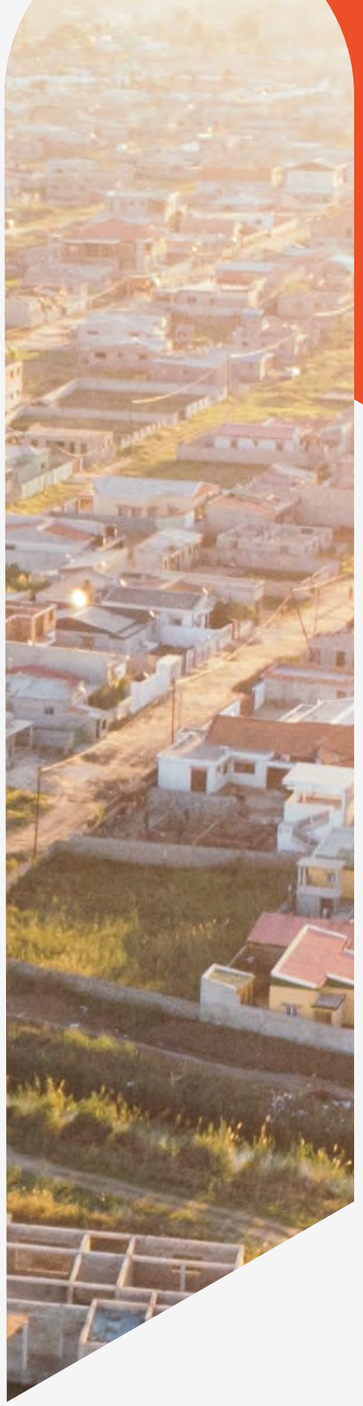
High Volume Transport Applied Research Programme

Supporting inclusive, green and resilient transport

HIGH VOLUME TRANSPORT
APPLIED RESEARCH

UK International Development
Partnership | Progress | Prosperity

The High Volume Transport Applied Research Programme (HVT) was a seven-year, £18 million investment by the UK Foreign, Commonwealth & Development Office (FCDO) to undertake research into the complex and interrelated issues of sustainable transport development across Africa and South Asia.



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Abbreviations

ADB	Asian Development Bank
AfDB	African Development Bank
DAC	Development Assistance Committee (of OECD)
ATO	Asian Transport Outlook
DFID	Department for International Development
FCDO	Foreign, Commonwealth & Development Office
EV	electric vehicle
E2Ws	electric two-wheeled vehicles
GHG	greenhouse gas
gTKP	Global Transport Knowledge Partnership
HICs	high-income countries
HDMM	Highway Development and Management Model
HVT	High Volume Transport Applied Research Programme
IFI	international financial institution
ITDP	Institute for Transportation and Development Policy
LEZ	low emission zone
LICs	low-income countries
LMICs	low- and middle -income countries
MDB	multilateral development bank
NDC	nationally determined contribution
NGO	non-governmental organisation
ODA	official development assistance
OECD	Organisation for Economic Cooperation and Development
ReCAP	Rural Roads and Transport Services for Communities in Low-Income Countries Programme
RED	Research and Evidence Directorate
SDGs	(UN) Sustainable Development Goals
SLoCaT	Partnership on Sustainable Low Carbon Transport
SOK	State of Knowledge
SUM4ALL	Sustainable Mobility for All partnership
SSA	sub-Saharan Africa
TDI	Transport Decarbonisation Index
TDCI	Transport Data Commons Initiative
TIP	trafficking in persons
TOD	transit-oriented development
TOR	terms of reference
T-TRIID	Transport-Technology Research and Innovation for International Development
UNEP	United Nations Environment Programme
UNESCAP	United Nations Economic and Social Commission for Asia and the Pacific
UNESCO	United Nations Educational, Scientific and Cultural Organization

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Introduction

Overview

Transport is key to driving economic growth and social development in low- and middle-income countries (LMICs). It connects people to jobs, healthcare, education and family. It allows goods to move to market. But developing infrastructure that meets the needs of LMICs is complex, costly and comes with many pressures including from climate change and competitive demands for limited resources.

Despite the need to make good decisions, there is a lack of applicable evidence to inform important investments and planning. The evidence base is often out of date and inadequate.

The High Volume Transport Applied Research Programme (HVT) provides a new body of research focused on Africa and South Asia, to help inform the decisions of policy-makers and planners and make road and rail transport greener, safer and more accessible, affordable and inclusive and to ultimately make good investment decisions that will help drive economic and social development.

This compendium highlights this new body of research. Through our core themes we explore the outcomes of research and share key insights that have progressed knowledge in transport in Africa and South Asia. The full list of research outputs and links to further reading are in the back of this report.

Inception

The inception of the HVT Applied Research programme back in 2015 came with the emergence of the role of transport in sustainable development, and most multilateral development banks (MDBs) switching their focus to sustainable transport that is accessible, efficient, safe and green. This focus was also reflected in the signing of the Paris Agreement in 2015 and a new sense of global commitment to addressing climate change.

For LMICs, the era was also marked by rapid urbanisation and huge population growth. It was clear that sustainable transport would make or break the future economies of these countries and be the driver to improve the quality of life for people across Africa and South Asia. But the evidence base to inform this development was out of date, patchy and not recognising the specific conditions of LMICs.

HVT was therefore created by the UK government, then the Department for International Development (DFID) and now the Foreign, Commonwealth and Development Office (FCDO), to undertake research into the complex and interrelated issues of sustainable urban transport development across Africa and South Asia.

DFID had also commissioned the ReCAP programme to finance further rural access research until 2020, so HVT could focus on high-volume transport.

During this time, FCDO has also supported improved data and evidence for transport decision makers through the World Bank's ieConnect programme, and through research on safer road design and management through the World Bank's Global Road Safety Facility (GRSF).

Over the past seven years, FCDO has invested a total of £18 million in HVT.

Aims

The programme set out with a number of core aims including:

- Produce a new body of research to help policymakers and practitioners across Africa and South Asia make decisions to develop accessible, affordable, inclusive, safer, greener transport.
- Develop research that can better inform and challenge the sector, and in so doing will cause ripples of change over time.
- Open eyes to situations and show what is possible.
- Crucially to not only share what is possible, but show how to implement sustainable transport measures.

Over the seven years of the programme, HVT has taken on much more, including:

- Convene and build up the transport and related sectors.
- Increase capacity of researchers, decision makers, practitioners.
- Change perspectives from old siloed approaches to new, holistic, multidisciplinary approaches.
- Include the voices, opinions, knowledge and skills of those living in LMICs.

Research for Community Access Partnership, ReCAP, aimed to improve accessibility for disadvantaged rural communities in Africa and Asia to economic opportunities and social facilities through improvements to rural infrastructure and transport.

The ReCAP rural access library contains reports and case studies detailing rural road projects and a user-friendly software tool, the Low Volume Roads DCP Software can be downloaded from the ReCAP website.

Implementation

This was a two-part programme. Part one involved a review of the literature and evidence available, identifying gaps in research and delivering a series of state-of-knowledge papers on four main themes of long distance strategic road and rail transport; urban transport; low carbon transport; and gender, vulnerable groups and inclusion. Research in part two of the programme covered topics identified during the State of Knowledge and scoping efforts, and were identified through open calls, direct procurement against a defined scope and through collaboration with partners.

Throughout the duration of the programme, more than 100 projects have been funded and covered topics such as resilient pavement design, decision support systems, informal transport, transit-oriented development, inclusion and urban planning. We have also funded research to support aspects of the global sustainable transport agenda, focused on mechanisms for improving transport data and tracking initiatives, supporting nationally determined contributions and climate finance.

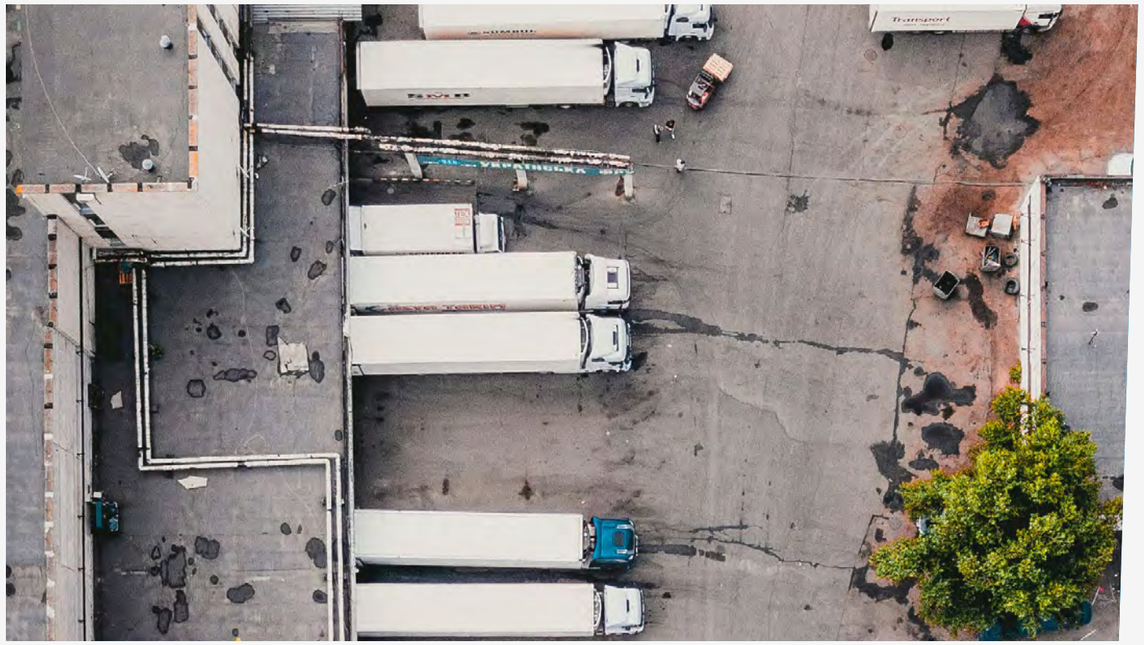
When the COVID-19 pandemic brought transport to a halt in March 2020, HVT created a knowledge piece to take stock of activities and responses by the transport community with some initial guidance towards needed activities and support in the context of transport in LMICs.

The publication became the go to piece identifying niches for action and guidance for institutions on investments. Shortly after, the programme's call for collective action resulted in 20 research projects that not only had a significant influence on various international organisations on maintaining and adapting transport systems during the pandemic but also informed planning for future pandemic-like events.

Innovation has been an important part of our approach, and we have funded two T-TRIID innovation funds supporting individuals and organisations to identify and share innovative concepts and solutions to the challenges facing the transport sector in LMICs.

Throughout the programme, we have acted as a convening and facilitating power within the sector, with the aim of not only disseminating knowledge but to encourage engagement and future collaborations.

HVT was delivered through a Programme Management Unit led by the international development consultancy DT Global.



Achievements

At the centre of the legacy of the programme is an extensive repository of new research supporting the development of transport in LMICs that is greener, safer and more accessible, affordable and inclusive.

But the legacy also goes beyond the repository of evidence, it is the ripple started by the research that builds the capacity of researchers, decision makers and practitioners. It is the attention to our core aim to not only talk a good game but to produce research that shows how to actually implement sustainable transport measures.

HVT's legacy is in its convening power, to bring people and ideas together, and the ability to fill the gaps in research that bring connections and launchpads for important future work. It is our hope that the HVT research is just the start for many more journeys towards sustainable transport in LMICs in the years to come.

Our research has powered change in three key ways

We've created understanding for decision makers and practitioners of the issues and challenges to creating sustainable and resilient transport.

We've built the knowledge, skills and attitudes of researchers, policy makers and others involved in our work.

Our research has led directly and indirectly to instrumental changes in policy, programme and transport practices.

Impact of HVT in numbers

102

research projects

188

reports, peer reviewed papers and policy documents

4,734

key stakeholders from LMICs participate in workshops and training sessions

27

outputs and activities in collaboration with third parties

23

podcasts produced with 2000+ downloads

140,560

downloads of HVT research across all websites and journals

Climate Change

a path to a sustainable future

Addressing Climate Change: Research Powering Change

The signing of the Paris Agreement in December 2015 marked a new era to try to reduce greenhouse gas emissions, and limit global temperature increases. It saw nearly every country in the world sign up, and perhaps finally recognise climate change as a global emergency that goes beyond all borders.

This new era was reflected in the transport sector, with the formation of collaborations like SLOCAT and SUM4ALL, and when HVT was emerging in 2015 it was very clear that the climate crisis would be an important part of the remit.

Over the last 10 years, whilst HVT research has explored many elements of transport in LMICs, the impact of climate change is ever-present. It is the golden thread that weaves into almost every research report and leads to the next research question forging future sustainable transport.

Each section of this compendium, therefore, includes elements of climate change but the following provides 10 key highlights from HVT's work.

1. Adaptation

While most sector research and policies focus on the mitigation of climate impacts from transport, the HVT programme provided substantial resources for research on adaptation. LMICs face greater risk from climate change because of their locations in high-risk regions and limited resources for adaptation. It means that transport systems are increasingly vulnerable to rising temperatures, unpredictable rainfall and extreme weather events like floods.

HVT research explored the issues transport systems are facing, and then in response to our State of Knowledge report on low carbon HVT measures, we prioritised research that showed how to implement measures and explained what people actually needed to do.

Highlights

Decision Support Systems for Resilient Strategic Transport Networks in LICs

University of Southampton and University of Oxford

Access research

A unique decision support tool for resilient strategic transport networks in LICs, based on a case study region covering Uganda, Zambia, Kenya and Tanzania.

The decision support system is built around an interactive web platform and aims to support investment decisions and options selection for long distance strategic land transport networks exposed to climate risks. It is the first multi-state transport infrastructure decision support system in a low-income country context and is freely available online.

Updated Road Note 31

TRL

Access research

Since Road Note 31 was first produced in 1962 it has been a valuable resource for the structural design of surfaced roads in tropical and subtropical regions, and has formed the basis of many countries' road manuals. Today's road infrastructure faces new challenges, most critically climate change.

In this fifth edition of Road Note 31, its first update in 25 years, TRL addresses its effects, including guidance on the design of concrete pavements to help with climate resilience, road rehabilitation and the use of climate resilient surfacings.

2. Mitigation

Scientists are clear that it is now or never if we are to stave off the catastrophic impact of climate change, and mitigation to reduce GHG emissions from transport is a key area of action. Traditionally, LICs have not been major contributors to GHG emissions, but with rising populations and urbanisation, these emissions are rapidly increasing.

HVT research has looked into mitigation methods that align with the specific transport set-ups, resources and passenger needs in LMICs. This has resulted in a large variety of mitigation insights, including the need to recognise the role of active mobility; the complexities of electromobility; and the need to work with existing transport systems like paratransit.

Highlights

Transitions

Vectos/SLR

Access research

SLR (formerly Vectos) set out to understand how we can better enable a more efficient, low carbon, affordable and safe transport network for the cities of sub-Saharan Africa (SSA), working proactively with the informal public transport sector who provide over 70% of the transport needs in these cities.

Despite informal transport's positive contribution to growing cities, there remain important negative aspects that need to be addressed, including congestion, severe air pollution, poor safety records and precarious employment.

Electromobility in LICs

Sum4ALL

Access research

In a unique partnership between HVT and the SUM4ALL Secretariat, two influential papers on the current and future role of EVs in LMICs were published and launched at COP27. Until then, the attention on electric vehicles as part of a global decarbonisation strategy had a strong bias towards passenger cars mirroring market and policy development in the Global North.

The two papers emphasised the need for different pathways in LMICs focusing on two and three wheelers, informal transport and buses, meeting people's needs for better and sustainable transport. Its latest influence can be recognised in the Global Roadmap by ZEVTC launched this year at COP29.

3. Data

Much of HVT's work has resulted in better open accessible data and data collection, and this has been particularly evident and important for supporting sustainable transport. Up-to-date data about emissions, about the impact of flooding and extreme heat, about the frequency of vehicles and congestion patterns, and much more, allows decisions to be made based on accurate modelling at both local and country level.

This responds directly to the HVT State of Knowledge report on low-carbon transport that showed a difficulty selling low-carbon measures to policy makers and society, in part because it's hard to quantify or measure.

Through HVT research, LMICs now have ways to access data about their emissions, and they can set targets and plans accordingly. And not only has HVT collected data and filled data gaps, it has established new and open access tools for the ongoing collection of data where previously budget restraints and lack of expertise were a block.

Highlights

African Urban Mobility Observatory

GoMetro

Access research

The Africa Urban Mobility Observatory (AUMO), by GoMetro, recognises that many SSA cities have limited access to data about people's movements and modes of transport because they lack adequate funding and capacity to obtain the data. This gap in data aggravates hindrances in pursuing sustainable transport. AUMO piloted Big Data applications to generate data, benchmark performance, and draw policy insights.

They used innovative mobile phone data collection methods that not only radically reduced the costs of collecting data, but also allowed for large and time-specific data sets to be explored. They could map things like travel times across cities, modal share, the changes people made on their journey, all essential to plan low-carbon solutions moving forward.

The Transport Data Commons Initiative (TDCI)

SLOCAT

Access research

Since 2022, and with strong involvement from the FCDO-funded Climate Compatible Growth programme, the TDCI is a collaborative global effort dedicated to transforming how transport data supports sustainable development in the sector. By creating an accessible, centralised and regularly updated transport data platform, the TDCI works towards enhancing efficiency and transparency for informed decision-making.

With support from HVT funding, the TDCI advanced the development of its core data infrastructure - the TDC Data Portal. This platform is built using the CKAN open-source data management system to enable seamless data access, integration and visualisation.

This process involved leveraging open-source technology to meet the unique demands of managing transport data. The repository consolidates diverse data sources and enables transparent emissions modelling.

4. Practical Knowledge

HVT's State of Knowledge report on low carbon transport reported that a big gap in the sector was knowledge on how to implement greener transport solutions. Often there would be a recommended solution but no clear way on how to implement change.

The State of Knowledge report particularly identified a need for practical, tacit knowledge through workshops for specific organisations and mentorship programmes as opposed to prolonged opportunities for education and training.

HVT responded to this and the final body of research includes a large range of toolkits, practical guides, frameworks and models for sustainable transport. In addition, the programme has commissioned numerous training sessions, workshops and learning opportunities aimed at all different types of stakeholder.

Highlights

The Pan-African Capacity Building Programme on Inclusive Climate-Resilient Planning for Active Mobility

SEI

Access research

This programme, led by the Stockholm Environment Institute at the University of York, delivered a masterclass programme focused on inclusive, climate-resilient approaches to active mobility planning. Masterclasses and workshops were delivered for 229 participants in five regions across Africa, equipping transport practitioners with skills to address infrastructure challenges and implement inclusive systems.

The programme by SEI was run with the UN Environment Programme (UNEP) Share the Road Programme as part of their plans to implement the Pan-African Action Plan for Active Mobility (PAAPAM). Key outcomes from the masterclasses include commitments from Ghana, Kenya, and Malawi to adopt PAAPAM, regional collaboration to integrate active mobility into urban strategies, and tools to design equitable transport systems.

Planning Framework for Low Emission Zone (LEZ) in Core areas of Indian Cities

CEPT University
CEPT Research and Development Foundation

Access research

The planning and implementation of low emission zones (LEZ) are gaining attention globally as an air quality improvement strategy. Several cities such as Amsterdam, London, Beijing, Seoul to name a few have successfully implemented LEZs as these cities already had well-established active and public transportation systems that offered good alternatives to road users.

However, its widespread adoption has not been observed in Asian cities. This Planning Framework for LEZ developed for the walled city of Ahmedabad by CEPT addresses these challenges by formulating an integrated strategy to reduce air pollution, to improve accessibility and mobility and enhance the quality of life.

This framework is developed based on international case studies, detailed analysis of local situations and evidence-driven recommendations, making it both actionable and implementable for Ahmedabad and adaptable for other Indian cities.

5. Innovation

Moving towards low-carbon, sustainable transport and finding solutions to adapt transport to the pressures of climate change is challenging and will not follow a simple, formulaic route. HVT has looked to invest in innovation that recognises the specific circumstances faced by different LMICs and explores the benefits of thinking differently.

Highlights

City Retrofit For All

Institute for Transportation and Development Policy (ITDP)

Access research

One of the greatest drivers of both climate change and inequity is urban sprawl. Many cities in Africa and South Asia are growing rapidly with informal settlements multiplying along major roads. Facing increased congestion along these corridors, cities often look to build urban highways as a means of improving traffic flow. However this expansion leads to continued congestion and sprawl, which in turns leads to higher costs, lower productivity, and less equity.

This project set out to think differently into addressing lack of access and continued sprawl. The research was based on the idea that the solution is to transform already low-density sprawl into transit-oriented development - denser places grounded in transit and walking with a mix of activities and strong, sustainable linkages to other parts of the city.

The project looked to better understand how to implement inclusive, equitable, transit-oriented development (TOD) within the existing built-up area of rapidly urbanizing cities in low-income countries in Africa, particularly Ethiopia and Tanzania.

The Transport-Technology Research and Innovation for International Development Fund (T-TRIID)

High Volume Transport Applied Research Programme

Access research

T-TRIID ran in two parts, and was a HVT fund to support individuals and organisations to identify and share innovative concepts and solutions to the challenges facing the transport sector in LMICs. Its core aim was always to be about more than ideas, it was to be about making those ideas happen.

Most of the projects worked at city level, addressing challenges with local stakeholders and included elements of exploring new ideas for greener, low-carbon transport.

This included the development of a new inclusive interchange design brief for SSA cities, using Lagos, Nigeria, as a pilot site. The brief was developed by SLR working closely with the Lagos Metropolitan Area Transport Authority (LAMATA) to support transport and urban planning authorities improve interchange design incorporating new technologies leading to mobility, economic, environmental and social benefits.

Spotlight

Since the Paris Agreement was adopted in 2015, some progress has been made in global climate action, including increased commitments from countries to reduce GHG emissions and the integration of climate adaptation into national policies. However, challenges persist, and the world is not on track to meet the 1.5°C target, with global temperatures already exceeding this threshold in 2024.

Transport plays a crucial role in achieving the Paris Agreement targets, as it accounts for approximately 23% of global energy-related CO2 emissions. But introducing decarbonising transport approaches is complex - especially for LMICs who face limited financial resources, inadequate infrastructure, and the need for technology transfer. To make transport infrastructure resilient, it is essential to integrate climate considerations into planning, strengthen vulnerable infrastructure, and promote policies that discourage development in high-risk areas.

As we move towards COP30 in Brazil, we reach a pivotal moment for assessing global progress and enhancing climate action as countries submit their updated Nationally Determined Contributions (NDCs). Despite efforts, there is a significant risk of falling short due to insufficient emission reductions, and as a sector we must find all means possible to push for the updated NDCs to make transport accountable and reduce emissions.

Data, political commitment, finance, and capacity building are crucial pillars for enhancing the transport sector within NDCs in the coming years. Accurate data is essential for tracking emissions, setting realistic targets, and measuring progress.

Political commitment ensures that ambitious targets are set and policies are implemented and sustained over time. Building on the outcome of COP29 in Baku, adequate climate finance is necessary to support the transition to sustainable transport modes and infrastructure. Capacity building empowers stakeholders with the knowledge and skills needed to design, implement, and maintain effective transport solutions. Together, these elements create a robust framework for achieving the decarbonisation goals outlined in the Paris Agreement.

HVT's work has significantly strengthened the knowledge base and created new tools to decarbonise the transport sector in LMICs in the ways outlined above. This includes the development of the Transport Data Commons Initiative and collaboration with UNESCAP, SLOCAT, ATO, and ADB on a common policy paper on Transport NDCs in the Asia region.

Additionally, HVT has supported the creation of tools such as the Transport Decarbonisation Index and climate finance tracking, which are powerful resources for countries to enhance their decarbonisation efforts. HVT has provided data, tools, adaptation and mitigation solutions, and capacity building at a critical moment in the climate crisis. Ten years on from the Paris Agreement, and faced with failures to meet targets, it is the hope that evidence and tools from programmes like HVT provide the building blocks to turn things around as we enter the next decade.

Holger Dalkmann
Sustain 2030 & HVT Consultant

6. Covid

HVT reacted quickly when it became apparent what a crucial role transport played in the COVID-19 pandemic. As well as publishing a key guidance piece early on in the pandemic, HVT commissioned 20 further research projects to support building resilient transport for the future.

Within this work, insights emerged from this unique moment in recent history to inform our understanding of the contribution of transport to pollution and the potential role of modes of transport not previously explored in depth.

