



Deliverable 4.3

**Opportunities and challenges for research
and international cooperation**



This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No 101096253.



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Summary sheet

Deliverable number	D4.3
Deliverable title	Opportunities and challenges for research and international cooperation
Deliverable version	Version 1.0
Work Package number	WP4
Work Package title	Global progress and international exchange
Due date of delivery	31/01/2026
Actual date of delivery	27/01/2026
Dissemination level	Public
Type	Document, report
Contributor(s)	UEMI, UNH, UITP, Volvo, FIER
Reviewer(s)	AVL, UEMI, UNH
Project name	Stimulating road Transport Research in Europe and around the Globe for sustainable Mobility
Project acronym	STREnGth_M
Project starting date	1 February 2023
Project duration	36 Months

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List of abbreviations and acronyms

Acronym	Meaning
2Zero	Towards Zero Emissions (co-programmed partnership)
AFD	Agence Française de Développement (French Development Agency)
AIT	Asian Institute of Technology
AU	African Union
AV	Autonomous Vehicle
BRT	Bus Rapid Transit
CINEA	European Climate, Infrastructure and Environment Executive Agency
CoP	Conference of the Parties
CSA	Coordination and Support Action
D	Deliverable
DART	Dar es Salaam Rapid Transit
DoA	Description of Action (STREnGth_M Grant Agreement)
EC	European Commission
EIB	European Investment Bank
EFSD+	European Fund for Sustainable Development Plus
ESG	Environmental, Social, and Governance
EU	European Union
EV	Electric Vehicle
GCF	Green Climate Fund
GGGI	Global Green Growth Institute
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit (German Development Agency)
IDRC	International Development Research Centre
ITF	International Transport Forum
KNUST	Kwame Nkrumah University of Science and Technology (Ghana)

Acronym	Meaning
LAIF	Latin America Investment Facility
LMICs	Low- and Middle-Income Countries
MaaS	Mobility as a Service
MYC	MobiliseYourCity
NCP	National Contact Point (for Horizon Europe)
NDICI	Neighbourhood, Development, and International Cooperation Instrument
NMT	Non-Motorized Transport
PAAPAM	Pan-African Action Plan for Active Mobility
R&I	Research and Innovation
RELIEVE	Latin American Research Network on Energy and Vehicles
RTR	Road Transport Research
SDGs	Sustainable Development Goals
SIDS	Small Island Developing States
SUMP	Sustainable Urban Mobility Plan
TOD	Transit-Oriented Development
TRIMIS	Transport Research and Innovation Monitoring and Information System
UCT	University of Cape Town
UN	United Nations
UNECA	United Nations Economic Commission for Africa
UNEP	United Nations Environment Programme
UNH	United Nations Human Settlements Programme (UN-Habitat)
V2X	Vehicle-to-Everything
WP	Work Package

Executive Summary

This deliverable, **D4.3 – Opportunities and challenges for research and international co-operation**, has been developed within the framework of the STREnGth_M project (Stimulating road Transport Research in Europe and around the Globe for sustainable Mobility). As part of Work Package 4 on *Global progress and international exchange*, the report examines how research, innovation, and international cooperation can be better aligned to support sustainable mobility transitions in emerging economies, while simultaneously advancing European strategic interests in road transport research and innovation.

Rapid urbanisation, motorisation, and economic growth in regions such as Africa, Asia, and Latin America are driving unprecedented increases in transport demand. While mobility is essential for economic and social development, current trajectories risk exacerbating congestion, emissions, inequality, and infrastructure stress. Emerging economies face a dual challenge: expanding access to safe and affordable mobility for underserved populations while decarbonising transport systems and avoiding carbon-intensive lock-ins. This context creates both urgency and opportunity for innovation and international collaboration.

The report highlights that emerging economies are no longer only recipients of technology but increasingly sources of innovation, particularly in areas such as two- and three-wheeler electrification, digital mobility services, battery swapping, frugal engineering, and new business models. These developments offer strong complementarities with European expertise in systems integration, standards, planning, and research. International cooperation, therefore, has the potential to deliver mutual benefits by co-developing solutions that are scalable, inclusive, and context-appropriate.

Building on prior mapping of programme synergies (D4.2), this deliverable focuses on *how* cooperation translates into impact. It identifies concrete impact pathways—from pilots to policy change and scaled investment—illustrated through real-world examples where EU-supported research and demonstrations have informed national strategies, unlocked development finance, and attracted private investment. At the same time, it identifies persistent bottlenecks that inhibit alignment and effectiveness, including fragmented donor procedures, limited local absorptive capacity, funding discontinuities between pilots and scale-up, misaligned incentives, and coordination fatigue.

Looking ahead to the 2025–2030 period, the report identifies strategic opportunities to accelerate progress. These include emerging funding and programming windows (such as Horizon Europe, NDICI/Global Europe, Global Gateway, and climate finance), priority regions with high potential impact, and transport sub-sectors where coordinated action can deliver outsized benefits—most notably public transport electrification, bus rapid transit, rail and transit-oriented development, green freight, and active mobility. The report also highlights the value of structured collaboration mechanisms, including the Global Task Force on Sustainable and Innovative Mobility, in translating research into actionable knowledge and policy support.

Finally, through detailed regional innovation mapping exercises in Latin America, Africa, and Asia, and an analysis of cross-cutting themes, the report provides evidence-based insights to inform European Commission services, ERTRAC, Horizon Europe partnerships, and other

stakeholders. It offers a foundation for more strategic, coherent, and impact-oriented international cooperation in sustainable mobility research and innovation.

1 Introduction

1.1 STREnGth_M project overview

STREnGth_M (Stimulating road Transport Research in Europe and around the Globe for sustainable Mobility) is an EU-funded Coordination and Support Action contributing to the planning of research and innovation in Europe by:

- Identifying future research needs in the field of road transport;
- Updating and supporting the coordination of strategic research agendas and roadmaps in the field; and
- Facilitating continuous exchange between road transport research related Horizon Europe partnerships and platforms.

Furthermore, it analyses research, innovation and cooperation capacities in EU Member States, explores funding instruments on national and regional levels and assesses the potentials of national and regional roadmaps.

In particular, STREnGth_M plays a key role in supporting ERTRAC, the European Road Transport Research Advisory Council, in terms of strategic support and dissemination, as well as liaising with other key European partnerships and technology platforms.

1.2 STREnGth_M WP4, task description and objectives of this report

This Deliverable D4.3 is part of Work Package 4 (WP4).

It is also the aim of this report to serve as a guide for stakeholders such as European Commission, ERTRAC and 2ZERO by:

- Identifying opportunities: Highlighting specific areas where EU actors can make the greatest impact, from scaling e-mobility pilots to developing harmonized standards.
- Informing investment decisions: Providing evidence-based insights into the needs and capacities of emerging economies, enabling targeted interventions.
- Supporting R&D and innovation: Offering a roadmap for collaborative research and innovation, with a focus on co-developing solutions that address local challenges while advancing global sustainability goals.
- Facilitating international collaboration: Showcasing examples of coordinated action and providing recommendations for strengthening partnerships across regions and sectors.

