 2015)

2.1.3 Climate Action and Urban Mobility

Transportation systems are a major source of greenhouse gas emissions (GHG) (see Figure 2), making them a critical focus for climate change mitigation efforts. The Paris Agreement underscores this urgency by committing UN member states to achieve net-zero emissions by 2050, and to limit global warming to 1.5°C (Teebken et al., 2022; Newell, Twena and Daley, 2021). Transforming urban transport systems is essential to meet this target, as current car-centric models are not only emission-intensive but also increase cities' vulnerability to climate impacts (Hickman and Banister, 2014).

Sustainable transportation alternatives, including active modes of travel and public transit systems, offer significant benefits. These systems can reduce emissions, build resilience, and foster equity (Poudenx, 2008). To succeed, it is vital to implement adaptive systems that address both environmental and social challenges while reducing reliance on private vehicles.

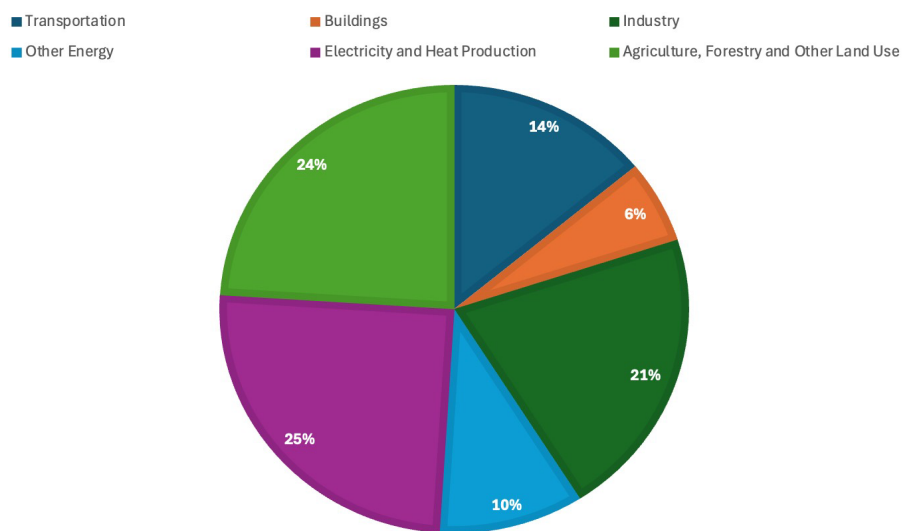


Figure 2: Global Greenhouse Gas Emissions by Economic sector (Source: Global Greenhouse Gas Emissions by Economic Sector, 2024)

2.2 Economic Implications of Urban Transport

2.2.1 Economic Development in Low-Income Countries

Economic development is the process of improving quality of life through income growth, diversification, and equitable access to opportunities. In low-income countries, it is often driven by financial development, which facilitates credit access to fund critical infrastructure projects, including those related to urban mobility (Bist, 2018).

In SSA, economic dependence on raw material exports makes countries vulnerable to fluctuations in global commodity prices (Katoka and Dostal, 2022). This economic instability, coupled with insufficient funding, significantly limits investments in vital infrastructure, resulting in inadequate urban mobility systems and limited economic development.

While these countries can employ strategies like leveraging local resources, fostering public private-partnerships (PPPs), and promoting community-driven initiatives (Rogerson and Rogerson, 2010). Their policies often neglect sustainable development principles and stakeholder engagement. Without these, such investments risk achieving short-term economic gains at the expense of long-term resilience and equitable progress.

2.2.2 Economic Role of Transport in Urban Development

Transport infrastructure enhances accessibility, reduces costs, and supports economic productivity. Investments in transport infrastructure directly stimulates public investment and indirectly improve productivity across sectors by facilitating market access, labour mobility, and business efficiency (Koźlak, 2017). These systems attract both local and foreign investment and drive regional competitiveness.

Moreover, transport infrastructure transforms the spatial distribution of economic activities, by expanding commuting ranges, stimulating job creation, and influencing migration patterns (De Vos and Witlox, 2013). These investments drive economic transformation and help reduce regional inequalities in developing regions. Nevertheless, transport investments are widely considered a "necessary but not sufficient" factor for economic development (John Swanson, 2003). Therefore, while essential, transport investments must be completed by other policies and investments to achieve sustainable economic growth. Highlighting the need for strategic investments in sustainable infrastructure.

2.2.3 Economic Issues Related to Car-Oriented Development

Car-oriented development represents a significant economic challenge to individuals and on the society (see Figure 3). From 2010 to 2019, car ownership in Africa grew by 27%, exceeding the global average of 16% (*Africa - SLOCAT Transport and Climate Change Global Status Report*, no date). Which leads to increased congestion, pollution and infrastructure costs. These investments divert funds from sustainable transport, reinforcing car dependency and limiting inclusive, sustainable mobility (Godefrooij et al., 2009).

This model also troubles low-income households forced to own vehicles due to inadequate public transport, causing "car-related economic stress" from high ownership and maintenance costs (Mattioli and Colleoni, 2016; Heinonen et al., 2021). As a result, those without cars face restricted access to jobs, education, and healthcare, disempowering vulnerable populations increasing socio-economic inequalities, and slowing overall economic progress (Mattioli and Colleoni, 2016).



Figure 3: Adverse Impacts of Car-Centric Development Figure adapted from (Cavoli 2021).

2.3 Sustainable Urban Mobility

2.3.1 Significance of Sustainable Urban Mobility

SUM refers to “environmentally friendly”, accessible, and efficient transport systems that prioritise public transit, walking, and cycling. It aims to meet mobility needs while minimising environmental and social impacts, making it one of the pillars of urban development (Oviedo *et al.*, 2022). By reducing environmental harm and fostering social inclusivity, SUM improves access to essential services and economic opportunities, contributing to more equitable and sustainable urban environments (Stojanović, Simeunović and Cvitković, 2023).

2.3.2 Socioeconomic Benefits of Active and Collective Travel

Active travel modes, along with collective transport, offer significant socioeconomic benefits, as illustrated in Figure 4. These modes provide cost-effective infrastructure solutions with high benefit-cost ratios, especially in reducing health-related expenditures and improving overall quality of life (Powell *et al.*, 2010). Investing in walking and public transport infrastructure not only supports economic development but also mitigates the negative impacts of car dependency, reducing carbon emissions and enhancing public health (Bertolini, 2012).

By lowering transportation costs and improving access to essential services and job markets, these investments drive equitable economic growth. These outcomes align with global development goals, underscoring the vital role of walking and public transport infrastructure in promoting resilient, inclusive, and sustainable urban development (Cavoli, 2021).

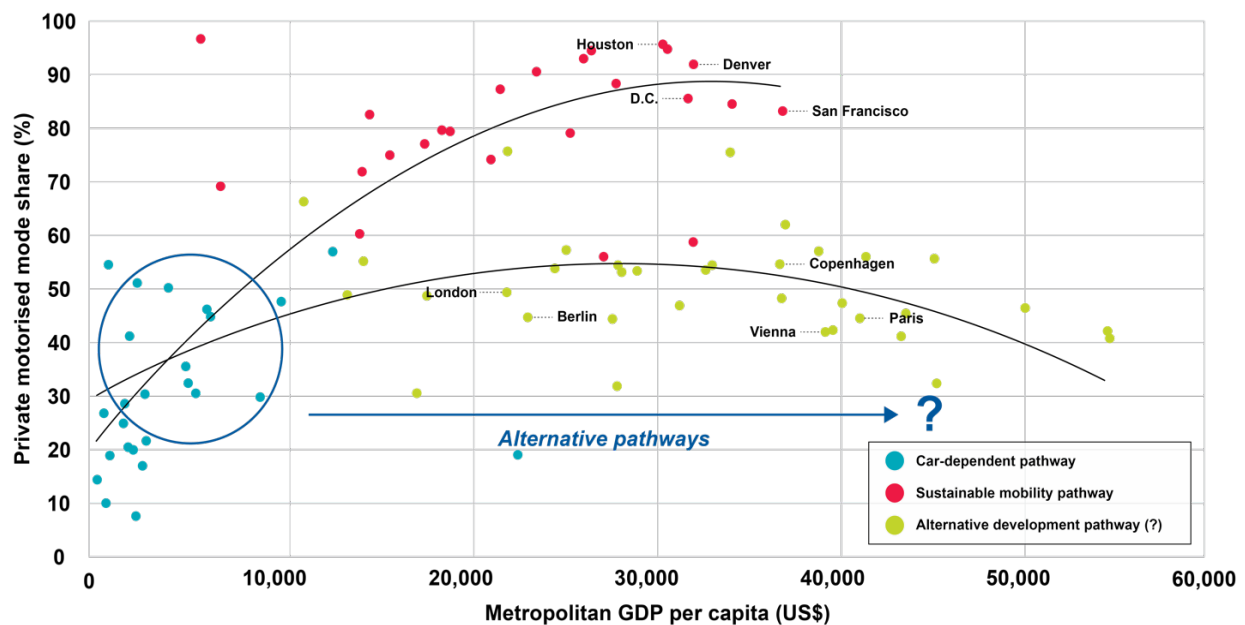


Figure 4: Leapfrogging to alternative urban development trajectories (Source: Cavoli, 2021)

2.3.3 Challenges of Transitioning to Sustainable Mobility

The shift to SUM faces significant challenges, including car-centric policies and fragmented governance, which limit the implementation of coordinated strategies for active travel modes (Kiviluoto *et al.*, 2022). Limited funding, especially in the Global South, and cultural resistance to reducing car dependency further amplify these obstacles.

Overcoming these barriers requires systemic reforms, such as improved governance, the development of bankable projects that attract more investors, and active public engagement (Climate Bonds Initiative, 2022). Additionally, urban congestion and socio-economic disparities worsen inefficiencies, highlighting the need for further research and data to inform strategies that promote sustainable mobility solutions tailored to specific regional contexts.

2.4 Rapid Urbanisation and Transport Systems

2.4.1 Importance of Rapidly Growing Cities

Rapidly growing cities, particularly in regions like SSA, are central to global economics and population growth but also face significant challenges (Pfister, Schultze and Hellweg, 2015). Urbanisation in these areas often outpaces the development of infrastructure and services, resulting in unemployment, underemployment, and environmental degradation. Unplanned urbanisation also increases risks from climate change, including flooding, landslides, and heatwaves (Parnell, Simon and Vogel, 2007).

While literature rightly explores the challenges of rapid urbanisation, SUM often remains overlooked, despite its critical role in addressing these issues and mitigating global warming. Integrating SUM into urban planning is essential for balancing the pressures of rapid growth with the need for equitable resilient urban development (Hu *et al.*, 2023). Solutions must prioritise infrastructure that supports SUM and that can help create sustainable and climate-resilient cities.

2.4.2 Opportunities for Sustainable Mobility in Growing Cities

Growing cities, particularly in the Global South, offer significant opportunities to implement sustainable mobility strategies. Integrating transport and land-use planning can create compact, transit-oriented developments that reduce car dependency and promote active modes of travel (Cavoli, 2021). Investments in sustainable infrastructure, including affordable public transit and NMT infrastructure, can lower GHG, and benefit underserved communities (Giduthuri, 2015).

However, tailored solutions and active stakeholder engagement are critical to addressing unique urban challenges. Strategic policies, adequate financial investment, and effective governance are essential to reach equitable and sustainable development. This highlights the potential for economic progress to coexist with environmental and social equity goals.

2.5 Sustainable Urban Mobility in Sub-Saharan African Cities:

2.5.1 Context and Challenges

SSA cities face significant barriers to achieving SUM, due to rapid urbanisation, underdeveloped infrastructure, and persistent socio-economic inequalities (Oviedo et al, 2022). The region's urban population growth has outpaced investment in essential transport systems, leading to heavy reliance on informal transport modes, such as paratransit, and walking. Funding constraints, economic barriers, and inadequate transport policies further amplify these challenges.

Despite these obstacles, SUM offers transformative potential (see Figure 4). Investments in sustainable transport can improve mobility for underserved communities in a sustainable manner, boosting economic productivity (Cavoli, 2021). Moreover, addressing the region's investment gap through innovative financing and coordinated planning is another key to unlocking this potential.

