***SUKUK**: International Journal of Banking, Finance, Management and Business*
Vol. 4, No. III, 2025
ISSN: 2978-316X (British Library)
https://sukukjournal.org.uk/index.php/sukuk/issue/view/12

Reconceptualising Fiscal Policy for Sustainable Mobility: The Role of Government Incentives in Eco-Friendly Vehicle Adoption

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Abstract

This study investigates the role of government fiscal incentives in promoting the adoption of eco-friendly vehicles, exploring how targeted subsidies, tax rebates, and regulatory measures can drive sustainable mobility while reducing environmental impact and supporting national climate goals. Amid escalating climate change concerns and urban congestion, governments face urgent pressure to design effective fiscal policies that accelerate eco-friendly vehicle adoption and reduce carbon emissions. The study focuses primarily on fiscal incentives and policy mechanisms influencing consumer adoption of eco-friendly vehicles, without delving into vehicle manufacturing technologies, private sector innovation strategies, or detailed international policy comparisons in depth. Key questions guiding this research include how government fiscal incentives can accelerate eco-friendly vehicle adoption and what economic and behavioural challenges are associated with these measures. Employing a qualitative approach and exploratory study, the research combines literature review, policy and fiscal frameworks analysis to determine how incentives can effectively promote sustainable transportation choices. Findings suggest that strategically designed fiscal incentives can significantly increase eco-friendly vehicle adoption, although their effectiveness depends on clear policy design, market awareness, and consumer responsiveness. Future research may explore long-term behavioural impacts, integration with public transportation policies, and the role of emerging technologies in supporting sustainable mobility.

Keywords

Sustainable Mobility, Eco-Friendly Vehicles, Fiscal Policy, Government Incentives, Environmental Policy

Introduction

Cities today face significant environmental and urban challenges. IPCC data shows urban areas account for about 70% of global CO2 emissions (Alam *et al*., 2024). Urban congestion is a growing problem, with cities like London facing traffic delays that cost the economy about £6.9 billion each year (Purohit, 2024). These challenges require a shift to sustainable mobility solutions that ease congestion and minimize environmental impacts.

Sustainable mobility integrates environmental sustainability into transportation planning. Adopting smart mobility solutions like electric vehicles (EVs) and improved public transport is essential. The UK government plans to end new petrol and diesel car sales by 2030 to encourage the shift to EVs (Upadhyay *et al*., 2024). Globally, various nations are implementing policies to promote eco-friendly transportation. The European Union's Green Deal, for example, aims to make Europe the first climate-neutral continent by 2050, with significant investments in sustainable transport (Mubarak *et al*., 2024). These initiatives are backed by international agreements, such as the Paris Agreement, highlighting the importance of collective climate action.

Transitioning to electric vehicles (EVs) and other eco-friendly alternatives can play a pivotal role in mitigating the emissions. Singh (2025) Electric vehicle adoption could reduce transportation-related CO2 emissions by up to 50% by 2030. The integration of eco-friendly vehicles into the transportation system also fosters innovation and economic growth in the green technology sector, creating jobs and stimulating investment in sustainable infrastructure (Tafida *et al*., 2024).

Integrating fiscal policy is vital for promoting sustainable mobility. Governments should effectively allocate resources to develop infrastructure like cycling lanes and electric charging stations. The UK's recent investment of £2 billion in cycling and walking infrastructure aims to encourage a shift towards non-motorised transport modes, thereby reducing congestion and emissions (Purohit, 2024). Such fiscal measures not only facilitate the transition to sustainable mobility but also enhance urban livability and public health.

Fiscal incentives play a crucial role in influencing consumer behaviour towards sustainable mobility. Liu and Selamat (2025) These incentives lower the initial cost of electric vehicles and increase consumer awareness and acceptance of sustainable transport. Direct financial incentives, regulatory measures can further enhance the effectiveness of fiscal policies. Shan and Ji (2024) note that government subsidies can drive corporate green transformation by incentivising manufacturers to invest in eco-friendly technologies. By imposing stricter emissions like corporate social responsibility can create a conducive environment for innovation in the automotive sector (Khurshic *et al*., 2025). This regulatory framework not only supports the transition to sustainable mobility but also ensures that manufacturers are held accountable for their environmental impact.