Highlights

Learning from COVID-19 pop-up bicycle infrastructure: an investigation into flexible and user-led bicycle planning in Cape Town, Nairobi, and Kampala

Rahul Jobanputra
Gail Jennings

Access research

Many cities in SSA reduced public and paratransit transport services drastically during the COVID-19 pandemic. This increased fares at a time when incomes were in decline. As a result, walking and cycling became more dominant forms of transport.

This study examined the opportunity for pop-up bicycle infrastructure during the pandemic in three cities – Cape Town, Nairobi and Kampala. It found that permanent, segregated bicycle lanes have become contested interventions in resource-poor cities, and their legitimacy is questioned because of the low numbers of cyclists.

At the same time, pop-up bike lanes have low user acceptance in terms of road safety and are poorly enforced. Yet, pop-up cycling lanes could offer value beyond the pandemic as pilots that could pave the way for more permanent and acceptable solutions to meet sustainable transport goals.

Modelling the links between transport, air quality and COVID-19 spread in Dhaka and Bangladesh

University of Leeds

Access research

This project's main aim was to understand the differential contribution of various COVID-19 related policies to the spread of the disease, but it also investigated the impacts of these policies on transport related outcomes including air quality.

This unprecedented reduction in the presence of motor vehicles on the roads in Bangladesh during lockdown periods and the reintroduction at various points provided the opportunity to explore the relationship between traffic and pollution in a number of cities in the country.

For example, air quality improved noticeably in areas with large construction and transport activities, however, such improvements were not statistically significant in other areas in Dhaka.

7. A Just Transition

The drive to greener transport is a complicated balance with very different challenges for LMICs compared to wealthy ones. The competition for resources is heightened in LMICs where resources are limited, exacerbated by increased climate adaptation needs from extreme weather conditions. Under this sort of pressure, it is the disadvantaged groups such as the elderly, people with disabilities, and women and girls who suffer the most with transport that does not meet their needs.

HVT has been at the forefront of advocating for a just transition to greener transport that does not leave any part of the community behind. HVT work has pioneered research that moves toward climate resilient development with solutions that involve marginalised groups; prioritises equity and justice; and reconciles different interests, values and world views.

Highlights

Gendered approaches for addressing adaptation capacity to hot weather conditions

Transportation Research and Injury Prevention (TRIP) Centre at the Indian Institute of Technology (IIT) Delhi

Access research

Cities around the world are increasingly vulnerable to rising temperatures caused by climate change, with intense and life-threatening heat waves becoming a regular occurrence. This project explored the exposure of women commuters to hot weather in Delhi and aimed to understand their adaptation capacity.

It found that women are more reliant on public transport and walking than other modes of transport, and often need to travel in the hottest part of the day. Low-income women in particular face significant challenges in adapting to high temperatures due to limited access to resources and lack of flexible mobility options.

The researchers went on to highlight a number of strategies identifying individual, community and government-led actions to reduce exposure and build adaptive capacity.

Using creative participatory approaches for inclusive climate resilient transport in Africa: Guidelines for Practitioners

Stockholm Environment Institute (SEI) at York University

Access research

Transport planning does not traditionally involve input from all parts of society, but only with open, active participation will we be able to understand complex problems such as the inter-linkages between urban mobility and climate resilience.

This guidance from SEI provides a set of concepts and creative tools to engage individuals who are often under-represented in transport policy making and planning processes.

These tools were put into use in Zambia, and resulted in the installation of the first 3D Zebra crossing in the country to support the safety of vulnerable groups, and demonstrating the benefits of broad stakeholder engagement.

8. Policy Change

Incorporating transport resilience into national strategies is essential to ensure that climate adaptation and mitigation measures receive adequate attention, funding and implementation. Governments have the opportunity to support greener transport through sustainable infrastructure investments, pricing instruments such as fuel taxes, and regulations, but our early research showed that these types of decisions needed a very different level of knowledge assistance to planners and practitioners.

For example, our State of Knowledge report highlighted that without more knowledge on how to prepare bankable proposals for low-carbon transport projects, LMICs were not able to attract investment. HVT research has supported practical guidance at country level to meet this urgent need.

At a global level, HVT supported a wide range of products and tools, and fostered new collaborations that could lead to substantial impacts in the coming years. With the upcoming COP30 in Belém and the ongoing process shaping the UN Decade of Action on Sustainable Transport, there is a unique opportunity to enhance the commitment and actions of countries and international organisations towards low-carbon and sustainable transport.

Highlights

NDC policy paper

UNESCAP

Access research

The NDC policy paper by UNESCAP, in partnership with SLOCAT and ADB, stresses the urgent need for stronger transport targets in NDCs to achieve low-carbon, sustainable, and resilient transport systems in Asia and the Pacific. It identifies current gaps in ambition and the focus on technology and efficiency solutions, advocating for a more comprehensive approach that includes adaptation and resilience measures.

To ensure government action on transport decarbonisation and strengthen NDCs, the paper suggests leveraging partnerships to accelerate electrification, improve fuel economy, and implement “avoid and shift” measures. Additionally, fostering collaboration with international organisations, providing technical assistance, and securing financial support are crucial.

The collaboration between UNESCAP, ADB, SLOCAT, and ATO, facilitated by HVT, could lay a foundation for improved coordination and common activities among development partners, UN organisations, and NGOs.

Climate Resilient policy guide

University of Birmingham

Access research

The University of Birmingham’s project provides systematic guidance on how to scope, develop and implement climate change adaptation plans for transport infrastructure in LICs in Africa and South Asia and aims to increase the resilience of all types of transport infrastructure to climate change.

The policy guide covers four steps in a process including, establishing scope; collecting data and analysis; identifying options and solutions; and funding and implementation. It highlights that this process is a circular ongoing cycle, and implemented changes need to be evaluated. People need to consider and build on what has gone before, rather than thinking of this as a ‘once only’ opportunity.

9. Local Level

National plans trying to balance how transport delivers both economic needs and sustainability can result in a reluctance or lack of implementation at local level. HVT recognised that alongside country level knowledge there was also a need to think and act locally. In part, there was a gap in local data and green targets. But there was also a gap around how to involve local communities, and for transport development to respond to the needs of everyday people.

HVT research, particularly the T-TRIID projects that partnered closely with researchers based in LMICs, gathered data, offered solutions, built collaborations and shared implementation guides for greener, sustainable transport at a local level.

Highlights

Freight emission index for heritage city of Ahmedabad

Urban Lab Foundation

Access research

The road-based freight transport scenario in India presents several challenges, including skewed modal share favouring road transport over rail, excessive diesel consumption, and low operational efficiency.

Addressing these challenges necessitates efforts to enhance efficiency, reduce emissions, and integrate freight transport into broader urban development strategies for a sustainable future. India at present lacks city level data to understand the impact and influence of these challenges on emissions.

Secondly, the collected data requires synthesis such that it can be used by decision makers to ideate and implement emission mitigation strategies. To address this knowledge gap, this study developed a tool for capturing freight emissions using the case study of the walled city area of Ahmedabad in Gujarat, India.

Tackling Africa’s road safety and emissions from the source (T-TRIID)

Autosafety Uganda

Access research

The project in Rubaga Division, Kampala, focused on raising awareness about the health and environmental impacts of road safety and transport-induced pollution. It targeted communities with a high concentration of automobile repair garages, aiming to reduce pollution by promoting change and best practices among motorists and workers in the auto industry.

Training workshops attended by more than 500 mechanics and technicians improved skills in emission control. The project also formed new links between local mechanics and decision makers at policy level, including conversations with the Ministry of Works and Transport that paved the way for the ministry to prepare a much needed ‘Garages Regulation’.

10. Climate Finance

COP29 in Baku, Azerbaijan was described as the finance COP, culminating in a formal agreement for high-income countries to take the lead in the mobilisation of US$300bn a year of climate finance for low-income countries. Although formally approved in the final moments of COP, it was criticised by a number of LMICs for not going far enough. A report from the Independent High-Level Expert Group on Climate Finance found that developing countries – excluding China - would need $1 trillion per year in climate finance by 2030, going up to $1.3 trillion by 2035.

HVT research highlighted these gaps in climate finance and one report from WRI found that within the $1 trillion, the transport sector will need roughly $575 billion per year by 2030, including around $450 billion for low emission transport infrastructure and $125 billion for fleet electrification and alternative fuels. Our research further explored the barriers to accessing finance, and potential solutions to unlocking investment.

Highlights

Access to Climate Finance

World Resources Institute (WRI)

Access research

This research examined the international climate finance landscape and identified significant gaps in funding for low-emission transport projects in LMICs. The project developed several tools, including a policy guide and a digital toolkit with step-by-step instructions for enhancing access to climate finance and creating an enabling environment for transport investments.

The policy guide outlines key solutions to barriers in accessing climate finance for transport in a variety of contexts including financial, institutional, informational and technological. A step-by-step guide directs readers to resources, case studies and other guiding materials with a view to enabling them to successfully access climate finance for transport.

Transport Decarbonisation Index (TDI)

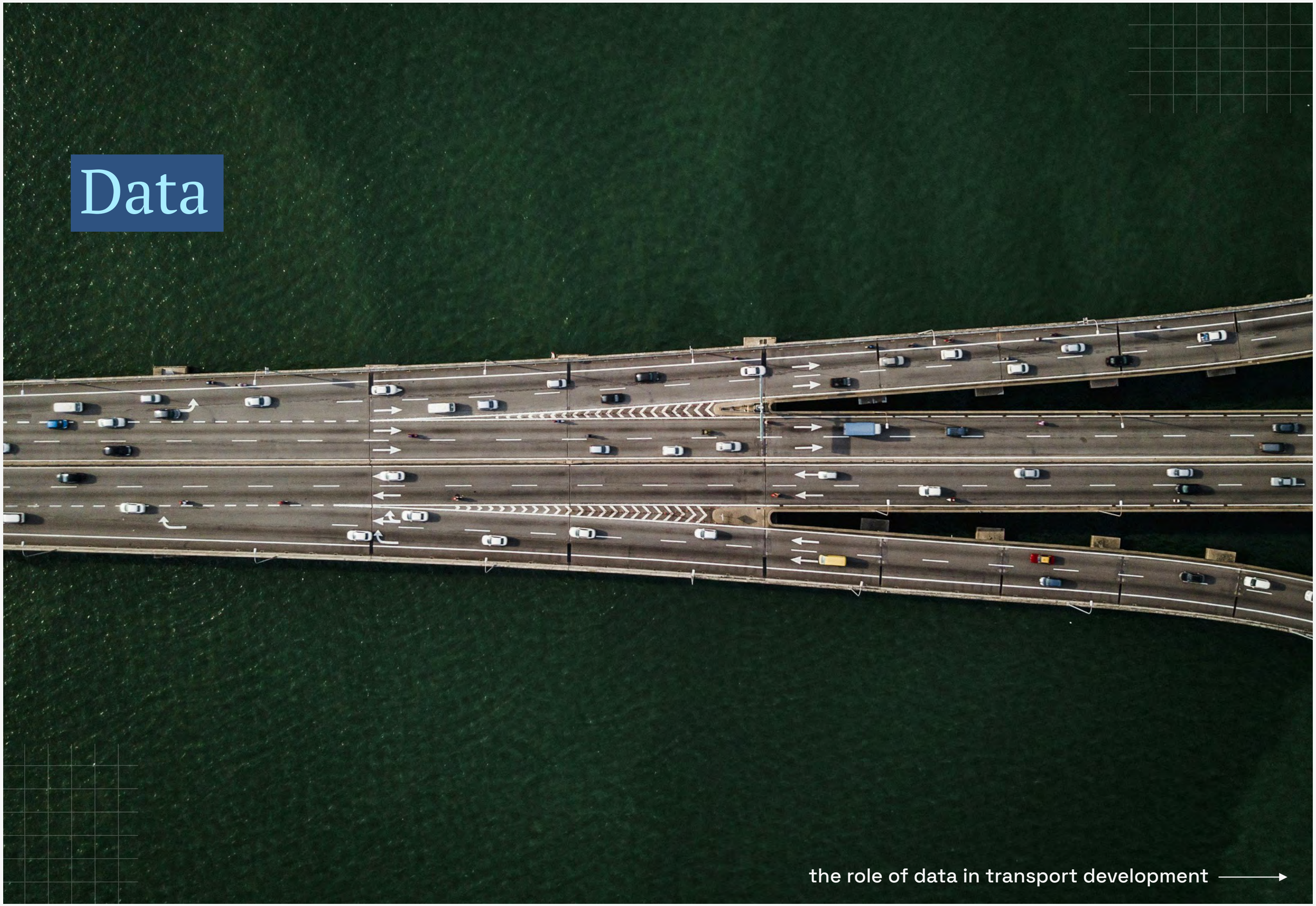
SLOCAT

Access research

This diagnostic toolkit has been developed to assist LMICs in reducing greenhouse gas emissions in surface transport. The TDI assesses a country's preparedness towards achieving net-zero emissions by 2050, enabling comparisons with other nations and tracking long-term progress.

The TDI can be used by policymakers to identify effective measures tailored to their specific contexts, considering factors like development status and transport system characteristics. It could become a key tool for improvements of NDCs in transport and also play a role in future tracking of the UN Decade of Action on Sustainable Transport.

Data



the role of data in transport development

“There’s a dynamic change going on in the transport sector and there’ll be an increased amount of change in the future. There are gaps that need significant investment, but it’s not just about investing and maintaining infrastructure. We also need to make sure we look at broader and innovative investments and work together, so we can scale up to see a significant level of impact that will make a real change in a sustainable way.”

- Jamie Leather, Asian Development Bank

Reliable research and data is fundamental to evidence-based decisions and planning. This is particularly the case for LMICs amidst rapid economic growth, intense competition for resources and growing pressures to adapt to climate change and decarbonise transport.

Yet reliable data for LMICs remains scarce and difficult to access. Where data does exist in LMICs, at best it tends to be hard to access across many fragmented datasets or it is outdated. There’s no standardisation of data, meaning different methods make it difficult to draw reliable insights.

However, addressing the absence of data is challenging. Data is traditionally expensive to collect, with reliance on BIG data collection models that need large numbers of in-person collection techniques and analysis. And data then becomes a rare commodity that isn’t openly accessible or centralised for easy access and sharing.

HVT’s new body of research addresses the gaps in data, as well as the techniques for collecting and sharing data freely. Our research spans many areas, including indexes and tools that explore cost-efficient data collection, harnessing computer vision data collection, feeding into innovative mapping tools and supporting measurement of decarbonisation efforts.

Quality data, like that collected as part of the HVT programme, supports the decisions of policy makers, planners and practitioners on a huge number of levels. At its most fundamental, access to data about people’s movements and modes of transport allows for informed decisions about infrastructure development to create inclusive, sustainable, safe and affordable transport.

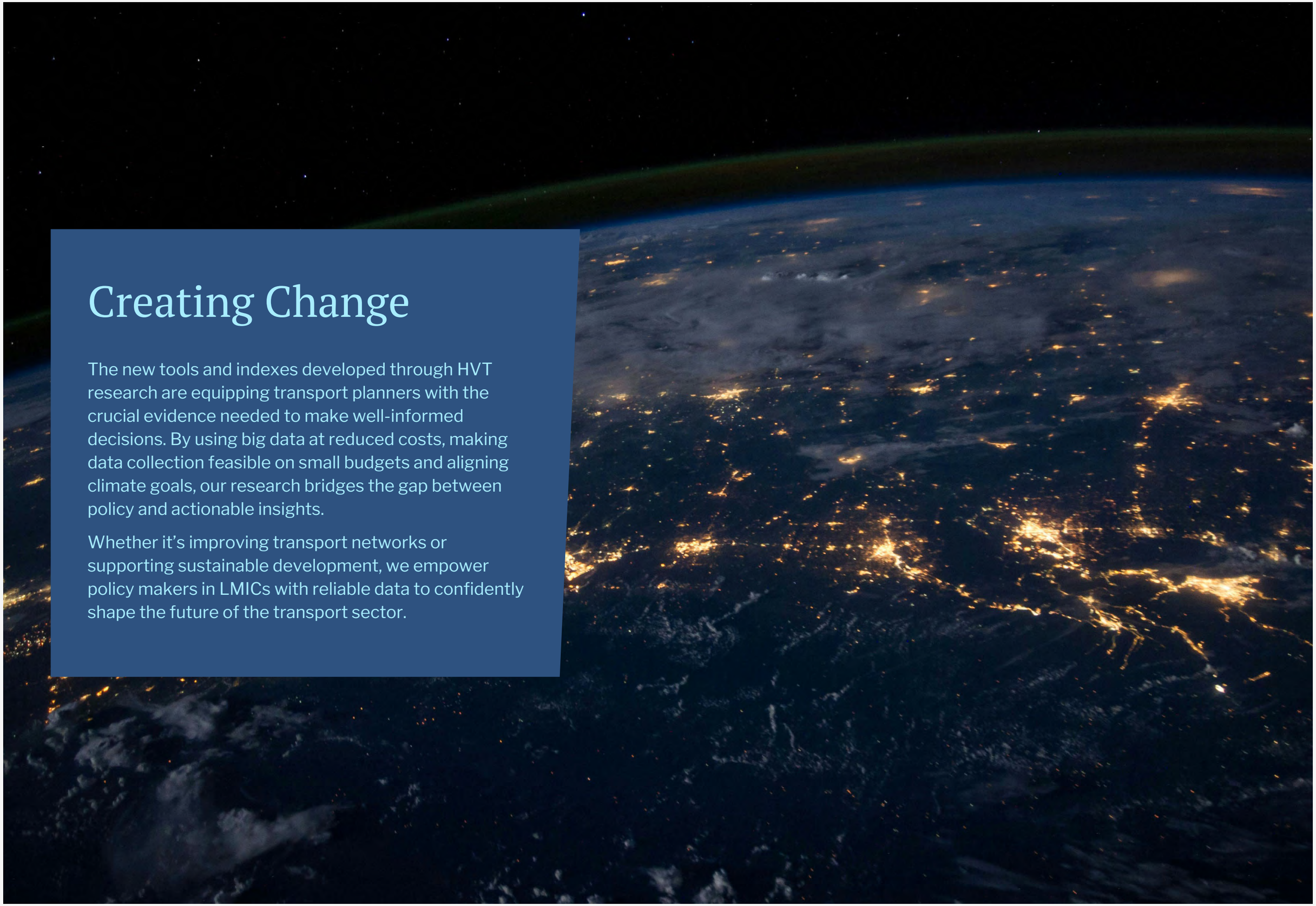
It gives reason and support to efficient allocation of resources. In terms of addressing the challenges of climate change, data allows science-based modelling of how to transition to a low carbon transport system to inform policy making and future investment. And it provides the opportunity to properly measure greenhouse gas emissions and set plans in place against measurable targets.

It is our hope that HVT’s new datasets will help to inform transport decisions for years to come, and the techniques explored by our researchers will set new standards.

in numbers

people still live more than 2km away from an all-weather road, where lack of access is inextricably linked to poverty[1]

of road safety research has been undertaken in LMICs, when most road deaths and injuries occur in these countries[2]



Creating Change

The new tools and indexes developed through HVT research are equipping transport planners with the crucial evidence needed to make well-informed decisions. By using big data at reduced costs, making data collection feasible on small budgets and aligning climate goals, our research bridges the gap between policy and actionable insights.

Whether it’s improving transport networks or supporting sustainable development, we empower policy makers in LMICs with reliable data to confidently shape the future of the transport sector.

Our Research

Africa Urban Mobility Observatory (AUMO)

GoMetro

Summary

The Africa Urban Mobility Observatory project looked to promote inclusive, low-carbon mobility in African low-income cities by piloting Big Data applications to generate data, benchmark performance and draw policy insights.

By exploring different data collection techniques, the team aimed to gain better insight into mobility patterns in target cities. They tested the use of existing technologies – particularly mobile phones and smartphones – to collect mobility data at scale, and develop a more cost-effective way to get this data than through conventional household questionnaires.

The insights collected led to meetings with government officials and partners in two cities, Kigali and Blantyre, to develop action plans and test the technology. Through these pilots, it was established that Unstructured Supplementary Service Data surveys could overcome the lack of internet connectivity on low-end mobile devices at significantly lower costs than field surveys.

Following the pilots and to encourage broader uptake, the team developed a web data platform and conducted workshops to support dissemination of the findings.

Access research

Key Insights

- Big Data offers opportunities to lower the overall costs of gathering relevant data for planning. It also opens opportunities for identifying links between mobility behaviour and other factors.
- Various challenges are restricting the uptake of Big Data in urban mobility. These typically relate to policies, management, infrastructure and technology, as well as people and communities. The experts consulted in this study view policy-related challenges as most significant.
- As Big Data technologies and applications evolve and find their way into developing cities in Africa, city authorities should be active in exploring how these can be leveraged and used.
- Cities should be aware of the emerging technological solutions that can serve as alternatives to costly hardware – for example, cloud based servers. The determination of infrastructure requirements, the earmarking of local funds and the identification of other funding and financing resources should be explored when considering Big Data collection initiatives.
- Developing cities are mostly confronted by significant limitations in terms of capacities, skills and resources. Finding ways to maximise collaboration can help address these issues.

“Our intention has been to transfer the knowledge we gained during this project to public officials, so that moving forward, they can continue to take advantage of these novel data collection techniques we’ve developed.”

- Philip Krause, Africa Urban Mobility Observatory

“What we’ve done here is assist decision makers in assessing the overall sustainability of transport intervention options. We’re not making the decision for them, but we’re giving them information which allows them to compare the performance of different options.”

- Simon Blainey, University of Southampton

Decision Support Systems for Resilient Strategic Transport Networks in Low Income Countries

University of Southampton, University of Oxford

Summary

A number of African countries are witnessing significant large-scale infrastructure investments driven by the prospects of strong economic growth. However, there is a danger that climate change driven hazards, such as flooding, might be detrimental to their growth and development plans, particularly in the context of widespread failures of transport infrastructures.

Using case study countries Kenya, Tanzania, Uganda and Zambia, the team developed future scenarios for key drivers of transport demand. From extensive data collected using open data on the infrastructure and its usage within the region, and flood maps from global hydrological models, they created a web-based tool which can assess potential losses from flood risk events.

These include direct damage costs to infrastructure and indirect economic losses incurred as a result of trade disruption.

This project provides transport decision-makers in LMICs with a free, online tool to support investment decisions. It enables the prioritisation of interventions that will deliver sustainable and resilient long-distance transport networks.

Access research

Key Insights

- Key roads and railways in East Africa are vulnerable to flooding, which could result in significant economic losses.
- The expected annual damages exceed $50 million USD for river and coastal flooding, and might increase to between $104 and $170 million USD in 2080 across the case study countries included in the research.
- On average, by 2080 an extra 1,086km of roads will be exposed to extreme fluvial flooding (where river and stream levels rise and break their banks), which is a significant increase of 60% from baseline flooding estimates.
- The results of the adaptation assessment show that improving drainage is the most effective solution, while installing flood walls and swales could also work well in many cases.
- For railways, the results suggest that options such as swales, flood walls and mobile flood embankments are the most effective adaptation options.

Computer Vision for Public Transport

Integrated Transport Planning Ltd

Summary

It's common for local transport authorities in LMICs to lack the resources and capacity to plan and regulate the sector. This project produced a computer vision data collection tool using AI.

It reduced the cost and complexity of data collection, with a focus on data that can be used in the development of city-wide transport strategies or Sustainable Urban Mobility Plans.

It used computer vision from many different sources, such as dashcam footage from city buses and taxi drivers, to see what transport was like in specific areas, and where people were walking and cycling. Using street-level imagery, it produced heatmaps showing the distribution of each item type across the study area.

The low cost for this tool makes data collection viable for even the smallest budget projects, where traditional data collection methods are not realistic. It allows for a quick and intuitive understanding of how people travel in different parts of a city and lists areas of interest for road safety improvements.

Access research

Key Insights

- Computer vision holds great potential for transport data collection.
- Transport organisations around the world routinely record large amounts of video, such as CCTV security cameras on buildings and in public transport vehicles, and using these vast data sources to make transport improvements more effective can be a powerful tool for helping people travel safely, affordably and efficiently.
- Although use of computer vision is not yet commonplace in all LMICs, improving awareness of its capabilities among local transport professionals, particularly how it can make use of pre-existing data for very cost-effective data collection, would enable its benefits to be more quickly realised once it is available.

"This tool can cut the cost of data collection and, more importantly, it can be used to support better transport projects in places where collection is currently very difficult, particularly smaller cities in LMICs where data is very sparse."

- Giles Lipscombe, Integrated Transport Planning

Spotlight

The collection, curating and analysis of data related to transport is of increasing importance to enable researchers, policy and decision makers to improve analysis, develop models and ultimately make better decisions.