However, with 48 countries comprising SSA, each with unique cultural, economic, and infrastructural contexts (World Bank Group, 2023), solutions must be localised and specific for

their context. Thus, tailored approaches are essential to ensure, that SUM initiatives are both effective and culturally relevant.

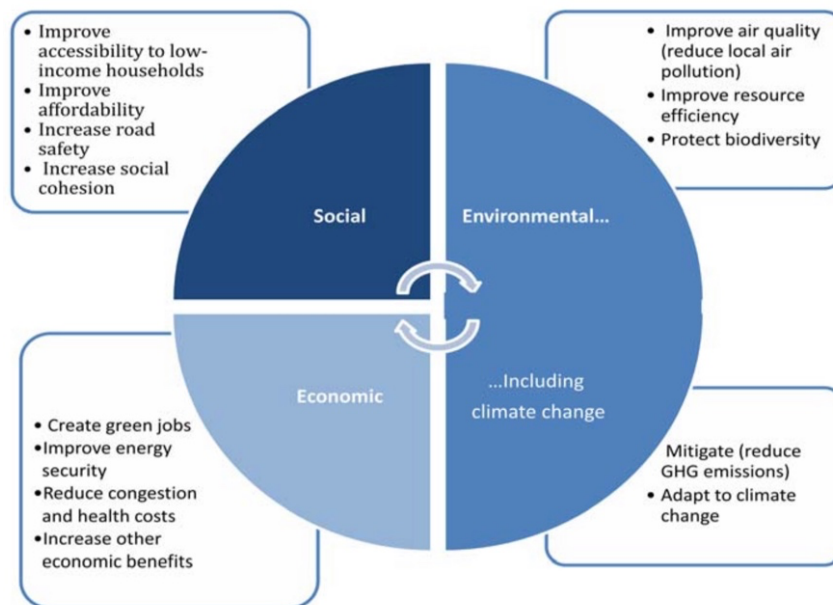


Figure 4: Benefits of Sustainable Transport Infrastructure (Source: Ang, 2013).

2.5.2 Transport policies in Sub-Saharan Africa

Transport policy in SSA cities faces numerous challenges, including infrastructural deficits, socio-economic constraints, and fragmented planning. Policies often prioritise road expansion for private vehicles over sustainable transport options (Osei – Kyei and Chan, 2016). This is influenced by the region's reliance on raw material exports and a car-oriented mindset, where car ownership is viewed as both a necessity and a status symbol. But existing gaps in infrastructure, elevate transport costs, cause delays, and expand economic distance, thereby reducing SSA's global competitiveness (Shara Aranoff *et al.*, 2009).

Furthermore, weak stakeholder coordination and underdeveloped regulatory frameworks further obstruct effective planning and financing for SUM (*Building a Strong Foundation for Urban Mobility in Africa: Lessons from Urban Transport Authorities | SSATP*, no date). These inefficiencies divert resources from SUM projects, deepening inequalities, environmental challenges, and unsustainable growth. To overcome these barriers and implement effective SUM, strong, well-coordinated policies aligned with sustainability principles are essential (Corfee-morlot *et al.*, 2012). (see Figure 5)

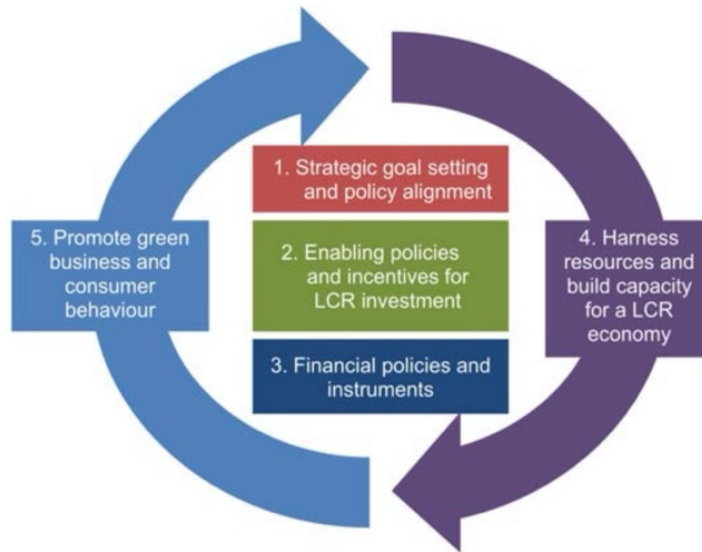


Figure 5: Green Investment Policy Framework (Source: Corfee-morlot et al., 2012)

2.5.3 Informal Economy in Urban Mobility

Urban informalities significantly shape city development in SSA cities, filling critical gaps left by formal systems. Informal economies provide essential employment opportunities, stabilise household incomes, and address basic needs (Azunre *et al.*, 2022). Informal transport systems, such as minibuses and motorcycles, offer cost-effective, flexible mobility for underserved populations. However, these systems often lack safety standards and reliability, exposing vulnerable populations to unsafe conditions and limited access to essential services (Oviedo et al., 2022). This reliance underscores the urgent need for safer and more reliable alternatives.

Operating outside regulatory frameworks, these systems also contribute to challenges like tax evasion, which undermines national economies and complicates their integration into formal urban planning (Berga, 2024). Despite these issues, informal transport remains crucial in areas with limited formal infrastructure. The transition to SUM must integrate and improve informal systems while formalising sustainable alternatives. Policies, should therefore, focus on enhancing the efficiency, safety, and inclusivity of informal transport to align them with long-term goals for equitable sustainable development.

2.6 Financing Sustainable Urban Mobility in Sub-Saharan Africa

2.6.1 Financing Constraints

The rapid increase in global demand for passenger and freight transport, particularly in SSA, has contributed to a major infrastructure investment gap. Global needs are projected to reach \$120 trillion by 2050 (Ang, 2013), with SSA alone requiring \$130–\$170 billion (Nyamkure, 2022). Yet, the region currently faces a funding shortfall of about \$100 billion annually (The push to close Africa’s infrastructure funding gap | Devex, 2024). This underinvestment limits the development of sustainable transport systems and deepens existing social and economic inequalities.

Many SSA governments lack the fiscal capacity to finance large-scale, long-term SUM projects. High debt servicing burdens, limited public revenue, and the substantial upfront costs

of feasibility studies and regulatory approvals act as significant barriers to accessing both public and private capital (Gutman et al., 2015; Were, 2024). Political instability, macroeconomic volatility, and currency risk further undermine investor confidence, while many projects remain too small or under-structured to attract private investment (Mercer, 2018; Dinga and Fonchamnyo, 2021).

In this constrained environment, international donors such as the World Bank (WB), African Development Bank (AfdB), and bilateral partners play a central role in financing transport projects. In SSA donor funding is not merely supplementary but essential to implementing urban mobility initiatives (Briceño-Garmendia, Smits and Foster, 2008). However, reliance on external funding often drives project selection, limiting the ability of local governments to allocate resources strategically or respond to community-specific needs. While donor engagement brings critical financial and technical expertise, it can also result in externally driven agendas that constrain the development of locally tailored and inclusive mobility solutions (Cavoli *et al.*, 2025).

2.6.2 Mobilising Private Capital for Sustainable Urban Mobility

Mobilising private investment is essential to bridge the financing gap for SUM projects in SSA. Given the high upfront costs, long payback periods, and perceived risks, attracting private capital requires financial instruments that improve the cost and risk-return profile of such projects.

A range of instruments such as PPPs, green bonds, concessional loans, and value capture mechanisms, can support this goal by enhancing financial viability and distributing risk (see Table 1). The tools offer pathways to access climate finance, generate local revenue, and enable long-term private sector engagement (Kaminker and Stewart, 2012; Suzuki, Cervero and Iuchi, 2013). Meanwhile, loan guarantees and credit enhancement mechanisms can help mitigate financial risks and improve investor confidence, particularly for large-scale urban transit systems (Garbacz, Vilalta and Moller, 2021).

However, the effectiveness of these instruments depends on the presence of a transparent and supportive financial regulatory environment. Private capital can play a transformative role in delivering inclusive, low-carbon transport but only when paired with strong public policy and financial planning.

Table 1: Financial Instruments Supporting Private Sector Involvement in SUM

Instrument	Level of Application	Key Advantages
Public Private Partnerships (PPPs)	Local	Enables risk-sharing with public entities, lowering exposure and improving project bankability.
Green Bonds	International	Provides access to sustainable finance markets and institutional investors for large-scale projects.
Grants and Concessional Loans	International, National, Local	Reduces initial capital burden, improving financial viability for private investors.

Land Value Capture Mechanisms	Local	Generates revenue from increased land values, offering returns through joint development opportunities.
Loan Guarantees & Risk Mitigation Tools	National, Local	Minimises financial risk and borrowing costs, encouraging long-term private sector commitment.

2.6.3 Examples of Regional Projects

While global examples of innovative transport financing are well documented, several successful cases have also emerged within SSA, offering regional inspiration. One example is Nairobi, Kenya, where the development of commuter rail services illustrates how PPPs can help bridge infrastructure gaps and transform urban mobility (Kamau, 2016). Led by Kenya Railways Corporation in partnership with private investors such as InfraCo Africa, a private infrastructure development group. They were able to modernise Nairobi's aging rail network and integrate it with other transport modes (Ncube and Lufumpa, 2017). The project delivered upgrades to rail infrastructure and stations, enhancing reliability, affordability, and capacity. It provided a sustainable alternative to car-dominated travel and informal minibuss systems, helping reduce congestion lower emissions, and shorten commute times (International Trade Administration, 2025). Beyond mobility gains, the initiative also supported economic productivity and demonstrated how PPPs can effectively share investment risk and deliver long-term, low-carbon urban transport solutions.

However, while Nairobi's case shows the promise of PPPs, it also highlights the need for context-specific strategies. African cities face diverse socio-economic and institutional challenges, making locally informed investment decisions essential for advancing sustainable mobility (Richter *et al.*, no date).

2.7 Case Study: Maputo, Mozambique

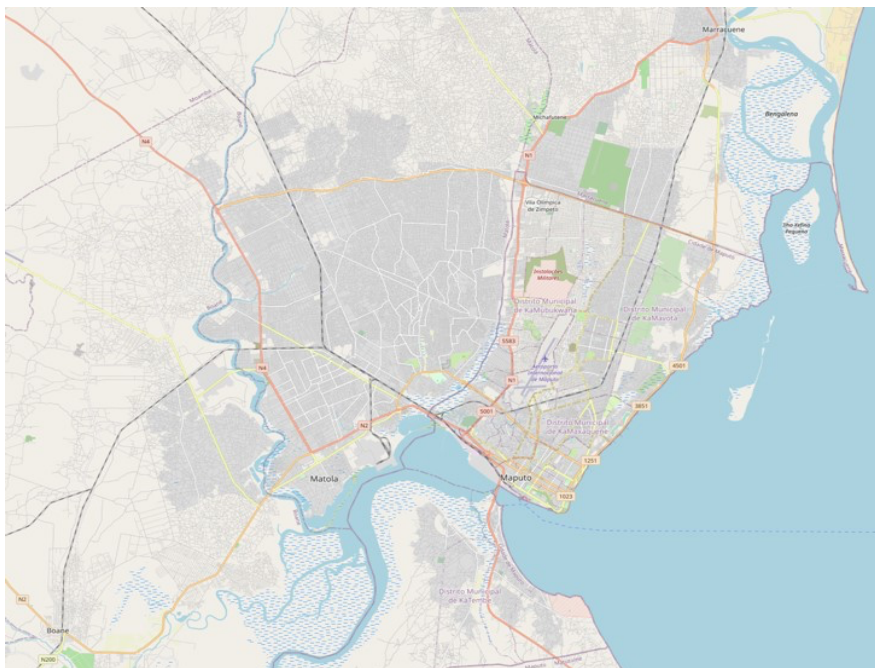


Figure 6: Map of Maputo (Source: © OpenStreetMap contributors)

2.7.1 Geography

Maputo, the Capital of Mozambique, is situated in the southernmost part of the country within the Maputo Metropolitan Area, covering an area of 347 km along the Indian Ocean coast, with altitudes reaching up to 62 meters. The city experiences a tropical savanna climate, bordering on a hot semi-arid climate (Hake, 2016).