The primary aim of this study is to explore how government fiscal incentives can effectively facilitate the adoption of eco-friendly vehicles. The questions driving this research focus on how

government fiscal incentives can boost the adoption of environmentally friendly vehicles and what economic and behavioral challenges may arise from these initiatives.

According to Verma and Singh (2025), targeted incentives can significantly influence consumer behaviour towards green car adoption through a structured approach. The interplay of national policies, regulatory measures, consumer behaviour, and effective fiscal strategies is essential. By prioritising these strategies, governments can effectively reduce carbon emissions, enhance public health, and stimulate economic growth. Hence, this research seeks to identify optimal fiscal strategies that promote sustainable mobility.

Literature review

Fiscal incentives play a critical role in promoting sustainable mobility. Governments worldwide have implemented various incentive programmes aimed at fostering the adoption of eco-friendly transportation solutions. These incentives typically include subsidies, tax rebates, and regulatory policies, which are designed to encourage consumers to shift towards greener alternatives.

A comprehensive review reveals that numerous countries have established incentive frameworks to promote sustainable mobility. For instance, Xu *et al*. (2024) highlight the effectiveness of on-demand ride-hailing platforms under green mobility initiatives, noting that government regulation and pricing strategies significantly influence consumer choices. Similarly, Cai *et al*. (2025) discuss the impact of environmental regulations combined with government subsidies, illustrating how a well-structured policy mix can stimulate clean technology innovation.

Theoretically, subsidies and tax rebates lower the financial burden on consumers, making eco-friendly vehicles more accessible. For example, Dokholyan *et al*. (2024) argue that green taxation can serve as a powerful driver for sustainable development, incentivising both consumers and manufacturers to adopt environmentally friendly practices. Regulatory policies also play a crucial role by establishing standards that encourage the adoption of sustainable technologies. The interplay of these incentives can lead to increased consumer adoption, ultimately contributing to a more sustainable transportation ecosystem.

Understanding consumer behaviour is essential for effectively promoting eco-friendly technologies. The literature identifies several factors influencing adoption behaviour, including financial, social, and psychological aspects. Amiri *et al*. (2024) provide a comprehensive review of behavioural approaches to eco-friendly choices, emphasising that nudges can significantly impact consumer decisions. Financial incentives are critical; however, social norms and peer influences also play a pivotal role in shaping consumer attitudes towards sustainable mobility options. Sharma *et al*. (2024) further explore the global culture surrounding eco-friendly products, indicating that consumer preferences are increasingly leaning towards sustainability, particularly in the context of the digital economy (Bin-Armia, 2024).

Market dynamics are heavily influenced by awareness and accessibility. Shehawy *et al*. (2025) discuss the importance of an integrated SEM-ESG framework in understanding consumer behaviour towards green technology adoption. Their findings suggest that increased awareness of environmental issues and the availability of supporting infrastructure, such as charging stations for electric vehicles, are crucial in enhancing adoption rates. Additionally, Ajirotutu *et al*. (2024) emphasise the need for policy frameworks that integrate green infrastructure into urban development, which can further facilitate consumer access to sustainable mobility options.

The environmental rationale for promoting eco-friendly vehicles is underscored by global emission reduction targets and the urgent need to combat climate change. The literature consistently highlights the necessity of reducing greenhouse gas emissions and other pollutants associated with traditional vehicles (Bin-Armia, 2025). Nunes and Nunes (2024) discuss fiscal rules and public finance sustainability, drawing lessons from global practices that emphasise the importance of aligning fiscal policies with environmental goals. The promotion of eco-friendly vehicles is not merely a matter of consumer choice but a critical component of broader environmental strategies aimed at achieving significant emission reductions.

National policies often reflect international commitments to sustainability, such as the Paris Agreement. These policies influence fiscal strategies by establishing clear targets for emission reductions and providing a framework for the implementation of incentives. Udodiugwu *et al*. (2025) argue that promoting environmental sustainability through eco-friendly products is essential for achieving sustainable development goals, thereby reinforcing the interconnectedness of policy frameworks and environmental objectives.

Methods

This research adopts a qualitative approach to explore the role of government fiscal incentives in promoting the adoption of environmentally friendly vehicles. Fiscal incentive is essential for reducing the financial burden on consumers, fostering the development of necessary infrastructure, promoting environmental sustainability, and addressing social equity issues. The study combines a literature review and policy analysis of government policy in governing the fiscal regulations, creating a comprehensive framework to understand the challenges and opportunities arising from the government's efforts to support sustainable mobility through fiscal initiatives.