1.3 Report structure

The report is structured to provide a comprehensive analysis of the challenges, opportunities, and pathways for innovation in sustainable mobility, with a focus on aligning European expertise and resources with the unique needs of emerging economies. The current **Section 1** provides an introduction, highlighting the project and the structure of the report.

Section 2 sets the stage by exploring the high-level challenges and opportunities in emerging economies, including the interplay of urbanization, infrastructure gaps, and climate imperatives. It highlights the potential for innovation in areas such as electrification, digitalization, and shared mobility.

Section 3 examines systemic challenges and opportunities for advancing sustainable mobility through international collaboration. It highlights key pathways for impact, such as scaling pilots into full systems, and identifies recurring bottlenecks, including governance fragmentation, funding gaps, and capacity constraints.

Section 4 presents the findings of regional innovation mapping exercises conducted in Latin America, Africa, and Asia. It provides a detailed analysis of the unique needs, capacities, and actors in each region, as well as specific opportunities for collaboration and innovation. Building on the regional insights from Section 4, **Section 5** identifies cross-cutting themes that transcend regional boundaries. These include systemic challenges such as institutional fragmentation and financial constraints, as well as opportunities for collaboration in areas like integrated planning, harmonized standards, and capacity-building.

2 Innovation Needs, Priorities and Opportunities in Emerging Economies

Transportation is a cornerstone of economic and social development, providing access to jobs, education, and markets. In emerging economies, the demand for mobility is rising sharply, driven by rapid urbanization and income growth. By 2050, global passenger and freight activity is expected to triple compared to 2020 levels, with the majority of this growth concentrated in Asia, Africa, and Latin America. Vehicle fleets are forecast to double, with over 90% of new growth occurring in low- and middle-income countries. This surge underscores the urgent need for innovative mobility solutions that can accommodate rising travel demand in a sustainable and inclusive way.

However, delivering sustainable mobility in these contexts presents a complex set of challenges. Rapid motorization is straining infrastructure, leading to chronic congestion and deteriorating air quality in many cities. At the same time, large portions of the population still lack access to reliable and safe transport. Informal modes—such as minibuses, jeepneys, and motorcycle taxis—often fill the gap, but they come with issues of safety, efficiency, and emissions. The current SDG 11.2 dataset¹ on “convenient access to public transport”, *now covering over 2,300 cities worldwide, indicates that only 60.9% of the global population has convenient access to public transport. Yet, significant regional disparities persist: while Northern America and Europe report accessibility levels of 82.6%, the figures drop to just 33.8% in Sub-Saharan Africa and 49.3% in Western Asia and Northern Africa. These gaps highlight the pressing need for more equitable and inclusive urban mobility solutions.*

Climate change adds another layer of urgency, as transport emissions are one of the fastest-growing sources of greenhouse gases in developing countries. These interlinked challenges call for innovation—not just in vehicle technologies, but also in mobility services, policies, and business models that can leapfrog older paradigms and achieve sustainable mobility for all.

Evolving role of emerging economies in innovation

Historically, advances in transport technology were concentrated in industrialized nations, but now, emerging economies are increasingly becoming sources of innovation and important collaborators in research. Countries like China, India, and Brazil have built significant automotive and mobility R&D capabilities, while entrepreneurs across Africa and Southeast Asia are devising new mobility services tailored to local needs. For example, ride-hailing platforms like SafeBoda in Kenya and Gojek in Indonesia have professionalized informal transport modes, integrating them into the digital economy. Similarly, startups like Ampersand in Rwanda are

¹ [Urban transport | Urban Indicators Database](https://data.unhabitat.org/pages/urban-transport): <https://data.unhabitat.org/pages/urban-transport>

pioneering affordable electric motorcycles with battery-swapping infrastructure, addressing both cost and infrastructure barriers.

The shift in innovation dynamics coincides with changing global trade patterns relating to trade policies disrupting supply chains and prompting reconfigurations in global markets. These changing dynamics create a window of opportunity for the EU to deepen partnerships with emerging economies, leveraging their growing innovation ecosystems to address shared global sustainability goals.

Emerging economies face complex, interlinked challenges in delivering sustainable mobility. This is a dual challenge: expanding access to mobility for underserved populations while simultaneously greening and modernizing transport systems to handle growing volumes sustainably. This context creates opportunities for innovation:

1. **Electrification of various vehicle segments:** In many Asian and African cities, two- and three-wheelers dominate personal mobility. Electrifying this segment could significantly reduce emissions, with an estimated potential to cut 500–600 megatons of CO₂ annually—equivalent to removing 200 million cars from the road. Linked to the broader push for electrification are battery-swapping innovations, driven by novel business models designed to address charging challenges in regions with unreliable electricity supply, as well as second-life battery applications & recycling.
2. **Digital mobility services:** Startups are leveraging mobile technology to provide GPS tracking and mobile data to optimize routes, on-demand transport solutions, such as ride-hailing, digital fare systems, and logistics platforms. These innovations are not only improving mobility but also formalizing segments of the informal economy.
3. **Integrated urban planning:** Some cities like Bogotá and Santiago in Latin America, but also Dar es Salaam and Dakar in Africa demonstrate the potential of bus rapid transit (BRT) systems to provide high-capacity, low-emission public transport. Solutions like BRT, when combined with policies to discourage private car use, can transform urban mobility landscapes.
4. **Finance and governance innovations:** In emerging economies, innovative finance and governance are vital for sustainable mobility. Blended finance, combining public funds, donor support, private investment, and own government revenues, has enabled projects like India's electric bus rollouts. Green bonds, used in Chile for metro expansion and in Mexico City for electric buses, mobilize climate-aligned capital.
5. **Frugal innovation and global collaboration:** Resource constraints in emerging economies have spurred the development of affordable, robust solutions. For instance, retrofitting diesel minibuses to electric has emerged as a cost-effective alternative to purchasing new electric buses, extending vehicle life while reducing emissions. Partnerships with emerging economies can support such development of solutions and innovations. In the EU-funded SOLUTIONSplus project, e-mobility solutions were tested, combining European technology with local adaptation to create scalable solutions.

Innovation in emerging economies should go beyond vehicle technologies to include mobility services, policies, business models, inclusion and accessibility, as well as research which would allow leapfrogging older paradigms. International collaboration is critical to addressing the mobility challenges of emerging economies. By pooling expertise, resources, and

technology, EU along with different regions can co-create solutions that are both innovative, inclusive and contextually appropriate. One example could be setting up joint R&D projects, such as on battery recycling and second-life applications that can address global challenges while building local capacity. These kinds of collaboration also offer mutual benefits. Emerging economies gain access to technical expertise, financing, and proven solutions, while industrialized regions gain insights into frugal innovation and access to rapidly growing markets.