Maputo's climate is characterised by an average annual precipitation of about 815 mm. The annual mean temperature is 22.8 °C, with January as the hottest month at 26.3 °C (*Maputo climate: weather by month, temperature, rain - Climates to Travel*, no date). Maputo's climate, marked by its tropical savanna characteristics, faces growing threats from global warming, including increased heatwaves, rising sea levels, and coastal erosion. (*Maputo's water woes show wider African climate challenges with too much rain and too little | WaterAid Australia*, no date). These challenges underscore the urgent need for resilient and sustainable urban planning to safeguard the city's mobility and overall liveability.

2.7.2 Socioeconomic Context:

Maputo was selected as the case study for this research because it encapsulates the key challenges and opportunities facing rapidly urbanising cities in SSA. Being Mozambique's political and economic centre Maputo faces challenges from rapid urban growth and reliance on informal transport systems. The Greater Maputo Metropolitan Area, home to three million people, contributes to over 20% of the national GDP. The population is projected to grow to 3.7 million by 2035 (see Figure 7), straining the region's infrastructure and planning capacity (Japan International Cooperation Agency, 2014).

Urban expansion has led to poor land use and significant segregation, with most economic activity concentrated in the central business district (CBD), causing severe impacts on the country's economic productivity. NMT travel accounts for 45% of trips, while Chapas (semi-formal minibuses) and My Loves (flatbed trucks) dominate motorised transport, handling almost 33% of trips but operate with minimal regulation and limited accessibility for underserved areas (see Figure 8) (Klopp and Cavoli, 2019; Tejada et al., 2023).

Investing in walking and public transport infrastructure can therefore offer transformative opportunity for Maputo. SUM can reduce and mitigate socioeconomic disparities and risks while driving inclusive economic growth.

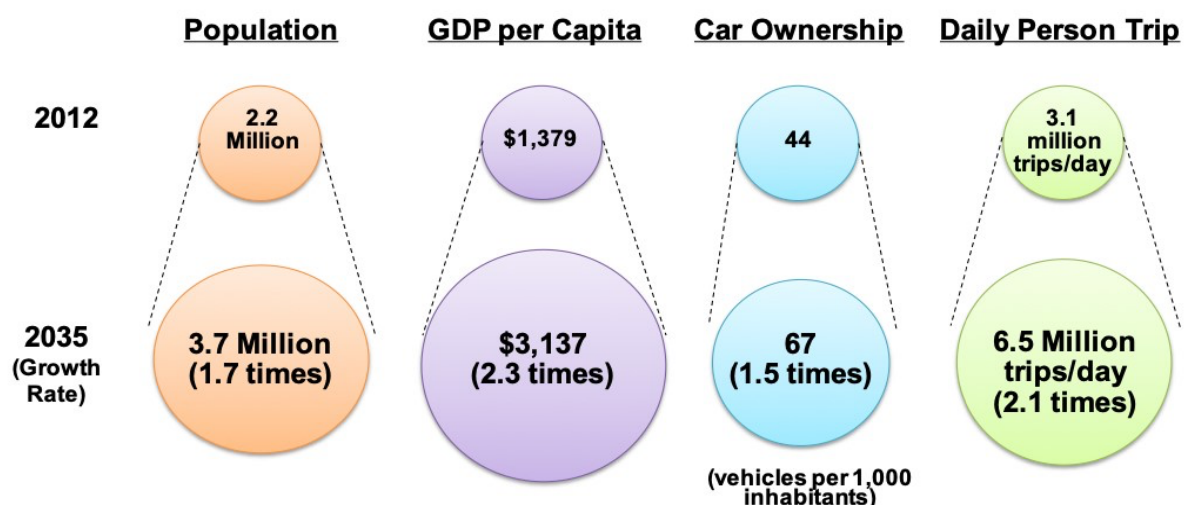


Figure 7: Projected Growth in Population, Economy, and Traffic Demand in Maputo, 2012–2035 (Source: Japan International Cooperation Agency, 2014)

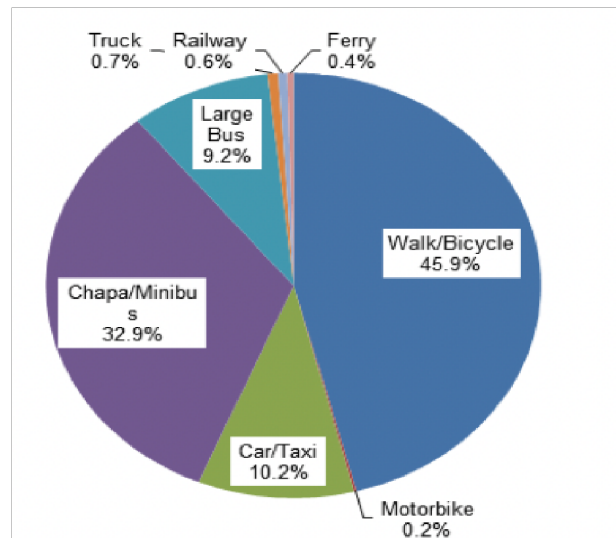


Figure 8: Existing Modal Split in Maputo (2012) (Source: Japan International Cooperation Agency, 2014)

2.8 Gaps in existing research

While the benefits of SUM in addressing urban inequalities and climate challenges are widely acknowledged existing research often fails to evaluate how infrastructure investments in SSA cities align with these goals. There is limited analysis on the extent to which public investment strategies support active and collective travel over car-oriented development, particularly in under-researched contexts like Maputo. Furthermore, few studies assess whether public spending prioritises active and collective mode over car-oriented development or examine the socio-economic trade-offs of these choices. This is further compounded by gaps in data and outdated records further limiting analysis and policy making. This study tries to address these gaps by critically examining the alignment of current investment patterns in Maputo with SUM principles and assessing their broader socio-economic implications.

3 Research Plan

3.1 Research Questions

Given the need for sustainable urban transition in SSA, the aim of this project is to evaluate the economic case for investing in walking and public transport infrastructure in SSA cities, focusing on Maputo as a case study. This involves assessing how such investments align with SUM objectives while trying to identify key local challenges. By exploring the socioeconomic and environmental impacts of prioritising active and collective travel modes, the study seeks to highlight their potential to foster equitable urban development and resilience.

The hypothesis driving this research highlights that public authorities in cities like Maputo continue to invest disproportionately in car-oriented urban development, which risks slowing the transition to more sustainable and equitable mobility systems. This project aims to investigate this hypothesis through the following research questions:

1. To what extent are public investments in Maputo aligned with sustainable urban mobility objectives?
2. What are the socio-economic implications linked with investments in active travel and public/collective transport versus car-oriented developments in Sub-Saharan African cities such as Maputo?

3.2 Methodology

This section outlines the research design, data collection methods, and analytical approach used to investigate the extent to which public investments in Maputo align with SUM objectives and the socio-economic implications of transport investment choices. Given the complexity of urban transport planning and investment decision-making, this study will employ a mixed-methods approach, combining both qualitative and some quantitative research to explore the economic and policy aspects of SUM in SSA cities, integrating semi-structured expert interviews and trying to analyse policy documents to provide a comprehensive understanding on investment trends, challenges, and impacts.

3.2.1 Qualitative Strategy and Data Sources

A qualitative approach is particularly well suited for this study, given the policy-driven and context-specific nature of transport investment (Murray *et al.*, 2018). Semi-structured interviews with key stakeholders involved in urban mobility planning, financing, and implementation allowed one to explore the values, motivations, and constraints shaping decisions (Thondoo *et al.*, 2020). Complementing this, efforts were made to analyse transport policies, and investment records using documents available online to complement the interviews, offering insights into actual spending patterns and institutional priorities. This combination could allow for cross-validation of findings (Bowen, 2009), and support a context-sensitive, evidence-based analysis of SUM in Maputo, highlighting implementation challenges, policy misalignments, and potential opportunities.

3.3 Data Collection

3.3.1 Semi-Structured Interviews

The first data collection method consisted of semi-structured interviews with stakeholders ranging from government advisors to local practitioners and international experts. 45-minute to

1-hour interviews were conducted remotely via Zoom or Microsoft Teams consisting of six main questions. All interviews were audio-recorded (with consent), transcribed, and anonymised before analysis. The interview guide is structured around key themes including, policy priorities, investment trends, financing mechanisms, and alignment with SUM objectives (see Appendix 1). This approach allowed for flexibility, enabling interviewees to diverge slightly from the main questions and share additional insights while ensuring all key research topics were covered (Galletta and Cross, 2013). Participants included:

Table 2: Overview of interview participants field of work

Expert	Sector	Description
IE1	Public Finance and Infrastructure Development	Experienced in advising on transport infrastructure financing and policy, particularly through partnerships with international financial institutions in Kenya.
IE2	Transport Planning and Infrastructure	Specialist in transport and road safety with experience in public transport systems, infrastructure design, and policy planning in Uganda.
IE3	Lead Transport Specialist at The World Bank	Works on the planning and delivery of transport projects at the Worldbank, with a focus on transport and infrastructure development in Sub Saharan Africa .
ME1	University Lecturer and Researcher	Researcher and lecturer based in Mozambique, focusing on transport policy, governance, and regulation in urban contexts.
ME2	Public Urban Transport Sector	Senior professional in the public transport sector with extensive experience in urban mobility service delivery and management in Mozambique.
ME3	Urban Mobility & Transport Policy	Leads research and policy initiatives to improve sustainable urban mobility in Mozambique, with a focus on data monitoring and strategic planning.

A total of six experts were interviewed for this study, three based in Maputo and three with broader international experience in urban mobility and transport policy across SSA. They are referred to as ME1-ME3 (Mozambique) and IE1-IE3 (international) to preserve confidentiality while allowing for meaningful comparisons between local and international experts. This sample size was chosen to provide diverse, in-depth insights while remaining feasible and within the scope and timeframe of the research.

3.4 Data Analysis

3.4.1 Semi-Structured interviews

This study employed a thematic content analysis to interpret the insights gathered from expected interviews. Given the qualitative nature of the research, this analytical approach was chosen for its ability to reveal both recurring patterns and divergences across expert perspectives (Neuendorf, 2018). Thematic content analysis is particularly well suited for policy-oriented research, where understanding underlying assumptions, institutional priorities, and socio-political constraints is essential (‘Oxford Review of Education Policy-oriented Research in Education’, 2006).

All interviews were fully transcribed and read multiple times to ensure familiarity with the data and begin identifying insights (Vaismoradi *et al.*, 2016). A deductive coding framework was applied, guided by the research questions and informed by the literature on SUM.

Transcripts were coded into a five-category matrix (see Appendix 4):

- Policy and institutional landscape
- Financing challenges
- Investment trends
- SUM alignment
- Persistent barriers and emerging opportunities

Each transcript was manually coded within these categories to ensure a thorough reading of the material and to accurately capture the full depth and nuance of the meaning of each answer (Vaismoradi, Turunen and Bondas, 2013). The codes captured repeated ideas, contradictions, and illustrative quotes.

This approach allowed for both within-case analysis (e.g., trends specific to Mozambique or Kenya) and cross-case comparison, especially regarding financial strategies, institutional capacity, and transport planning priorities (Maher *et al.*, 2018). This allowed the analysis to remain focused on key themes while still leaving room to capture unexpected insights. (Kallio *et al.*, 2016).

To maintain confidentiality in line with ethical approval, only a brief sample of the matrix has been included in the appendix (Appendix 4). The full matrix was excluded to uphold anonymisation commitments made to interview participants.

3.4.2 Policy Document Analysis

A targeted Document Analysis was conducted using a comprehensive and systematic approach to locate relevant documents for evaluating Maputo's public transport investment patterns and their alignment with SUM principles. This strategy included multilingual searches, metadata filtering (e.g., filetype), and cross-browser validation to ensure both the breadth and reliability of results (Liu and Jiu, 2023).