A comprehensive literature review and exploratory studies were conducted to evaluate implementation of fiscal policies on the adoption of eco-friendly vehicles. These approaches examine fiscal incentives based on income or providing additional support for electric vehicle purchases among disadvantaged communities.

The analysis highlights the policy frameworks and fiscal incentives. Consequently, government fiscal incentives play a crucial role in promoting the adoption of eco-friendly vehicles, significantly

impacting the transition towards a more sustainable and environmentally friendly transportation system. By making eco-friendly options more affordable, governments can encourage more consumers to consider making the switch. This research provides practical recommendations for improving Indonesia's fiscal policies, aimed at promoting sustainability and encouraging economic development and resilience.

Result and Discussion

Effectiveness of Fiscal Incentives

Targeted subsidies and tax rebates are crucial tools in promoting sustainable mobility, particularly in the adoption of electric vehicles (EVs) and other green technologies. Research indicates that financial incentives significantly influence consumer behaviour, leading to increased adoption rates of environmentally friendly vehicles. For instance, a study by Javadnejad *et al*. (2024) highlights that in the United States, states offering substantial tax rebates for EV purchases saw an approximate 30% increase in sales compared to those without such incentives. This demonstrates that financial incentives can effectively lower the initial cost barrier that often deters consumers from transitioning to sustainable mobility options.

The effectiveness of these subsidies is often enhanced by their strategic design. Guo *et al*. (2024) propose that a well-structured subsidy model, which considers both manufacturer and consumer behaviours, can lead to a more pronounced impact on market dynamics. Their evolutionary game model illustrates how targeted subsidies can create a symbiotic relationship between manufacturers and consumers, fostering a more robust market for green technologies. This synergy not only accelerates the adoption of sustainable mobility solutions but also encourages manufacturers to innovate and improve their offerings in response to consumer demand.

However, the effectiveness of these fiscal incentives can be limited by several factors. One significant barrier is the public's awareness and understanding of these incentives. Many consumers remain unaware of the financial benefits associated with adopting sustainable technologies, which can hinder their decision-making process. To address this, comprehensive public awareness campaigns are essential to educate potential buyers about available subsidies and tax rebates, as well as their long-term financial and environmental benefits (Bin-Armia, 2019).

The sustainability of these incentives is often questioned. As government budgets face constraints, the longevity of fiscal incentives can be uncertain. Policymakers must ensure that these programmes are not only financially viable but also adaptable to changing market conditions. For instance, Okeke *et al*. (2024) discuss the importance of integrating risk management strategies into the design of policy incentives to ensure their effectiveness in the long term. This approach can help mitigate potential financial risks and ensure that incentives remain in place to support the transition to sustainable mobility.

Regulations also play a vital role in shaping consumer adoption of sustainable mobility solutions. They can either enhance or limit the effectiveness of fiscal incentives, depending on how they are structured. For example, stringent emissions regulations can create a market environment that necessitates the adoption of cleaner technologies. Javadnejad *et al*. (2024) argue that in regions with strict emissions standards, consumers are more likely to consider EVs as a viable alternative, particularly when coupled with fiscal incentives. This regulatory push not only incentivises consumers but also compels manufacturers to innovate and produce more environmentally friendly vehicles.

Regulations can support the implementation of fiscal incentives by establishing clear guidelines and standards for manufacturers and consumers alike. Guo *et al*. (2024) highlight that a cohesive regulatory framework can facilitate the effective allocation of subsidies and tax rebates, ensuring that they reach the intended recipients. By aligning fiscal policies with regulatory measures, governments can create a comprehensive approach that maximises the impact of these incentives on consumer behaviour.

However, the effectiveness of regulations can be limited by factors such as bureaucratic inefficiencies and lack of enforcement. In some cases, regulations may be poorly communicated or inconsistently applied, leading to confusion among consumers and manufacturers. To mitigate these issues, it is crucial for governments to streamline regulatory processes and enhance transparency. Okeke *et al*. (2024) suggest that integrating policy incentives with robust regulatory frameworks can create a more conducive environment for sustainable mobility, as it simplifies compliance for manufacturers and provides clearer choices for consumers.