Strategic importance of collaboration

International partnerships are critical to addressing shared sustainability goals while meeting the unique needs of emerging markets. Collaborative innovation can:

- **Accelerate decarbonization:** Joint R&D projects can drive advancements in EV technology, battery recycling, and sustainable transport systems.
- **Promote inclusivity:** Mobility solutions must address equity gaps, ensuring access for underserved populations.
- **Foster resilience:** Building local research and manufacturing capacity can reduce reliance on imports and create sustainable ecosystems.
- **Enhance financing capacity:** Partnerships can strengthen the capacity of emerging economies and financial structures to mobilize blended finance, green bonds, and concessional funding to unlock investments in sustainable mobility.

Emerging economies are at a crossroads in their mobility transitions. They have the opportunity to leapfrog to cleaner, smarter systems, but this requires overcoming significant barriers, like high upfront costs, technical capacity gaps, and entrenched informal systems. Innovation, whether in technology, policy, financing or business models, will be the key to navigating these challenges.

In the process of doing so, international collaboration offers an important mechanism to accelerate innovation, scale solutions, and align global efforts toward sustainable mobility. The next section explores how coordinated research and cooperation can unlock these opportunities, while addressing the barriers that often hinder progress.

3 Opportunities and challenges for research and international cooperation

Having mapped the potential synergies of programmes in D4.2, this current deliverable now focuses on the opportunities, barriers and coordination efforts delivering tangible improvements in transport systems.

The previous section sets the stage by outlining the innovation needs and opportunities in emerging economies, and this section builds on that by exploring how international cooperation can address these needs and scale solutions. In this section, we are diving into the *how*, showing specific pathways where collaboration has worked (e.g., pilots leading to policy and investment) and identifying the bottlenecks that need to be addressed to make these efforts more effective. And then, we will look into actionable opportunities for the next five years, aligning with the themes in earlier sections.

3.1.1 Impact Pathways: From Pilots to Policy Change to Scaled Investment

Several **illustrative pathways** show how coordination among European actors can create virtuous cycles of innovation, policy reform, and scaling up:

- **Innovation to Investment (Kigali, Rwanda):** The EU-funded SOLUTIONSplus project piloted 24 electric motorcycle taxis driven by women, breaking gender barriers in a male-dominated sector. The pilot demonstrated the viability of e-mobility, reducing emissions and training women drivers. Inspired by its success, Kigali developed an e-mobility strategy, attracting World Bank and AfDB funding for 200 e-buses and private investment to scale up e-motorcycles. A Rwandan transport official noted, “The EU pilot gave us evidence and confidence; now bigger players are coming in to scale it.”
- **Policy to Infrastructure (Douala, Cameroon):** MobiliseYourCity (MYC) helped Douala, Cameroon, create its first Sustainable Urban Mobility Plan (SUMP), which laid the groundwork for \$320 million in World Bank and AFD funding for BRT lines and junction improvements. The SUMP provided a coherent vision, enabling donors to co-finance projects with confidence. The expected outcome: a 25% increase in public transport use and a 15% reduction in CO₂ emissions by 2030.
- **Research to Policy (Chile):** The EU's Horizon 2020 DeCARB LAC project developed tools to quantify transport emissions, which Chile's Ministry of Transport adopted into its national e-mobility strategy. This strategy has since supported the deployment of over 800 electric buses in Santiago, financed by private and national funds. EU research provided the analytical foundation for evidence-based policy and investment.
- **City-to-City Twinning (Pasig, Philippines):** Mentored by Murcia, Spain, Pasig piloted electric quadricycles for health services through SOLUTIONSplus. The implementation of this initiative influenced policy, with the government considering support for e-quads

and e-trikes for various use cases. Pasig itself allocated resources to maintain the fleet, demonstrating how city-level pilots can scale and impact local services.

These pathways reveal recurring success factors: early coordination, inclusive stakeholder engagement, and the use of data to build trust and attract investment:

- *Early coordination on planning and pilots* – De-risks later infrastructure finance.
- *Inclusivity and stakeholder engagement* – European projects often emphasize participation (e.g. consulting informal transport operators in Douala’s plan, or training women drivers in Kigali), which builds social license for changes.
- *Use of data and evidence* – Aligning on metrics (like in Quito measuring 6.5 tCO₂ avoided in the pilot) helps convince finance ministries and banks to fund scale-up.

3.1.2 Bottlenecks: What Inhibits Alignment and Impact

Despite progress, several challenges hinder seamless cooperation of “one system, many actors”. The most commonly cited bottlenecks include:

- **Fragmented Procedures:** Each donor has its own project cycle, procurement rules, and safeguard standards. In joint efforts, reconciling these can be slow. For example, in the Dakar bus project, aligning EIB’s and AFD’s procurement processes with Senegal’s preferences caused delays in procuring 380 buses because of differing technical specs requirements. Another challenge is the perceived slowness of EU grant disbursement, in that, while thoroughness is a strength, maintaining credibility requires finding a balance between rigorous procedures and timely action to meet the expectations of partner countries.
- **Visibility and Credit-Sharing Issues:** Donor agencies naturally seek to showcase their contributions, but this can sometimes lead to misalignment. As one bilateral agency representative noted, “There’s often competition for the ‘flag’ on a project”. For instance, during funding discussions for Abidjan’s urban transport improvements, multiple donors vied for leadership. Co-branding initiatives, such as labeling projects as “Team Europe” and including all logos, have helped mitigate these tensions, but smaller EU Member States sometimes feel overshadowed by larger players. Transparent communication, joint public relations efforts, and a “collective impact” mindset—where results take precedence over individual recognition—are essential to fostering alignment.
- **Local Absorptive Capacity:** Limited institutional capacity in recipient cities often hampers the implementation of complex, multi-donor projects. For instance, in Dar es Salaam’s BRT expansion, the city transport authority (DART) struggled to manage overlapping donor requirements from the World Bank and AfDB. A joint capacity building program, wherein World Bank financed a Project Management Consultant to help DART manage multiple donor contracts, eventually resolved these issues. However, without dedicated support units for multi-donor projects, even well-funded plans can falter. For example, Addis Ababa’s BRT project faced years of delays due to the city’s inability to manage French- and Korean-funded components simultaneously.
- **Misaligned Incentives or Priorities:** Diverging priorities between donors and governments can lead to disjointed efforts. Such was the case in Kenya around 2015, wherein

the government prioritized highway construction while EU donors focused on urban transit systems, resulting in parallel investments rather than coordinated action. Over time, Kenya's inclusion of BRT in its transport strategy has enabled better alignment. Continuous policy dialogue is critical to harmonize priorities, and EU can play a key role by presenting a unified voice to encourage governments to adopt sustainable transport goals.