Given that official documents in Mozambique are often published in Portuguese, both English and Portuguese search terms were employed to capture a wide range of sources (Arora and Hemrajani, 2023). Key terms included:

Table 3: Search keywords used to identify relevant transport investment

Language	Example Keywords Used
English	“Maputo public transport Investment”, “Urban Mobility Mozambique site: worldbank.org”, “Mozambique transport master plan”, “Maputo mobility funding +PDF”, “Maputo transport infrastructure financing”, “Mozambique urban transport PPP”, “Maputo BRT feasibility study”, “Mozambique sustainable urban mobility strategy”, “Donor-funded transport projects in Mozambique”, “World Bank Mozambique transport”, “Maputo urban mobility project site:afdb.org”, “Mozambique transport sector public expenditure review”, “Maputo municipal mobility plan”
Portuguese	“Plano Diretor de Transportes Maputo”, “Governo de Moçambique mobilidade urbana sustentável”, “investimentos em transporte Maputo”, “relatório mobilidade urbana +PDF”, “Financiamento de infraestrutura de transporte Maputo”, “Parcerias público-privadas transporte urbano Moçambique”, “Estudo de viabilidade BRT Maputo”, “Estratégia de mobilidade urbana sustentável Moçambique”, “Projetos de transporte financiados por doadores em Moçambique”, “Banco Mundial transporte Moçambique”, “Projeto de mobilidade urbana Maputo site:afdb.org”, “Revisão dos gastos públicos no setor de transportes Moçambique”, “Plano municipal de mobilidade urbana Maputo”

In some cases, “+PDF” or “filetype:pdf” was added to the search terms to prioritise official reports and formatted documents, especially technical plans and evaluation summaries.

Multiple sources were accessed to ensure triangulation of findings (Kern, 2018). The different sources accessed are outlined below:

Table 4: Platforms used to access transport-related policy documents, reports, and investment data.

Source Type	Accessed Platforms	Search Methods
Internet search engines	Google, Bing (via Chrome, Firefox, and Safari Browsers)	Used broad and targeted keyword searches such as the key words that can be seen in table 3
Government Websites	Ministry of Transport and Communications(<i>Ministério dos Transportes e Comunicações</i> , 2025) Ministry of Public Works(<i>Ministério das Obras Públicas e Habitação</i> , 2025), Agência Metropolitana de Transportes(Agencia Metropolitana de Transporte de Maputo (AMT) Devex, 2025).	Navigated to “Publicações”, “Relatórios”, and “Plano Diretor” sections; also used internal search bars.
International donors and multilateral organisations	World Bank Open Knowledge Repository, World Bank Project Database, African Development Bank Projects Portal, UN-Habitat Publications	Used keywords and filters for Maputo/Mozambique; applied “urban mobility”, “transport”, and “project documents” tags.
Academic & grey literature	Google Scholar, ResearchGate, SSRN	Used thematic keywords and filtered by region and discipline (urban transport, infrastructure).
News and national media outlets	O País, Notícias, Carta de Moçambique	Included search for reported launch of projects (e.g. BRT, Plano 1000) and political statements on transport investment. Validated investment announcements.

Searches were conducted using multiple browsers to account for variations in content or local domain restrictions(Kim *et al.*, 2012). Additionally, searches were repeated on different days to ensure consistency in returned results, and the top 30 results were manually screened for relevance.

The research prioritised

- National transport master plans (Plano Diretor de Transportes)
- Investment programs or public expenditure frameworks
- Project appraisal documents, feasibility studies, and implementation reports from donors
- Official press releases and public statements confirming infrastructure investments
- Independent or donor-backed evaluations of SUM implementation

3.5 Ethical Consideration

Ethical approval was sought to ensure compliance with UCL's standards. Given that research involving human participants and personal data involves ethical risks, that must be carefully considered (UCL Research Ethics Service, 2025). This was a very low-risk application with well-defined parameters, which received approval from the UCL Research Ethics Committee, ensuring that adequate measures were in place to protect both participants and the researcher. Full information on ethical safeguards, research methods, and risk mitigation strategies can be found in Appendices (1, 2, and 3)

3.6 Reflecting on the Research Process: Lessons from Practice

While the interview process was ultimately productive, it was not without challenges. Conducting in-person interviews and observing the local transport system firsthand could have offered deeper contextual insights and enriched the understanding of SUM progress and barriers in Maputo. Additionally, the ethics application process proved to be lengthy and administratively demanding. The time required to secure approval from UCL's ethics committee introduced delays in initiating primary data collection and constrained the overall research timeline. Finally, the limited availability of publicly accessible data restricted the depth of analysis, particularly in assessing the alignment between official planning documents and actual investment trends.

4 Results

In this section, insights from the six expert interviews (IE1, IE2, IE3, ME1, ME2, ME3) were analysed and presented in a consolidated format to explore how transport investment decisions align with SUM goals in SSA, with a focus on Mozambique. The findings are structured thematically according to a framework developed during data analysis (see Appendix 4), allowing for the identification of patterns, context-specific challenges, and recurring themes across cases. The interview responses were categorised under five main themes: Policy and Institutional Landscape, Financing Challenges, Investment Trends, SUM Alignment, Transport Mode Prioritisation, and Persistent Barriers and Emerging Opportunities. To support and validate the interview findings, a document analysis was also attempted to identify relevant policy documents, reports, and project evaluations. Together, these findings provide a multi-dimensional view of the barriers and opportunities shaping sustainable mobility transitions in the region.

4.1 Semi-Structured Interviews

4.1.1 Policy and Institutional Landscape

In Mozambique, experts pointed to a persistent lack of strategic vision and institutional coordination in the transport sector which represents a key barrier to progress in SUM. ME2 noted that “There is no comprehensive vision guiding the transport model,” (ME2, 2025), making long-term, coherent planning difficult. ME1 echoed this, noting that even where policies exist, they are often not enforced or implemented. This view was reinforced by ME3, who highlighted a recurring “misalignment between political intention and practical action.” (ME3, 2025). Pointing to the disconnect between policy rhetoric and delivery. These weaknesses have contributed to stagnation in both public transport and urban mobility innovation.

This fragmented institutional environment also limits Mozambique’s ability to attract private sector involvement in transport development. None of the Mozambican experts identified private sector participation as the current policy focus. Instead, ME1 explained that “Public transport in Mozambique... has more social roots than economic ones,” (ME1, 2025), which makes the sector less attractive for private investment. ME2 added that the absence of a clear strategic direction further complicates the potential for public-private collaboration in transport infrastructure.

By contrast, across the wider SSA region, many countries are actively working to create more enabling environments for private investments in transport. IE1 and IE2 highlighted that countries like Kenya, Tanzania, and Uganda are introducing tax incentives, reforming regulatory frameworks, and developing PPP models to attract investment. Kenya’s 2021 PPP Act, for example, was cited by IE1 as a major step in fostering “an enabling environment for investors.” (IE1, 2025). IE3, speaking from a development agency perspective, noted that international donors are increasingly observing this trend across SSA where states seek innovative financing models for large-scale infrastructure. However, he stressed that legal reform alone is not sufficient success also depends on “strong governance structures and institutional capacity” (IE3, 2025), to manage and sustain such partnerships effectively.

Table 5: Policy and Institutional Landscape

Mozambican Experts (ME1-ME3)	International Experts (IE1-IE3)
Weak inter-institutional coordination and enforcement of policies	Kenya, Uganda, and Tanzania are developing enabling environments for private investment
Misalignment between political intentions and actual delivery	Kenya's 2021 PPP Act cited as a milestone for attracting private capital in transport
Public transport viewed more as a social service than an economic sector	PPPs increasingly used across SSA to expand transport infrastructure
Lack of strategic direction limits public-private collaboration	Transport consistently ranked among top 3 investment priorities due to its role in economic growth
"No comprehensive vision guiding the transport model" (ME2,2025)	Legal reforms alone insufficient governance capacity is essential for sustaining private investment

4.1.2 Financing Challenges

Building on the institutional context, it is important to understand the financial limitations that directly shape how infrastructure and mobility projects are prioritised, funded, and delivered. In Maputo, experts described a public transport sector under significant financial strain. ME1 explained that "public transport companies must finance themselves," (ME1, 2025), yet returns on investments have been very low since 2015, making it difficult to justify continued funding. He emphasised that the system is caught in a cycle of underperformance and underinvestment, compounded by the government's limited fiscal capacity to absorb losses or fund major transport projects.

ME2 echoed this, noting that Mozambique's national budget lacks the capacity to support large-scale mobility projects, making external donor financing, especially from institutions like the WB, a critical funding source. However, both ME1 and ME2 pointed out that such support often comes with complex requirements, which delays implementation. As a result, heavy reliance on external aid is not sustainable, as many projects stall due to bureaucratic hurdles or shifting donor priorities.

ME3 raised deeper structural concerns, arguing that Mozambique's high dependency on aid and elite-oriented governance results in inefficient allocation of public funds. He noted that "Resources are allocated to private cars, but that money goes abroad imports, fuel... it doesn't stay in the local economy," (ME3, 2025), while the majority population continues to rely on underfunded and informal transport systems. These dynamics, he argued, restrict the country's financial autonomy, and reinforce inequality.

These challenges reflect broader trends across SSA. IE1 explained that in Kenya, debt servicing consumes up to 70% of the country's GDP, significantly limiting fiscal space. In response, many governments are increasingly turning to PPPs to mobilise private capital for infrastructure

delivery. Same for IE2 who added that traditional financing methods in Africa such as tax revenue and concessional loans are no longer sufficient, prompting a shift toward innovative funding approaches that combine public, private, and donor contributions. To mobilise funding for transport infrastructure development.

Table 6: Financing Challenges

Mozambican Experts (ME1-ME3)	International Experts (IE1-IE3)
System stuck in a cycle of underperformance and underinvestment due to lack of government fiscal capacity	In Kenya, debt servicing takes up “70% of GDP,” (IE1, 2025) severely limiting public investment in transport
National budget cannot support large mobility projects; donor funding is essential but slow due to bureaucracy	Governments increasingly use PPPs to mobilise private capital for large-scale transport infrastructure
Heavy reliance on aid is not sustainable; many projects stall due to shifting donor priorities	Traditional financing models like tax revenue and concessional loans are no longer sufficient across SSA
Resources are allocated to private cars... that money goes abroad” (ME3,2025), little impact on the local economy	There is a shift toward blended finance models combining public, private, and donor contributions
Financial decisions reinforce inequality by favouring car users while informal and public systems remain underfunded	Governance and institutional capacity are seen as key to managing and sustaining long-term financial investment

4.1.3 Investment Trends

4.1.3.1 Road Infrastructure Dominance

With policy and financing contexts established, it is important to consider what is being prioritised under these constrained budgets. In Maputo, several experts highlighted how road construction continues to dominate investment decisions. ME1 explained that funding continues to flow consistently toward road infrastructure because such investments are considered to be easier to finance and more politically rewarding and meaning they are more appealing to investors, who view them as economically viable and low risk.

ME3 and ME2 went further, describing this investment pattern as a form of “cultural colonisation” (ME3, 2025), a strong preference for cars that comes from colonial and post-colonial planning ideas. In this context, car ownership is associated with progress, while public, NMT, and informal modes of transport remain overlooked. ME2 linked this to an outdated planning framework: “Transport planning still relies on colonial-era frameworks instead of embracing a holistic and future-oriented approach.” (ME2, 2025). The expert called for a shift toward multimodal integration where different transport modes work together to enhance accessibility, equity, and sustainability. Without this shift, both warned, cities risk becoming locked into unsustainable and exclusive mobility systems.

Similar dynamics were reported across the region. In Kenya, IE1 noted that road infrastructure remains a policy priority because it is seen to benefit a bigger portion of the

population. However, he acknowledged that there is a gradual shift toward cleaner alternatives, pointing to recent investments in electric buses and commuter rail which aim to reduce emissions and improve service for commuters. In Uganda, IE2 described a continued emphasis on expressways and toll roads, driven by their “high political visibility and economic impact” (IE2, 2025). Yet he stressed that such projects contribute little to inclusive mobility. Public transport and NMT options receive far less attention, he explained, partly because walking and cycling are still associated with poverty. And noted that without dedicated infrastructure, active mobility will remain both unsafe and underused, especially in densely populated urban areas.

4.1.3.2 Multimodal Gaps

Alongside the dominance of road investment, interviewees highlighted gaps in multimodal and public transport systems. In Maputo, ME3 argued that despite claims, public transport continues to be treated on the same level as private transport “and that will never work because private transport will always come out on top.” (ME3, 2025). He pointed to the lack of prioritisation for high-capacity vehicles like chapas, noting that “a minibus carrying 20 people is stuck in the same traffic as a private car with two passengers.” (ME3, 2025). This, he explained, reflects not only a policy failure to support collective mobility but also affects conditions for users who depend on it most.