HVT has made real strides in addressing the data gaps that decision makers and others in LMICs find when looking for reliable information to help with their decisions. Yet, perhaps HVT's greater legacy is in finding innovative approaches to data collection and usage that can be applied for the next generation of researchers.

When I joined the programme, I was impressed by the dedication and creativity of the teams working hard to identify the gaps in research and data – and to fill them.

For example, we've funded researchers to use smartphones for large-scale mobility data collection, while others have used dashcam footage from buses combined with artificial intelligence to develop cost-effective data solutions. HVT-funded projects have also created accessible, scalable web platforms and free tools, ensuring that the ability to use data isn't limited by funding constraints.

The data coming out of these projects has also shone a light on inequity, for example highlighting the challenges faced by women and girls and exposing where action is urgently needed.

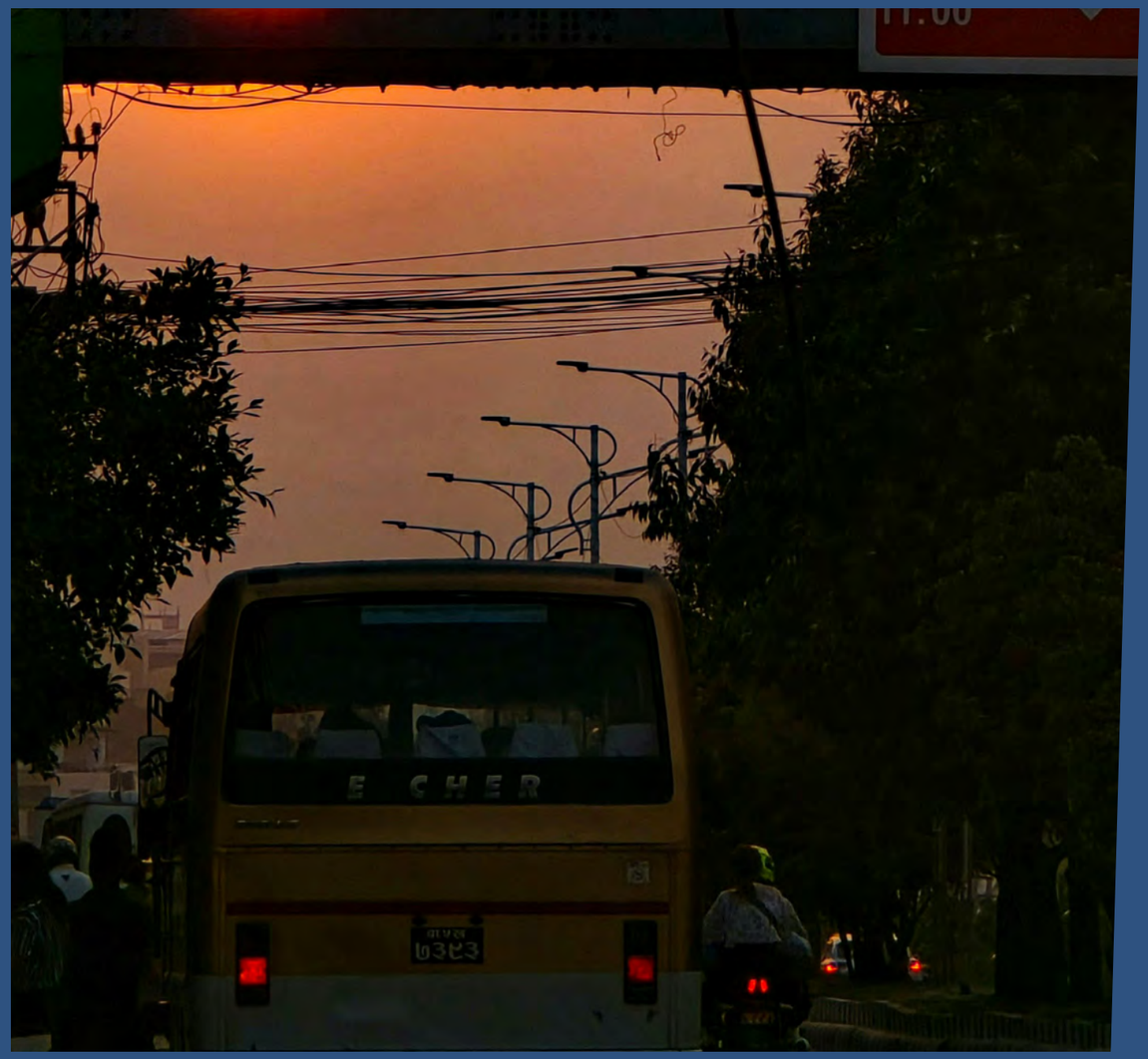
By bringing these issues to the forefront, we've provided researchers, governments and decision makers with a body of evidence that can be used, and built on to drive meaningful change.

Flagship initiatives, like the Transport Decarbonisation Index, have further demonstrated the value of robust data. This project is equipping decision makers in LMICs with the tools to identify the most effective strategies for reducing greenhouse gas emissions.

Looking ahead, I hope the future brings us even more opportunities for data-driven innovation. The HVT programme has empowered people to explore new methods for collecting and sharing data, ensuring that robust evidence continues to drive progress in the transport sector.

Our projects are a springboard for further innovation, leaving behind a legacy of improved knowledge, tools and methods that will shape sustainable transport systems for years to come.

Neil Ebenzer
Team Leader, HVT



“We hope that the TDI will become the go-to toolkit for practitioners and policymakers working on transport decarbonisation because we know it can help them to make informed and balanced decisions. It has a very comprehensive nature, it enables countries to identify potential improvements across all transport modes.”

- Nikola Medimorec, SLOCAT

Transport Decarbonisation Index

SLOCAT

Summary

The Transport Decarbonisation Index (TDI) is a diagnostic toolkit that’s been developed to assist LMICs in reducing greenhouse gas emissions in surface transport. The TDI assesses a country’s preparedness towards achieving net-zero emissions by 2050, enabling comparisons with other nations and tracking long-term progress.

The project involved a number of phases, including an assessment of existing knowledge, development of methodology and pilot testing. It has the potential to support decision makers to better understand which measures are most effective for their specific contexts, considering factors such as development status and transport system characteristics.

The index aims to support LMICs to fulfil their climate pledges, with an ultimate goal of achieving net zero by 2050 and to limit global warming to 1.5 degrees Celsius above preindustrial levels. The TDI diagnoses decarbonisation and also measures progress and indicates whether more stringent measures are required.

Access research

Key Insights

- There has been a significant increase in terms of the enthusiasm of the scientific community to look into indexes in surface transport. However, the regional focus has primarily been in East Asia and Europe.
- The transport sector accounted for approximately 15% of global greenhouse gas (GHG) emissions in 2019. Road transport is the largest contributor within this sector, followed by waterborne navigation and railways.
- In 2022, it is estimated that the transport sector emitted 8.1 billion tons of GHG, with 88% of the emissions coming from surface transport modes. Road transport modes are estimated to contribute 76%.
- There is a need to situate decarbonisation efforts within a wider spectrum of sustainable development objectives in LMICs. Highlighting the co-benefits of emissions mitigation may prove to be key in communicating the need to transition into more sustainable pathways for surface transport.

The Transport Data Commons Initiative

SLOCAT

Summary

The Transport Data Commons Initiative (TDCI) is a collaborative global effort dedicated to transforming how transport data supports sustainable development in the sector. By creating an accessible, centralised and regularly updated transport data platform, the TDCI works towards enhancing efficiency and transparency for informed decision-making.

Over 30 international partners came together to harmonise data processes and ensure the transport sector's alignment with the Sustainable Development Goals and the Paris Agreement. The TDCI platform aims to foster collaboration among governments, cities, international organisations and civil society by enabling the exchange of reliable and standardised data.

With support from HVT funding, the TDCI advanced the development of its core data infrastructure - the TDC Data Portal. This platform is built using the CKAN open-source data management system to enable seamless data access, integration and visualisation.

This process involved leveraging open-source technology to meet the unique demands of managing transport data. The repository consolidates diverse data sources and enables transparent emissions modelling.

Access research

Key Insights

- Open-source foundation: The TDC Data Portal was built on the CKAN platform, chosen for its flexibility, scalability and strong community support, making it ideal for managing diverse transport data.
- Customisable features: The platform was tailored to integrate transport-specific tools, enabling seamless data visualisation, integration and access for stakeholders.
- Streamlined data management: The platform supports efficient data consolidation and harmonisation, allowing for the aggregation of diverse datasets into a centralised repository.
- Focus on user accessibility: The platform was designed with a user-friendly interface, ensuring stakeholders from various sectors can easily access and utilise data for emissions modelling and sustainable decision-making.

"The launch of the TDC Portal is a significant milestone for data accessibility in the transport sector. This platform enables not only GIZ, but the global transport community, to seamlessly share and access transport-related data. Ultimately, better data will lead to better policies and a more sustainable transport sector."

- Daniel Bongardt, GIZ

“No major review of the code structure for ODA to the transport sector has been undertaken for several decades. It’s vital to reflect the adoption of the 2030 Sustainable Development Agenda and the Paris Agreement on Climate Change, as well as resolutions and declarations regarding sustainable transport adopted by the United Nations. We hope that the recommendations from this research will lead to changes to support sustainable transport into the future.”

- Henrik Gudmundsson, CONCITO

OECD DAC Indicators and Amendments

CONCITO

Summary

Funding for LMICs is provided through mechanisms such as Official Development Assistance (ODA). Managed and monitored by the OECD Development Assistance Committee (DAC), this assistance aims to promote the economic development and welfare of developing countries.

By boosting economic development, alleviating poverty, and helping LMICs pursue the full range of Sustainable Development Goals, including climate change mitigation and adaptation, ODA plays a crucial role in global development efforts.

This project looked at what role the ODA plays in providing access for sustainable transport modes and climate compatible transport solutions. Through literature review, data extracted from the OECD Data Explorer and interviews with ODA experts, the project mapped out the ODA spending on transport from the last ten years.

It also analysed the current procedures and data codes used in reporting and delivered a set of ideas for new categories or indicators to measure and report on ODA in support of sustainable transport.

The final report highlights the main findings from the research, analyses several ideas to provide better information on ODA for transport and summarises three main recommendations for the future.

Access research

Key Insights

- Transport received $11.8 billion per year or 5.7% of all ODA on average for the ten year period 2013-22 with a declining trend.
- Transport received less than health and education sectors, about the same as the energy sector, and more than the water and sanitation sector.
- Within transport, road transport received the most by around half of all ODA, followed by rail transport at 30% and transport policy at around 10%.
- Among the main recipients of transport ODA are India and the Philippines together with other Asian countries, and Egypt in Africa.
- Each sector is represented by certain ‘codes’ in the system. As transport codes have not been changed for decades, it means that there are, for example, no dedicated codes for items such as active transport, public transport, electric vehicles, or mobility services helping women reach jobs.
- The OECD Development Assistance Committee has the authority and capabilities needed to redefine and enhance the reporting of ODA for transport.

Gender

“Transport is seen as neutral, by the transport operators and professionals, even by the policy makers. And because it is neutral, the needs of women are not factored in.”

- Fatima Adamu, Nana Girls and Women Empowerment Initiative

Women’s and girls’ mobility is critical on many levels. Without access to adequate transport women cannot access essential services like markets and healthcare to support themselves and their families, they cannot reach social support networks and often cannot get to work or to school.

Transport is not inclusive for women and girls, this is the case the world over, but it is especially clear in LMICs in Africa and Asia. Women’s travel patterns are different from men’s, with women making frequent, shorter trips with more stops to combine multiple tasks. This difference partly reflects sociocultural norms and women’s roles in the household, where they assume the greater share of caring responsibilities, both for children and the elderly.

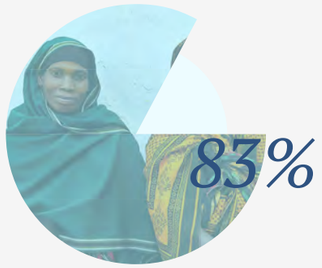
But a lack of affordable, accessible, safe public transport is also a key barrier to women’s mobility. Women face more physical risk than men when travelling and in public spaces. Fear of violence and sexual harassment can impact their mobility decisions, such as the time of day they will travel, the types of transportation they might choose, and even whether to travel at all.

Without appropriate, safe transport women are prevented from fulfilling their own potential and making economic contributions to growth and prosperity at household, regional and national levels. The impact of this was estimated by the International Labour Organisation in 2016 to be a loss of 15% of GDP.

The underrepresentation of women in the transport sector exacerbates these issues. Transport planning is rarely informed by data and evidence on gender-based mobility needs and experiences, which leads to infrastructure and services that do not reflect women’s voices and specific requirements.

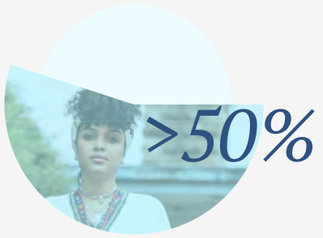
HVT research examines the intersection between gender, poverty and transport and explores the policies, strategies and tools needed to achieve inclusive, safe and secure transport systems for women in LMICs.

in numbers



up to 83% of women in Blantyre, Malawi said they experienced sexual harassment regularly[3]

of women harassed in Lagos and Blantyre did not report it, most did not know who to report it to and did not think anything would happen if they did[4]



of women interviewed in Mekelle, Ethiopia had been harassed[5]

Creating Change

Through HVT research, policymakers and transport providers in LMICs across Africa and South Asia are becoming more attuned to the travel needs of women and girls.

By examining the lack of gender inclusiveness in urban public transport and shedding light on the dangers women face, our research has pushed the transport sector to recognise the issues and not only actively support women but to include them in the planning process.

From developing a new decision-making tool to address sexual harassment on public transport in Africa, to shaping new action plans and street designs prioritising the safety and needs of women commuters in India, our work has helped to ensure that service and infrastructure improvements lead to safer, more inclusive journeys for women and girls.

Our Research

Empower project

SLR Consulting

Summary

The prevalance of sexual harassment against women and girls on public transport in SSA is known to be a serious problem. But there is often a lack of official data and little knowledge of how best to take effective action. The EMPOWER project addressed the causes and extent of the issue, and built the capacity of transport professionals to deliver gender-equitable, inclusive transport through the use of a user-friendly online decision-support tool.

The SHE-CAN tool - Sexual Harassment Engagement-Changing Attitudes meeting Needs - is designed to enable decision makers and transport providers to collect the evidence needed to identify the problem and to apply the measures available to tackle it directly.

The tool shares good practices outlining different types of interventions, including legal frameworks, surveillance and policing and infrastructure improvements to help transport operators, local and regional authorities, NGOs and community groups make the right decisions according to their context, objectives and the resources available.

In 2024, a subsequent phase of the project developed national networks of key stakeholders and applied SHE-CAN in ten countries across sub-Saharan Africa. Public awareness campaigns, passenger surveys, focus groups and further training workshops were delivered to equip stakeholders with the data and knowledge to use the tool effectively.

In Nigeria, a key partner, the Lagos Metropolitan Area Transport Authority (LAMATA), used it to launch a Gender Equity Plan, which includes recruiting female bus drivers, conductors and ground staff, bus station and vehicle design, street lighting, surveillance systems and raising awareness of sexual harassment among staff and the public.

Key Insights

- Research found widely different perceptions of the definition of sexual harassment, leading to underreporting of incidents.
- Coordinated action and collaboration by many stakeholders is essential to ensure better safety and personal security for women, with SHE-CAN as a focus providing support to that.
- Support from national and regional governments is critical to setting up the process and giving the issue of sexual harassment the weight it deserves. Both the formal and informal transport systems must also be engaged as part of a more inclusive approach to planning.
- The project proved the value of the train-the-trainer approach to capacity building. One virtual workshop trained 10 trainers on the SHE-CAN tool, who then held workshops with key local and national stakeholders and within six weeks had empowered 150 people to take actions across ten countries.
- Many of the tool's resources are relevant to audiences both within and beyond Africa.

Access research

"Thanks to the EMPOWER project, I've seen that so many different organisations have been brought together to understand how we can all act together, synergise and come up with solutions."

- Mohammed Yakubu, Abuja Urban Mass Transport Company Limited

“The digitalisation of public transport creates opportunities for collecting and analysing gender disaggregated data to prioritise service and infrastructure improvements for a safer commute for women and girls. Simultaneously, we need to acknowledge the gender digital gap and that if we don’t address how women with limited digital literacy will use and access public transport, we are really going to leave them behind.”

- Sonal Shah, The Urban Catalysts

Safe and Secure Public Transport in Delhi

The Urban Catalysts

Summary

As long as transport authorities in low-income countries (LICs) continue to rely on data which does not reflect gender differences, there will remain a significant gap in the creation of gender equitable public transport systems. Traditional data sources, such as household or travel surveys, do not capture variations in public transport usage, their scope limited to specific routes rather than across the entire system. This effectively excludes insights into women’s and girl’s travel patterns from effective planning and service provision.

This project highlighted the critical role of data in addressing this gap and improving the safety and reliability of public transport for women and girls in Indian cities. It centred on the digitisation of public transport ticketing systems, aiming to provide transport authorities with evidence-based insights and to encourage a proactive approach to safety and security on urban buses. The initiative focused on electric buses (e-buses) and was piloted along one route, in partnership with the Delhi Transport Corporation.

The first phase of the project involved identifying gaps through literature reviews, primary surveys with female commuters and focus group discussions with depot staff. It also included analysis of the knowledge and behaviour of public transport frontline staff regarding the safety of female commuters. The second phase focused on implementing evidence-based recommendations and evaluating the impact of these interventions.

Findings revealed limited awareness of existing safety initiatives among women and a distinct gender-bias among frontline staff. Women preferred air-conditioned, quiet e-buses over CNG buses, but were concerned about long waiting times, frequent breakdowns and malfunctioning passenger information systems. Strategies were developed to improve women’s safety on e- buses, including a mobile app tailored to their needs and education levels, providing real-time information. Lessons from the pilot were then scaled up to other routes across the city and can be replicated by bus transport agencies in other LICs.

Key Insights

- Women felt more unsafe inside e-buses than at the bus stops. 69% of women reported feeling unsafe on Delhi’s buses.
- Low levels of digital literacy among women. While many women commuters have access to a smartphone, only a small minority know how to make digital payments, access transport information or provide feedback.
- Women are often unaware of existing helplines or apps. At the start of the project, only 2% were aware of the One Delhi application, 5% knew about panic buttons on buses, and 10% were familiar with the Delhi Transport Corporation helpline number.
- Male frontline transport staff do not fully recognise sexual harassment as a critical safety concern.
- Digitalised ticketing systems that can capture gender-disaggregated data at the point of sale of a ticket can be used to improve women’s safety on public transport.

Access research

Spotlight

When I first got involved with the HVT programme back in 2021, I'd already been working on research and activism for women's rights for Nigeria for over two decades. I was only too aware that the issue of sexual harassment in public transport in sub-Saharan Africa was getting little to no attention.

There was some much needed literature and research on issues such as early and forced marriage, intimate partner violence and sexual violence but limited attention accorded to the transport space.

In fact, the transport sector in Nigeria was completely gender blind, both in terms of policy and practice. Transport was seen as neutral, by the transport operators and professionals, even by policy makers. And because of this neutrality, the needs of women were not factored in.

Using public transport was - and still is - challenging for women. For instance, when women try to get on a public transport vehicle carrying their babies on their back, many operators don't want to stop for them because they have a heavy load, and they remain at the bus station where they face frequent harassment.

Similarly, there are many instances of verbal and physical abuse of female taxi drivers and bus conductors for working in the transport sector.

I was therefore extremely motivated to be invited to join the EMPOWER project where a key element of my work was to establish an evidence base for the extent and nature of sexual harassment and violence against women on public transport in sub-Saharan Africa.

We need to bridge the gap between transport authorities and transport users and it is thanks to the EMPOWER project that issues like harassment have come out.

One of the biggest challenges is the lack of data. Data on sexual harassment is collected at national level, but there is no data about sexual harassment and transport. What the EMPOWER project did was give us a tool to start collecting the data and allow us to start from somewhere.

Thanks to the HVT project, for the first time in Nigeria, we were able to bring together the Ministry of Transport and the Ministry of Women's Affairs, as well as transport operators to discuss and explore opportunities for collaboration on sexual harassment. Not only were the three actors brought together, but also the idea that there is a connection between sexual harassment and public transport was something that we realised for the first time.

There is so much to be done, but we've got started so we can really do something about it. For instance, Nana Girls and Women Empowerment Initiative is currently collaborating with two transport unions - the National Union of Road Transport Workers and the National Association of Road Transport Owners - to develop a guideline for making transport stations safe for women passengers and drivers.

Dr Fatima Adamu
Nana Girls and Women Empowerment Initiative, Nigeria

“A gender-equitable transition to electric two-wheelers can enable women’s mobility and employment while advancing low-carbon transport pathways. Achieving this requires coordinated efforts from national, state, and local governments, alongside active support from the industry. The time for action is now.”

- Manisha Sharma, The Urban Catalysts

WE2: She moves on Electric Two Wheels. Understanding the Barriers and Opportunities for Uptake and Use of Electric Two-Wheelers amongst Women in India

The Urban Catalysts

Summary

Women in India form a small fraction of drivers, holding only 6.3% of the total number of driving licences issued as of March 2020. However, the share of licences issued to women has increased at a compound annual growth rate of 9.3%, indicating a rising demand for personal mobility among women. Yet, only 4-7% of delivery drivers were women in 2021. Despite this, there is limited research on the gendered use and ownership of electric two-wheelers (E2Ws).

This research showed that there are multiple barriers preventing more women from owning and using them. These include a limited understanding of the design of E2Ws, high upfront costs and limited access to finance, difficulties with driver training and licensing processes, and access to quality and safe charging infrastructure.

The report covered the cities of Delhi and Chennai and outlined recommendations to address these key challenges at both national and state level. These focusd on enabling access to finance for purchasing an electric two-wheeler, enhancing their access to supportive infrastructure and identifying ways to navigate the socio-cultural factors that hinder their adoption of E2Ws.

At the national level, key actions include conducting research on gendered differences in E2W usage, developing a roadmap for a gender-equitable transition to electric mobility, implementing gender-sensitive guidelines for charging infrastructure, and publishing annual data on EV registrations by gender.

At the state and city levels recommendations emphasise the revision of state EV policies to include gender responsive strategies, as well as providing institutional support to women commercial users.

The E2W project produced a Call to Action, calling on government and private sector stakeholders to provide the policy, infrastructure, training and financial systems to create a more inclusive ‘ecosystem’ to empower women in the uptake of electric two-wheelers and to contribute to wider environmental goals.

Key Insights

- Women hold only 6.3%of the total driving licences in India (as of March 2020).
- Few people in India take formal driving lessons - only 8% of men and 2% of women - with women often being taught by family members. People often pay 2.5-2.7 times the prescribed fees to obtain a licence, largely due to lack of awareness of licensing processes leading to a reliance on agents, making it unaffordable for many women.
- Down payments for female E2W users were typically 32% of the purchase price, compared with 26% for men. Limited financial literacy, lack of shared experience and low or no credit scores were key obstacles for women in accessing financing.
- An infrastructural audit of charging infrastructure found that 35% and 54% of the charging points in Delhi and Chennai, respectively, were not-operational. 65% of the audited charging points in Delhi are rated as ‘poor’ or ‘very poor’ and 85% of those audited across both cities received similar ratings. Many stations are poorly lit, and are located in inactive areas which raises safety concerns, especially for women.
- Women have less knowledge of the mechanical workings of EVs, and less awareness of deals and discounts offered to owners of an electric vehicle.

Access research

Women's Personal Safety, Participation and Employment Linkage in Urban Public Transport

ALERT Engineering Plc

Summary

In Ethiopia, as in other LICs, women's mobility patterns differ from men's and are influenced by caring and household responsibilities and by cultural restrictions. This means women need to use public transport and make regular short trips while avoiding rush hours.

But public transport planning and decision making in Ethiopia does not take women's movements into account and does not address their needs and priorities, leaving them vulnerable to gender based violence and different forms of sexual harassment.

This project examined gender inclusiveness on urban public transport in the city of Mekelle in the Tigray region of Ethiopia. By examining women's daily mobility experiences, the study revealed that achieving gender inclusiveness in the transport sector continues to be a major challenge. Sexual harassment in the form of verbal and psychological abuse was rampant but rarely reported due to repressive cultural norms and weak legal and regulatory frameworks.

Women's involvement in public transport planning and decision-making is also low, with little integration or effort shown to address the issue of inclusion in the transport system. The sector is dominated by men and the working environment is not conducive to women. Issues of gender equality in recruitment, wages and benefits have not been addressed.