- **Funding Gaps and Continuity:** A coordinated approach only works if all components are financed in sync. In some cases, pilots funded by the EU have succeeded but stalled due to a lack of follow-on investment. For example, an e-mobility pilot in Uganda demonstrated success but failed to scale as private investors hesitated and public funds were unavailable. This highlights the need for better sequencing: when funding pilots, parallel efforts should secure scale-up financing through mechanisms like guarantees, or blended finance. Without this, pilots risk becoming “orphaned experiments.” As one expert noted, “We have no shortage of pilots, but a shortage of pilots graduating to full systems.
- **Coordination Fatigue and Transaction Costs:** Aligning multiple actors requires significant time and resources, which can slow implementation. A city official in an East African capital observed that while donor coordination is beneficial, “We spend so much time in workshops and writing joint reports that actual work on the ground slows.” Streamlining processes, such as consolidating reporting into a single joint progress report for all funders, can reduce this burden. Delegated cooperation—where one lead agency executes on behalf of others—can also simplify coordination, though it requires trust and a willingness to cede control. For instance, The EFSD+ joint guarantee platform helps reduce burden by having one mechanism cover many financiers, but more simplification is still needed.
- **Political and Economic Risks:** External factors, such as political changes or economic crises, can derail coordinated efforts. For example, in Latin America, some EU-supported BRT initiatives were discontinued following elections that brought mayors with car-centric agendas into office, shifting priorities away from sustainable transit solutions. Similarly, rising global interest rates have caused some low-income countries to backtrack on borrowing plans, jeopardizing transport projects. Flexibility is essential to adapt to such risks, including the provision of additional grants or guarantees to keep projects viable during economic downturns.

3.2 Opportunities 2025–2030: Emerging Funding Windows, Priority Regions, and High-Impact Sectors

The next five years present critical opportunities to accelerate sustainable transport transitions and to put transport on a sustainable trajectory to meet the 2030 climate and development goals. For Europe and partner countries, several opportunities are on the horizon to accelerate action: major funding cycles (both European and multilateral), political milestones, and technological advances. This section highlights key opportunities in terms of **funding windows** and **sub-sectors**, and suggests how EU actors can leverage them in a coordinated fashion.

3.2.1 Funding and Programming Windows

- **Mid-Term Review of NDICI (2024/25):** The EU's review of its Global Europe allocations offers a chance to increase funding for sustainable transport, such as urban mobility in Africa or rail connectivity in neighbouring regions.
- **Global Gateway Projects (2025):** Major transport corridor projects, such as the Abidjan–Lagos corridor, will require financing. EU can frontload grants for climate adaptation measures and urban transit connections.
- **Horizon Europe (2025–2027):** Aligning Horizon calls with Global Gateway priorities can ensure innovations are ready for deployment by 2030. For example, funding low-cost electric bus technologies for tropical climates could address specific regional needs.
- **Climate finance scaling:** The Green Climate Fund and development banks are increasing transport-related climate finance. EU can package programs like an “African E-Bus Deployment” to attract concessional funding.
- **Member State Budget Cycles and Development Strategies:** Upcoming strategy updates in key Member States, such as Germany's BMZ 2030 (2025) and France's AFD refresh (2026), present opportunities to align national priorities with EU's sustainable mobility goals. Explicit commitments, such as “supporting 100 cities with sustainable mobility by 2030” or investing “€X billion in green transport,” could mobilize additional bilateral resources. Coordinating these updates through a Joint Donor Statement on Sustainable Transport could align budgets, strengthen political will, and set collective targets for clean mobility access and GHG reductions.
- **Private Sector and Blended Finance Windows:** Climate finance and ESG investing are creating opportunities to attract private capital for sustainable transport. European development finance institutions, such as FMO and Proparco, are launching funds to support e-mobility and infrastructure. Tools like EFSD+ guarantees and technical assistance can structure bankable projects, such as electric bus leasing facilities or green bonds for rail. The EU could pilot models like an **EU-African Electric Bus Leasing Facility**, crowding in private investment and scaling clean transport solutions by 2030.

3.2.2 Priority Regions

While all developing regions need support, certain places offer especially high impact or strategic value in the coming years:

- **Mega-Cities in Africa:** Cities like Lagos, Kinshasa, Nairobi, Luanda will see explosive growth to 2030. If their transport systems lock into car dependency, emissions and congestion will soar; but if they pivot to transit and EVs, it changes the trajectory. These mega-cities are priorities in the AU-EU partnership.
- **Secondary Towns:** Secondary towns are rapidly growing economic hubs, and because their transport systems aren't yet locked into car dependency, early investment in public transport, walking, and cycling can avoid the congestion and emissions seen in larger cities. With lower costs and simpler governance, sustainable mobility in these towns delivers high impact and supports more balanced national development.

- **Landlocked African Countries:** Improving transport corridors in Uganda, Zambia, and Mali can reduce trade costs and enhance connectivity. Regional integration through ECOWAS and EAC can amplify these benefits.
- **Small Island Developing States (SIDS):** Electrifying public transport in Mauritius and Seychelles can serve as a model for sustainable mobility in island contexts.
- **EU Neighbourhood:** Supporting rail electrification and urban transit in Eastern Europe and North Africa can create demonstration effects for other regions.

3.2.3 High-Impact Transport Sub-Sectors

Finally, certain **transport modes and approaches** stand out as high-impact for the 2025–2030 timeframe, deserving concentrated support:

- **Bus Rapid Transit (BRT):** Expanding BRT systems in 100 cities by 2030 could benefit over 100 million urban residents. Linking BRT projects to renewable energy can attract green finance, whilst embedding BRT into broader urban planning - including housing, land use, and economic development - can maximize social impact, reduce sprawl, and create more inclusive, sustainable cities.
- **Rail and Transit-Oriented Development (TOD):** Europe's expertise in land value capture and station planning can support sustainable rail projects in Africa and Asia.
- **Green Freight:** Piloting electric truck corridors, such as Mombasa–Nairobi, can reduce emissions and improve logistics efficiency.
- **Non-Motorized Transport (NMT)/ Active Mobility:** Building 10,000 km of sidewalks and cycle lanes by 2030 can enhance accessibility and safety, particularly in African cities. In 2024, UNEP, UN-Habitat and WHO have launched the Pan-African Action Plan for Active Mobility (PAAPAM), a continent-wide framework to promote walking and cycling as safe, accessible, and sustainable modes of transport across Africa. It aims to embed active mobility into local and national policies and investment decisions.

While systemic challenges such as funding gaps and coordination fatigue persist, innovation mapping at the regional level provides a critical lens to identify specific needs, capacities, and opportunities. By understanding the unique contexts of Latin America, Africa, and Asia, international actors can tailor their interventions to maximize impact and foster sustainable mobility transitions.

3.2.4 Global Task Force

As part of the collaborative international agenda, and with support from UN-Habitat, the STREnGTh_M project has contributed to building a shared knowledge base on innovation opportunities and supported the establishment of a Global Task Force on Sustainable and Innovative Mobility. Initiated at the Twelfth World Urban Forum and further advanced during CoP29 and CoP30, the Task Force brings together international partners to explore themes such as e-mobility, climate-resilient transport, digitalization, and empathetic mobility. Through webinars, and expert dialogues at COPs, including a dedicated webinar on innovation needs in emerging economies, the Task Force has co-developed a suite of think pieces. Three of these think pieces (Financing Sustainable Urban Mobility, Empathetic Mobility, and Transit-Oriented

Development) have already been completed, while others are underway. Under the transport digitalization theme, an academic paper *"African e-mobility startups' perceptions and use of information systems, challenges, and opportunities"* has also been published. These outputs demonstrate how coordinated research and stakeholder engagement can generate practical knowledge products that support policy development, investment planning, and capacity-building in emerging economies.