ME2 echoed these concerns, describing sustainable mobility efforts in Maputo as largely symbolic. Citing past campaigns in Maputo promoting bicycle use but noting that no investment was made in the necessary cycling infrastructure. And said that without proper planning and funding, such initiatives remain superficial rather than transformative.

IE2 and ME1 reinforced this view, arguing that sustainability is often deprioritised in Maputo and in SSA in favour of short-term political and economic considerations. In the Ugandan context, IE2 explained, “sustainability concerns are often secondary to economic and political considerations,” (IE2, 2025), with many projects meeting only minimum environmental requirements and lacking meaningful implementation.

ME1 also highlighted prevailing social attitudes as a barrier. Public transport, he argued, is commonly viewed as a basic service rather than a key component of economic development. He explained that public transport is seen as a service rather than a sector, a point of view that weakens its place in national development strategies and undermines efforts to attract long-term investment the expert said. Still, IE2 observed early signs of progress in Africa, citing efforts to integrate expressways with other transport modes as a potential move toward genuine multimodal connectivity.

Table 7: Investment Trends

Mozambican Experts (ME1-ME3)	International Experts (IE1-IE3)
Road construction dominates due to being easier to finance and more politically rewarding	Roads remain a top priority in Kenya and Uganda due to broad appeal and high visibility
Car-centric planning linked to cultural colonisation and outdated colonial-era frameworks	Expressway integration with other modes in Uganda shows early potential for multimodal development
Public transport is underprioritised; collective modes like chapas lack infrastructure support	In Uganda, active travel is often marginalised, with cycling and walking still perceived as modes used primarily by those with limited financial means.
Sustainable mobility initiatives like cycling promotion are symbolic and lack real investment	limited investment in inclusive transport modes; sustainability often a secondary concern.
Public transport is seen as a service, not a sector, limiting its strategic importance	Kenya is slowly shifting toward cleaner modes (e.g. electric buses, commuter rail) as part of greener goals

4.1.4 SUM Alignment

Despite growing awareness of its values, SUM remains under-prioritised in both policy and practice across Mozambique and the wider SSA region. In Mozambique, ME1 highlighted that financial constraints and weak regulatory frameworks continue to limit investment in sustainable mobility. Although mobility plans exist, he argued that they lack the political backing and institutional capacity required for meaningful implementation: “There must be the political will and institutional strength to implement them effectively.” (ME1,2025). ME3 reinforced the broader economic value of SUM in low-income contexts, calling it the most viable macroeconomic model. Yet, he noted that without genuine political commitment and long-term planning, its potential will remain unrealised.

ME2 echoed this, noting that while there is increasing recognition of SUM's importance in Mozambique, current investment remains largely reactive for urgent infrastructure needs. Sustainable mobility is indeed the desirable model, the expert said, “but what I see is that investments are only being used to respond to immediate concerns like traffic congestion not guided by long-term thinking.” (ME3, 2025). Without a strategic vision, initiatives risk becoming short-term fixes rather than structural shifts the expert noted.

From a multilateral perspective, IE3 highlighted the WB’s efforts to embed sustainability into all transport projects, particularly through investments in walking, cycling, and e-mobility. However, he stressed that infrastructure alone is insufficient: “Building a BRT system is not enough; you need the institutional capacity to run and maintain it,” underscoring the need for stronger local governance.

Similar limitations were identified across the region. In Kenya, IE1 acknowledged that SUM is not a central priority in current transport investments. Walking and cycling are often excluded from infrastructure planning, while sustainability efforts are largely focused on promoting

electric vehicles. “To truly achieve sustainable mobility, there must be more investment in electric buses, rail, and supporting infrastructure not just private e-mobility,” he argued (IE1, 2025). IE2 added that sustainability is often treated as a procedural requirement rather than a policy priority in Uganda. Active travel modes remain sidelined, and while interest in electric mobility is growing, essential infrastructure and planning support are still lacking the expert noted.

Table 8: SUM Alignment

Mozambican Experts (ME1-ME3)	International Experts (IE1-IE3)
SUM under-prioritised despite growing awareness; limited by financial constraints and weak regulatory frameworks	SUM is not a central priority in Kenya; walking and cycling are often excluded from planning
Mobility plans lack political will and institutional capacity to be implemented	Sustainability efforts focus too much on private e-mobility; need more public investment in buses, rail and infrastructure
UM is the most viable macroeconomic model in low-income contexts, but requires long-term planning	In Uganda, sustainability is treated as procedural rather than a real policy goal
Current Investments are reactive and focused on urgent fixes, not long-term strategies	SUM efforts lack institutional support and integration into broader governance
Public transport is seen as a service, not a sector, limiting its strategic importance	“Building a BRT system is not enough; you need the capacity to run and maintain it” (IE3, 2025), strong local governance needed

4.1.5 Persistent Barriers and Emerging Opportunities

All experts identified structural barriers and potential opportunities for aligning SSA’s transport system with SUM principles. ME3 in the Mozambican point of view pointed to two core challenges: a strong preference for cars and resistance from powerful elites. “The culture of private car ownership is becoming deeply ingrained... as if it were an acquired right,” he observed (ME3, 2025). These attitudes, combined with unstable leadership, have left many well-designed policies unimplemented he explained. Still, he remained optimistic. The expert pointed to growing donor engagement and international pressure, as an opportunity to implement SUM into education, public discourse, and national budgets. “Sustainable urban mobility isn’t just about the environment... it’s about equity, efficiency, and economic self-reliance” (ME3, 2025).

ME2 identified major capacity gaps, especially the lack of qualified transport planners and weak coordination across institutions as key barriers to implementation. These weaknesses, the expert argued, undermine effective implementation. Nevertheless, the expert noted a growing policy shift toward inclusive, climate-aware planning. Real progress, however, will require moving beyond fragmented, reactive decision-making the expert said. ME1 echoed these concerns, noting that while Mozambique has mobility plans and regulatory frameworks, many remain only on paper due to weak enforcement and limited state capacity. International support

exists, but its effectiveness depends on the government’s ability to implement policies and maintain standards the expert said.

From a broader regional lens, IE2 highlighted fragmented planning and poor modal integration as major inefficiencies in Africa. Infrastructure remains heavily reliant on public funding, with alternative models like PPPs limited by mistrust and political resistance. He stressed the need for stronger institutional commitment, civic engagement, and a broader public understanding of SUM’s long-term value. IE1 underlined fiscal constraints as the key barrier in Kenya: “The biggest challenge is the lack of revenue... due to high debt repayment obligations.” (IE1, 2025). He also flagged a lack of technical expertise among local financial professionals as a missed opportunity in scaling up PPPs. Still, he noted opportunities to align climate goals and inclusive development with multilateral-backed investment.

Finally, IE3 emphasized the role of climate finance as a catalyst for change. He pointed to low-carbon transit as a promising pathway but warned of the implementation gap: “The challenge is translating long-term national plans into credible, fundable project pipelines.” (IE3, 2025). For him, unlocking SUM means asking not just what to build, but why: “How can transport systems unlock human potential, economic opportunity, and regional integration?” (IE3,2025).

Table 9: Barriers and Opportunities

Mozambican Experts (ME1-ME3)	International Experts (IE1-IE3)
Cultural preference for cars and elite resistance hinders SUM progress	Fragmented planning and poor modal integration limit regional efficiency
Leadership instability weakens implementation of existing policies	Fiscal constraints and technical gaps undermine large-scale investments
Lack of skilled planners and poor coordination slow down reforms	PPPs face mistrust, but climate-aligned investment offers new opportunities
Plans often exist but lack enforcement and political support	Emphasis on climate finance and need to turn plans into bankable projects
International support exists, but depends on stronger state capacity	Shift needed toward people-focused and inclusive transport goals

4.2 Policy Document Analysis

Despite extensive and methodical document analysis conducted using both English and Portuguese search terms across multiple platforms, there remains a notable lack of publicly available and detailed government investment data specific to urban transport in Maputo. While international organisations such as the WB and AfDB provide valuable project documents and policy assessments, these should not be interpreted as substitutes for transparent, domestic

policy disclosures. This distinction is crucial: donor-funded initiatives often reflect external priorities conditionalities, not necessarily the Mozambican government's consistent policy commitment or internal investment trends.

The most concrete national document found was the 2015-2035 transport Master Plan, developed with JICA support, which articulates a vision aligned with SUM through BRT development and institutional coordination. However, no detailed government reports were found tracking the implementation or financing of this plan. The study relied heavily on third-party reports, such as a 2022 World Bank-funded BRT project and the "Plan 1000" bus procurement initiative. These demonstrate a recent, donor-driven shift toward SUM-friendly investment. Nonetheless, reliable data on local investment levels in NMT, operational subsidies, or modal integration remains scarce.

5 Discussion

This chapter critically examines the findings presented in the results section, situating them within the wider literature on SUM in SSA, with a particular focus on Maputo. The results broadly confirmed expectations based on existing research, while also revealing specific institutional, financial, and cultural dynamics unique to the Mozambican context. Notably, all experts acknowledged the importance of SUM and its wider socio-economic benefits, consistent with the broader literature, which highlights SUM as a key driver of inclusive and climate-resilient development.

5.1 A Misalignment Between Policy and Practice

While SUM features increasingly in policy discourse, implementation in Maputo remains fragmented and symbolic. Experts noted that urban mobility plans often exist only on paper, lacking the institutional capacity and enforcement mechanisms needed for delivery. This reflects a well-documented pattern across SSA, where governance and poor coordination continue to undermine transport reform (SSATP, 2022).

In practice, transport investment still prioritises private vehicles and road infrastructure. Car ownership continues to be associated with social status and modernity, a pattern described by ME3 as a form of “cultural colonisation,” (ME3, 2025). Where imported notions of progress shape policy choices and deepen inequalities. This observation aligns with literature highlighting how walking and cycling are often marginalised due to class associations and undermine those who rely on it. (Shara Aranoff *et al.*, 2009; Mattioli & Colleoni, 2016). As a result, NMT and public transport modes, remain neglected in planning and investment decisions, despite accounting for nearly 79% of the modal split in Maputo (Japan International Cooperation Agency, 2014).

The persistence of this car-centric development model underscores a fundamental misalignment between policy ambitions and actual priorities. As noted in the literature, this reflects a broader regional gap in translating SUM goals into action (Kiviluoto *et al.*, 2022).

5.2 Funding Priorities

Investment trends in Maputo reveal a strong bias toward short-term, visible projects such as road construction, while collective and NMT modes remain underfunded. Experts explained that road projects are often seen as politically rewarding and financially “easier” to finance. Mirroring SSA-wide trends that favour tangible, short-term results over inclusive, long-term planning. (Osei-Kyei & Chan, 2016; Kiviluoto *et al.*, 2022).

Notably, Maputo has yet to adopt the innovative financing approaches observed in countries like Kenya and Tanzania, which have introduced legal frameworks to facilitate PPPs and land value capture (Kaminker & Stewart, 2012; Suzuki *et al.*, 2013). The absence of such tools in Mozambique marks a divergence from regional peers and represents a critical missed opportunity. Long-term financing mechanisms could offer access to capital while reducing donor dependency an issue mentioned by the Mozambican experts and the literature (Briceño-Garmendia, Smits and Foster, 2008). Yet these remain underutilised due to institutional and technical constraints straining the capacity to structure, scale, or sustain investments in transport infrastructure independently (Cavoli *et al.*, 2025).

5.3 Barriers to Implementing SUM

The analysis identified three core barriers to implementing SUM in Maputo: fiscal limitations, institutional fragmentation, and socio-cultural resistance to modal shift. First, underfunding continues to limit implementation capacity. Heavy debt obligations and limited fiscal space continue to limit the government's ability to invest in sustainable infrastructure echoing concerns in the literature about financing gaps in economies with limited fiscal capacity (Were, 2024; Gutman et al., 2015).

Second, weak inter-institutional coordination, a shortage of technical expertise, and poor enforcement capacity leave many SUM initiatives stalled at the planning stage (Shara Aranoff et al., 2009). As ME2 emphasised, meaningful progress will require moving beyond reactive and isolated approaches, a sentiment that aligns with broader critiques of urban governance in the world (Ang, 2013).