Cultural and societal attitudes towards sustainability can influence how regulations are perceived and adopted. In regions where there is strong public support for environmental initiatives, regulations tend to be more effective in driving consumer adoption. Conversely, in areas where scepticism about climate change prevails, regulatory measures may face significant resistance. Therefore, understanding the socio-cultural context is essential for policymakers to design regulations that resonate with the public and encourage widespread acceptance of sustainable mobility solutions.

The Implications on Economic, Behavioural Challenges and Policy Design

The transition towards sustainable mobility necessitates a comprehensive approach that integrates economic implications with fiscal incentives and infrastructure development. As urban centres grapple with increasing congestion and pollution, fiscal policy must evolve to support sustainable transport solutions. According to Limoa and Weku (2024), dynamic fiscal policies that promote financial sustainability are essential in fostering an environment conducive to sustainable mobility. This involves not only the implementation of tax incentives for green technology but also the development of infrastructure that supports such technologies. For instance, cities like

Amsterdam have successfully integrated cycling infrastructure, demonstrating that investment in sustainable transport can yield significant economic benefits, including reduced healthcare costs and enhanced productivity (Limoa & Weku, 2024).

Moreover, the economic implications of reconceptualising fiscal policy extend beyond immediate financial incentives. Investments in sustainable mobility infrastructure can lead to long-term economic growth by creating jobs in construction, technology, and maintenance sectors. Arimoro and Musa (2025) argue that supporting infrastructure development through targeted tax frameworks can stimulate local economies, particularly in emerging markets where such investments are crucial for development. For example, the British government's investment in electric vehicle (EV) charging infrastructure is projected to create thousands of jobs while reducing carbon emissions and dependence on fossil fuels (Arimoro & Musa, 2025).

However, the effectiveness of these integrated approaches hinges on the alignment of fiscal policies with broader economic goals. Policymakers must ensure that fiscal incentives do not merely serve as temporary measures but are part of a cohesive strategy that addresses the underlying economic drivers of transport choices. This requires a thorough understanding of local economic conditions and the specific needs of communities. As Zaman and Kusi-Sarpong (2024) highlight, identifying critical success factors related to sustainability is vital for influencing consumer behaviour and ensuring that policies resonate with the public.

Despite the potential benefits of sustainable mobility, several barriers hinder its widespread adoption. Affordability remains a significant challenge, particularly in low-income communities where the initial costs of adopting green technologies can be prohibitive. The upfront costs associated with electric vehicles, for instance, can deter potential consumers despite the long-term savings on fuel and maintenance (Zaman & Kusi-Sarpong, 2024). Policymakers must therefore consider how fiscal policies can alleviate these financial burdens, perhaps through subsidies or tax rebates that make sustainable options more accessible to all income brackets.

Market awareness also plays a crucial role in the adoption of sustainable mobility solutions. Many consumers are unaware of the benefits associated with sustainable transport options, which can lead to a lack of demand. Effective communication strategies are essential in addressing this gap. As highlighted by Marie (2025), clear and consistent messaging about the advantages of sustainable mobility can significantly influence public perception and consumer behaviour. For example, campaigns that educate the public on the environmental and economic benefits of electric vehicles can help shift consumer attitudes and increase market readiness.

Infrastructure limitations present another critical barrier to the adoption of sustainable mobility. In many cases, existing transport systems are not equipped to support the integration of new technologies, such as EV charging stations or dedicated cycling lanes. This lack of infrastructure can discourage consumers from making the switch to more sustainable options, as the necessary support systems are either absent or inadequate. Arimoro and Musa (2025) emphasise the importance of developing robust infrastructure to facilitate the transition towards sustainable

mobility. Policymakers must prioritise investments in infrastructure that not only supports sustainable transport but also enhances overall mobility within urban environments.

Furthermore, the interplay between these barriers—affordability, market awareness, and infrastructure limitations—creates a complex landscape that policymakers must navigate. Solutions must be multifaceted, addressing each barrier simultaneously to create an environment conducive to sustainable mobility. This could involve collaborative efforts between government, private sector stakeholders, and communities to develop tailored strategies that meet the unique needs of different populations.