4 Innovation Mapping: Needs, Capacities, Actors and Opportunities in the Partner Regions

The previous section focuses on the broader opportunities and challenges for research and international cooperation, highlighting systemic bottlenecks and pathways to scale. It's about the **how**—how coordination, funding, and partnerships can drive sustainable transport transitions.

This section zooms in on regional innovation mapping—identifying specific needs, capacities, actors, and opportunities in Latin America, Africa, and Asia. It's about the **what**—what specific gaps and opportunities exist in these regions, and how they can be addressed.

It aims to achieve that by presenting the findings from the regional innovation mapping exercises conducted in partnership with academic institutions in Latin America, Africa, and Asia. The analysis considers contextual factors that shape each region's mobility challenges and highlights opportunities for collaboration, particularly with EU stakeholders. A summary table at the beginning of this chapter provides an overview of these elements for each region, offering a quick reference for policymakers and stakeholders.

Region	Gaps/Needs	Capacities	Actors	Opportunities
Latin America	Lack of harmonized regulations for 2- and 3-wheelers; Limited data on EV performance; Barriers to financing for informal operators; Freight inefficiencies (e.g., cargo theft, excessive idling, high air conditioning demand);	Academic networks like RELIEVE providing strong technical support for mobility initiatives; Strong automotive industry in Mexico and Brazil. High quality engineering schools in Mexico, Brazil, Colombia, Peru and Chile.	Governments; Private sector (e.g., Uber Eats, Rappi); Academia (RELIEVE); Civil society; International NGOs	Public transport electrification; Tailored charging infrastructure for last-mile EV fleets; Battery recycling & second-life applications; Freight optimization with advanced telemetry ; Market entry for EU manufacturers to test locally adapted EVs Policy momentum in countries like Chile and Colombia Growing demand for 2- and 3-wheeler

	Trained personal for EVs maintenance			presenting an opportunity for local manufacturing and innovation in EV technology
Africa	Lack of harmonized technical standards for EV components; Grid deficits and limited charging infrastructure; Reliance on donor funding; Limited technical expertise in EV manufacturing and maintenance	Established automotive assembly sector in South Africa, Morocco, and Kenya (that can pivot toward EV production); RE potential (e.g., Kenya's 80% RE mix); Emerging battery swapping networks in East Africa	Governments; Private sector (e.g., Ampersand); Research institutions; NGOs and international organizations	Battery-swapping to address infrastructure gaps; Regional training hubs for capacity building; EV manufacturing with EU companies; Integration of EV charging with RE; Localizing EV production to reduce import dependency
Asia	Inconsistent regulatory mechanisms for mass transport electrification; Inadequate charging infrastructure; Affordability gaps for public transport; Resistance to formalization and digitalization	Private sector leadership (e.g., VinFast in Vietnam) driving innovation in EV manufacturing and deployment; Urban mobility initiatives in Delhi and Kathmandu; Universities and/or research institutions (e.g., AIT) as key partners for innovation and capacity building	Governments; Private sector (e.g., VinFast, Tojo Motors); Academia; Civil society	Blended financing models (e.g., Kathmandu's first-loss guarantees); Battery swapping for commercial vehicles; Research on EV technology and battery recycling; Market diversification for EU partnerships in Asia's fast-growing EV market

Source: Authors' summary

4.1 Latin America

The insights for Latin America are drawn from a collaborative study led by Tecnológico de Monterrey through the Latin American Research Network on Energy and Vehicles (RELIEVE). The study mapped the landscape of sustainable urban mobility across the region, identifying key gaps and opportunities for accelerating the transition to more inclusive, low-carbon, and efficient transport systems.

Gaps

The transition to sustainable urban mobility in Latin America faces several challenges across policy, technology, infrastructure, and social dimensions.

- **Policy and regulation:** A lack of harmonized regulations, particularly for 2- and 3-wheelers, hinders market development. For example, there are no robust safety standards for vehicle quality or battery disposal, creating risks for consumers and the environment. Stakeholders emphasized the need for energy efficiency programs for motorcycles and tax incentives to encourage the switch from conventional to EVs.
- **Technology and data:** Limited data on the real-world energy efficiency of electric 2- and 3-wheelers and their use in last-mile logistics and passenger transport restricts the adoption of e-mobility. The performance of these vehicles under local operating conditions also remains largely un-assessed and poorly understood, limiting their integration into urban mobility systems. Moreover, opportunities related to second-life battery applications are underexplored. Local production of key electric components for EVs is crucial.
- **Social and financial barriers:** Informal transport operators, who dominate the sector, face significant barriers to formalization and electrification. Many lack access to financing, and there is resistance to digitalization due to concerns about transparency and taxation. Safety concerns, such as crashes and theft, also remain critical. Technician in EVs operation and maintenance is an urgent need. Social inclusion of underserved population and gender parity are key factors of success in EVs adoption.
- **Freight:** The freight sector in countries like Mexico faces distinct challenges, including cargo theft, driver shortage, fuel price volatility, and high fuel consumption from engine idling. While advanced telemetry systems could optimize operations, their adoption remains limited due to cost and technical barriers.

Stakeholder ecosystem

A diverse ecosystem of stakeholders is shaping the e-mobility transition in Latin America. Effective collaboration among these actors is essential for progress:

- **Government:** National and municipal bodies are responsible for creating policy frameworks and regulatory environments.
- **Private sector:** Automotive industry in Mexico, Brazil and Colombia, major transport companies, e-mobility associations are essential for accelerating the adoption of EVs.
- **Large users:** Companies in logistics and last-mile delivery (e.g., Uber Eats, Rappi, DiDi Food) are significant drivers of demand for light-duty electric vehicles, especially in urban centers with zero-emission zones.

- **Academia:** Research networks like RELIEVE and strong automotive engineering schools in Mexico, Colombia, Peru, Brazil and Chile are critical for data analysis, technology validation, and providing evidence-based insights for policymakers.
- **Civil society:** Cooperatives representing informal transport operators (e.g., cycle taxi drivers), transport advocacy organizations and NGOs play a vital role in representing user needs and ensuring an inclusive transition.

Opportunities for innovation and collaboration

Latin America presents significant opportunities for advancing sustainable urban mobility.