Third, deeply embedded cultural attitudes continue to shape transport priorities (Kiviluoto *et al.*, 2022). Car ownership is widely perceived as aspirational while, walking, cycling, and public transport are often viewed as lower-status modes of travel, primarily associated with low-income populations. These attitudes diminish political and social support for SUM, despite its well-documented social and economic benefits in the literature (Powell *et al.*, 2010), and the consistent emphasis placed on these benefits by all the experts interviewed in this study.

Together, these barriers form a loop in which SUM remains, financially overlooked, and institutionally unsupported. Directly impacting people who could benefit the most from it, particularly low-income and underserved communities (Heinonen et al., 2021). This confirms expectations but also highlights the bigger nature of the challenge: SUM implementation in Maputo is not just a technical issue it requires political will, social transformation, and institutional reform.

5.4 Pathways to Progress

Despite these obstacles, the findings point to clear entry points for reform. Rather than upgrading outdated infrastructure systems, Maputo could centre future transport investments around SUM principles, prioritising modes that are low-carbon, cost-effective, and socially inclusive.

Notably, early signs of progress are emerging across some SSA countries. Experts pointed to the introduction of electric buses in Nairobi and improved modal integration in Uganda as examples of emerging best practices, developments that were not widely documented in the existing literature. However, IE1 noted that achieving SUM requires increased investment not only in e-vehicles but also in the required infrastructure needed to ensure accessible integrated networks.

Critically, SUM should be reframed not only as an environmental agenda but as a tool for urban equity and economic resilience (Poudenx, 2008). A view echoed by ME3, who noted that “sustainable urban mobility isn’t just about the environment it’s about equity, efficiency, and economic self-reliance.” This aligns with calls in the literature to “leapfrog” car-dependent models and deliver development aligned with the SDGs and the Paris Agreement (Cavoli, 2021; Hu et al., 2023).

To advance SUM in Maputo and across SSA, five key actions are recommended:

1. **Strengthen Institutions and Coordination**

Maputo needs a clear governance structure for urban mobility. Creating a dedicated transport authority and investing in training will improve coordination and build technical capacity for SUM. Establishing frameworks to attract private and climate-aligned investments.

2. **Mobilise Sustainable Finance**

To overcome budget constraints, Maputo should pursue PPPs, green bonds, and other innovative financing methods. Structuring key projects as bankable investments that will attract more private and multilateral funding.

3. **Prioritise Inclusive Infrastructure**

Investment should shift towards walking, cycling, and public transport. Upgrading BRT, expanding bus routes, and adopting “complete streets” design will improve access, equity, and efficiency.

4. **Enhance Data and Planning**

Regular mobility data and annual audits are needed for evidence-based planning. Improved transparency will support monitoring, accountability, and investor confidence.

5. **Promote Cultural Change**

Public campaigns and civic engagement can shift attitudes away from car dependence. Education and participatory planning will help build support for inclusive, sustainable transport systems.

A detailed policy brief was prepared as part of this research and is included (see Appendix 5) as a working draft. It will be refined further and shared with key stakeholders in Maputo, including policymakers, urban planners, and mobility advocates, to enhance the impact of the research and support the translation of its findings into actionable, locally relevant strategies.

5.5 Results Limitations

This study’s qualitative methodology enabled a rich, context-specific understanding of SUM challenges in Maputo. However, the lack of publicly available investment data posed a key limitation. Without access to quantitative records on budget allocations, infrastructure priorities, or financial performance, it was difficult to systematically assess the alignment between policy and spending.

This absence of transparency raises important questions about accountability in transport governance. For Maputo to fully embrace sustainable mobility, it must address these data gaps by publishing detailed infrastructure plans, investment outcomes, and budget tracking mechanisms as highlighted in the literature (Corfee-morlot *et al.*, 2012). Only with greater visibility can policymakers, researchers, and the public meaningfully evaluate progress and inform future decisions.

6 Conclusion

6.1 Structured Conclusion

This study set out to evaluate the economic case for investing in walking and public transport infrastructure in SSA cities, using Maputo as a case study. The research examined the extent to which public investment patterns align with SUM principles and explored the broader socio-economic implications of prioritising different transport modes. Based on the findings, the study can confirm its central hypothesis: that current investment decisions in Maputo do not sufficiently support a transition towards sustainable and inclusive mobility.

While policy frameworks increasingly reference SUM in Maputo for its benefits, their implementation remains fragmented, underfunded, and dominated by road infrastructure and car-centric planning. Expert interviews revealed three key barriers to the implementation of SUM: fiscal constraints, institutional fragmentation, and deep-rooted socio-cultural attitudes linking car ownership with progress. These factors continue to marginalise walking, cycling, and public transport, limiting progress toward more equitable resilient urban mobility systems. However, the research also identifies emerging pathways forward for reform, including the need to strengthen institutional capacity, establish legal frameworks that support investment, prioritise active and public transport, enhance data transparency to guide evidence-based decision making and foster a cultural shift through public engagement.

This research contributes to a broad range of literature on mobility transitions in the Global South by offering new evidence from a relatively under-researched context. It also strengthens the case for reframing SUM not merely as an environmental or technical goal but as a tool for equity, resilience, and inclusive economic development. To further support this, a draft policy brief has been included in Appendix 5. It is intended for stakeholders in Maputo such as policymakers, urban planners, and advocacy groups, and aims to translate the research findings into actionable strategies. The findings proved to be valuable in uncovering systemic gaps, planning inconsistencies, and emerging opportunities within Maputo's landscape. The policy insights and strategic recommendations developed here may also be of use to other cities seeking to embed sustainability, equity, and economic resilience into their urban mobility systems.

A review the wider literature on urban mobility in SSA revealed both the breadth of the issue and gaps in the research. Transport systems remain underdeveloped, with far-reaching social and environmental impacts that disproportionately affect low-income populations. While this study offers a modest contribution to understanding these dynamics, further research is needed to assess the impacts of current mobility models and the potential of sustainable alternatives.

6.2 Limitations and Areas for further Research

Despite its contributions, this study faced several limitations. Most notably, the lack of publicly available data on transport investments in Mozambique constrained the depth of quantitative analysis and made it difficult to rigorously assess the alignment between policy commitments and actual expenditure. The research also relied on a small sample of six expert interviews. While these perspectives were insightful, the limited sample size inevitably restricted the diversity of perspectives. Broader engagement with transport users, community members, and local civil society could have brought in a more grounded understanding of mobility challenges in Maputo. Furthermore, the exclusive focus on expert voices may have overlooked important social, behavioural, and lived dimensions of transport experiences.

Administrative challenges also posed challenges: The ethics application process was more time-consuming than anticipated, delaying the start of data collection and constraining the overall project timeline.

This research should therefore be seen as a starting point for examining the alignment between transport investments and sustainable mobility goals in Maputo. There remains significant scope for more expansive, inclusive, and in-depth investigations. Looking ahead, future research should explore how transport investments impact accessibility and equity for low-income populations, especially in contexts where public and NMT modes remain underfunded. Given the vital role of informal transport systems in SSA, there is also a need to investigate how these networks can be integrated into SUM frameworks in ways that enhance safety and sustainability while preserving affordability. As cities like Maputo confront intensifying climate risks, there is a pressing need to understand how inclusive and resilient mobility systems can reduce GHG emissions and contribute to long-term urban sustainability. Finally, sustainable transport transitions across Africa should be guided by strategies tailored to the unique socio-political and economic conditions of each context, to deliver outcomes that are both equitable and effective for diverse urban environments.

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8 Appendices

Appendix 1: Topic Guide Semi-Structured Interview



Topic Guide: Semi-Structured Interview (Online)

Researchers:

Nelson Cosme (UCL)

Dr Clemence Cavoli (UCL Primary Researcher/Supervisor)

Topic guide and research questions

1. Description

a) Format

- A set of questions sent before the interview
- Online semi-structured interviews (audio and/or video recorded)
- Follow-up questions are allowed

b) Length: 1 hour

c) Aim: This project aims to understand investments in transport infrastructure in Maputo, Mozambique. It seeks to contribute to the growing body of research on urban mobility in the Global South and to provide actionable recommendations for decision-makers seeking to improve mobility in rapidly growing urban environments.

Personal Information

a) Name

b) Email address

c) Job position

d) Organisation

2. Background information

Participants will be invited to briefly describe their experience and role in the transport or urban development sector in Maputo.

Here are key concepts and definitions that may be referred to during the interview:

1. **Sustainable Urban Mobility (SUM):** Transportation systems that are environmentally friendly, inclusive, and efficient, prioritising modes such as walking, cycling, and public transit while minimizing reliance on private vehicles.
 2. **Active Travel Modes:** Non-motorized forms of transport, such as walking and cycling, which promote physical activity and reduce environmental impact.
 3. **Collective Transport:** Public or shared transport systems, including buses, minibuses, and other forms of mass transit that provide affordable and accessible mobility.
 4. **Car-Oriented Development:** Urban planning that prioritises private vehicle use through extensive road networks and parking infrastructure.
 5. **Infrastructure Investment Gap:** The difference between the funding available and the amount needed to develop essential infrastructure, such as roads, sidewalks, and public transit systems.
 6. **Barriers to SUM Implementation:** Challenges such as insufficient funding, fragmented governance, cultural resistance to reducing car dependency, and lack of coordinated policies.
- These concepts will guide discussions during the interview to ensure a shared understanding of the key themes related to sustainable urban mobility in Maputo and Freetown.

Semi-Structured Interview Guide

1. **Vision and Priorities:** To what extent do current transport investments in (Maputo) reflect broader policy priorities, and which policy goals are they primarily focused on (e.g., economic growth, accessibility, environmental sustainability)?
2. **Investment Focus:** Over the past five years, what have been the main transport/mobility infrastructure investments made in your city (across modes)? What transport/mobility infrastructure projects are planned? Are there any specific projects you believe are particularly significant for SUM?
3. How are transport infrastructure projects typically financed in [Maputo]? Are there challenges in attracting funding for projects focused on certain modes versus others? *Any innovative financing solutions to address these issues?*
4. **SUM Alignment:** To what extent do current and planned investments align (or fail to align) with sustainable urban mobility objectives (considering aspects like accessibility, affordability, safety, environmental impact, and efficiency)?
5. **Modal Balance and Socio-Economic Implications:** How do current and planned investments influence the balance between different transport modes (e.g., private cars vs. public transport, active travel)? What are the potential socio-economic implications of prioritizing active travel and public transport over car-oriented development in (Maputo/Freetown)? Consider impacts on:
 - Access to jobs, education, and services
 - Household budgets (transport costs)
 - Public health
 - Economic productivity
 - Social equity
6. **Challenges and Opportunities:** What are the main challenges facing transport investments in your city (including financing, planning, implementation, and community engagement)? What opportunities do you see for better aligning transport investments with broader goals like equity, inclusivity, and climate resilience? *This explores the practical constraints and potential solutions.*

Appendix 2: Participation Information Sheet for Experts

Participant Information Sheet For Experts: Sustainable Urban Mobility, Climate Action Plan, and Transport Justice

UCL Research Ethics Committee Approval ID Number:

YOU WILL BE GIVEN A COPY OF THIS INFORMATION SHEET

Title of Study: An economic case for investing in walking and public transport infrastructure a Maputo case study

Department: Department of Civil, Environmental and Geomatic Engineering

Name and Contact Details of the Researcher(s): Nelson Cosme (nelson.cosme.22@ucl.ac.uk)

Name and Contact Details of the Principal Researcher: Dr Clemence Cavoli
(clemence.cavoli@ucl.ac.uk)

Invitation Paragraph

1. What is the project's purpose?

You are being invited to participate in a third-year bachelor's in engineering dissertation project. This study aims to explore the economic case for investing in walking and public transport infrastructure in Maputo. The research focuses on understanding current transport policies, socio-economic impacts, as well as barriers to sustainable mobility.

2. Why have I been chosen?

You have been selected due to your expertise and professional experience in areas such as urban mobility, transport policy, sustainable development, or project finance. The study aims to gather insights from up to six participants, all of whom have significant knowledge or experience relevant to the research objectives. The participants will include stakeholders from Maputo, and international organisations. Your insights are sought to contribute to a comprehensive understanding of the challenges and opportunities in implementing sustainable urban mobility solutions in these contexts.