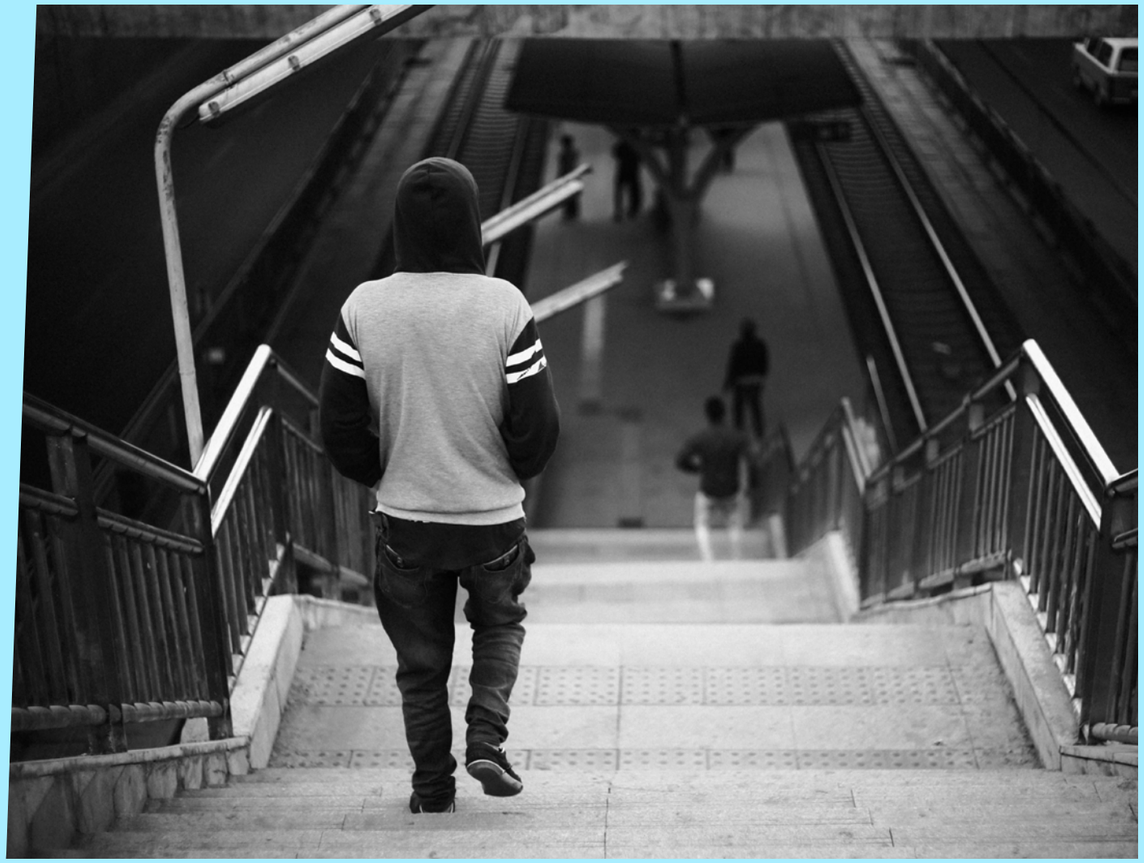
Key Insights

- Poor infrastructure, gender insensitive provision, poor awareness of women's rights and repressive cultural values all lead to a lack of inclusion in transport. A lack of specific legislation against harassment on public transport and no implementation of existing laws regarding women's safety and security means people in the city are not aware of them.
- An unequal recruitment process, wage differences, low representation of women in leadership positions and non-conducive working conditions all contribute to the lack of women working in the transport sector.
- Sexual harassment is widely underreported and difficult to track due to weak legal and regulatory frameworks. Harassment is not seen as a crime and there is no clear procedure for reporting it, responding or bringing the perpetrator to justice.

Access research

"More than 50% of the women we interviewed were harassed in different forms and this really affects their mobility. Mobility is a human right, so restricting women's mobility means that we are restricting their day-to-day life. Efforts to reverse the situation by different stakeholders have so far been unsatisfactory. The most common reaction to harassment is still silence."

- Alemgena A. Araya, Alert Engineering



“This research is a call to action for the transport sector, including Ministries of Transport, transport companies, driver training providers, and transport associations to do more to combat trafficking in persons.”

- Cathy Green, Research Team Leader

An Investigation into the Impact on Social Inclusion of High Volume Transport (HVT) Corridors and Solutions to Identifying and Preventing Human Trafficking

Transaid, North Star Alliance, Scriptoria Ltd.

Summary

Trafficking in persons (TIP) is endemic in Africa due to high poverty levels, lack of employment opportunities, economic instability, poor governance, conflict and a growing demand for cheap labour. The African continent has 109 international boundaries totalling 45,000 kilometres.

Reliable statistics on TIP are often not readily available, but the International Labour Organisation estimates that 27.6 million people were in forced labour in 2022. Of these, 39% were women and girls and approximately 14% were from Africa.

This project explored the role of the transport sector in TIP. It generated new evidence on the relationship between human trafficking and long-distance transport corridors and cross-border posts in sub-Saharan Africa with a focus on Tanzania and Uganda.

Links to international markets make both countries significant hubs for TIP. Cross-border trafficking is thought to be widespread, but domestic trafficking is also an issue with large numbers of children being trafficked from rural areas to urban centres.

The researchers carried out surveys and key informant interviews, collecting quantitative data from 1,548 vehicle operators and communities located along selected transport corridors. The research shed light on the severity of the problem in high volume transport areas, the demographics involved and the role that HVT stakeholders play in these activities.

It highlighted opportunities to develop effective interventions and policy change to improve awareness of TIP as well as to aid identification and support of victims.

Access research

Key Insights

- The research confirmed that the transport sectors in Tanzania and Uganda play a key role in TIP. They also provide an important entry point for identifying victims.
- A significant proportion of vehicle operators had been approached by traffickers and asked to transport victims of trafficking.
- Vehicle operators in both countries lack information on the risks and repercussions of human trafficking. This can affect their willingness to intervene if they recognise cases.
- Certain vehicles, particularly taxis and minibuses, manage to avoid vehicle and passenger checks at borders and are therefore likely to be a favoured form of transport for traffickers.
- Public information campaigns are desperately needed to raise awareness among local communities, as targeted training for transport operators and professionals who are more likely to witness cases of TIP (restaurant workers, sex workers, money changers).
- Border control officials and traffic police need to become more visible and proactive, with training at every level. Documentation of children travelling alone must be systematically checked and anyone with them questioned.
- There is a lack of training for drivers employed by transport companies. Supervision and monitoring of drivers could also be improved. Companies could also consider introducing anti-TIP charters and/or a code of conduct for drivers that focuses specifically on trafficking.

Gaining or losing ground: Ensuring that post COVID-19 transportation serves the needs of women with low-income in sub-Saharan African cities

Gail Jennings, Emma Arogundade and Heather Allen

Summary

The study investigated the impacts of the rapid responses to the COVID-19 pandemic, particularly with respect to rural and urban mobility on women with low income. It looked at the way in which these COVID-related containments affected women's lives in terms of access to mental and physical health amenities, independence and agency, employment and livelihoods.

This research consisted of a combination of a literature review and in-depth interviews with transport and gender experts from representative organisations in South Africa, Uganda, Nigeria and Kenya. It examined the intersections of transport, poverty, resilience and gender.

The researchers found consensus that the crisis had worsened existing inequalities, in addition to creating new ones, and has been a disaster for women's empowerment.

Findings were that women were more likely to have lost their jobs and livelihoods during the pandemic, compared to men in similar circumstances, and this was compounded by increased levels of care and family duties. The combination of these two aspects suggested that many women would struggle to return to previous – and already precarious – levels of financial and societal independence within the foreseeable future.

Access research

Key Insights

The report made recommendations to support enduring gender-sensitive transport:

- Recognise the multiple ways in which women move: women travel differently, making shorter, more frequent trips, and during non-peak hours.
- Ask women what their needs are – and listen to what they say: transport decision-makers need to engage and involve different women to better understand their needs.
- Empower women and girls through non-motorised transport: a relatively unexplored mode for women and girls in African cities is bicycle travel, which could play a strong future role in short trips.
- Affordability of transport is key: discussions over ways to subsidise the paratransit sector must be revisited and accelerated.
- Transport must be safer for women: improved security and policing may be one intervention, while another is the strengthening and support for women working in the transport sector.
- Inclusive planning is essential: only when equity, access, safety and ease are key success indicators, will transport be for everyone.

Spotlight

As we move into the UN Decade of Sustainable Transport from January 2026, it is crucial to keep inclusion and gender equity front and centre. We cannot accept a world where nearly 50% of the population do not enjoy equity and dignity. Gender inequality in transport infrastructure and planning has an impact on women's access to education, employment, social opportunities and on their wellbeing. Robust research and credible data are needed to reach a wide range of stakeholders, most of all policy makers.

Women tend to be more reliant on public transport and walking than men. Making public transport more efficient, affordable, convenient and safe is therefore a crucial step towards enhancing women's access to opportunities and their 'right to the city'. Further, women are more likely to experience sexual harassment while waiting for and using public transport. Inadequate infrastructure such as badly lit streets and bus stops and unsafe pavements also impede mobility.

Data collected by Safetipin in cities across India showed that the most common spaces in which women face sexual harassment are on the street and on public transport, which they need to access daily. Women also reported that they did not get support from bystanders and transport staff and had to deal with any incident on their own. Young women gave us the insight that some families find it easier to prevent girls from going out, in the name of protection.

To address this in one city young women and local NGOs developed the "I Will Go Out" campaign, going out in small groups to engage the public on their right to access the city at all times.

HVT research in Africa and South Asia has spanned a wide range of issues linked to inclusion, accessibility, affordability and greening the transport sector. From India, the research has highlighted how gender disaggregated data is useful for transport planning.

It has also examined the impact of heat on the mobility of women, especially caregivers of young children, with a focus on their commute to and from school. In Africa, the programme supported research on women's experience of sexual harassment in Nigeria, Malawi and Rwanda and the development of a digital tool to help policy makers understand these experience and find ways to address them.

We need to build in gender responsive strategies and collect robust data on a regular basis. Key areas that need to change to achieve gender-inclusive transport include infrastructure designed with safety and accessibility in mind.

Gender-sensitive policies should support caregivers with flexible work hours and safe transport options. Tackling sexual harassment in public spaces and transport is crucial and requires legal reforms, staff training, and awareness campaigns, and technology must be used as an enabler to ensure it plays a part in bridging the gender gap. By prioritizing inclusive planning, we can create more equitable transportation systems for everyone.

Kalpana Viswanath
CEO, Safetipin

“With the help of data we could actually get to talk about how women are making more trips than men, which never gets reported. This is not part of our general planning method and that’s where we need to change. To be able to understand the needs of women, the concerns at the time of day they travel and how much they travel.”

- Deepty Jain, Indian Institute of Technology, Delhi

Gendered Approach of Addressing Adaptation Capacity to Hot Conditions

Indian Institute of Technology, Delhi

Summary

The rise in temperatures due to climate change over the past two decades has led to a sharp increase in heat waves in India. The extreme heat poses serious health concerns, particularly for vulnerable people living in cities which tend to be densely built up with little green space. Heatwave action plans are often oversimplified and not tailored to the needs of vulnerable groups, particularly women, and there is limited data available about the risks women face when they travel in scorching sun.

This project explored the exposure of women commuters in Delhi and examined their adaptation capacity. It aimed to identify which trips were adaptable and which were not and to offer solutions which could be used to reduce the risks associated with heat exposure. Data collected from women in different socio-economic groups showed that travel choices are based largely on income and occupation. It also found that the adaptation capacity of women from low income groups tends to be far lower due to their dependence on walking at certain times of day.

The project highlights that addressing rising temperatures will require adopting both mitigation and adaptation measures. Shaded streets, water misting stations, increased green cover and drinking water kiosks, for example, would contribute to mitigation.

Reducing exposure to heat by changing the timing of outdoor activities, staying hydrated and altering routes could increase resilience to heat related risks. The study’s findings will help design specific strategic recommendations for action plans which address vulnerabilities across all gender and income groups.

Access research

Key Insights

- Women’s vulnerability to extreme heat is due to their limited access to resources and their multiple roles – in the home, in society and at the workplace. The inflexibility of these roles means they are often not able to change their mode or time of travel.
- Even in the highest income group, a majority of women (around 50%) walk rather than take public transport. This shows their dependency on walking which, while good for the environment, is also exposing them to harmful conditions.
- Potential solutions would include all of the following: infrastructure provision, operation and management of services, engagement with the community and urban planning.
- If paratransit systems were made more affordable and accessible, they could meet the needs of women - since they make short trips - reduce passengers’ exposure and provide services on narrow lanes.

Disability

addressing transport inequality
for people with disabilities

“Before the injury I was an active member of society, I had many friends and used to go out with them to do some activities and sports. But after the injury it was difficult for me to go out with them, because the environment is not adapted for wheelchair users, either the streets, transportation, shops, restaurants or other facilities.”

- Fadi, wheelchair user

World Health Organization + The World Bank (2011). World Report on Disability. Available from: https://www.who.int/disabilities/world_report/2011/report.pdf (date last accessed 02/12/2021)

According to the World Health Organization, more than one billion people live with some form of disability globally, accounting for around 16 percent of the world’s population, the majority of whom live in LMICs. For many, transport infrastructure is completely inaccessible.

Transport is a key enabler to access education, employment and healthcare, as well as social connections with family and friends. It is therefore crucial that transport systems do not exclude people with disabilities or make it harder for them to travel. However, in LMICs, the lack of accessible transport often means people with disabilities face poverty and isolation, exacerbating exclusion from society.

The range of different challenges encountered by people when using transport systems varies, and depends on the activity limitations that the individual experiences. Common barriers include a lack of step free access to transport, insufficient dropped kerbs and the absence of tactile paving.

Footpaths and roads are rarely accessible for disabled people due to poor design and maintenance and streets have uneven surfaces, potholes and contain many obstacles, making them hazardous.

It is clear that rapid urbanisation in LMICs has outpaced the development of inclusive transport systems and the design and delivery of transport has often neglected people with disabilities.

HVT research set out to highlight the inequalities across the transport sector and explore the challenges being faced by people with disabilities as they travel about their cities. Our work offers practical tools, guidance and insights to ensure that people with disabilities can benefit from more inclusive transport systems, ultimately leading to greater participation in society.

Everyone working in the transport sector has a responsibility to better understand the challenges faced by people with disabilities and to support the creation of strategies and policies to improve their experiences.

It’s also essential that people with disabilities are involved in shaping and creating the policies that affect their lives. The HVT work pushes for changes to attitudes as well as transport infrastructure.

in numbers

people live with some form of disability[6]

of the worlds population experience disability[7]

of people with a disability live in low- and middle-income countries[8]

Creating Change

As a result of HVT research, transport planners, decision makers and representatives of disadvantaged groups now have access to evidence-based guidance and tools to develop climate resilient transport systems that meet the needs of people with disabilities. Our work has helped to widen the focus on inclusion and climate resilience in transport planning, leading to a more robust, cost-effective and sustainable sector.

By highlighting best practices to urban planning professionals globally, there is greater recognition of the needs of people with disabilities, ensuring they are actively involved in the decisions that shape their environments.

Our Research

Update of Road Note 21 – Enhancing the Mobility of Disabled People

Integrated Transport Planning Ltd

Summary

Overseas Road Note 21 was published in 2004 to provide guidelines to practitioners to improve access to transport and reduce mobility barriers for people with disabilities. To reflect improvements and changes in international best practice for accessible transport services, the team set out to update this existing guide.

The subsequent Road Note 21 is a best practice guide for designing inclusive and accessible transport for disabled people worldwide, with guidance applicable to low and middle-income countries. The guide uses examples from around the world of where good practice has been observed in the design and delivery of transport.

Through a literature review and engagement with key international experts, the team were able to identify and map new and updated good practice approaches and case study examples.

The subsequent guides are split into two parts. Part 1 provides overarching guidance to policy makers on how best to approach creating more accessible transport for people with disabilities, while part 2 provides detailed guidance for practitioners working to implement changes on the ground.

Access research

Key Insights

- Planners and designers should follow the concept of Universal Design wherever possible. This would make transport as accessible and usable as possible for the broad population, including people with disabilities.
- Transport vehicles must be capable of securing wheelchairs and their occupants properly for transport.
- Accessible footway design, including surface quality, layout, tactile paving, colour and lighting, are all needed to be considered and improved.
- For people with disabilities, having access to information in usable formats is particularly important. It helps to avoid unnecessary effort and ensures they can plan journeys with confidence.
- Good training on accessibility and inclusion topics for staff working to provide transport services (e.g. bus drivers, rickshaw operators, ticket sellers) is often one of the key interventions that helps people with disabilities to overcome the challenges they often experience when travelling.

“The update combines evolved thinking around how people with physical, sensory and neuro-diverse disabilities around the world interact with the built environment, with significant changes that digital comms and mobile technologies have had on the way we plan and make journeys.”

- Crystal Asige, Kenya Senator, leading disability rights advocate and expert consultant on Road Note 21

Inclusive Climate Resilient Transport Planning in Africa

Stockholm Environment Institute at the University of York

Summary

Active mobility such as walking and cycling plays a vital role in economic and social prosperity in African cities. Yet every day, people from disadvantaged groups, such as people with disabilities, older people, young people and women, are forced to make unsafe journeys.

Without adequate sidewalks, cycle paths and public transport, many people in African cities are forced to use motorised vehicles including minibuses, motorbike taxis, paratransit and cars, whenever they can afford to do so to get around.

This has disastrous impacts on air quality, greenhouse gas emissions, road safety, traffic congestion, overall economic efficiency and quality of life. With climate change expected to compound these transport challenges, researchers undertook an assessment to understand the awareness that transport planners and decision makers have of catering for the needs of disadvantaged groups. They also looked at the challenges of incorporating the views of disadvantaged groups and climate resilience in the planning process.

The team developed guidance for practitioners to provide a set of concepts and tools for more inclusive and climate-resilient transport in Africa. It acts as a reference document to assist transport decision makers, planners and representatives of disadvantaged groups.

It introduces key issues relevant to inclusive and climate resilient transport and includes tools that can be used to engage low-income and disadvantaged groups in policy making and planning processes to make sure their voices are heard.

Access research

Key Insights

- Planners and decision makers engaged in delivering transport infrastructure should use creative participatory approaches in existing transport planning or policymaking processes.
- Data needs to be gathered and integrated into transport policymaking and planning processes to achieve more inclusive climate resilient mobility outcomes.
- Lessons learnt should build on good practice to inform policy and upskill practitioners and enhance future projects.
- Inclusion and accessibility should be integrated into existing and future transport plans.
- It is critical for disadvantaged groups to be included in transport planning to ensure their voices and concerns are heard and considered.
- Planners should empower disadvantaged groups to take part in processes that inform and influence the design, development and delivery of transport policy and planning outcomes.

Disability Inclusive Policy Brief

Transformative Urban Mobility Initiative (TUMI)

Summary

Safe, affordable, accessible and sustainable transport systems for all is a key target of the United Nations Sustainable Development Goals (SDGs) for 2030. This target specifically includes public transport to meet the needs of people with disabilities as well as other vulnerable people.

In line with the SDG target, this study produced a policy brief to set out practical steps to making the right choices to ensure that public transport meets the mobility needs of people with disabilities.

The policy brief was prepared specifically for transport policy makers and professionals in LICs in Africa and Asia, but is applicable to all countries in these regions.

It details how the starting point is to engage with people with disabilities and their representative organisations to understand the needs and priorities from their perspective.

The steps within the brief are based on best practices in countries worldwide. It highlights how many obstacles to mobility can be overcome with simple, low cost solutions, such as removing obstructions on footpaths, designing bus stops to make it easier to board buses and providing clear, easy to follow route signs.

Access research

Key Insights

- Improving the mobility of people with disabilities starts by increasing awareness and by changing attitudes at all levels, from senior politicians and officials, to engineers and contractors, to the operators of transport services, and to fellow travellers.
- Assumptions should never be made about what people with disabilities want. They have to be consulted and engaged in deciding on measures to improve their mobility.
- The mobility needs of people with disabilities must be factored into transport and city planning policies and into plans, designs and budgets right from the start. This is essential because retrofitting accessibility features is difficult and expensive.
- The principles of Universal Design need to be incorporated in national legislation so that standards for disability inclusive design can be set, monitored and enforced.
- Everyone engaged in the design, delivery, operation and use of transport and the pedestrian environment needs training on inclusive mobility to understand what must be done and why.
- Mobility standards should be monitored and enforced in the design and implementation of transport infrastructure and systems.

“A key message from the brief is that denying people with disabilities basic mobility carries a huge economic as well as social cost. For the sake of often low-cost simple measures, people are denied the ability to live independently and to access employment or healthcare. And of course, where major investment is made in new transport systems, accessibility should be a non-negotiable condition of funding.”

- Ann Frye, lead researcher

Spotlight

Public transport isn't operated with disabilities in mind. It means that 10-16% of the people in the world living with a significant disability are partially or completely excluded from the life they should be able to lead. There's children that can't get to school, people who quit work because they can't get there, and people who can't get to hospital or access amenities.

When I was involved in a road crash, that was the beginning of a new chapter in my life. I injured my spine and lost the use of my lower limbs. For almost 30 years, I've been in a wheelchair.

I quickly began to realise that public transport was inaccessible. But it was the key to independent mobility. Every time I needed to go somewhere, I had to rely on others. That life was restrictive and stressful. Now, nearly three decades on, we're still dealing with barriers.

I continue to see gaps in the planning, design and implementation in transport infrastructure. People with disabilities are often an add-on in policy to tick the box, but I don't believe there's intention for implementation.

We face many barriers as we try to live our everyday lives, including costs of transport, lack of ramps and safe walkways.

Being unable to get around affects people's quality of life, health, wellbeing and freedom. There needs to be deliberate effort to make changes, and the transport sector needs to embrace an inclusive mindset and culture.

When we think of interventions we think of big budgets. This isn't the case. HVT research has shown it's possible to have low cost changes, like removing obstructions from footpaths, accessible bus stop levels and easy to follow signs. This research has shown we can start simply.

People with disabilities have the right to exist and access transport like anyone else. HVT's research in this area has helped to highlight the challenges and hopefully give the push the sector needs to embrace availability, accessibility, affordability and safety for people with disabilities.

Bright Oywaya
Disability Advocate, Kenya

Informal Transport

a path to a sustainable future →

“If you were to take them away [informal transport], the economies of most sub-Saharan African cities would collapse. They are absolutely essential to how the economies function, because very often they are able to access areas that other modes can’t.”

- Roger Behrens, University of Cape Town

Fast growing cities in LMICs are often low-rise with inadequate space for streets and public spaces. Public transport in these cities regularly fails to keep pace with the rapid and sprawling growth.

Informal transport, including minibuses, motorbike taxis, rickshaws and shared cars, has become a lifeline for most people, and is the primary form of transport throughout sub-Saharan Africa and Asia. It especially plays a crucial role in last-mile connectivity, bridging the gap between major transit hubs and the places where people live, work or access vital services.

Since informal transport is generally cheaper to operate, it’s an affordable solution for people to complete essential journeys. It’s adaptable and flexible, changing with demand and circumstances.

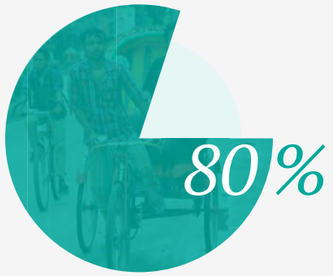
As well as moving people and goods around, informal transport offers employment opportunities for drivers and vehicle owners in economies where jobs can be scarce.

However, little is known about the size of the informal public transport sector as it’s largely unregulated and undocumented.

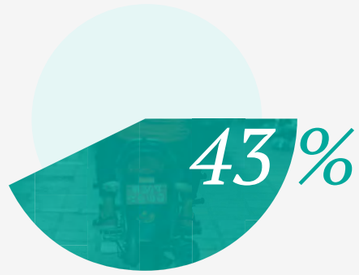
Operators often use older and poorly maintained vehicles, which contribute to congestion and increase air pollution. The lack of regulation also leads to safety issues for passengers, especially women, who frequently face harassment when using services.

For these reasons, informal transport often suffers from a negative image and is neglected in transport planning, with some cities imposing bans. To address the lack of knowledge and coordination in the sector, HVT commissioned several research projects to understand the barriers and challenges, and to explore how informal transport can become part of integrated transport systems.