- **Public transport electrification:** Focusing e-mobility initiatives on public transport like bus fleets and integrating them into broader urban mobility strategies offer the greatest potential for emission reductions.
- **Regulate LDVs:** In cities with low- or zero-emission zones, there is an opportunity to establish clear regulations for LDVs (this includes defining authorized traffic routes, setting max. speeds, and establishing minimum requirements for energy performance and battery safety).
- **Charging infrastructure:** There is an opportunity to develop tailored charging infrastructure and specific operating strategies for the growing fleets of EVs used in last-mile distribution.
- **Battery recycling and second-life applications:** The region has untapped potential for lithium mineral production, developing second-life applications for EV batteries, which could reduce costs and environmental impacts.
- **Freight optimization:** Advanced telemetry systems could address inefficiencies in freight transport, reducing fuel consumption and emissions while improving security.
- **Market diversification:** Growing demand for 2- and 3-wheelers in Latin America offers an entry point for EU manufacturers to test locally adapted EVs or EV technology, leveraging expertise in vehicle design.

4.2 Africa

Insights for Africa are drawn from a regional innovation mapping exercise led by the University of Cape Town. The study highlights the unique challenges and opportunities for sustainable urban mobility in the region, with a focus on informal transport systems and 2- and 3-wheelers as strategic entry points.

Gaps

- **Policy and regulation:** Only 27 out of 54 African countries have taken action on the transition to e-mobility, and most lack harmonized technical standards for EV components. Rwanda stands out as a leader, offering green license plates and preferential treatment for EV users. Import incentives are common, but comprehensive policies are rare. Broader gaps in urban mobility policies, like the lack of integrated transport plans, also limit progress.
- **Technology and infrastructure:** Grid deficits and limited charging infrastructure are bottlenecks. For example, Sub-Saharan Africa has only 317 public chargers, which is insufficient to support widespread EV adoption. Battery swapping networks are emerging as a pragmatic solution in East Africa.

- **Business models and finance:** Development finance dominates the market, with limited private venture capital available. East Africa, including Kenya and Rwanda, has seen some progress, but most countries remain heavily reliant on donor funding.
- **Capacity building:** There is a need for technical expertise in manufacturing, repair, and maintenance of EVs and infrastructure. Gender equality in capacity-building programs also is an untapped opportunity.
- **Joint venture manufacturing potential:** Africa's expanding automotive assembly sector - particularly in South Africa, Morocco, and Kenya - is well positioned to pivot toward EV production. This creates significant opportunities for European companies to engage in joint ventures, transfer technology, and build supply chain partnerships, thereby accelerating Africa's EV ecosystem while simultaneously broadening their own market presence.
- **Integration with renewable energy:** EV charging linked to renewables offers big opportunities in Africa. Kenya's energy mix is over 80% renewable - mainly geothermal, hydro, wind, and solar - making clean charging viable. Decentralized systems like solar mini-grids can also overcome grid deficits and attract green finance.
- **Urban planning alignment:** Embedding e-mobility into **public transport systems** (e.g. into emerging BRT corridors) ensures EV adoption complements broader mobility strategies.
- **Consumer awareness:** Public education campaigns are needed to build trust in EVs, address misconceptions, and highlight long-term cost savings.

Stakeholder ecosystem

Key actors include:

- **Governments:** Responsible for creating supportive policies and regulatory frameworks.
- **Private sector:** Vehicle manufacturers, energy providers, and technology companies driving innovation. Companies like Ampersand in Rwanda are leading the charge in electric motorcycle adoption.
- **Research institutions:** Universities and research organizations providing data analysis and expertise.
- **Civil society:** NGOs advocating for sustainable and equitable transport solutions.
- **International organizations:** Supporting capacity building and financing opportunities.

Opportunities for innovation and collaboration

- **Battery swapping:** Battery swapping networks are emerging in East Africa as a pragmatic solution to infrastructure gaps. Leveraging European innovation in battery technology to expand swapping networks is a key opportunity.
- **Capacity building:** Establish regional training hubs to address technical expertise gaps.
- **Harmonized standards:** Collaboration with European institutions to develop technical standards for EV components which could unlock market potential.

- **Market diversification:** Africa's reliance on imported EV components presents an opportunity for European companies to localize production and reduce supply chain dependencies.

4.3 Asia

These insights are drawn from a study led by the Asian Institute of Technology (AIT), and it focuses on four key cities: Delhi, Hanoi, (Metro) Manila, and Kathmandu.

Gaps

- **Policy and regulation:** Regulatory mechanisms for mass transport electrification are inconsistent. For example, while Delhi has set ambitious targets for battery swapping and women's workforce participation, Manila faces resistance to public transport modernization (especially jeepneys) due to affordability concerns. Resistance to formalization and digitalization remains a challenge.
- **Technology and infrastructure:** Charging infrastructure is inadequate, with battery-swapping identified as a potential solution for commercial vehicles. In Hanoi, charging stations are concentrated at VinFast dealerships, limiting accessibility.
- **Social and financial barriers:** Affordability gaps (e.g., for public transport in the Philippines) hinder progress.

Stakeholder ecosystem

Key actors include:

- **Governments:** National and local authorities driving policy and regulation.
- **Private Sector:** Companies like VinFast (Vietnam) and Tojo Motors (Philippines). Smaller players are not to be missed.
- **Academia:** Institutions like AIT providing research and capacity building.
- **Civil Society:** Cooperatives and advocacy groups representing informal operators.

Opportunities for innovation

- **Blended financing or testing of suitable financing mechanisms:** Kathmandu's financing model, which combines subsidies and first-loss guarantees, could be replicated in other cities like Manila.
- **Battery swapping:** Expanding battery swapping initiatives with EU support could address infrastructure gaps.
- **Research and innovation:** Collaborate on EV technology, battery recycling, and sustainable transport systems.
- **Market diversification:** Asia's fast-growing EV market, led by companies like VinFast, offers opportunities for European partnerships to co-develop solutions and expand market reach.

While the innovation mapping exercises highlight the unique needs and opportunities in Latin America, Africa, and Asia, they also reveal shared challenges and priorities that transcend regional boundaries. These cross-cutting themes provide a framework for international collaboration, enabling stakeholders to address systemic barriers and scale solutions globally.

The following section explores these themes in greater detail, offering strategic entry points for transformative change.

5 Innovation Mapping: Cross-cutting topics

The transition to sustainable mobility in emerging economies is shaped by a complex interplay of challenges and opportunities that transcend regional boundaries. While each region—Latin America, Africa, and Asia—has unique characteristics, several high-level themes emerge that highlight shared priorities and areas for collaboration. These cross-cutting topics provide a lens through which international stakeholders, including the European Commission, can identify strategic entry points for innovation, investment, and policy alignment.

While each region presents unique challenges and opportunities, several cross-cutting themes emerge from the innovation mapping exercises. Emerging economies face a range of systemic challenges in their transition to sustainable mobility. These include rapid urbanization, fragmented governance, financial constraints, and capacity gaps. Addressing these challenges requires a holistic approach that integrates mobility with broader development goals, such as energy security, urban planning, and social equity.