3. Do I have to take part?

Participation is entirely voluntary, and it is your choice whether to take part. If you decide to participate, you will receive this information sheet to keep and will be asked to sign a consent form. You can withdraw at any time during the interview or up to two weeks afterward without giving a reason. If you choose to withdraw, any data you have provided will be securely deleted.

4. What will happen to me if I take part?

If you agree to participate, you will be invited to take part in a virtual, semi-structured interview conducted via Zoom or Microsoft Teams, depending on your preference. The interview will last approximately 45 minutes and will focus on your professional experiences, challenges, and insights related to urban mobility, particularly in the context of sustainable transport in Sub-Saharan Africa. Participation is flexible, and you may choose to skip any questions you are not comfortable answering.

5. Will I be recorded and how will the recorded media be used?

With your consent, the interview will be audio-recorded to ensure accuracy. The recordings will be transcribed using a secure, GDPR-compliant transcription service or by the researcher. Any personal identifiers, such as names, job titles, or organisations, will be anonymised during transcription to maintain confidentiality. The anonymised transcripts will be analysed to identify themes and insights related to the research questions. The analysis will focus on understanding urban mobility challenges, socio-economic impacts, and potential strategies for improving transport infrastructure. All recordings will be securely stored on encrypted devices or password-protected systems accessible only to the researcher. After transcription and analysis, the audio

recordings will be permanently deleted, and anonymised data will be retained only for the duration of the study in compliance with data protection regulations.

6. What are the possible disadvantages and risks of taking part?

The risks associated with participating in this study are minimal. The interview will focus on professional insights rather than personal or sensitive information. While the interview requires a time commitment of approximately one hour, every effort will be made to ensure the process is convenient for you. You can choose to skip questions or withdraw from the study at any time if you feel uncomfortable. All data will be anonymised, securely stored, and handled in confidence to protect your identity and contributions.

7. What are the possible benefits of taking part?

Participation provides an opportunity to share your professional experiences and perspectives on sustainable urban mobility. The study is intended to contribute to academic understanding and policy discussions regarding sustainable transport infrastructure. While there is no direct benefit to participants, the anonymised findings will aim to inform discussions around improving urban transport systems in a manner that supports inclusive and sustainable urban development. The final dissertation will be shared with participants, offering insights into the research findings and their implications for urban mobility in the studied contexts.

8. What if something goes wrong?

If you have any concerns or wish to raise a complaint regarding the research interview process, please feel free to contact the project supervisor, [Dr. Clemence Cavoli](mailto:Dr.Clemence.Cavoli@ucl.ac.uk), at the Centre for Transport Studies.- clemence.cavoli@ucl.ac.uk.

9.

If [you](#) complaint has not been handled to your satisfaction, you can contact the Chair of the UCL Research Ethics Committee – ethics@ucl.ac.uk.

10. Will my taking part in this project be kept confidential?

All information collected about you during the research will be treated with the utmost confidentiality. Audio recordings will be securely stored on a centralised platform (UCL OneDrive). Transcripts will be pseudonymised at the earliest opportunity, meaning your name will be replaced with a random identifier to ensure your anonymity. Every effort will be made to ensure that you cannot be identified in any reports or publications resulting from this research. The recordings and transcripts will be securely stored for the duration of the research period and will be permanently deleted upon completion of the Bachelor of Engineering programme by the end of September 2025.

11. Limits to confidentiality

Confidentiality will be respected subject to legal constraints and professional guidelines. However, due to the small number of people being interviewed and the limited number of specialists in this field, it may be possible that you are identified in a publication through a description of your role or profession and/or from a quote that you gave during the interview.

12. Local Data Protection Privacy Notice

The controller responsible for this project is University College London (UCL). Oversight of UCL's activities involving the processing of personal data is provided by the UCL Data Protection Officer, who can be reached at data-protection@ucl.ac.uk.

This project-specific privacy notice outlines how your personal data will be handled. For more general information on how UCL processes participant data, please refer to UCL's general privacy notice for research participants: [click here](#).

Categories of personal data to be collected:

- Name
- Email address
- Audio recordings
- Video recordings

The lawful basis for processing your personal data is the performance of a task carried out in the public interest. All data will be processed only as required for the research project, specifically for the third-year dissertation. Your data will be anonymised to the greatest extent possible, and efforts will be made to minimise the processing of personal data at every stage.

Your personal data will be stored securely and processed only until the completion of the project.

All data will be permanently deleted by **September 2025**.

If you have any concerns about how your personal data is being processed or wish to exercise your rights under data protection laws, please contact UCL at data-protection@ucl.ac.uk.

16. Contact for further information

If you wish to have further information, please contact Nelson Cosme nelson.cosme.22@ucl.ac.uk or the Project Supervisor Dr Clemence Cavoli clemence.cavoli@ucl.ac.uk.

Participants will be given a copy of the information sheet and, if appropriate, a signed consent form to keep and remember to thank the participants taking part in the project.

Thank you for reading this information sheet and for considering taking part in this research study.

Appendix 3: Consent Form for Adults in Research Studies

CONSENT FORM FOR ADULTS IN RESEARCH STUDIES

Please complete this form after you have read the Information Sheet and/or listened to an explanation about the research.

Title of Study: An Economic Case for investing in walking and public transport infrastructure a Maputo case study

Department: Civil, Environmental & Geomatic Engineering (Faculty of Engineering Sciences)

Name and Contact Details of the Researcher(s):

Nelson Cosme (nelson.cosme.22@ucl.ac.uk)

Name and Contact Details of the Principal Researcher:

Dr Clemence Cavoli (clemence.cavoli@ucl.ac.uk)

This study has been approved by the UCL Research Ethics Committee: Project ID number 0339

Thank you for considering participating in this research. Before you decide to take part, the researcher will provide a detailed explanation of the project to ensure you fully understand its purpose and scope. If you have any questions about the Information Sheet or anything discussed during the explanation, please feel free to ask the researcher before making your decision. Once you agree to participate, you will be given a copy of this Consent Form for your reference, which you can keep and review at any time.

I confirm that I understand that by ticking/initialling each box below I am consenting to this element of the study. I understand that it will be assumed that unticked/initialled boxes means that I DO NOT consent to that part of the study. I understand that by not giving consent for any one element that I may be deemed ineligible for the study.

		Tick Box
1.	*I confirm that I have read and understood the Information Sheet for the above study. I have had sufficient time to consider the details and my role in the research. I have also had the opportunity to ask any questions, which have been answered to my satisfaction, and I agree to participate in an individual interview.	
2.	* I understand that I have the right to stop the interview at any time and that I can withdraw my data up to two weeks following the interview if I choose to do so.	
3.	* I consent to participate in this study. I understand that my personal information, including my name, email address, audio recordings, and video recordings, will be used solely for the purposes explained to me. I acknowledge that, in accordance with data protection legislation, the lawful basis for processing this information is the performance of a 'public task.'	
4.	Use of the information for this project only * I understand that all personal information will be kept confidential, and every effort will be made to ensure that I cannot be identified. I acknowledge that the data collected during this study will be securely stored, and the research team will strive to ensure I remain unidentifiable in any resulting publications. However, I am aware that due to the specialised nature of this study and the small number of participants, identification may still be possible. I consent to the data I provide being securely archived on a password-protected computer within a UCL OneDrive account. I understand that the recordings and anonymised transcripts will be retained for the duration of the research period and will be deleted following the completion of the Bachelor of Engineering degree, expected in the final quarter of 2025.	
5.	* I understand that my information may be reviewed by authorised individuals from the University for monitoring and auditing purposes.	
6.	I understand the direct/indirect benefits of participating.	

7.	I understand that my data will not be shared with any commercial organisations and will remain the sole responsibility of the researcher(s) conducting this study.	
8.	I acknowledge that I will not receive any financial benefit from this study or from any potential outcomes it may lead to in the future.	
9.	I understand that the information I provide will be included in a published report, and I would like to receive a copy of it. (Yes/No)	
10.	I am aware of who I should contact if I wish to lodge a complaint.	
11.	I voluntarily agree to take part in this study.	

Name of participant

Date

Signature

Appendix 4: Thematic Framework for Interview Analysis

Key insights	Policy and Institutional Landscape	Investment Trends	Financing Challenges
IE1	The expert highlighted Kenya's strong political commitment to attracting private investment in transport infrastructure. A central focus has been creating an "enabling environment for private capital investors" through progressive legal and policy reforms. A key milestone in this effort was the enactment of the 2021 Public-Private Partnership (PPP) Act, which significantly expanded opportunities for private sector involvement across sectors, particularly in transport IE1 explained. This legislative framework is complemented by ongoing efforts to establish a national infrastructure master plan and a tolling policy for Nairobi, intended to better structure, manage, and reduce the risk in investments in key infrastructure assets such as roads, railways, airports, and ports. According to the expert, mobilising private capital remains a strategic priority for Kenya, driven by the recognition that large-scale infrastructure projects especially in transport require diversified and sustainable financing mechanisms. The expert also noted that Kenya's approach is increasingly being expanded in other Sub-Saharan African countries, as governments recognise the need to supplement limited public resources with private and blended finance models	The interviewee described a clear investment trend in Kenya over the past five years, with roads receiving the majority of transport infrastructure funding, followed by railways and airports. This prioritisation is largely shaped by rising demand and changing mobility patterns. The expert noted that the "significant increase in the use of motorcycles (boda bodas) between 2008 and 2020" has directly influenced the government's decision to increase road investment, as more people shift away from walking and cycling toward motorized transport. There is a dominance of road infrastructure in national planning. However, future projects aim to diversify investment across transport modes, with plans to expand railways to ease congestion, continue developing highways and toll roads through PPPs, and upgrade existing airports to improve connectivity between major towns and cities. These developments reflect a growing recognition of the need for multimodal transport systems, even as roads remain the dominant investment focus.	The interviewee highlighted severe fiscal constraints, noting that "70% of our GDP is dedicated to debt repayment," which limits the government's ability to invest in transport. With traditional tax revenue insufficient and borrowing capacity exhausted, the country has turned to Public-Private Partnerships (PPPs) as the main alternative funding model. The expert stressed the need for better public understanding of why private investment are critical to advancing infrastructure development.
IE2	IE2 emphasised that transport infrastructure is consistently ranked among the top three priority sectors across Sub-Saharan African countries, largely due to its pivotal role in driving economic development and enhancing regional connectivity. They noted that railway infrastructure is receiving growing attention, particularly in Kenya, Tanzania, and Uganda, where governments are increasingly investing in large-scale projects to support trade, mobility, and integration. To enable this expansion, the expert explained that several governments are working to establish policy environments that are attractive to private investors. These efforts include the introduction of tax incentives and the development of supportive legal frameworks. The interviewee highlighted that "policies are being developed to encourage private sector participation," particularly through public-private partnerships (PPPs), which are now widely seen as a key mechanism for financing and delivering major transport infrastructure. The expert stressed that without such enabling measures, the private sector would be unlikely to commit the necessary long-term capital required to modernise and expand transport networks in the region.	The expert described a strong continent-wide focus on road and airport infrastructure, noting that "many African countries are improving airport infrastructure, investing in the railway sector, and developing highways and expressways." He also highlighted that in Uganda, "sustainability concerns are often secondary to economic and political considerations." Among the investments, road infrastructure especially expressways and toll roads remains the dominant investment, largely due to its "political visibility and economic impact." Countries like Kenya, Uganda, and Tanzania are expanding airport capacity to support growing passenger and cargo volumes. Still IE2 highlighted that in Africa some countries are trying to integrate expressways with other transport modes without being to specific.	The expert highlighted that inadequate public funding and heavy debt burdens are major constraints to transport investment in many African countries. They noted that "traditional sources of financing such as taxes are insufficient," and "heavy debt servicing limits government spending on new transport projects." As a result, governments are turning to alternative financing models, with growing interest in public-private partnerships (PPPs) and toll roads, which are increasingly seen as "viable funding options." The expert also underscored the role of international donors and development banks, which continue to be crucial sources of funding for transport infrastructure, especially in contexts where public finances are limited.
IE3	IE3 described the World Bank's overarching vision for transport in Sub-Saharan Africa as one centred on developing systems that are "inclusive, resilient, and regionally integrated." The expert also emphasised that the Bank works closely with national governments to create new and innovative ways of financing projects to ensure better transport infrastructure planning. However he stressed that strong institutional frameworks and sound fiscal management are essential necessities for attracting long-term private investment in transport infrastructure across the region.	The expert highlighted a growing demand for support in developing regional transport corridors, particularly those "connecting landlocked countries to ports," which are seen as essential for economic integration across Sub-Saharan Africa. At the same time, attention is shifting toward urban mobility improvements, especially in fast-growing secondary cities, where countries are seeking help with integrated public transport systems, BRT development in Maputo for examples.	The expert identified limited fiscal space as a major challenge across the region, noting that many countries are "reaching debt sustainability limits," making traditional public financing less viable. In response, the World Bank promotes blended financing solutions and supports governments in structuring bankable transactions, while also helping to build institutional capacity to ensure these partnerships deliver long-term value. However, even well-designed projects often face implementation delays due to procurement bottlenecks, land acquisition issues, and poor inter-ministerial coordination, highlighting the importance of strengthening administrative systems alongside financial mechanisms.