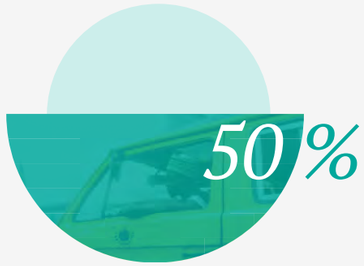
in numbers



of traffic in Bangladesh is made up of three-wheeler slow-moving vehicles[9]



of road traffic deaths in Nepal involve motorcycles[10]



or more people in sub-Saharan Africa use informal transport to meet their daily needs[11]

buses serve 1,800 routes across the cities of Accra, Kumasi, Freetown, Cape Town and Maputo[12]

Creating Change

The research undertaken on informal transport sought to encourage joint working by public authorities and the informal public transport sector. It can be used to help shape policy and action plans for low carbon, good quality and safe transit.

New standards are serving as a model for inclusive road design that could be adapted and implemented in many LMICs. By prioritising the needs of vulnerable groups, our work marked a significant step towards creating safer, more equitable roadways and sets a precedent for global road design practices.

Our Research

TRANSITIONS

Vectos (part of SLR)

Summary

What happens in urban transport in African cities over the next two decades will be a key determinant in global climate change outcomes. The TRANSITIONS project set out to understand how we can better enable a more efficient, low carbon and safe transport network for the cities of sub-Saharan Africa, working proactively with the informal public transport sector.

A literature review took place to establish the state of knowledge on informal transport in sub-Saharan African cities and identify important gaps with the view to formulating policy interventions.

TRANSITIONS research explored current attitudes towards informal public transport, how to best engage with the sector and routes towards low carbon mobility across four countries - South Africa, Mozambique, Ghana and Sierra Leone. Extensive research was gathered through stakeholder interviews and workshops, passenger surveys, and GPS tracking of more than 150 vehicles.

Outputs include a routemap, which sets out a sequence of steps needed to enhance services and move forward the policy debate. For example, the routemap highlighted that infrastructure provision for informal public transport, as well as improved regulation and consistent enforcement, are important aspects for improving services. It also contains self-appraisal questions to assist practitioners to understand the current situation in their city.

Access research

Key Insights

- Public authorities must recognise the value and benefits the informal public transport sector can offer and the potential for cost-effective improvements.
- Fare setting is a widely established practice, occurring in four of the five study cities, but the process is not well understood. Given that it is a key determinant of both business viability and the affordability of mobility, it is a subject worthy of further research.
- Establishing and enforcing route licensing is a fundamental element of a well-functioning system. Without proper enforcement of route licensing, aggressive competition on routes and the associated congestion and road safety issues result in a spiral of decline.
- Ensuring adequate road surfacing, designing sustainable drainage, maintaining roads and providing basic services at stops, like seating and shelter, are important steps towards improvement that public authorities can facilitate.
- Greenhouse gas emissions can be reduced with the existing fleet through better operational efficiency, like reducing congestion to prevent idling, improved driving practices, providing better road conditions and dedicated lanes, and by improving the maintenance and fuel efficiency of vehicles.

“Public transport interchanges are vibrant focal points in city life, where transport, commerce and social interaction weave together. Getting interchange design right is key to promoting low carbon, efficient, inclusive and affordable mobility, while getting it wrong could lock in disincentives and problems for many years.”

- Tim Durant, SLR

Inclusive Interchanges

Vectos (part of SLR)

Summary

Inspired by the findings of the TRANSITIONS work, the Inclusive Interchanges project collaborated with the Lagos Metropolitan Area Transport Authority (LAMATA) to inform the conceptualisation, design and delivery of interchanges that integrate formal and informal modes of transport.

To take the previous work forward, the primary aim of this project was to develop and pilot an Inclusive Interchanges Design Brief for use by public transport and urban planning authorities.

The project involved a review of existing interchange design guidance, design appraisals of two planned interchanges in Lagos, site visits combined with stakeholder meetings and a workshop, and development of a passenger survey questionnaire, which was then tested by LAMATA.

The Design Brief output of the project provides an appraisal template for public transport interchanges, incorporating summary guidelines, that will support planners and designers when they review the designs of existing and proposed facilities.

Providing an example for practitioners, an appraisal of this type was conducted for two interchanges in Lagos, namely Mile 2 and Marina. Commentary on the resulting positive design aspects and recommendations on improvements, along with a passenger survey questionnaire, are provided in the Inclusive Interchanges outputs.

Access research

Key Insights

- Where the integration of formal and informal transport operations are planned, interchanges may form a focal point for capacity building and professionalisation of informal transport associations, as well for improved enforcement of route licensing and vehicle inspections.
- Licensed informal public transport services should be provided with dedicated space for passenger collection and drop-off at interchanges designed for formal modes.
- Informal market traders often congregate around transport interchanges. The services they provide for passengers, as well as the income they generate, can be supported through the provision of dedicated space at interchanges and basic facilities to display and store their goods.
- The passenger survey revealed the importance of providing shelter from sun and rain at the interchanges, as well as seating. The provision of toilets with wheelchair accessible cubicles help to enhance overall levels of provision.
- Planning interchanges with minimal distances and level changes between modes is important to ensure efficient and convenient multi-modal travel, especially to support the travel of people with disabilities, older people and families, who may need to rest while changing from one form of transport to another.

Policy and Regulation Development for Motorcycle Taxi Safety in Nepal

University of the West of England, Bristol
Nepal Injury Research Centre and the Kathmandu Medical College

Summary

Despite the high number of road traffic deaths in Nepal involving motorcycles (43%), which are often used as taxis, policy makers are reluctant to formalise them as a form of public transport to improve safety.

The research set out to understand the place of motorcycle taxis in the public transport system in Nepal, to examine ways to enhance their safety and to identify changes in policy and regulation that could enable this.

The research involved analysing traffic police reports, engagement with stakeholders, focus groups and the development of process maps on the desired future for motorcycle taxi regulation.

The team identified risk factors for crashes and injuries and where potential changes in policy and regulation could improve safety.

The team engaged with stakeholders to help finalise a two-wheeler directive and shape 12 recommendations for operators and regulators to support the formalisation of motorcycle taxi operations in Nepal.

Key Insights

- Project engagement with a wide range of stakeholders demonstrated that improving motorcycle taxi safety in Nepal is a shared responsibility.
- The Nepal traffic police records significantly under-estimate the true number of motorcycle taxi crashes occurring in Kathmandu valley.
- Newspapers aren't currently reporting motorcycle taxi crashes, which means the public may not be aware of the risks associated with them.
- There is limited evidence to support the development of safer motorcycle taxi systems in LMICs.
- 12 recommendations were agreed by stakeholders, including mandatory use of helmets, formalising operations and limiting working hours, which could serve to build a practical action plan for improving motorcycle taxi operations in Nepal in the future.

Access research

"This is very important research which will have an overarching effect on not just the safety of two-wheeler taxis but the safety of all motorcycles in Nepal."

- Sudeen Dawadi, a regular two-wheeler taxi passenger

"We're building an evidence-base of support from riders and passengers around the importance of regulation. We hope this will help prompt the Ministry of Physical Infrastructure and Transport to finalise the two-wheeler regulations incorporating the recommendations we've developed with stakeholders."

- Dr Jonathan Flower, University of the West of England, Bristol

Road Design Guidelines Considering Three-Wheeler Slow-Moving Vehicles for Urban and Rural Roads of Bangladesh

Islamic University of Technology

Summary

Three-wheeler slow-moving vehicles (Tri-SMVs), like rickshaws, make up as much as 80% of the vehicle trips in Bangladesh, but the roads are largely designed for motorised vehicles with four or more wheels. This creates safety and comfort issues for Tri-SMV drivers and passengers, significantly affecting the mobility of vulnerable groups.

Through opinion surveys of Tri-SMV operators and users, quantitative field measurements of roads and analysis of road-user interactions, the team identified where current road design regularly fails to meet the needs of three-wheelers.

They developed technical recommendations to support engineers to create roads that help the urban environment to thrive.

Access research

Key Insights

- Speed breakers (speed bumps) should be redesigned with a smoother shape and limited height to have less impact on Tri-SMVs, enhancing passenger comfort, improving vehicle stability and reducing injuries.
- Adjusting lane widths to allow sufficient space for Tri-SMVs to navigate safely alongside other vehicles, reducing collisions and decreasing congestion and environmental impacts.
- Redesigning intersections to create more gradual approaches and incorporating longer acceleration lanes to help Tri-SMVs navigate more safely and efficiently.

> “In summer, you can’t walk for extended durations in Bangladesh because temperatures reach 40-45 degrees Celsius. How can we expect children to get to school or people to get to work without rickshaws? It’s not a robust solution to ban them, because there’s no better alternatives. But design and safety need to be improved because there’s a big lapse of safety practice.”
>
> **- Dr Nazmus Sakib, Islamic University of Technology**

Africa Urban Mobility Observatory (AUMO)

GoMetro

Summary

The Africa Urban Mobility Observatory project aimed to identify and evaluate the informal paratransit services operating in six research cities. This included understanding their operating models, establishing the roles these services played in supporting mobility, revealing the experiences of travellers, and understanding the contribution of passenger transport towards CO2 emissions.

This research also aimed to identify possible informal paratransit reform strategies which could improve levels of service, reduce fuel consumption and CO2 emissions, and improve operational sustainability.

The research team identified and evaluated the informal paratransit services operating in six research cities - Blantyre, Gaborone, Kigali, Kinshasa, Lagos and Maseru. As well as desktop research, a stakeholder questionnaire was produced, tailored for each city, and stakeholders were interviewed. Data from the Africa Urban Mobility Observatory Web Data Platform was used to draw insights into mobility patterns and passenger experiences in the six cities.

The insights from this research reveal the strengths and weaknesses associated with informal paratransit operations, and possible reform strategies to be considered to improve levels of service and safety, reduce CO2 emissions, and improve operators' profit margins.

Access research

Key Insights

- Informal paratransit operations perform a critical function, supporting the majority of daily trips across the evaluated cities. Generally, informal paratransit users are captive, rather than choice users, and are among some of the most vulnerable population groups in the region.
- The research found fragmented services, a lack of funding for subsidies, uncoordinated service management and delivery, and weak regulatory and enforcement environments.
- There's an urgent need for reform to help protect the safety of travellers, improve levels of service and to reduce harmful emissions.
- It shouldn't be assumed that the solution to these challenges is to replace informal paratransit services with formal public transport services. Informal paratransit services have inherent resilience which should be recognised as a foundation on which to build.
- Increased support for the sector, more active involvement from regulatory authorities and help to balance supply and demand, would ensure more reliable levels of service.

"The Africa Urban Mobility Observatory highlights the transformative potential of informal paratransit reform. By recognising its resilience, addressing critical challenges, and balancing regulation with support, we can enhance mobility, reduce emissions, and uplift millions of vulnerable commuters across African cities—driving sustainable, inclusive urban transport solutions for the future."

- Justin Coetzee, GoMetro

Spotlight

Africa's cities have a transportation problem. Rapid growth is putting overwhelming pressure on road networks. Cars are clogging the streets, releasing emissions that worsen climate change. Expanding public transport is critical.

My home city of Lagos, Nigeria is the largest and most congested mega-city in Africa, and it urgently needs more efficient public transport. Even with huge investment into the Bus Rapid Transport network we cannot keep pace with rapid population growth.

Many policymakers and transport planners dismiss informal transport as a problem – as unregulated, unsafe, polluting, and outdated. But the reality is they serve an estimated 70 percent of trips. Integrating our network of Danfos into LAMATA's formal transport system should be part of the solution for the affordable and green transport that we and other African cities need.

Fortunately, support for alternative solutions is emerging. Stakeholders should work together towards smaller, low-cost and incremental improvements in popular transport services, based on the research and exchange initiatives of groups like C40 Cities, the Global Network for Popular Transport, Mobilise Your Cities, UITP and the HVT programme.

We've been working as part of the project team for the HVT-funded Inclusive Interchanges project to inform the design and delivery of two interchanges in Lagos.

Getting interchange design right and integrating new public transport services with existing informal transport is vital to provide efficient and inclusive mobility for all. Through this project, we've developed a design brief to support planners and designers when they review the designs of existing and proposed facilities.

To be sure, working with the popular transport sector is not without its challenges. It takes time to build relationships and find the right balance of policy measures and incentives for making popular transport safer and more reliable

But starting with small steps, the potential for progress across Africa is vast. Cities that show they can work effectively with the existing informal transport sector will be building the competencies required for larger public transport systems, and could bring more investment their way in the future.

Oluwaseun Sonoiki
Legal Counsel at Lagos Metropolitan Area Transport Authority (LAMATA)

Active Mobility

a path to healthier and more inclusive cities

“Walking is already low carbon. It’s also an inclusive mode because it’s cost-free. You can walk out your front door and choose to walk in your local community. It’s the way we interact as human beings and it’s accessible to anybody.”

- Bronwen Thornton, Walk 21 Foundation

Walking is the primary mode of transport in most LMIC cities. And both walking and cycling are crucial to economic inclusion and for mitigating urban congestion, and helping to reduce greenhouse gases and pollution.

These are affordable modes of transport for lower-income groups who often find motorised transport out of reach. Active mobility creates access to vital services, while reducing pollution and also contributing to better health and wellbeing.

Yet walking and cycling are often overlooked and undervalued in policy and infrastructure planning, and as a result, pedestrians and cyclists face significant safety challenges.

These include poorly maintained roads and pavements, speeding vehicles and a lack of bike lanes and pavements. Every day 78% of people in Africa walk for transport, and every day they not only walk in uncomfortable conditions but they put their lives at risk.

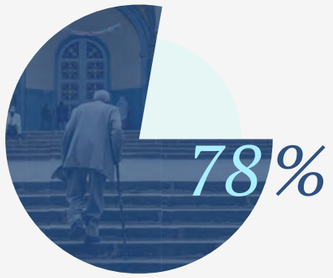
The COVID-19 pandemic began to change perceptions globally of walking and cycling as vital modes of transport, as people looked for alternatives to travelling on packed and infrequent public transport.

In most African cities, however, people changed their modes of transport less than others around the world. The pandemic highlighted that for most Africans walking is a necessity rather than a choice. It also highlighted that urgent action was needed to enable active mobility to play its central role in offering sustainable, safe and inclusive transport across LMICs.

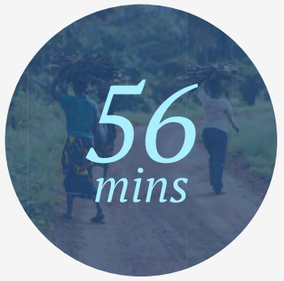
HVT research examined the barriers and challenges faced by pedestrians and cyclists in LMICs, and the attitudes towards active mobility both during and post the COVID-19 pandemic.

It explored what needs to change for walking and cycling to play a vital role in the future of sustainable urban mobility. As part of our work, we looked to then take these insights into the plans of policymakers and transport practitioners across Africa.

in numbers

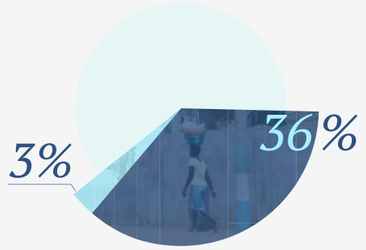


of people in African cities use walking as their mode of travel every day[13]



people in Africa travel on foot or bike on average every day[14]

killed every day in African cities[15]



traffic fatalities of pedestrians and cyclists in Africa in 2019[16]

Creating Change

The insights and findings from HVT research will lead to a greater understanding among practitioners and decision makers of the challenges in developing policy that meets the needs of people who walk and cycle in cities. By developing new knowledge on how to create equitable policies, our research in this area is assisting cities to create greener and more inclusive transport.

This knowledge is being transformed into action by the development of useful tools that practitioners can use and masterclasses to support learning and dissemination.

Spotlight

Active mobility—walking and cycling—is the backbone of sustainable transport in LMICs. It provides affordable (often free) mobility while mitigating congestion, air pollution, and greenhouse gas emissions. Yet, despite its immense value, active mobility remains underfunded and undervalued in planning and policy.

Through UNEP's Share the Road Programme, we have spearheaded efforts to elevate walking and cycling across Africa, including the launch of the Pan-African Action Plan for Active Mobility (PAAPAM) in 2024. HVT's active mobility research has contributed to the much-needed evidence base to support this critical agenda.

For decades, walking has been the primary mode of transport for most people in African cities, often out of necessity rather than choice. However, walking and cycling are constrained by safety challenges, limited infrastructure, and a lack of policy attention.

HVT's research filled this gap by identifying the barriers pedestrians and cyclists face, from insufficient investment to ineffective policy frameworks.

By providing robust data and insights, the research equipped practitioners and decision-makers with the tools to address these challenges and reshape urban transport systems.

The potential of this research is transformative. Findings highlight the importance of prioritising active mobility and tools developed from the research, such as policy briefs and training frameworks, are available for cities to integrate active mobility into their planning processes.

Looking forward, HVT's research offers a clear pathway to a healthier, safer, and more inclusive urban future. By aligning evidence with action, UNEP's Share the Road Programme, supported by HVT insights, is helping cities unlock the potential of active mobility to drive sustainable development, improve lives, and create vibrant, equitable cities across Africa.

Carly Gilbert-Patrick
Team Leader, Active Mobility, Digitilization and Mode Integration, UN Environment Programme

Our Research

Investing in walking in African cities: Moving beyond policy and ‘Our walking is our asset’: Exploring the way in which walking is valued in pedestrian practice and policy in African cities

Walk 21 Foundation

Summary

Only 19 out of 54 African countries have developed policies and plans for walking in recent years. There’s still a limited evidence base to guide the development of policies aimed at improving and securing walking as a key mode of transport. This research set out to understand why walking receives so little policy attention and resource allocation in African cities and to expand the knowledge on how walking is measured and valued.

The research included a literature review, an online survey and in-depth interviews with government authorities, non-government organisations, universities and funding bodies. Questions focused on how walking is currently valued in transport policy and practice across Africa and on identifying effective ways to increase the value placed on walking and secure resources for it.

Several barriers were identified, such as lack of funding and data, ineffective policies and a lack of respect towards people who walk. Despite these challenges, there was recognition that walking is an essential transport mode for a sustainable future in Africa and that it’s not too late for cities to address the urban and policy challenges around walking.

The findings indicate that a healthy, safe, equitable and sustainable future for urban Africa could potentially be delivered within existing resources. This led to the development of a policy brief that outlines ways to more effectively value and integrate walking into policy, along with recommendations for action.

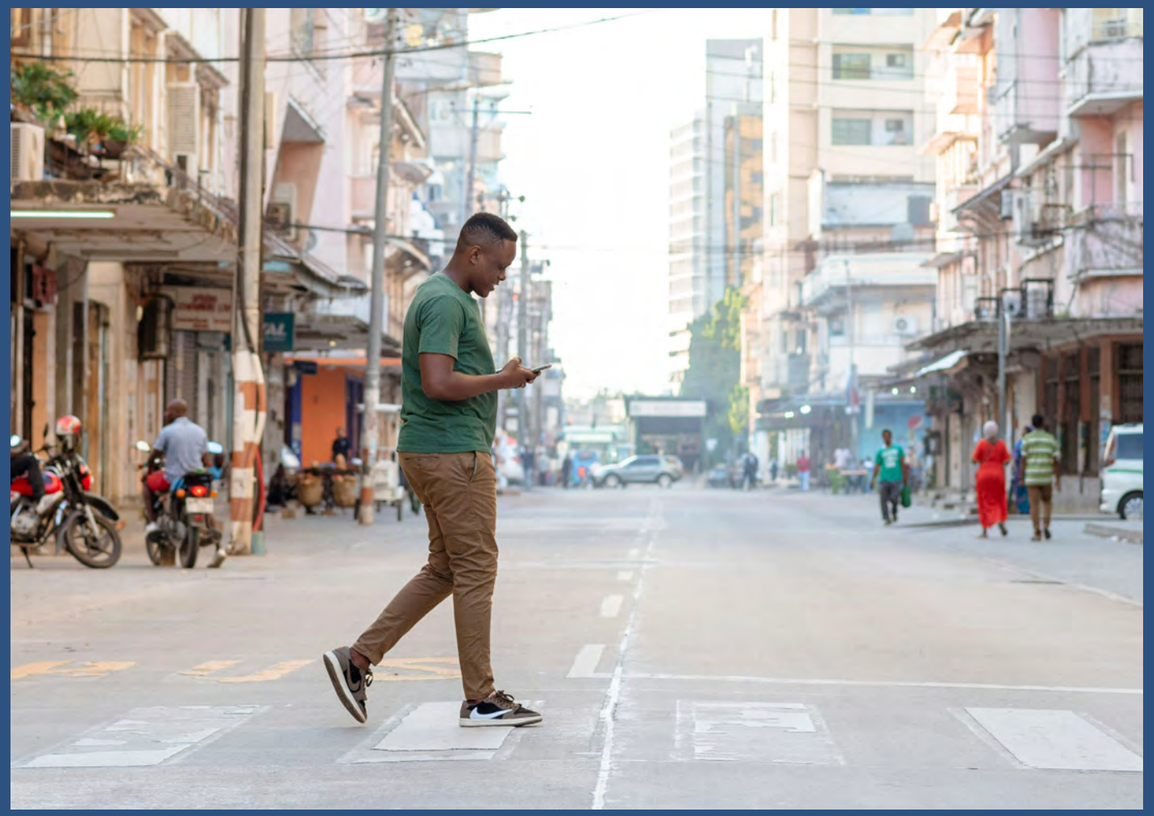
Access research

Key Insights

- A key step towards increasing the value of walking is to redefine success in a way that positions walking as part of the ‘the African dream’ – an aspiration to cultivate an accessible, sustainable future that values walking as an asset, rather than emulating the unsustainable motorised models seen in developed countries.
- Developing an Africa-specific framework for evaluating the impact of transport investment would help rebalance the prioritisation of funding. This could lead to improvements that protect current pedestrians and possibly attract new people to walking as a mode of transport.
- Establishing methods to evaluate the walking experience and understand the needs of pedestrians – beyond basic ‘road safety’ and ‘time saving’ metrics – would help inform a new approach to providing for pedestrians.
- Training and capability-building initiatives to develop the technical expertise to implement walking policies and effective solutions are critical to ensuring that investment in walking infrastructure achieves lasting impact.

“The insights and findings from this research will lead to a greater understanding among practitioners, activists and decision makers of the challenges in developing policy that truly attends to the needs of people who walk in African cities. It outlines what are the most effective actionable solutions to address the barriers limiting the value of walking.”

- Carly Gilbert-Patrick, UN Environment Programme



“PAAPAM provides a blueprint for tackling urban mobility challenges, blending inclusivity, sustainability, and resilience while ensuring measurable impacts and strong local ownership through meaningful partnerships.”

- Gary Haq, Stockholm Environment Institute

Pan-African Capacity Building Programme on Inclusive Climate Resilient Planning for Active Mobility

Stockholm Environment Institute (SEI) at the University of York

Summary

Despite the immense demand for active mobility, Africa’s transportation infrastructure does not meet the needs of its population. This situation is exacerbated by the effects of climate change, emphasising the need to promote non-motorised transport to reduce greenhouse gas emissions and develop climate-resilient transport infrastructure.

To tackle these issues, efforts such as implementing the UN Environment Programme’s Pan-African Action Plan for Active Mobility (PAAPAM) have been put into action. Building on SEI’s previous work around inclusive climate-resilient transport in Africa, this extension project has raised awareness and increased capacity of transport policymakers and practitioners to include the voices of disadvantaged groups when planning for active mobility.

Using HVT outputs on women’s personal safety, climate resilience, inclusive transport, transport-oriented development and activity mobility, a masterclass programme for decision-makers in Africa’s transport industry was developed. Working with the UN Environment Programme, the masterclass was launched at the World Urban Forum in Cairo in November 2024.

Delivered through a combination of in-person and online workshops, it covered the guidance framework and climate impacts through interactive sessions and case studies. Participants explored tools from participatory approaches to digital storytelling, empowering them to navigate climate change’s complex impact on transportation planning while ensuring inclusivity.

Access research

Key Insights

- The masterclasses were attended by 229 participants, made up of government ministries, civil society organisations and academia across Africa.
- By the course’s end, participants had developed skills in understanding the impact of climate change on transportation in Africa, equipping them with the skills to address climate risks to transport infrastructure and promote active mobility.
- A key aspect of the training involved using AI to envisage what future inclusive, safe, accessible and climate-resilient transport systems could look like.
- Participants became adept at using the guidance framework to promote inclusivity, employing participatory tools, engaging in group reflection, and implementing strategies for inclusive and resilient transportation planning in the face of climate challenges.
- The workshops secured policy commitments from Ghana, Kenya, and Malawi, embedding active mobility into national and regional priorities, along with commitments from five cities in Ghana.