The cross-cutting topics from the exercise highlight shared priorities and areas where international collaboration, particularly with EU stakeholders, can drive transformative change in sustainable mobility. Some of the common challenges across the regions are as follows:

- **Institutional fragmentation:** Sectoral silos and weak governance structures hinder coordinated action. For example, ministries responsible for transport, energy, and urban development often operate independently, leading to conflicting strategies and inefficiencies.
- **Financial constraints:** Limited access to financing mechanisms, particularly for informal operators, remains a significant barrier. Development finance dominates in many regions, but private-sector investment is often lacking, as well as weak systems for governments' own revenue collection and reinvestment in sustainable mobility.
- **Capacity gaps:** Technical expertise in areas such as EV manufacturing, maintenance, and infrastructure deployment is insufficient, particularly in Africa and parts of Asia.
- **Social and cultural barriers:** Resistance to the technology transition and digitalization underscores the need for locally suitable approaches.

In these cases, opportunities for collaboration and innovation can be in the following interventions:

- **Integrated planning:** Aligning mobility planning with energy and urban development strategies can optimize resource allocation and maximize synergies. For instance, EVs can act as both energy consumers and storage units, supporting grid stability and renewable energy integration.

Under the umbrella of the STREnGth_M Global Task Force, UN-Habitat and partners including UNECA developed a Transit-Oriented Development (TOD) think piece. The paper advances an integrated planning approach that aligns transport investments with land use, housing, and urban development, promoting compact, mixed-use development around high-capacity public transport corridors. It positions TOD as a practical tool to reduce car dependency, improve accessibility, and strengthen the

efficiency and financial sustainability of public transport systems. By embedding TOD within broader urban and mobility planning frameworks, the think piece provides actionable guidance to support inclusive, low-carbon urban growth while unlocking opportunities for innovative financing and cross-sector coordination.

- **Harmonized standards:** Supporting the development of standards for EV components and infrastructure can reduce market fragmentation and encourage investment.
- **Capacity-building:** Establishing regional training hubs and curricula can address technical expertise gaps while promoting inclusivity and gender equality.

The challenges and opportunities identified in emerging economies are echoed in global research and policy discussions. Key insights from the literature provide a foundation for understanding the systemic changes needed to achieve sustainable mobility. Firstly, a narrow focus on vehicle electrification alone is insufficient. Transformative change requires a shift toward shared and public mobility, as well as land-use densification to reduce travel demand. Secondly, transitioning to a shared e-mobility system can deliver significant cost savings. By 2050, the annual cost of urban passenger transport in a sustainable scenario could be \$8–10 trillion less than in a business-as-usual scenario. Thirdly, aside from economic benefits, there is also the social equity lens that must be considered. Ensuring that mobility transitions are inclusive is critical. Low-income households, youth, and persons with disabilities often face limited mobility options in car-centric systems. Lastly, composite indices, such as the Sustainable and Electric Mobility Index, can help track progress and identify pathways to achieve net-zero emissions while ensuring accessibility and affordability.

Building on the high-level needs and literature insights, several cross-cutting themes emerge as strategic entry points for collaboration and innovation: financing and business models, digitalization and formalization, infrastructure, social dimensions and equity, research and development, and market diversification. The discussion that follows dissects these into opportunities for collaboration.

1. *Financing as a key enabler*

Access to financing is a critical enabler for e-mobility transitions across all regions. However, the financial landscape varies significantly. Informal operators, who dominate the transport sector in many regions, often lack information and access to traditional financing mechanisms. In most Asian cases, **access to financing** is the primary barrier, with informal operators often unable to secure loans or other financial support. While lack of information is also an issue in some cases, it is secondary to the broader challenge of access. In Africa and Latin America, similar challenges exist, with informal operators and small-scale projects struggling to attract investment due to perceived risks and limited financial literacy. Resistance to formalization and digitalization further complicates efforts to provide financial support.

Tailored financing mechanisms, such as concessional loans, subsidies, and first-loss guarantees, have proven effective in de-risking investments and encouraging adoption. For example, Kathmandu's blended financing model (GGGI-GIZ-MAF) provides subsidies and guarantees to de-risk loans for electric minibuses, creating a replicable template for other regions. In Africa, development finance institutions dominate the market, but there is an opportunity to attract private venture capital by demonstrating the viability of e-mobility

investments and showcasing successful pilot projects. Access to financing is a universal challenge, but tailored mechanisms can unlock significant opportunities.

In terms of collaboration potential, European institutions can contribute to testing and scaling these models by providing technical assistance, co-financing, and policy guidance to ensure financial mechanisms are inclusive and sustainable. Blended financing, which combines different types of capital (e.g., grants, loans, private equity), offers a more flexible and scalable solution than traditional co-financing models. Experimentation with financing models, particularly those tailored to informal operators and small-scale projects, could unlock significant opportunities for adoption and scale.



Under the umbrella of the STREnGth_M Global Task Force, UN-Habitat and partners (MobilizeYourCity, UNEP, African Development Bank among others) have been developing the “Integrated Approaches to Financing Sustainable Urban Mobility” paper. It serves as a practical guide for policymakers, urban planners, local governments, and development practitioners in low- and middle-income countries (LMICs). The report equips stakeholders with strategies, tools, and financial mechanisms to tackle the challenges of financing and implementing sustainable mobility. By addressing LMIC-specific needs, it aims to empower cities to build transport systems that are inclusive, resilient, and climate-friendly, while opening opportunities for European partners to contribute innovative financing insights.

2. Digitalization and formalization

Digitalization and formalization are essential for improving transport systems and integrating informal operators into the e-mobility ecosystem. However, resistance to these changes is a common challenge. Operators often view digital tools, such as e-ticketing systems and GPS tracking, as threats rather than opportunities. These technologies make their operations transparent and more visible to authorities, which can lead to closer monitoring and exposure to taxation.

But opportunities for collaboration also lie in digitalization as it can create tangible benefits for operators, such as simplified loan repayments, improved fleet management, and enhanced passenger safety. Nepal is an example wherein banks are encouraging operators to adopt digital fare collection systems, which allow loan instalments to be deducted from accounts, reducing default risks. In Latin America, digital tools can help optimize last-mile delivery and integrate informal transport into formal networks.

This is an area where EU experience in digital mobility platforms and data-driven transport solutions could come in. Support can be in the form of developing user-friendly, scalable digital tools that address local needs while fostering transparency and accountability.

Under the umbrella of the STREnGth_M-M Global Task Force, UN-Habitat and UEMI have advanced research on transport digitalization through the publication of an academic paper “*African e-mobility startups’ perceptions and use of information systems, challenges, and opportunities.*” Drawing on case studies from the EU-funded SOLUTIONSplus project and interviews with African e-mobility startups, the paper highlights the critical role of information systems in enabling interoperability, innovative financing models, and data-driven decision-making within e-mobility ecosystems. It also identifies key challenges, including regulatory

gaps, fragmented digital systems, capacity constraints, and financing barriers, providing evidence-based insights to support inclusive and scalable digital mobility transitions in emerging economies.