ME1	The expert noted, "public transport in Mozambique... has more social roots than economic ones," which reinforces its marginalisation in policy and investment strategies. While international organisations like the World Bank have been involved in supporting transport projects, ME1 stressed that "the government needs to show stronger commitment to embrace international support and implement mobility plans effectively." Without that commitment, donor-backed projects risk stalling in Mozambique, and structural challenges such as weak institutional capacity will continue to undermine progress toward sustainable urban mobility.	ME1 explained that funding continues to flow consistently toward road infrastructure because such investments are considered "easier to finance," "more politically rewarding," and generally more appealing to investors, who view them as economically viable and low risk. The government prioritises roads because they offer broader economic benefits and more accessible financing: "For road construction, it is much easier to secure financing due to the broad network of beneficiaries." The main problem he said is that in Mozambique "People see public transport as a service, not a sector," which according to him weakens efforts to attract long-term investment. Although international agencies continue to support metropolitan transport initiatives, the expert stressed that weak implementation capacity remains a major challenge, even with ongoing technical and financial assistance.	The expert outlined that public transport in Mozambique is largely self-financed, as "public transport companies must finance themselves," due to the lack of government subsidies. This model creates serious sustainability issues, especially as investments since 2015 have yielded "very low or almost no return," limiting future funding. In contrast, road infrastructure is more attractive to investors, as it's considered economically viable and easier to finance. The government's limited fiscal space and debt servicing obligations further restrict its ability to support public transport. While international donors play a key role, their support depends on meeting strict conditions, adding another layer of complexity to financing efforts.
ME2	ME2 highlighted a fundamental lack of strategic direction in Mozambique's transport sector, noting that "there is no comprehensive vision guiding the transport model". This absence of long-term planning, the expert explained, undermines efforts to develop coherent mobility strategies and limits the potential for effective implementation. According to ME2, without a clear roadmap, transport initiatives remain fragmented and reactive, often shaped by immediate needs rather than a broader development agenda. She also emphasised that this lack of vision has serious implications for public-private collaboration. In her view, the absence of a stable, forward-looking strategy makes it difficult to attract private investors or international partners, as there is little clarity about long-term priorities or how projects will be sustained. As she put it, the government "doesn't really know what kind of transport model it wants," which leaves infrastructure planning limited and strains efforts to mobilise coordinated support for sustainable urban mobility.	ME2 said that transport planning in Mozambique still follows outdated ways of thinking: "Transport planning still relies on colonial-era frameworks instead of embracing a holistic and future-oriented approach." Because of this, the country struggles to build better, more sustainable transport systems. The expert stressed the need to plan for different types of transport like walking, cycling, and buses to work together. Without this change, the expert warned, "cities risk becoming locked into exclusionary and inefficient mobility systems." They also felt that efforts to support sustainable transport have mostly been symbolic. For example, the expert mentioned a campaign in Maputo to encourage cycling but said, "no actual investment was made in cycling infrastructure like bike lanes." Without real planning or money, they explained, according to the expert these ideas stay superficial and don't lead to real improvements. there has been little real investment in transport infrastructure in recent years. The government has mostly focused on importing buses instead of improving roads, terminals, or bus stops. "There was no visible investment, except for just filling potholes," they said. They explained that most investments are small, short-term fixes, not part of a bigger long-term plan.	A central barrier to investment is financial. The expert identified the limited capacity of Mozambique's national budget to fund high-cost transport projects. Public transport fares are kept deliberately low for social equity reasons, but this makes it impossible for transport companies to be financially self-sufficient. This situation creates a persistent funding gap, making external donor financing particularly from institutions like the World Bank essential. Still, reliance on external support is not a sustainable solution, and project implementation is often slow or stalled.
ME3	ME3 explained that although Mozambique has officially supported sustainable mobility, especially through donor-backed projects like the World Bank's Move Project, this support has not led to real change. There is a misalignment between political intention and practical action," he said, noting that while sustainability is talked about, it rarely gets fully implemented. He also pointed out that frequent leadership changes and weak coordination between government institutions make it hard to follow through on long-term transport plans. The expert stressed that without strong political commitment and a shift away from car dependency, sustainable mobility will remain just a goal on paper. He argued that real progress requires not just more funding, but also deeper reforms and a clear strategy to prioritise collective and non-motorised transport.	The expert described the prevailing investment pattern in Mozambique as a form of "cultural colonisation," shaped by colonial and post-colonial planning ideals that promote car ownership as a symbol of progress. In this context, investments continue to prioritise road infrastructure and private vehicle use, while collective, non-motorised, and informal transport modes remain overlooked he said. Despite references to public transport in policy discourse, the expert argued that it is still treated "on the same level as private transport—and that that will never work because private transport will always come out on top." He stressed that this lack of prioritisation for high-capacity vehicles like chapas leads to inefficiencies and social inequities, as "a minibus carrying 20 people is stuck in the same traffic as a private car with two passengers." This, according to ME3, reveals a failure to support the mobility needs of the broader population and reflects the continued marginalisation of collective transport in policy and investment decisions.	He discussed how Mozambique's limited fiscal space, high dependency on international aid, and elite-biased governance structures result in inefficient allocation of public resources. He highlighted that most money allocated to transport indirectly benefits the car-owning elite, while the majority population relies on underfunded informal systems. "The country allocates many resources to private cars, but that money goes abroad imports, fuel... it doesn't circulate within the national economy." He also pointed out the structural difficulty in shifting power away from elites due to hierarchical governance norms. "It's difficult to challenge hierarchies... they are too deeply respected."



Policy Brief: Advancing Sustainable Urban Mobility in Maputo

Nelson Cosme

Introduction

As Maputo continues to urbanize rapidly, its current mobility system, dominated by car-centric infrastructure and under-resourced public transport, is unsustainable. Without urgent reform, this model will deepen socio-economic inequality, increase emissions, and restrict access to opportunity for the city's growing population. These brief highlights the key barriers undermining progress toward sustainable urban mobility (SUM) and outlines strategic recommendations for action.

Key Challenges

1. Institutional Fragmentation and Weak Implementation

Transport planning in Maputo is hindered by siloed institutions and poor coordination between local and national agencies. While documents like the 2015–2035 Transport Master Plan exist, they remain largely unimplemented due to lack of enforcement capacity and clear leadership. Experts have described a disconnect between political intent and operational follow-through, resulting in stagnation across public transport initiatives.

2. Severe Funding Constraints

Public transport operations in Maputo are caught in a cycle of underinvestment and underperformance. Operators are expected to self-finance despite poor returns. The city remains heavily reliant on international donors, yet donor-led projects are often delayed and may not align with local priorities. Unlike peer cities, Maputo lacks strong legal frameworks to attract private investment or establish public–private partnerships (PPPs).

3. Car-Centric Planning and Social Inequity

There is a persistent cultural and political bias toward private car ownership, widely seen as aspirational. This perception drives disproportionate investment in road infrastructure while neglecting sidewalks, cycle lanes, and public transport systems. The result is an inequitable mobility system that disadvantages the majority of citizens, particularly low-income residents who walk or use informal transit daily.

4. Missed Regional Opportunities

While countries like Kenya and Tanzania are introducing PPP frameworks and piloting electric buses, Maputo has not yet followed suit. Regional examples show that inclusive, climate-smart transport systems are achievable when governments take proactive steps. Maputo risks falling behind unless it adopts similarly progressive approaches.

Why Sustainable Urban Mobility Matters

- **Climate Resilience:** SUM reduces greenhouse gas emissions and enhances urban resilience to climate risks such as flooding and heatwaves.
- **Social Equity:** Investments in walking and public transport directly benefit low-income populations, improving access to jobs, education, and healthcare.
- **Economic Efficiency:** Public and active transport modes move people more efficiently than private cars and keep economic value circulating locally.

Policy Recommendations

1. Strengthen Institutional Capacity and Coordination

Urban transport reform in Maputo requires a clear institutional framework and empowered governance. Establishing a dedicated Metropolitan Transport Authority or a high-level inter-agency coordination task force would help align responsibilities, improve collaboration between municipal and national agencies, and reduce institutional overlap. Mandates should be clearly defined and supported by legal authority and adequate resourcing. Local authorities must be empowered to lead on Sustainable Urban Mobility (SUM) implementation. In parallel, targeted investment in training programmes for transport planners and mobility professionals is essential to build long-term technical capacity.

2. Mobilise Sustainable Finance and Partnerships

Given Mozambique's limited public budgets, Maputo should pursue innovative and diversified funding mechanisms to advance sustainable transport. This includes developing a robust legal framework for Public–Private Partnerships (PPPs) and seeking access to climate finance instruments such as green bonds or concessional loans. Priority projects, such as Bus Rapid Transit (BRT) or electric bus fleets, should be structured as bankable, well-defined investments to attract private and multilateral finance. Reducing donor dependency through blended finance approaches will help ensure more predictable and context-sensitive funding for long-term urban mobility initiatives.

3. Prioritise Infrastructure for Walking, Cycling, and Public Transport

To improve access, equity and efficiency, Maputo must rebalance infrastructure investment in favour of inclusive, people-oriented transport modes. This includes expanding safe pedestrian walkways, protected cycling infrastructure, and accessible crossings, particularly in lower-income areas. Public transport systems should be upgraded by accelerating the BRT roll-out, expanding routes, and modernising the city's bus fleet (e.g., under the "Plan 1000" initiative). All new infrastructure should adhere to "complete streets" design principles, accommodating all users, not just cars. Roads should prioritise high-capacity modes such as buses and chapas through dedicated lanes or intersection prioritisation, to maximise people movement and network efficiency.

4. Improve Data Transparency and Evidence-Based Planning

Evidence-based decision-making requires regular and transparent data collection on mobility indicators, including modal share, budget allocations, transit performance, emissions, and safety. The city should commit to publishing annual mobility audits, enabling more effective planning, monitoring and public accountability. Collaboration with academic institutions, local experts, and development partners will be critical in designing robust monitoring and evaluation frameworks. Improved data availability can also enhance investor confidence and help Maputo qualify for performance-based funding from climate and development finance institutions.

5. Foster a Cultural Shift Through Public Engagement

Beyond infrastructure and finance, Maputo must work to shift public attitudes towards sustainable transport. The current association of private cars with success and status needs to be challenged. City-wide awareness campaigns can promote the health, affordability, and time-saving advantages of walking, cycling, and public transport. Incorporating sustainable mobility themes into school curricula and professional training courses will help build a new generation of planners and citizens who value inclusive transport systems. Active public engagement, through consultative forums, participatory planning, and citizen feedback mechanisms, can help ensure infrastructure reflects residents' real needs. A stronger culture of civic involvement will also support the implementation of more ambitious, people-focused transport policies.

Conclusion

Shifting Maputo's transport system toward sustainability is no longer optional, it is essential for climate action, social equity, and economic development. The city has a unique opportunity to align its infrastructure and policy priorities with the needs of the majority. As one expert noted: *"A rich country isn't one where poor people own cars, but where rich people use public transport."*

By acting now, Maputo can lead by example and build a resilient, inclusive mobility system that delivers for all its citizens.