The relationship between consumer behaviour, market readiness, and policy design is intricate and critical for advancing sustainable mobility. Consumer behaviour is often influenced by a range of factors, including economic conditions, social norms, and individual preferences. Zaman and Kusi-Sarpong (2024) assert that understanding these behavioural drivers is essential for developing effective policies that encourage the adoption of sustainable transport options. For instance, the perceived inconvenience of switching from traditional vehicles to electric ones can deter consumers, highlighting the need for policies that address these concerns through improved infrastructure and incentives.

Market readiness, defined as the preparedness of the market to embrace new technologies and practices, is another crucial component in this equation. Policymakers must assess the current state of the market to identify gaps and opportunities for intervention. This includes evaluating the availability of sustainable transport options, the extent of consumer awareness, and the readiness of infrastructure to support these options. As highlighted by Limoa and Weku (2024), dynamic fiscal policies that adapt to market conditions can facilitate a smoother transition towards sustainable mobility. For example, phased implementation of incentives for electric vehicles can align with market growth, ensuring that supply meets demand.

Policy design must therefore be informed by insights into consumer behaviour and market readiness. Effective policies should not only incentivise the adoption of sustainable technologies but also create a supportive environment that addresses potential barriers. This could involve the introduction of tiered incentives based on income levels or targeted campaigns to raise awareness about the benefits of sustainable transport. As Marie (2025) notes, clear communication of policy objectives is essential for gaining public support and ensuring successful implementation.

The effectiveness of fiscal policies aimed at promoting sustainable mobility is heavily reliant on their clarity, consistency, and communication. Clear policies provide a framework for stakeholders to understand their roles and responsibilities in the transition towards sustainable transport. Policymakers must ensure that the objectives of fiscal incentives are well-defined and easily accessible to the public. As highlighted by Marie (2025), effective communication strategies are crucial for public policy implementation, ensuring that citizens are informed and engaged in the process.

Consistency in policy design is equally important, as fluctuating or contradictory policies can undermine public trust and deter investment. For instance, if incentives for electric vehicles are frequently altered or discontinued, consumers may be hesitant to invest in such technologies, fearing that future support may not be guaranteed. Limoa and Weku (2024) emphasise the need for stable and predictable fiscal policies that create a conducive environment for sustainable mobility. This stability not only encourages consumer confidence but also attracts investment from businesses looking to develop sustainable transport solutions.

Moreover, well-communicated policies can enhance public engagement and participation in sustainable mobility initiatives. When citizens understand the rationale behind policies and the benefits they offer, they are more likely to support and adopt sustainable practices. Policymakers should utilise various communication channels, including social media, public forums, and community outreach, to disseminate information effectively. Arimoro and Musa (2025) suggest that engaging with communities directly can foster a sense of ownership and responsibility towards sustainable transport initiatives.

In addition, the importance of feedback mechanisms cannot be overstated. Policymakers should establish channels through which citizens can voice their opinions and experiences related to sustainable mobility policies. This feedback can inform future policy adjustments and improvements, ensuring that initiatives remain relevant and effective. As Zaman and Kusi-Sarpong (2024) point out, understanding consumer behaviour and preferences is essential for refining policies that resonate with the public.

Environmental and Social Impact

The reconceptualisation of fiscal policy to favour sustainable mobility is pivotal in achieving significant reductions in carbon emissions. According to Turan *et al*. (2024), optimising transport systems can lead to a marked decrease in greenhouse gas emissions, particularly when integrated with innovative fiscal measures. the transition to sustainable mobility is not merely a theoretical exercise; it has practical implications that are already being observed in various regions. For example, cities that have invested in public transport infrastructure and green technologies have reported not only lower emissions but also improved air quality. The introduction of low-emission zones in cities like London has led to a 30% reduction in nitrogen dioxide levels, demonstrating the effectiveness of targeted fiscal policies (Greater London Authority, 2023).

Fiscal policies that support sustainable mobility can also stimulate economic growth. By investing in green infrastructure, governments can create jobs in emerging sectors, such as renewable energy and electric vehicle manufacturing. Mahmood *et al*. (2024) highlight that green finance is essential in driving these investments, as it provides the necessary capital for innovation and infrastructure development. The Belt and Road Initiative, for instance, showcases how strategic

investments in sustainable transport can yield economic benefits while simultaneously addressing climate change (Mahmood *et al*., 2024). Thus, the fiscal policy framework must evolve to prioritise sustainability, aligning economic incentives with environmental imperatives.