3. Infrastructure gaps

Inadequate charging infrastructure is a bottleneck across all regions, limiting the adoption of EVs. Battery swapping has emerged as a potential solution, particularly for commercial vehicles. Charging stations are often concentrated in urban centers, leaving peri-urban and rural areas underserved. Grid reliability is also a concern, particularly in Africa and parts of Asia.

Interviewed stakeholders deem that battery-swapping offers a practical alternative to traditional charging, reducing downtime for commercial vehicles. In East Africa, battery swapping networks are emerging as a pragmatic solution for e-motorcycles. Battery-swapping stations are also being integrated into the Delhi's broader e-mobility strategy, providing a model for other urban centers.

EU advancements in battery technology and operational models can potentially accelerate the deployment of battery swapping networks in these emerging economies, while partnerships with local stakeholders can ensure these solutions are adapted to regional contexts.

4. Social dimensions and equity

Cultural and social factors play a significant role in the success of e-mobility transitions. Resistance to the transition, concerns about equity, and the need for community engagement are recurring themes. Informal operators often view electrification as a threat to their livelihoods, while affordability gaps exacerbate resistance to change. Integrating cultural narratives into e-mobility initiatives as well as into capacity-building programs can foster acceptance and ownership.

Universities are uniquely positioned to lead these efforts by fostering regional collaboration and advancing *local* skills in sustainable transport. For example, the **Transport Leadership Capacity Advancement Program for Africa (Trans CAP-Africa)**, led by KNUST Ghana and the University of Cape Town, is a four-year initiative funded by IDRC Canada with the aim to build managerial and leadership skills among mid-career transport professionals focusing on low-carbon transport solutions. European stakeholders can support such initiatives by collaborating with universities to co-develop curricula, provide technical expertise, and facilitate international exchanges. These partnerships can ensure that capacity-building efforts are inclusive, regionally relevant, and aligned with global sustainability goals.

Under the umbrella of the STREnGth_M Global Task Force, a think piece on “Empathetic Mobility” was developed, following a session at the twelfth World Urban Forum. The think piece advances a people-centred, life-course approach to mobility, emphasizing dignity, accessibility, safety, and inclusion, from children and adolescents to caregivers, persons with disabilities, and older adults. It positions empathy as a practical planning principle, calling for participatory design, capacity-building, and the integration of empathy-based indicators into

policies and projects. By foregrounding human experience in transport planning, the think piece provides an actionable framework to ensure that wider mobility transitions are socially just, inclusive, and responsive to diverse user needs.

5. Research and development

Collaborative research and development is essential for addressing technical and operational challenges in e-mobility. Many economies often lack the resources needed to develop and deploy innovative solutions, such as second-life battery applications and advanced telemetry systems. Joint R&D projects can drive innovation while building local capacity.

Universities play a critical role in fostering innovation ecosystems and advancing regional collaboration. Asian Institute of Technology, Tecnológico de Monterrey, and the University of Cape Town are well-positioned to collaborate with European institutions on projects related to digitalization, payment schemes, EV technology, battery recycling, ensuring inclusivity of solutions, and sustainable transport systems. The aforementioned Trans CAP-Africa co-led by KNUST Ghana and the University of Cape Town brings together seven universities to build capacity, creating a pipeline of professionals equipped to implement mobility solutions across the region. Programs like this can serve as hubs for regional exchanges, enabling knowledge sharing and fostering a new generation of leaders equipped to drive sustainable mobility transitions.

Living labs as co-creation spaces, often hosted by universities, can serve as opportunities to experiment with various technologies and operational models. European research institutions and industry players can partner with regional universities and private-sector stakeholders to co-develop solutions, share knowledge, and build innovation ecosystems. These collaborations can accelerate the deployment of sustainable transport solutions while ensuring that they are adapted to local contexts.

6. Market diversification

Emerging markets in Latin America, Africa, and Asia offer significant opportunities for market diversification and the development of localized EV value chains. Many regions rely heavily on imported EV components, limiting local economic benefits and creating supply chain vulnerabilities. Fostering domestic innovation can reduce dependencies and create new economic opportunities, and the EU can support the development of localized EV value chains, while also expanding their market reach in emerging economies. In Latin America, for instance, local assemblers of 2- and 3-wheelers are beginning to emerge, creating opportunities for European manufacturers to collaborate on technology transfer and capacity building. Meanwhile, development of regional training hubs in Africa can support the growth of local manufacturing and maintenance industries.

These cross-cutting topics highlight the interconnected nature of the challenges and opportunities in sustainable mobility transitions. By addressing these themes through collaborative, regionally adapted approaches, the EU stakeholders can help in driving

sustainable mobility while fostering innovation, inclusivity, and economic growth across Latin America, Africa, and Asia.

6 Conclusion

This report demonstrates that sustainable mobility transitions in emerging economies are both a global necessity and a strategic opportunity for Europe. Rising transport demand, climate imperatives, and persistent access gaps require solutions that go well beyond incremental technological change. They call for integrated approaches that combine vehicle technologies with governance reform, innovative financing, digitalisation, inclusive planning, and capacity building. Research and international cooperation are central to enabling these transformations.

The analysis shows that international collaboration can be highly effective when it follows clear impact pathways. EU-supported research and pilots have repeatedly proven their value when they are embedded in local policy processes, aligned with long-term planning, and linked to follow-on investment. Evidence-based approaches, inclusive stakeholder engagement, and early coordination among donors and partners emerge as critical success factors for scaling solutions from experimentation to system-level change.

At the same time, the report underscores that coordination challenges remain significant. Fragmented procedures, limited institutional capacity, misaligned priorities, and gaps between pilot funding and large-scale investment continue to undermine impact. Addressing these barriers will require more deliberate sequencing of funding, stronger mechanisms for delegated and joint implementation, sustained policy dialogue, and greater attention to local capacity and ownership.

The regional innovation mapping exercises reinforce that there is no one-size-fits-all solution. Latin America, Africa, and Asia each face distinct mobility challenges and opportunities, shaped by different institutional contexts, market structures, and social dynamics. However, the cross-cutting themes identified—integrated planning, harmonised standards, innovative financing, digitalisation, infrastructure provision, social equity, research collaboration, and market diversification—provide a coherent framework for targeted and adaptable cooperation.

For European stakeholders, the coming years represent a critical window. Aligning Horizon Europe research agendas with Global Gateway investments, climate finance, and Member State development strategies can significantly enhance the global impact of European research and innovation. By engaging as a coordinated partner—combining research excellence, policy expertise, and financial instruments—the EU can support emerging economies in leapfrogging towards cleaner, more inclusive mobility systems, while strengthening its own innovation ecosystems and global partnerships.

In conclusion, Deliverable D4.3 provides both a strategic rationale and practical guidance for advancing research and international cooperation in sustainable mobility. By building on the lessons, opportunities, and recommendations outlined in this report, European and international actors can move from fragmented interventions toward more coherent, scalable, and transformative mobility solutions that contribute meaningfully to global climate, development, and equity objectives.