Learning from COVID-19 Pop-Up Bicycle Lanes: Applying the Principles of Rapid, Temporary Interventions to sub-Saharan African Cities

Gail Jennings, Rahul Jobanputra, Constant Cap, Genevive Ankunda

Summary

Following the COVID-19 lockdown, many cities in sub-Saharan Africa focused resources on public transport. However, physical distancing requirements reduced capacity and increased congestion.

In contrast, some countries in Europe and Latin America implemented emergency or pop-up bicycle lanes to help address transport issues during the pandemic. These lanes involved reallocating space to bicycle traffic, either for certain times of the day or all day, using paint or temporary barriers.

Such tactical urbanism or piloting schems are not approaches readily used in sub-Saharan African cities. The reason why these have not been considered in SSA cities as a response to transport needs was investigated in this research, especially as several technical resources and design guides exist. This study took the concept of pop-up bicycle infrastructure and investigated the potential of these principles to develop priority routes for bicycle travel in three case cities - Cape Town, Nairobi and Kampala.

The team reviewed literature on bicycle promotion in low-cycling countries, as well as bicycle master planning and network design. They also reviewed transport policy and strategy, to determine whether there existed an enabling environment or stumbling blocks in case cities toward installing temporary interventions.

Overall, this study suggested that pop-up infrastructure, based on user-needs, could draw attention to measures that are lighter, quicker and cheaper to implement. They can be trialled and quickly re-allocated or moved if they have unintended adverse impacts or could be better implemented elsewhere.

Key Insights

- Bicycle lanes and their installation have become contested interventions in resource-poor cities. Trialling user-proposed routes with light-touch, context-specific infrastructure designed in collaboration with local stakeholders could build decision-makers' confidence in these interventions.
- Where pop-up infrastructure was developed outside sub-Saharan Africa during the pandemic, in many instances cities were fast-tracking plans that already existed. This highlights the importance of pilots and plans that are ready for action.
- African cities already have high levels of walking with their own set of public health challenges. Narratives to increase walking and cycling tend to focus more on their potential for congestion mitigation and poverty-alleviation than on their physical health benefits.
- In all three case cities, roads where people commonly cycle often lack the space required to install bicycle infrastructure without substantial political will and demonstration of value. Pop-up facilities or pilots are able to provide some of the evidence needed to support their development.
- Pop-up bicycle facilities, when implemented as well-designed pilot projects, can help cities to achieve climate goals and targets. These pilots enabled evidence collection to motivate and support both political and technical decision-making.

Access research

"This study has been included annually in University of Cape Town's Masters degree in Transport Studies, reaching not only South African students but students across the continent."

- Gail Jennings, Project Lead

Transport Infrastructure and Access

strengthening networks for a resilient future →

“The most critical challenges facing today’s infrastructure are climate change effects on already existing infrastructure which is not designed to withstand these impacts.”

- Andrew Otto, TRL

Governments are making investments to build and maintain transport infrastructure, but it takes a long time and huge amounts of money to create access to the vital destinations that people and economies need to thrive.

LMICs, in particular, face significant challenges. Ageing infrastructure, insufficient maintenance and limited funding often leave transport systems underdeveloped and prone to issues like congestion, accidents and inefficiencies.

Many cities lack comprehensive transport networks, and with rapid expansion of urban areas, it’s made it difficult to integrate new transport routes and systems quickly enough to meet growing demand.

The changing climate is also affecting our infrastructure in ways we had not previously anticipated. More frequent and severe weather events, such as flooding, heatwaves and storms are damaging essential infrastructure and increasing maintenance costs.

This makes it even more important to understand how to build and maintain infrastructure in ways that are sustainable, climate resilient and reduce the impact on the planet.

For people with lower incomes, public transport costs are disproportionately high, prone to inefficiencies leading to accidents and congestion. When fares eat into household budgets, this limits people’s ability to access jobs, education and vital services. High costs force people to rely on unsafe transport, walk long distances or even avoid travel altogether.

HVT has built an evidence base to inform the development of road, rail, walking and cycling infrastructure to create systems that are affordable, safe and robust. From tools that can help to design climate-resilient roads, to hydrogen fuelled trains, our research is encouraging infrastructure that’s fit for the future and the development of transport systems that allow everyone to travel affordably and efficiently.

in numbers

people still live more than 2km away from an all-weather road, where lack of access is inextricably linked to poverty[17]

of roads in sub-Saharan Africa are paved compared to around 80% in high-income countries[18]

increase in the costs of maintaining transport infrastructure by 2050 is expected[19]

is needed annually for transport infrastructure investments in LMICs[20]

Creating Change

As materials and road usage evolve, HVT research has updated knowledge to drive improvements in the transport industry across LMICs. We've supported professionals to adopt the latest design and maintenance standards, while exploring new technologies like hydrogen-fuelled trains to make transport more environmentally friendly.

Our research has guided efforts to reduce emissions and mitigate the environmental impact of transport as the right infrastructure is built to meet the needs of today and tomorrow.

Our Research

Updating Road Note 31: A guide to the structural design of bitumen-surfaced roads in tropical and sub-tropical countries

TRL Ltd.

Summary

Road Note 31 was first published in 1962 to provide guidance for the design and maintenance of roads in tropical and subtropical regions. It aims to improve the quality and durability of roads and offers advice on topics such as selecting the right materials, pavement design, drainage, erosion and extending the life of roads.

It was revised in 1966, 1977 and 1993 to take into account the advances in our understanding of the behaviour of road-building materials and their interactions in pavements.

This new fifth edition involved collaboration with experts and organisations in various parts of the world. It incorporates major improvements and shifts in emphasis due to changes in materials, climate and road usage.

For example, it extends the designs of previous editions to cater for heavier traffic loads of up to 80 million equivalent standard axles, and takes into account the effects of the climate. Rigid pavement design has also been included due to its importance in combatting climate change.

Access research

Key Insights

The new edition of Road Note 31 includes the following principal differences:

- For bitumen surfacing layers, the traditional fatigue is no longer considered the main cause of surface failure. Bitumen in the top surface layer ages and becomes brittle quickly in hot climates and cracks develop from the top downwards. It is essentially a ‘sacrificial’ layer and does not need to be exceptionally thick if the remainder of the pavement is designed appropriately.
- Road failures at subgrade level are rare, provided that the drainage and pavement foundation are satisfactory.
- Climate change is a serious concern and road design must now consider revised climate factors, such as changes in storm levels and frequencies, and also methods of minimising damage created by extreme events like fast flowing water and erosion.
- Guidance is included on the design of rigid pavements, which is a useful option for the provision of climate resilient roads.

“Road Note 31 is a guide targeted at road and pavement designers and road planners so they can make informed decisions on how to enhance the climate resilience of the infrastructure they’re building now and into the future.”

- Andrew Otto, TRL

Spotlight

Road transport and road infrastructure have long been a cornerstone of economic prosperity and the foundation for vibrant, prosperous communities. They are essential for connecting people to jobs, schools, hospitals, and markets, fostering opportunities and improving quality of life. While roads bring immense social and economic benefits, it's equally important to address their externalities: traffic deaths and injuries, environmental impacts and air quality primarily.

The challenge is to develop road networks and road transport in a way that maximises their benefits while meeting our sustainability goals. How can we ensure that the significant investments required for road development, upgrades and rehabilitation are spent wisely, creating infrastructure that not only meets today's needs but also anticipates and adapts to the realities of climate change? How can we design and manage roads and transport systems that actively move us closer to a net-zero future?

These are crucial questions—and ones that the IRF is addressing every day. Thanks to innovative research, like the insights generated through the HVT programme, we now have the tools and knowledge to empower many of our members with evidence-based approaches for shaping impactful projects, plans, and policies.

Road infrastructure takes time to materialise, but the HVT programme's influence on sustainable development is already being felt and will only grow in the years to come.

For example, climate adaptation measures introduced in the updated Road Note 31 are already being applied in numerous countries, and the revisions to the Highways Design and Maintenance Standards Model, supported by HVT, are ensuring that millions of dollars of investment are directed toward building sustainable, resilient roads.

Perhaps one of the programme's most inspiring legacies is its commitment to innovation and collaboration. Meeting today's transport challenges requires bold ideas and collective action. Our partnership with HVT during the COVID-19 pandemic is a testament to this, as we rapidly developed the gTKP platform to provide quick access to critical knowledge, resources, and best practices during an unprecedented time. Support from the HVT programme also allowed IRF and the Global Alliance of NGOs for Road Safety to review policy and practice in terms of Africa's response to the pandemic and its impact on transport and mobility of goods.

The legacy of the HVT programme lies not just in its outputs but in its ethos of forward-thinking and partnership. I am confident that these contributions will continue to support and inspire the transport sector as we work toward a more sustainable future.

Susanna Zammataro
Director General, International Road Federation (IRF)

HVT's research with TRL to update Road Note 31 has already driven far-reaching impacts. Knowledge has been shared across the industry and will be applied in the design and construction of roads and pavements for years to come.

This work enabled the development of climate-resilient roads, ensuring that infrastructure adapts to the future challenges of climate change as illustrated below.

Road Note 31

Aim: making roads more affordable, efficient and resilient to climate change by updating and disseminating a new online Road Note 31 (RN31)

Activity:
168 participants from leading road authorities and agencies attend dissemination events in Zambia, Rwanda and Ghana

- Tools for reducing emissions
- New Skills
- Ability to compare design options
- Changes guard against premature pavement failures
- Chief Engineer at the Road Development Agency, Zambia instructs planning team to immediately adopt the axle load survey forms
- Senior Road Design Engineer at the Rwanda Transport Development Agency interested in incorporating new pavement design into manuals

Activity:
Build relationships with key authorities and agencies

- Workshop held at the Association of Southern African National Roads Agencies (ASANRA) conference in Zanzibar, Tanzania
- 9 countries trained
- Engaged key decision makers
- Saint Helena Government is informed of Road Note 31
- Amend design of a road to take into account anchor beam recommendation
- Releases pressure and avoids downhill creep of the concrete pavement
- Presentation delivered at International Road Federation Conference
- RN31 informing the revision of the Nigeria Federal Ministry of Works road design manual

Activity:
Research

- Identifies knowledge gaps
- Intention to develop climate resilient roads and pavements
- Countries update codes and guidelines when up for renewal
- Mozambique and Kenya road agencies to carry out flood model studies as a result

Activity:
Feeds into other plans and guidelines

- Asian Development Bank Green Roads flagship document will refer to RN31 for climate resilience of roads as best practice.
- Guideline prepared for Asian Disaster Preparedness Center to develop standards for climate-resilient roads and bridges in South Asia refers to RN31.

"The updated Road Note 31 addresses the gaps in our current Pavement Design Code. These new areas will be applied in our designs to supplement the Code."

Yobe Mwalula, Engineer,
Road Development Agency, Zambia

“We are already looking at technologies, including hydrogen, that can deliver sustainable rail travel in low-income countries. As diesel is phased out across transport networks globally, we need to find new possibilities that will be cost-effective and enable low income countries to develop and adopt sustainable technologies.”

- Professor Clive Roberts, University of Birmingham

Novel Traction Systems for Sustainable Railway Futures in LICs

University of Birmingham

Summary

Rail transport is returning to a priority position in the transport sector to combat CO2 emissions since it is one of the most sustainable modes of transport. However, there are infrastructure and financial challenges in LICs in sub-Saharan Africa. In these countries, most of the railway transport is still carried by combustion engines, and the electrification of lines seems a far-fetched vision.

This research investigated the feasibility and potential implementation of alternative technologies to railway electrification. A series of activities, using modelling and simulation tools, moved from an initial analysis of capability requirements to developing practical concepts for retrofitting existing railway assets to hydrogen-based systems.

As a result of the research, the team, along with industry partners Porterbrook, developed a hydrogen fuelled train, the HydroFLEX, upcycling a 30-year-old electric train. This hydrogen-electric train – the world’s first – is capable of travelling over both electrified and non-electrified railway tracks, making it particularly useful to regions and routes where there is only partial or no electrification of the network.

Access research

Key Insights

- The overall state of sub-Saharan African countries railway infrastructure continues to be mostly in poor shape. With the exception of a few newly built lines, the network in the region has remained unchanged since the period of European influence, with assets dating back to almost 100 years ago.
- With the emergence and subsequent dominance of road transport in the second half of the twentieth century, the railways entered a downward spiral of shrinking revenues, insufficient maintenance and inefficient operations that led to the current state.
- The state of infrastructure in sub-Saharan LICs was found to be insufficient when compared to the global averages, with a much more drastic contrast when compared to world leaders in railway transport.
- Data availability and consistency remain one of the main challenges for railway research in the region. Information regarding railway performance and assets was found to be outdated or missing.

HrDM5

TRL Ltd., Ian Greenwood, Laval University, Hodos Media Ltd.

Summary

The Highway Development and Management Model (HDMM) has for many years been the primary tool, used by governments and development banks, for the appraisal of major road networks in LMICs. The last edition, HDM-4 version 2, was released in 2005. A newer version was essential to address emerging challenges in road asset management, including climate resilience, environmental sustainability, and to better incorporate road safety and wider social and economic benefits. With declining sales of HDM-4 and the end of the licensing period, the time was right to consider re-engineering the software and to transition to an online cloud-based system.

To support the longevity of the update, HVT conducted research in 2022 that identified and captured the user and business requirements for the next version. This included understanding the use of HDM-4 by road administrations, development banks, international development agencies, consultants, academics and other stakeholders. The research was carried out by a consortium led by Hodos Media and included TRL and HDM Global.

In 2023, Hodos Media updated a business plan for HDM-4 based on an earlier study to produce a bankable business case and to explore all the possible options for putting the ownership, management, and maintenance on a more sustainable and commercial basis.

In 2024, the World Bank identified six complementary initiatives that were designed to lay the foundation for the development, launch and management of new software and model, HrDM-5. HVT led on three of these projects:

- Gap analysis and updating of the functional requirements – delivered by TRL Ltd
- Gap analysis and updating of the road user effects modelling - fuel consumption and emissions – delivered by a consultant Ian Greenwood
- Gap analysis and updating of mechanistic fuel and tyre consumption modelling – delivered by Laval University

The project delivered by TRL includes a series of technical papers which define the vision, mission and goals for HrDM-5. It addresses high-level scoping issues, including the classes of road to which HrDM-5 should apply and the role of Information Quality Levels, within a new analytical framework. Key gaps addressed include models for road deterioration, crash prediction models for incorporation of road safety analysis and support for greenhouse gas emissions modelling.

Two further projects that HVT funded focused on updates that were needed to model Road User and Environmental Effects (RUE). The HDM-4 v 3.0 edition of Modelling Road User and Environmental Effects is a comprehensive guide detailing the road user and environmental impacts within the HDM model. It is part of a suite of HDM-4 documentation. HVT also funded the gap analysis on RUE to better inform the development of HrDM5.

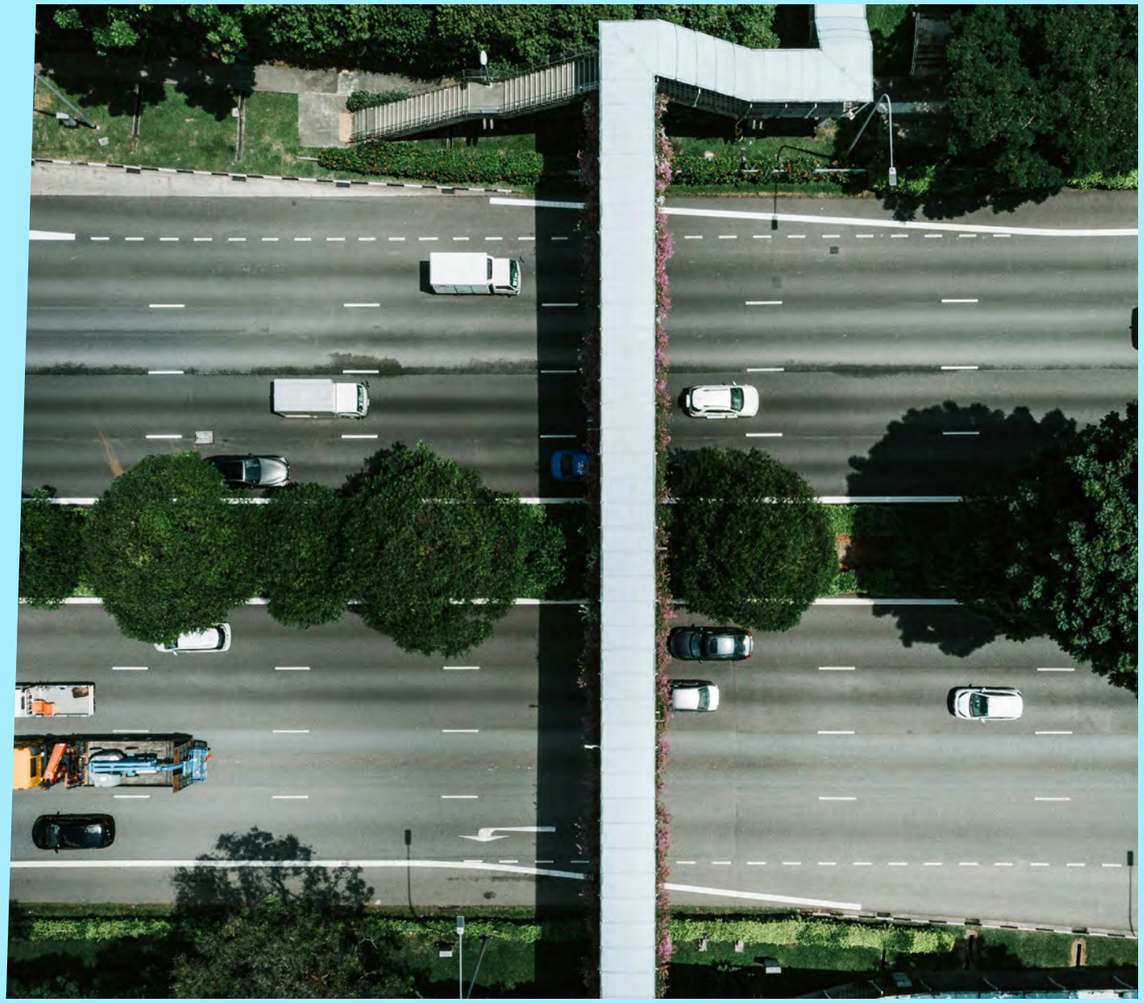
The two projects provided a comprehensive review of the existing literature on emissions, mechanistic fuel and tyre consumption modelling and updated models for use in HrDM-5. Through collaboration between projects, several papers were delivered that contributed to the first draft of a new HrDM-5.0 RUE book, version 0.1.

Once developed and deployed, HrDM-5 will be used to appraise tens of billions of dollars-worth of road projects globally. It will be used to enhance connectivity, improve climate resilience and mitigate against the effects of climate change.

Access research

“By equipping planners and decision-makers with advanced tools and methods, HrDM-5 will help drive improved sustainability, resilience and safety of key road infrastructure for the next 20 years and beyond.”

- Kevin McPherson, TRL



“The freight emission index helps set emission reduction targets. The strategies include the revision of the vehicles scrappage policy, incentives to transition to cleaner fuel, influencing load factors, design innovation and solutions to reducing empty runs.”

- NS Jayalakshmi, the Urban Lab Foundation

Freight Emission Index for Walled City of Ahmedabad

Urban Lab Foundation

Summary

India’s freight and logistics sector is a critical pillar of the economy, contributing 13-14% of the country’s GDP. However, as freight demand is projected to triple with economic growth, the sector’s heavy reliance on diesel is raising significant environmental concerns.

The lack of city-level emissions data is a barrier to effective policymaking and India’s commitment to achieving net zero emissions by 2070.

This research, using the case of the walled city of Ahmedabad in Gujarat, presented a comprehensive approach to reducing emissions in the freight sector. It highlighted the importance of policy changes, regulatory frameworks and technological innovations.

The development of a scalable freight emission index tailored for walled cities was designed to support the measurement of emissions, provide a set of key indicators for decision makers and develop a mitigation plan for reducing freight emissions.

It provides valuable insights that can be applied to other urban areas in India, helping to understand commodity-specific emission efficiency and design targeted emission reduction strategies. It also enables urban local bodies and city authorities to better understand emission efficiency, while freight operators can also assess the efficiency of their fleet.

Access research

Key Insights

- The index defines a clear purpose for conducting emission mapping and identify the audiences for the results. This clarity guides the entire process of emissions calculation, ensuring that the methodology aligns with specific objectives.
- When tracking greenhouse gas emissions, the technical aspects of a vehicle like its fuel type, engine type, vehicle type and age, influence its on-ground emission. Newer vehicles and vehicle technology should be encouraged alongside a shift to greener fuel alternatives, where feasible.
- The efficiency of logistical operations and the efficient use of fuel are closely tied to the environmental impact of freight transportation. Effective management of these aspects can directly reduce the pollution associated with moving goods. Improving operational efficiency characteristics, like load-factor, number of empty trips and congestion time, is critical for reducing emissions.
- The Global Logistics Emissions Council (GLEC) framework is a valuable resource for greenhouse gas emissions accounting, specifically for road freight transportation. Beyond simply outlining the steps involved in emissions calculation, GLEC assists when data may be lacking or challenging to obtain.

Planning Framework for Low Emission Zone (LEZ) in Core Areas of Indian cities

CEPT University and CEPT Research and Development Foundation

Summary

Low Emission Zones (LEZ) have been effective in many global cities at improving air quality by restricting vehicles in specific areas. However, their widespread adoption has not been observed in Asian cities.

This project set out to formulate a framework for planning and designing LEZs for core city areas in developing countries by using the case of the walled city of Ahmedabad. The bustling core area has a high-density population, employment and is an economic hub. These factors attract passenger and freight trips from different parts of the city. Two-wheelers are the predominant mode of transport for the movement of goods and people.

A comparison of the air pollution levels across the walled city revealed the need to manage traffic and curb air pollution. Based on a literature review of international cases, policy landscape, consultations with key stakeholders and assessments of the base situation, the team identified solutions and developed strategies which include measures such as parking management, improving accessibility for pedestrians and transit users and enhancing public transport.

It also supports the adoption of electric vehicles, building green spaces and most importantly, communicating the measures with relevant stakeholders for awareness creation and securing their buy-in.

The project team discussed the strategies with consulting advisory group members and conducted a workshop with them to finalise the action plan which aims to achieve improvement in air quality and enhanced urban mobility.