The societal benefits of reconceptualising fiscal policy for sustainable mobility extend beyond environmental impacts. One of the most pressing issues in urban areas is congestion, which not only affects travel times but also has significant economic costs. According to Olaleye *et al*. (2024), innovative frameworks that coordinate transportation logistics can substantially reduce urban congestion. For example, cities that have adopted congestion pricing models have observed a decrease in traffic volume, leading to more efficient transport systems and enhanced mobility for residents. This approach not only alleviates congestion but also encourages the adoption of green technologies, as individuals and businesses seek alternatives to traditional fossil fuel-dependent transport.

Furthermore, the promotion of sustainable mobility through fiscal measures can lead to increased public investment in green technologies. Anthony Jnr (2024) notes that local governments in Norway have successfully implemented policies that support the development of electric public transport systems, thereby reducing reliance on private vehicles. These initiatives not only contribute to lower emissions but also enhance the quality of life in urban communities by providing accessible and efficient public transport options. The societal shift towards embracing green technologies is essential for fostering a culture of sustainability, which can be further supported by fiscal incentives that reward environmentally friendly practices.

In addition to economic and environmental advantages, the social equity implications of sustainable mobility policies cannot be overlooked. By prioritising public transport and non-motorised transport options, fiscal policies can ensure that all community members, regardless of socioeconomic status, have access to mobility solutions. This inclusivity is vital for fostering social cohesion and reducing disparities in access to essential services. As cities continue to grow, the need for equitable transport solutions becomes increasingly critical, underscoring the importance of integrating social considerations into fiscal policy frameworks.

Conclusion

The findings of this study highlight the crucial role that strategically designed fiscal incentives can play in accelerating the adoption of eco-friendly vehicles and, by extension, advancing sustainable mobility goals. Subsidies, tax rebates, and regulatory measures have shown significant potential in reducing the financial barriers to adoption, thereby encouraging consumers to consider greener alternatives. However, their effectiveness is not automatic; it relies heavily on the clarity of policy design, the extent of market awareness, and the degree of consumer responsiveness. Without these complementary factors, even the most well-intentioned fiscal measures may fall short of their intended impact. This underscores the reality that fiscal policy,

while powerful, must operate within a broader ecosystem of regulatory, social, and infrastructural support.

From a policy perspective, the study suggests that fiscal incentives should not function as isolated interventions but as components of an integrated strategy for sustainable mobility. Integrating these incentives with broader environmental policies can help ensure coherence and maximize their long-term effectiveness. Equally important is the need for public awareness programs that bridge the gap between policy design and consumer understanding. Many potential adopters remain unaware of the financial and environmental benefits available to them, which can limit the reach of existing measures. By embedding awareness campaigns into the rollout of fiscal incentives, governments can foster more informed decision-making and build stronger public support for sustainability initiatives.

Continuous evaluation and adaptation of fiscal incentives are also essential. Market dynamics, consumer behaviour, and technological innovation are constantly evolving, and static policies may quickly become outdated. Governments must therefore adopt a flexible approach, regularly assessing the performance of their incentive schemes and making adjustments as needed to reflect emerging challenges and opportunities. This adaptability will help ensure that fiscal incentives remain relevant, financially sustainable, and aligned with the shifting realities of both markets and climate policy agendas.

Looking ahead, this study identifies several promising directions for future research. First, it is necessary to investigate the long-term behavioural impacts of fiscal incentives on consumer decision-making. While short-term adoption can be measured through sales figures, understanding whether incentives foster lasting shifts in attitudes toward sustainability requires deeper exploration. Second, future studies could examine how fiscal incentives might be integrated with broader public transportation policies to create more holistic mobility systems. For instance, linking electric vehicle adoption with investments in electric bus fleets or shared mobility platforms could create synergies that extend beyond individual consumer choices. Finally, empirical research on the cost-effectiveness of various incentive models and on consumer responsiveness across different income groups and cultural contexts would provide valuable insights for refining fiscal policy design.

In sum, fiscal incentives have proven to be a powerful lever for advancing sustainable mobility, but they must be embedded in a broader framework of policy coherence, public engagement, and continuous learning. By addressing economic, behavioural, and infrastructural challenges in tandem, governments can create the enabling conditions for a transport system that is not only environmentally sustainable but also socially equitable and economically resilient.

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