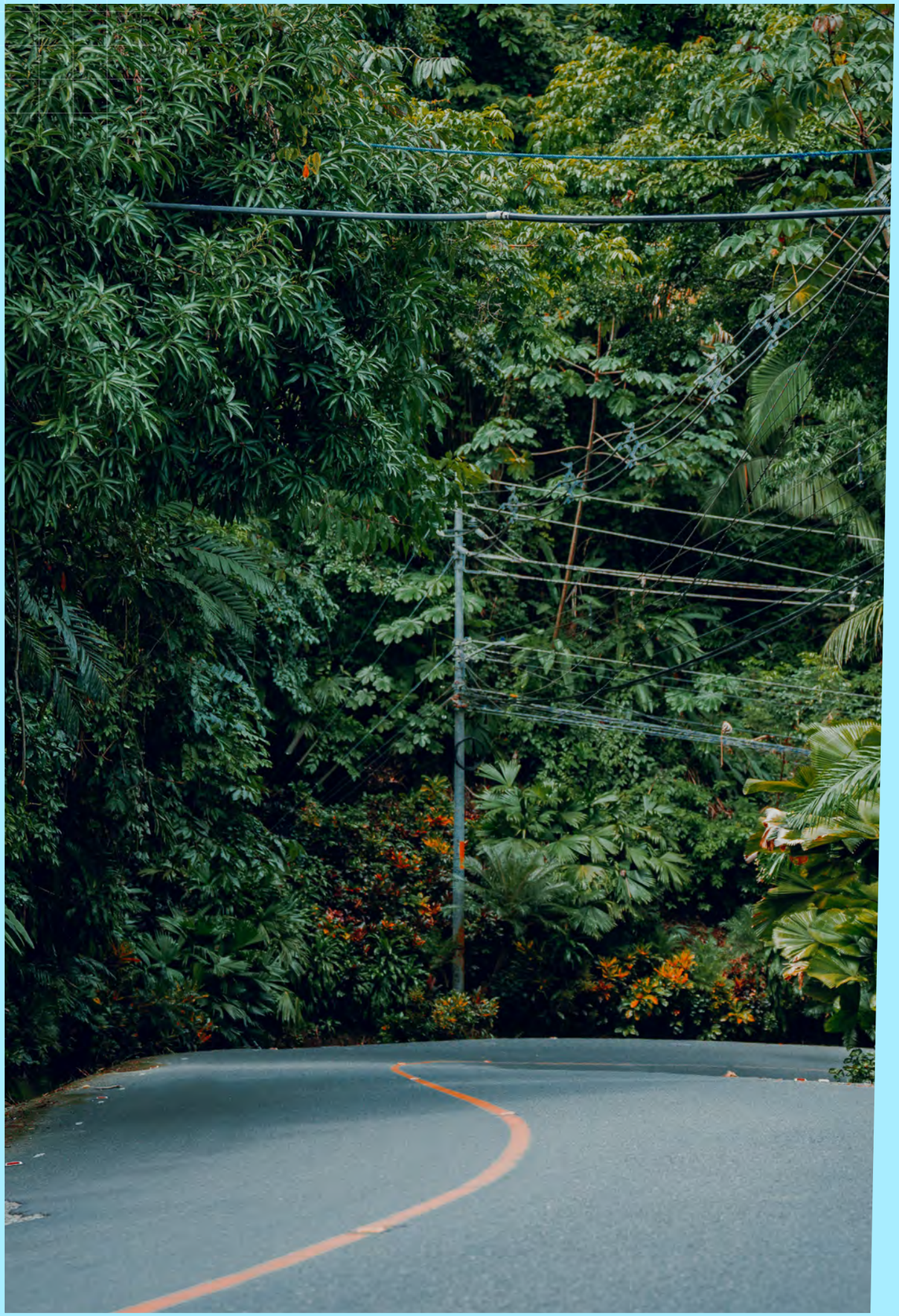
Access research

Key Insights

- The encroachment of road space by parked vehicles has resulted in a reduction in carriage way space, contributing to congestion. To ensure the smooth movement of both vehicles and pedestrians, it is essential to optimise parking spaces by eliminating four-wheelers, defining designated areas and introducing time-based parking fees to discourage long-term users.
- Walkability is compromised in the walled city and measures focusing on pedestrian safety, space management and regulatory enforcement are essential. Key market areas could be transformed to pedestrian-only zones with time regulated entry for goods vehicles.
- The declining service quality of buses has discouraged people from using public transport. It is essential to improve the quality by rationalising the routes and improving the accessibility to transit hubs by adopting safe crossings, wayfinding systems and integrated public transport systems.
- Along with mobility interventions, promoting electrification of three-wheelers, light commercial vehicles and two-wheelers can significantly reduce pollution. Raising awareness, setting up of electric charging infrastructure and the electrification of buses can encourage the adoption of electric vehicles.
- Dense urban form, increased vehicle emissions and overcrowded conditions exacerbate air and noise pollution, creating an unhealthy environment for residents and visitors. By planting trees and shrubs in these spaces, the urban microclimate can be positively affected to mitigate the localised urban heat island effect, provide shade and create a more liveable environment.

“The core areas of Indian cities are vibrant economic hubs that attract significant travel demand leading to congestion and poor air quality. Addressing these challenges requires an area-based approach. A strategic Low Emission Zone plan can help overcome traffic and environmental challenges by focusing on reducing motorised traffic, promoting sustainable mobility and advancing cleaner vehicle technologies.”

- Surya Sugathan, CEPT



Climate Resilient Sustainable Road Pavement Surfacings

University of Birmingham

Summary

The effects of climate change, such as warmer temperatures, extreme precipitation events and rising sea levels could severely affect road pavement performance in the future, particularly in low-income countries. Having the right types and mix of materials for road surfacing is vital as this has a significant impact on road performance and longevity.

The project assessed the climate resilience and economic viability of three global best practice types of road surfacing for use in LICs. These are the modified epoxy asphalt surfacing, modified epoxy cheap seal and fibre mastic asphalt.

A life cycle analysis and development of deterioration models looked at the performance of these surfaces to work out which can provide low maintenance and climate resilient roads that are economical.

A quality control technique using Fourier Transform Infrared Spectroscopy was also developed and found suitable for quality control of the surfacing materials mixture and supporting anti-fraud detection.

Successful designs and construction of trial sections in Ethiopia showed that it's possible to use alternative materials and construction methods to achieve resilient roads that reduce road maintenance burdens and associated costs.

Access research

Key Insights

- It is imperative that decision-makers appropriately consider and account for current and future extreme weather conditions during the planning, design and construction phase of the road network.
- There are many ways to better cope with these conditions, including improved climatic and design modelling, the use of more resilient materials, appropriate technical specifications and improved construction techniques.
- Road authorities and administrations will need to make the case for increased cost outlay in the short term in order to deliver medium to long-term savings.
- It is essential to build capacity at all levels and facilitate multi-stakeholder partnerships to support the development of climate resilient road infrastructure. These partnerships are able to provide the human, technical and financial resources to deliver change in contexts where such resources may be limited.
- There is a need to identify best practice and innovation in pavement surfacing development from across the global north and south, support partnerships and capacity building between the private and public sectors and provide platforms that facilitate knowledge sharing and transfer.

City Retrofit for All

Institute for Transportation and Development Policy (ITDP)

Summary

Based on research in Tanzania, Ethiopia and India, the project aimed to examine transport and land-use planning in places with rapid economic growth. Its focus was on how to most effectively improve informal settlements, transport and access, while supporting the needs of disadvantaged communities.

To do this, it had to demonstrate what inclusive transit-oriented development might look like in lower income countries and how it could be achieved in lower capacity environments.

Outputs from this research include a new tool, one of the first of its kind, to explore how cities in Eastern Africa could best achieve TOD. The tool focuses on local development plans around transport stations, especially in informal, residential areas in large, fast-growing cities, commonly home to the poorest communities.

The tool comprises of a series of sections, including an overview of TOD and its benefits. It's based on the TOD Standard, which consists of eight core principles supported by performance objectives and 25 metrics which can be used to assess neighbourhoods and developments.

The tool guides decision makers on how to develop shared visions and goals, conduct data analysis and develop and implement planning scenarios that prioritise the most important areas.

Access research

Key Insights

- Basic services, like water, electricity, sanitation, sewers and drainage, are prerequisites for all other aspects of inclusive TOD. Without basic services, the other aspects often fail to function.
- Several key elements of inclusive TOD need limited or no government intervention, particularly in informal settlements. These include higher densities, a mixture of uses, visually active frontages, physically permeable frontages, and minimal space devoted to automobiles and parking.
- Government intervention is needed in the provision of basic services, the construction of footpaths and cycle paths, shade and shelter elements, well-connected street and path networks, and elements to promote affordability alongside improvements to infrastructure and services.
- The TOD Standard, as currently written, is lacking several key elements that are critical to inclusive TOD in LMICs context.
- There is a need for better tools for planning small areas, such as around transit stations. While some tools exist, they are often expensive and difficult to use, requiring expensive training and ongoing support to use effectively. More readily accessible tools would alleviate the financial burden on cities to do effective planning.

"One of the goals of our research was to identify the most important aspects of TOD that weren't happening in low- and middle-income countries, especially in informal settlements. Governments should focus their efforts on these areas to use their capacity most effectively to create walkable, inclusive communities."

- Jacob Mason, Institute for Transportation and Development Policy

Safety

“We have about two million vehicles in the country, but most of them are in poor states. So you find that when imported vehicles are used they come with problems, and then they come here to run on bad roads and are subjected to poor maintenance, then the problems increase.”

- Michael Wanyama, Autosafety Uganda

Road safety is a crucial issue in many LMICs, with the World Health Organization reporting that 90% of global road deaths occur in these regions.

While economic development has contributed to rapid motorisation, road safety management and regulations have struggled to keep pace. The gap between rising traffic volumes and insufficient safety measures has heightened risks for all road users, including pedestrians.

A lack of investment, poor vehicle safety standards and inadequate safety infrastructure have further compounded road safety problems. Limited road safety policies fail to address these issues, while underdeveloped infrastructure increases the risks for everyone on the road. The combination of these factors poses significant safety concerns, with road traffic deaths representing a major public health challenge.

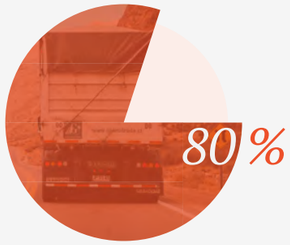
In many LMICs, pathways and pedestrian crossings are often inadequate or non-existent, making it difficult for people to move around safely.

This is particularly problematic for people with disabilities, who face additional barriers such as poorly maintained streets, limited access to public transport and a lack of ramps and tactile guidance to support their movements.

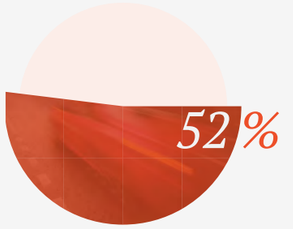
Safety concerns are further increased by poorly lit areas and a lack of secure pedestrian access, which disproportionately affect women and disadvantaged groups. Creating safe and accessible pedestrian spaces is essential to create inclusive cities where everyone can travel safely and independently.

HVT research has contributed to this effort by promoting accessible cities where mobility is safe for all. This includes finding ways to improve safety by working collaboratively with vehicle mechanics and technicians, as well as advancing the safety and mobility of transport systems for people with disabilities.

in numbers



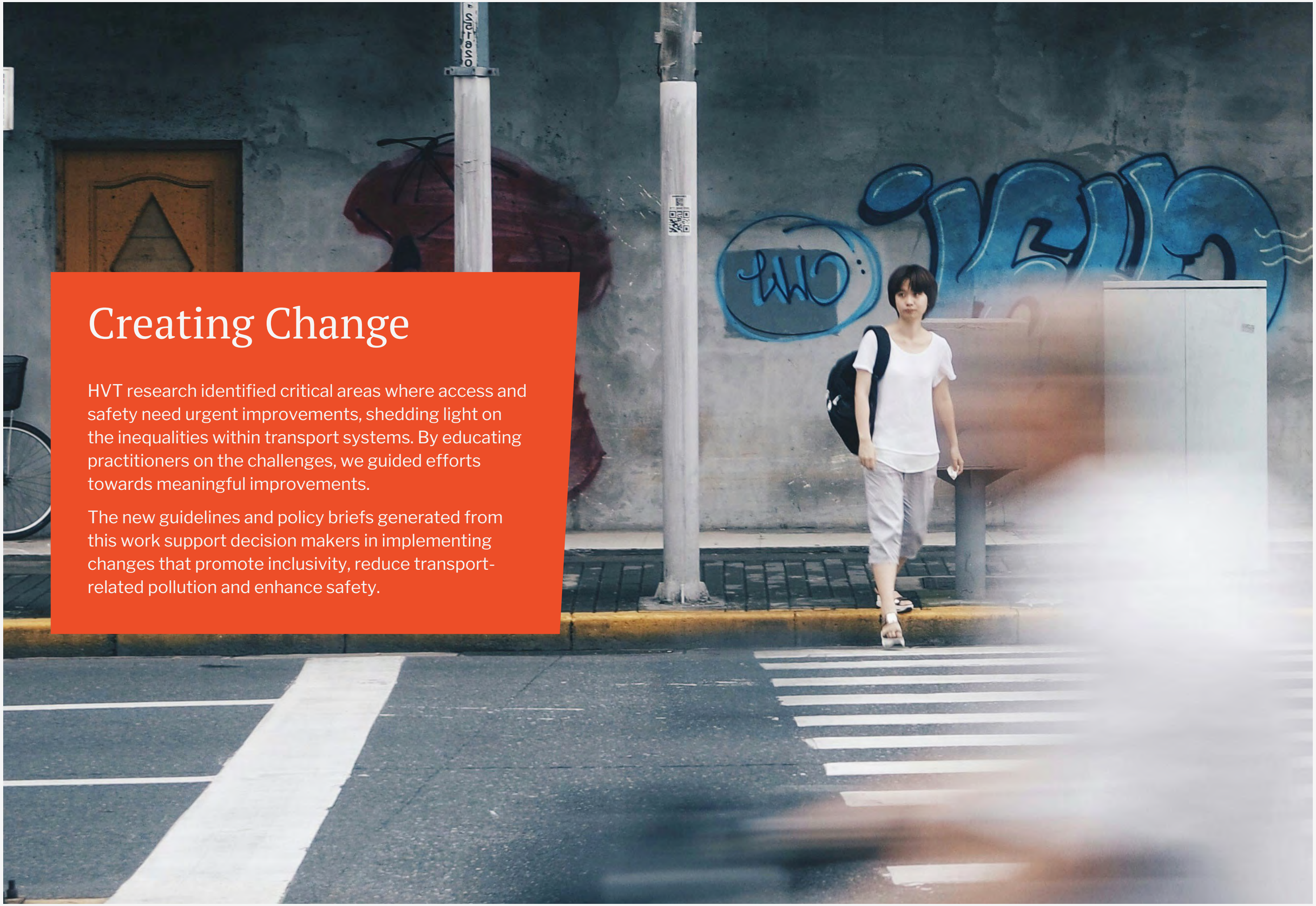
of goods and 90% of passengers are carried by road transport in Africa[21]



increase in road traffic crashes between 2020 and 2023 in Uganda[22]

people are killed on roadways worldwide every year[23]

of road deaths occur in LMICs[24]



Creating Change

HVT research identified critical areas where access and safety need urgent improvements, shedding light on the inequalities within transport systems. By educating practitioners on the challenges, we guided efforts towards meaningful improvements.

The new guidelines and policy briefs generated from this work support decision makers in implementing changes that promote inclusivity, reduce transport-related pollution and enhance safety.

Our Research

Safety and Mobility Challenges of People with Disabilities in Mekelle City: Towards Inclusive Urban Transport

Mekelle University

Summary

Mekelle, the capital city of Tigray, is the second largest and fastest growing city in Ethiopia. Traditionally, the city's transport planning and infrastructure has prioritised vehicles, which means the needs and safety of pedestrians, and especially people with disabilities, have been neglected.

The research undertaken by Mekelle University included face-to-face interviews with over 400 people with disabilities and on-site assessments of public roads, buildings, transport services and stops.

Key informants were interviewed and the team held focus group discussions with people from government and private institutions, practitioners, higher education, NGOs and associations for people with disabilities.

The research revealed how current law enforcements, directive and design guidelines are insufficient to address the barriers people with disabilities experience. From this, the team produced new guidelines and a policy briefing to support accessible and safe transport for everyone.

Access research

Key Insights

- To improve compliance with building proclamations, it is essential to implement continuous awareness programmes together with stronger law enforcement, focusing on the safety and accessibility needs of people with disabilities in Mekelle city.
- Developing inclusive directives and guidelines for people with disabilities, along with ongoing awareness initiatives, will help to realise accessible transport infrastructure, design and construction.
- To reduce confusion among stakeholders and the wider community, closer collaboration with disability associations, architects and engineers, as well as increased use of conventional and social media, is needed.
- Consultation with people with disabilities during planning, design and implementation of public urban transport infrastructure will help to incorporate their needs and gradually remove the barriers that limit their access.
- Strong collaboration among government bodies, disability associations, architects and engineers, contractors, public transport providers, and other relevant stakeholders should be encouraged to create a more inclusive urban environment and transport services.

"This study will be a source of data for researchers and it will help policymakers with information about the challenges that people with disabilities face. It will work as a tool to create awareness regarding the safety and accessibility of transport for people with disabilities."

- Dmtsu Gebremariam Hagos, Mekelle University

image courtesy of Autosafety Uganda

“We’re engaging mechanics, but also the government. If the government can adopt this, set up a system to fully regulate what mechanics are doing and proper maintenance structures, it’ll enhance safety and contain emissions.”

- Michael Wanyama, Autosafety Uganda

Tackling Africa’s Road Safety and Emissions from the Source

Autosafety Uganda

Summary

Kampala, Uganda’s capital, is one of Africa’s most polluted cities, with under-regulated road transport being a major contributor to poor air quality. At the same time, road traffic accidents have increased significantly, resulting in fatalities and serious injuries.

The research targeted local mechanics, as Kampala’s roads are filled with old and poorly maintained vehicles. The goal was to promote behavioural changes and best practices by linking poor vehicle maintenance to broader global issues like public health and climate change.

Mechanics, technicians, garage owners, transport associations and spare parts dealers were engaged through awareness campaigns on proper vehicle maintenance to reduce pollution and road accidents.

Focus group discussions with 218 mechanics highlighted knowledge gaps, and four training workshops, attended by over 500 participants, improved skills in emission control and road safety.

The project also collected and analysed emissions data for quantification and policy engagement and piloted retrofitting a conventional vehicle with an electric motor to encourage electric mobility uptake in the informal sector.

A policy brief was developed to advocate for measures to reduce transport-related pollution and road accidents, to encourage stakeholder engagement beyond the project.

Access research

Key Insights

- The mechanics engaged by the project gained improved skills in handling vehicle safety and emission control systems, leading to more effective maintenance practices.
- The training fostered collaboration among local mechanics, community leaders, and transport associations, creating a network of change agents focused on road safety and pollution control, including the newly formed National Auto Garage Owners Association.
- The emissions data collected provided insights into the local vehicle maintenance practices, including the impact of using substandard parts or failing to address emission system faults, and established a baseline for future assessments and policy reform.
- The electric vehicle retrofitting pilot demonstrated the feasibility of electric retrofitting in Uganda and raised awareness about the benefits of electric vehicles, paving the way for broader adoption and investment in clean transportation technologies.

The impact of HVT's work ripples far beyond the initial research aims of a project.

Our research with Autosafety Uganda has laid the groundwork for further innovation, from sparking future projects to developing collaborations.

It's informed policy and regulations, built vital industry relationships and delivered tangible benefits such as improved safety and reduced emissions.

"They trained us on how exhaust gases pollute the air and how to prevent it."
Kibali Joseph Howard, Car Mechanic

Awareness and new approaches for mechanics

"Based on how the programme found us, it has really improved our skills."
Sseruw Charles, Panel Beater

Recycling oil and tyres

Retrofit e-vehicles

Safety in the workplace

"At first I didn't know that spray paint is dangerous, but when you trained us I'm now much aware."
Kafeero Lawrence, Spray Painter

The regulation is not stand alone but embedded in the Traffic and Road Safety Regulations as the "SCHEDULE FOR CLASSIFICATION OF VEHICLE REPAIR FACILITIES AND SPECIALISED SERVICES". It included elements like classification of garages (A, B & C), stipulating the kind of services to be carried out to qualify for a particular class license, the minimum qualifications of technicians and basic tools & equipment for each class and things like occupational safety and environmental compliance requirements.

Reducing emissions

New skills

Improved safety

Safer vehicles

Activity:
Trains more than 500 mechanics on safety and emissions (more than 1,500 since project began)

Emissions data collection

Opens up conversations and meetings with local community about garages, set up.

The information is used by the Ugandan Ministry of Transport & Works to pave the way for the ministry to prepare a much needed 'Garages Regulation'.

Autosafety Uganda:

Aim: To tackle emissions and road safety in Uganda from the source

Activity:
Builds relationship with Ministry of Works and Transport

"There was a gap between ministry of works and the local community because the local community fear to come to our offices. And when we go out there to meet them they don't give us audience. They run."
Eng Immaculate Nyamizi, Senior Vehicle Inspector, Ministry of Work and Transport

Autosafety invite Ministry to their garages

Analysis of data ongoing and now leading to further plans to reduce emissions

Activity:
Builds relationship with UNEP and ICCT

Two orgs ask Autosafety for help

Autosafety train project team on real time emission data collection

No real time data about emissions. No way of knowing true emissions levels and sources. No such project in whole of Africa.

Introduce others to the project - the Ministry of Works & Transport, Kampala Capital City Authority, The National Bureau of Standards and the local tax body. The project was funded by FIA foundation.

UNEP and ICCT collect data from 200-250 vehicles a day

Spotlight

The decisions we make around road safety can mean life or death, which is why we need reliable research that provides us with the evidence needed to make a real difference. Far too many people experience life-changing injuries or die on roads that are not designed with safety as a priority.

For many LMICs, there are significant challenges to improving road safety. Inadequate strategies and plans, a lack of coordination between agencies and difficulties in securing finance all contribute to unsafe roads and transport systems that fail to protect the most vulnerable. HVT's research has provided valuable evidence to help people working in the transport sector make safer and evidence-based decisions.

In many African countries, vehicles on the roads are often second-hand imports from developed nations, where they've been condemned as unsafe. But here, they're relied on as primary modes of transport, despite the risk to passengers and other road users. This has made the work of HVT-funded projects vital in identifying the root causes of these challenges, and beginning to propose practical solutions.

In Africa, we don't have modern machines to diagnose vehicle issues. Instead, mechanics rely on their skills, knowledge and experience to figure out what's wrong and fix it.

Recognising this, HVT partnered with Autosafety Uganda to deliver innovative training programmes for local mechanics and technicians. These fostered behavioural change and improved vehicle maintenance practices, which are essential for a safer future.

Safety is also a vital part of transit-oriented development, allowing people to live and work in the same area. Ensuring the safety of pedestrian walkways is fundamental, particularly for vulnerable groups such as people with disabilities. HVT's work with Mekelle University highlighted the unacceptable challenges faced by people with disabilities as they try to get around their city. The research shows how closer collaboration, inclusive planning and stronger law enforcement will create safe and accessible environments.

As the transport sector continues to evolve, safety must remain central to our work. With the rise of hybrid and electric vehicles in the future, we need to consider how we build capacity to maintain these vehicles and invest in the necessary infrastructure to support them in a way that is both safe and climate-resilient.

Joseph Haule
Chair of Tanzania Roads Association
and HVT Ambassador

Crisis Response

strengthening transport with recovery
and resilience after COVID-19

“These studies have shown that aligning future plans for a healthier, safer, cleaner and efficient transport system will not only reduce the impact of a pandemic, but also improve the access and safety of the people in LICs.”

Holger Dalkmann, Sustain 2030 & HVT Consultant

When the COVID-19 pandemic hit, HVT knew that the transport sector would have a key role to play in the mitigation of the spread of the disease and in keeping low-income economies moving.

With a limited evidence base on what would work and many transport institutions having limited capacity for dealing with a crisis of this scale, HVT set out urgently to gather and disseminate critical information.

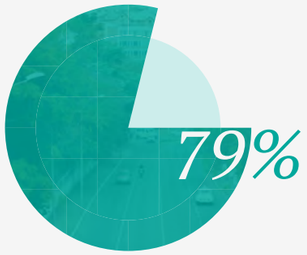
We also knew that fear and misinformation was gathering pace as each day went by, and we needed to act fast to present well-informed insights that could help to keep people connected, and economies moving.

We were extremely fortunate to be able to direct funds quickly into research in this area and to be at the forefront of the early response. We could not have done it alone, and we recognise our sector partners who worked alongside us sharing knowledge and networks.

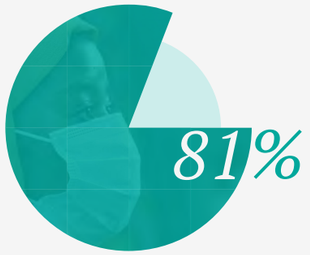
We launched a call to action to the transport community with an open call research programme which received 200 expressions of interest. We awarded 20 research projects from a field of 45 proposals which formed the portfolio of the ‘COVID-19 Response and Recovery Transport Research’.

The work concluded that there is an urgent need to develop transport systems that make transport less fragile and more resilient to future pandemics. The work shone a spotlight on how the transport systems in LMICs reacted, and put forward recommendations to rebuild better from the devastating impact of COVID-19 and improve the preparedness for future crises.

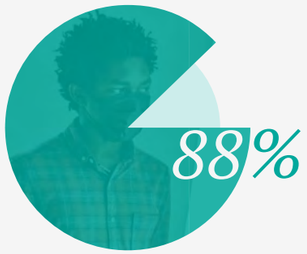
in numbers



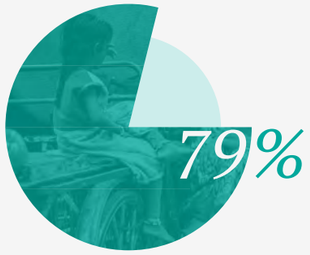
of households in Antananarivo, Madagascar were living below the poverty line during the COVID-19 restrictions period, up from 64%[25]



of respondents in Tanzania reported that disability made them feel more at risk from COVID-19 when travelling [26]



of respondents in Nigeria could not move on public transport to search for and secure employment during COVID-19, up from 59%[27]



of resource poor women in Delhi did not work during lockdown and lost an estimated income of £75m[28]

Key Insights

- The restriction of transport services during the pandemic led to losses in livelihoods, transport businesses, taxes and toll revenues. It also caused delays in freight services and a myriad of other disruptions with severe consequences for economies and people's health and wellbeing.
- Many public transport operators and governments in LICs did not institute all emergency regulations. This left them exposed to financial risks resulting from legal action by people exposed to COVID-19 in the transport systems.
- Pre-pandemic inequalities related to gender and disabilities widened as a result of COVID-19. Over 85% of women work in the informal sector in LICs. These women were more likely to have lost their sources of income and suffer domestic violence and take on more domestic work during the pandemic.
- Dramatic localised improvements in air quality occurred virtually everywhere where traffic levels dropped as a result of lockdown. Modelling of the links between air quality, transport and COVID-19 in Bangladesh showed that local weather patterns and policy caused great variations in air quality. This can have immediate impact on air pollution and reduce the over 4.6m people that die every year due to poor air quality.
- The research confirmed that there was a direct correlation between increased mobility and increase in spread of diseases thus validating the policy measures that restricted mobility.
- It was observed in HICs that due to lockdown there was a reduction in the number of road accidents, but the number of fatalities increased. This was also observed in LICs. However, the situation was more complex in rural areas in LICs where in some cases both levels of accidents and fatalities increased following the institution of lockdowns.
- In some South Asian countries such as Afghanistan, Bangladesh, Pakistan and Nepal, public transport restrictions were less comprehensive than India which suspended all modes of transport except for transport for essential goods and health workers. In southern and east Africa, cross-border restrictions led to freight disruptions and shortage of essential goods. In west Africa, many hand-to-mouth transport workers protested against lockdown despite cash-strapped governments distributing limited 'palliatives' in the form of food and essential supplies.
- In Nigeria, the pandemic became a force for innovation and change amongst transport workers who developed new businesses, increased the use of IT technology, and improved sanitation systems and enforcement at transport hubs.
- People in seven African countries felt strongly that, despite the inconvenience of social distancing and capacity restrictions, daily commute and travel was generally more comfortable and safer due to fewer passengers. They suggested that this, alongside other measures that promote safety and reliability, could be made more permanent.
- Through research in Cape Town, Uganda and Nairobi, we learnt much about active transport. This included what is required to improve walking and cycling policy but also on the important role Tactical Transit Lanes can play in rapidly growing LIC cities.

read the full compendium of
our COVID-19 research at

transport-links.com

"The findings highlight the critical need to have the voices of people with disabilities heard not only in the development of emergency transport planning for future pandemics, but also significantly for conventional, long-term transport planning processes."

Jeff Turner, HVT

Spotlight

The COVID-19 pandemic pulled into sharp focus the challenges the transport sector was facing, especially in LMICs. It highlighted long-standing issues, such as inequalities related to gender and disabilities, the fragility of transport systems, and the urgent need to build resilience and futureproof the sector.

By the time the World Health Organisation declared pandemic status on 11th March 2020, we were already seeing chaos in the transport systems across low-income countries. India's transport system effectively collapsed as huge numbers of migrant workers rushed to return to their home villages. Informal transport operators in South Africa used insecticides as disinfectants. Elsewhere, buses and trains were overcrowded despite the critical need for physical distancing.

We urgently convened the sector and gathered and disseminated reliable information on what worked and what didn't to mitigate the spread of the disease. And then our open Call to Action for research dug deeper into how our sector had responded, and how we needed to learn for the future.

The 20 research projects we awarded as part of HVT's COVID-19 Response and Recovery Transport Research fund revealed the vulnerabilities in LMICs and emphasised the importance of building resilience into our transport systems.

The research clearly revealed a need for all stakeholders in the transport ecosystem to work together for a more robust sector that can mitigate and bounce back from challenges.

This includes enhancing inclusivity and accessibility, increasing our understanding of the important relationship between transport and health outcomes, and tackling the climate crisis. The international transport community must deepen its support for LMICs as they transition to sustainable, safer, healthier, inclusive and low-carbon transport systems.

The pandemic also amplified the intersection between transport and health. To reduce unnecessary deaths from air pollution and the sheer number of road fatalities, we need better and wider understanding of the links between transport and health.

One of the most striking setbacks from the pandemic was how it widened inequalities, particularly for women and people with disabilities.We must pay more attention to all vulnerable groups as part of research activities and policy action.

Looking ahead, creating a new health and transport agenda, enhancing climate action on both mitigation and adaptation and embedding inclusivity at the heart of transport policies will be essential. These priorities should shape partnerships beyond the lifecycle of the HVT programme, ensuring that transport systems in LMICs are equipped to navigate future crises.

Dr Bernard Obika
Former Team Leader, HVT

Policy Change

building a sustainable transport sector →

“There’s a battle of the minds to be won. Public transport and active modes are currently often perceived on the continent as the transport modes of the poor. The priority for a lot of people, once they reach a certain level of revenue and social status, is to own their own car. There needs to be an alternative that is functional, comfortable and appealing in image if we want to make public transport the preferred option and leapfrog that phase of massive automobile development that the West has known.”

- Simon Saddier, World Bank and the Africa Transport Policy Programme

Good policy formulation and planning in the transport sector helps to provide a framework to navigate complex challenges.

Well-formulated policies shape transport systems that are efficient, equitable and sustainable. With effective planning, governments, ministries and the sector can handle rapid urbanisation and increasing demands with less environmental harm.

However, many LMICs face significant data and evidence gaps, making long term planning challenging. To address this, bringing people together, building consensus and aligning narratives across stakeholders can enhance collective knowledge.

Since HVT’s inception, the programme has been able to inject resources to facilitate collaboration and be a convening power for those working at policy level to improve transport in Africa and South Asia.

Our work has also driven policy improvements through providing quality data to inform evidence-based decision making. This includes the Transport Decarbonisation Index, the Transport Data Commons Initiative and amendments to the OECD DAC indicators which can be seen in section two, Research and Data.

To generate momentum and translate plans into action, we’ve commissioned projects that contribute to thought leadership, foster innovation and explore a shared vision for the future of transport with sustainability at its centre. The following projects draw on this unique position and provide much needed oxygen to joint-thinking and collaboration.

in numbers

needs to be invested between now 2025 and 2050 - seven times what is currently being spent - to reach a low-carbon transport pathway[29]

of the over 190 countries that signed the Paris Agreement had included transport targets in their nationally determined contributions since 2022[30]

Creating Change

HVT research has driven meaningful change by expanding knowledge and influencing policy in critical areas like climate-resilient transport and climate finance. Outputs from the research uncovered barriers, highlighting opportunities and encouraging greater investment in areas like electromobility.

Additionally, the research enhanced understanding of the international climate finance landscape, supporting the next generation of Nationally Determined Contributions and advancing greener transport decisions.

The guides and frameworks produced through our work offer practical support to policy makers which helps to strengthen long-term sustainability.

Our Research

Improving Access to Climate Finance in Low- and Middle-Income Countries

World Resources Institute

Summary

Mobilising climate finance for transport is crucial. Climate finance supports efforts to mitigate and adapt to climate change. The transport sector receives $334 billion in global climate finance per year, but the investment gap between what is being spent and what is needed for sustainable and low-carbon transport is enormous. Investment is also uneven, with less than 3% flowing to the least-developed countries.

Implemented by WRI with support from SLOCAT Partnership and Vietnamese-German Transportation Research Center (VGTRC), this research examined the international climate finance landscape to bridge the investment gaps for sustainable, low-carbon transport in LMICs.

By analysing 839 transport projects and 14 case studies, the project identified barriers to accessing climate finance and proposed evidence-based solutions tailored to LMIC contexts.

The research integrated insights from stakeholder consultations, including workshops in Kenya and India, and a roundtable at Transforming Transportation 2024, fostering collaboration among public and private stakeholders.

Outputs from this project include a state-of-knowledge publication covering various modes of transport and financial instruments.

There's also an interactive toolkit to support transport project sponsors, transit operators and public-sector officials in navigating the climate finance landscape and a policy guide to provide actionable and evidence-based guidance and resources for policy makers and stakeholders.

Access research

Key Insights

- Uneven access to climate finance: LMICs face significant disparities in accessing climate finance, receiving disproportionately low funding despite urgent transport decarbonisation needs. Barriers such as limited fiscal capacity, high upfront costs, and inadequate policy frameworks hinder their ability to attract and use international funding effectively.
- Challenges of project preparation: Many LMICs struggle to develop bankable transport projects due to limited technical capacity, perpetuating a cycle of inadequate resources and constrained expertise. Addressing these barriers requires targeted capacity-building initiatives and support for project design and implementation.
- Insights from case studies: The state-of-knowledge research found that one-third of the land transport projects receiving climate finance were focused on road construction, while there were fewer initiatives for public transport and electric mobility. Additionally, projects aimed at resilience made up only 20% of the cases, indicating missed opportunities for an integrated approach to both mitigation and adaptation.
- Solutions to unlock finance: The research proposes strategies that involve creating enabling environments with sustainable policies, attracting private investments through de-risking instruments, and using innovative financing tools like green bonds and blended finance. Capacity-building programmes, such as the project's climate finance for transport course, empower stakeholders to navigate complex funding landscapes and implement impactful solutions.

"While COP29 has yielded inadequate overall finance outcomes, the transport sector will receive more climate finance through public and private sources. As funding grows, it becomes crucial for country and city officials, banks, and development institutions to harness and scale up these funds effectively to meet our goals of reducing emissions and increasing resilience."

- Benjamin Welle, WRI

Spotlight

Transport policies have a huge potential to boost sustainable and inclusive growth in LMICs, especially where there might have historically been limited investment in infrastructure or governance. Strong transport policy frameworks can drive investment and development, and be completely transformative for rapidly urbanising and growing populations, yet getting effective policies in place - and turning policy into actionable plans - is no easy task.

It's a task made more urgent and pressurised by climate change, and transport must play a key part not only in reducing carbon emissions and improving air quality and well-being, but also in building resilience to climate risks and adapting infrastructure to withstand changing conditions. We are at a make-or-break moment in history to address the alarming realities of transport greenhouse gas emissions: current policies and frameworks remain insufficient to align transport with the 1.5°C target of the Paris Agreement.

The upcoming years present a pivotal window to turn existing challenges into opportunities and accelerate progress towards sustainable, low-carbon transport. Achieving meaningful emission reductions in transport while aligning the sector with broader sustainability, equity and resilience objectives requires cohesive action.

This means integrating policies, planning and regulations with robust institutional frameworks and accessible financing mechanisms to ensure effective implementation. It's crucial to raise the bar towards ambitious measures in the next Nationally Determined Contributions (NDCs), and their alignment with national transport policies. And we must set the conditions to achieve meaningful progress during the UN Decade of Sustainable Transport set to launch in 2026.

HVT's work recognises the challenges that policymakers face in LMICs, and has taken on a role to build robust research that not only expands knowledge but also deepens collaboration. Perhaps most critical, is that the research offers practical support to planners and policymakers that can be tailored to the needs and assets of individual countries.

SLOCAT's work with HVT includes four projects that have aimed to enhance ambition and robustness of transport strategies, improve access to climate finance, deepen understanding among policymakers of the performance of their transport sectors, improve collection and analysis of reliable data and advance collaborative data platforms. We're proud to have contributed to the knowledge in these areas and also to know the work provides a launch-pad for what comes next.

We have a unique opportunity to make transformative changes to transport systems worldwide by addressing systemic inefficiencies, closing the gap on climate finance on transport, while creating evidence-based momentum for ambitious global, national and sub-national action. The challenges ahead are immense. However, the strategies and tools developed under the HVT programme demonstrate that solutions are within reach.

Maruxa Cardama
Secretary General, SLOCAT

“NDCs 3.0 are critical for setting policies and targets to accelerate worldwide transformations both in how people and goods are moved, and how transport systems are powered. The UN Decade of Sustainable Transport is also a unique opportunity to turbocharge commitment and rally broad multi-stakeholder support. You can count on SLOCAT and its partners to support knowledge-based policy making and drive multi-stakeholder partnerships for this transformation.”

- Maruxa Cardama, SLOCAT

Supporting the next generation of NDCs and the SDG Decade of Action

SLOCAT

Summary

Climate experts are clear that the next five years are make-or-break for the battle to survive climate change. The transport sector plays a critical role and has two significant landmark moments that need strong international collaboration across the sector.

The next round of nationally determined contributions (NDCs) revisions before COP30 in Brazil in 2025 and the launch of the UN Decade of Sustainable Transport in 2026 both represent opportunities to increase knowledge, encourage evidence-based decision making and improve engagement of key stakeholders in the process.

Led by SLOCAT, working closely with the Asian Development Bank and in partnership with UNESCAP, this research has supported the next generation of NDCs – which are the plans detailing how countries intend to address climate mitigation and adaptation to meet the Paris Agreement targets.

This work has included a consultation, reports and a policy brief focusing on Asia-Pacific NDCs. It’s helped to highlight major gaps and strengths and analysed projected impacts and necessary improvements.

With the start of the UN Decade of Sustainable Transport in 2026, HVT has supported SLOCAT to galvanise the global transport community and build consensus across stakeholders to inform an implementation plan for the decade. This aimed to strengthen how transport can help to achieve the Sustainable Development Goals (SDGs).

Access research

Key Insights

The next NDCs provide a major opportunity for setting transport targets to achieve 10 interconnected improvements:

1. Connecting climate action policies for transport to the broader economic development, sustainability and resilience goals of your country.
2. Tracing ambitious yet achievable national pathways for the reduction of transport emissions, by setting specific short-, medium- and long-term targets, for all freight and passenger transport modes and subsectors.
3. Prioritising the expansion and improvement of public transport systems, as well as walking and cycling infrastructure.
4. Accelerating the phase out of internal combustion engines and the uptake of electrified rail and vehicles across light-, medium- and heavy-duty segments.
5. Organising the transition away from fossil fuels and fossil fuel subsidies in transport, while simultaneously mandating and incentivising the use of renewable energy across all transport modes.
6. Strengthening the adaptation and resilience of transport infrastructure and networks to the impacts of climate change.
7. Accelerating finance approaches for clean transport and access to them by subnational governments.
8. Implementing measures for capacity-building and skilled workforce development for the transition to low-carbon transport.
9. Improving policy alignment between NDCs and other national policies on transport through inter–ministry and cross-sectoral collaboration. This alignment can facilitate the NDC revision process and leverage the impact of the NDC throughout its implementation period.
10. Articulating robust multi-stakeholder consultation, data collection, as well as tracking, reporting and evaluation tools.

Adaptation for Transport Resilience to Climate Change

University of Birmingham

Summary

Resilient transport networks that can withstand the impacts of weather and climate change are crucial in order to sustain the social and economic needs of communities. This is a particular challenge for developing countries, as losing a vital – or in some cases the only – transport link to essential services can exacerbate existing risks or introduce new risks associated with poverty.

Low-income countries in Africa and South Asia are already experiencing severe impacts of climate change such as drought, extreme heat and storms with heavy rainfall and flooding.

This project combined primary and secondary data to characterise the current interest, challenges and barriers to improving the resilience of transport to climate change in these countries. From this, a climate-resilient transport policy guide was developed. It provides background and context on the problem and practical steps to develop, prepare and implement adaptation plans for transport resilience to climate change.

The policy guide provides a framework to help policy makers through the necessary processes to increase transport resilience to climate change through adaptation planning.

This includes improving coordination between government bodies, ministries and sectors, building capacity around climate knowledge and finance, and increasing levels of stakeholder engagement at all parts of the adaptation planning process.

Access research

Key Insights

- National adaptation plans are improving over time, but only a few of them discussed transport as a sector. There are capability gaps in implementation, monitoring and evaluation.
- Mechanisms and tools exist to support decision makers, but it can be difficult to select the most appropriate methods due to lack of capacity.
- Climate awareness is still in its infancy across stakeholders engaged in this research. Often, design specifications of transport infrastructure are well understood, but aren't localised and don't reflect climate related information.
- Government coordination, capacity building and awareness raising and full stakeholder engagement will facilitate improved transport resilience.

"The policy guide highlights to governments and ministries that there is much more to this than simply improving the transport system. Transport is something that enables many other benefits in terms of health and wellbeing, trade and many other sustainable goals."

- Professor Andrew Quinn, University of Birmingham

Electromobility in Low-Income Countries in Africa

Sustainable Mobility for All Partnership (SuM4All)

Summary

Electrification of transport is a central pillar of the much-needed emissions reduction in the transport sector, along with a strong shift towards public transport, walking and cycling. The transition to electromobility is gaining momentum in some African LICs, although the current market penetration of electric vehicles in Africa is low compared with other regions in the world.

Many LICs face challenges transitioning and scaling up renewable electricity, including cost and governance. However, there is an opportunity to develop more sustainable transport systems that promote low emission mobility.

Two influential papers in partnership with SuM4ALL from this project have been published to expand knowledge around e-mobility and electrification, the benefits, barriers, finance and opportunities. These papers launched at COP27 helped to raise awareness about the need for more cross-sectoral exchange between transport and energy, stimulating and enriching the discussion on the ways both sectors can collaborate and coordinate.

Until the publication of these papers, the attention on electric vehicles as part of a global decarbonisation strategy had a strong bias towards passenger cars mirroring market and policy development in the Global North. The two papers emphasised the need for different pathways in LMICs focusing on two and three wheelers and public transport (informal transport (mostly minibuses) and formal bus systems), meeting people's needs for better and sustainable transport.

These papers are also being used to inform long-term strategies for decarbonising energy and transport, integrating road transport electrification and the development of renewable electricity.

Access research

Key Insights

- Long-term strategies (LTS) contemplating net zero emissions by 2050 are key instruments in driving transformational changes in countries.
- Transport-Energy modelling and strong stakeholder engagement are critical for increasing the acceptability and transparency in LTS design.
- Transformations needed to reach net zero emissions require investments that are outweighed by the benefits that they will bring.
- Supporting investments in electric two- and three-wheelers is a first step toward e-mobility, supported by local private finance.
- The international community must deliver on financial commitments to support the adaptation and development of transport systems in African LICs, with the most appropriate and affordable technology, including the renewable energy sector.

Climate Parliament

Climate Parliament

Summary

The Climate Parliament is an international network of legislators dedicated to preventing climate change and promoting renewable energy. The main aim of this project was to bring key decision makers together to engage them at an early stage on two flagship HVT-funded projects: the Access to Climate Finance for Transport (ACF) project and the Transport Decarbonisation Index (TDI).

Through three roundtables, 70 members of parliament and senators from African countries came together to accelerate uptake of HVT research findings and advocate for cleaner mobility in their countries.

Representatives from countries including Bhutan, Botswana, Egypt, The Gambia, Ghana, India, Kenya, Malawi, Nepal, Nigeria, South Africa, Sierra Leone, Sri Lanka, Tanzania, Zambia and Zimbabwe participated in the sessions.

Over the course of the roundtables, researchers from both the ACF and TDI discussed the challenges and barriers that countries may experience, such as an absence of policies and frameworks, data gaps and costs. Discussions helped MPs to understand how these can be tackled, what tools are available and how these two projects can support better policy development.

The sessions highlighted how insights from these projects can be integrated into the next round of Nationally Determined Contributions (NDCs) and how decarbonisation could be at the heart of developments.

Access research

> “The transport system is neglected with old and abandoned cars from developed nations being dumped here. [The sessions were] an eye opener and I have learned a lot.”
>
> **- MP, The Gambia**

> “The diverse views covered by both presenters and fellow parliamentarians, increased my views on decarbonisation and the need to look within in order to succeed.”
>
> **- Legislator, Nigeria**

“The toolkit provides a clear pathway to positive impact on energy and transport systems by supporting efficiency improvement that is so desperately needed in LMICs.”

- Bernard Obika, former HVT Project Lead

Digital Toolkit for Energy and Mobility

Sustainable Mobility for All Partnership (SuM4All)

Summary

The nexus between energy and mobility, although widely recognised, has only recently attracted focused attention. Yet bridging the gap between the sectors is vital for the international transport community to achieve universal, efficient, safe, and green mobility.

The Digital Toolkit for Energy and Mobility attempts to tie the two sectors together and to move from discussion to action. The toolkit provides a pathway to positive impact on energy and transport systems by supporting efficiency improvement through the lens of three policies from the Global Roadmap of Action toward Sustainable Mobility (GRA). These are:

- Expand public transport infrastructure
- Plan for integrated multimodal freight transport networks
- Promote public discussions on new mobility solutions for example, autonomous vehicles, e-mobility, and on-demand transportation

The development of this toolkit is part of a comprehensive effort undertaken by the SuM4All partnership to elaborate an actionable GRA.

Led by Sustainable Energy for All (SEforALL) and HVT under the SuM4All umbrella, the toolkit is developed for public policymakers, transport and energy experts, researchers, and the wider public and private sector stakeholders interested in or implementing action on low emission mobility addressing the nexus between transport and energy.

Access research

Key Insights

- Bridging the gap between the transport and energy sectors is crucial when seeking to achieve a universal, efficient, safe, and green mobility while developing sustainable, and energy-efficient transport projects.
- The interconnections between energy and mobility, although widely recognised have seldom been explored in detail and their potential has not been fully developed.
- This toolkit aims to provide a set of content and capacity development tools to enhance three measures of the GRA. This includes: (i) “Promote Public Discussion on New Mobility Solutions”(ii) “Expand Public Transport Infrastructure” and (iii) “Plan for Integrated Multimodal Transport Networks”.

Capacity Building

LMICs have the vision and foresight to develop sustainable and efficient transport systems, but there is often a gap between the desire to change infrastructure and making it happen.

This gap exists for a multitude of reasons and circumstances, but capacity building is one way to span the gap, helping to give policy makers, transport planners and practitioners the skills to implement change.

Capacity building is the process of developing and strengthening skills, resources, policies and institutions so that the transport sector can thrive in a rapidly changing world. This includes activities such as training, education and knowledge-sharing, establishing clear policies and regulatory frameworks, building systems for data collection and analysis, and fostering stakeholder engagement.

These efforts support organisations to design and manage transport systems that are efficient, inclusive and resilient to challenges like climate change and urbanisation. They can drive social and economic development and growth, helping LICs achieve healthier communities and stronger economies.

Despite its importance, many LMICs face significant challenges in capacity building. Insufficient budgets, limited institutional capabilities and a lack of technical expertise often hinder progress.

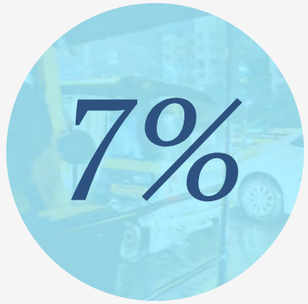
The complexity and cost of transport reforms, combined with the need to balance expansion with environmental sustainability and social inclusion, exacerbate these difficulties. There is also a lack of literature and guidance on how to effectively implement capacity building, which slows progress further.

HVT research was threefold. Firstly, we commissioned research to explore the challenges in capacity building and to improve capacity building opportunities and skills.

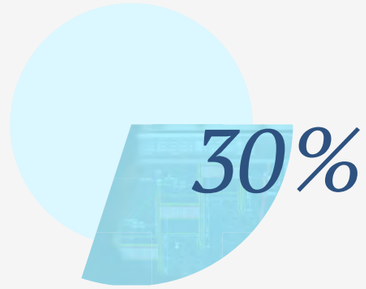
Secondly, we embedded capacity building into our project management and research commissions. As research projects evolved, we looked to build the capacity of the researchers to ensure that not only had we reached research insights but our researchers and institutions were better equipped for further research.

Thirdly, we commissioned capacity building projects and ran research uptake activities with a specific goal to take the evidence base from the programme and to introduce it to key stakeholders. An extension of this was the nurturing of communities of best practice, informally and organically growing skills and opportunities.

in numbers



of engineering companies who have a sustainability strategy believe they have the skills to fulfil it[31]



of students had encountered the UN's Sustainable Development Goals during their academic journey according to a 2022 survey from Siemens[32]

Creating Change

HVT research highlights innovative approaches to build capacity across diverse budgets and needs. By helping the transport sector to strengthen its capabilities and expand knowledge, we facilitated the sharing of best practices and fostered growth.

We also supported the next generation of engineers by encouraging creative problem-solving through initiatives such as design challenges and curriculum-enhancing playbooks. These equip future professionals with the skills and tools needed to develop sustainable and inclusive transport systems.

Our Research

Capacity Building in Sustainable Urban Mobility for Low-Income Countries

Transport for Cairo

Summary

There is a significant lack of literature on capacity building in the field of passenger transport and urban mobility. This research addresses this gap by examining various capacity building activities and their effectiveness for LICs. The main objectives of the research were to gather knowledge to create an evidence-base, establish a needs assessment methodology and develop tools and guidance to improve future capacity building.

Through literature review, interviews with experts and stakeholder consultations, the subsequent report identifies six types of stakeholders involved in capacity building and an overview of the different organisations and entities under each category. The research catalogues 14 capacity building formats, showing that there are many more options beyond traditional training. Each format is linked to the transport sector, with an analysis of its strengths and weaknesses.

The report outlines a wide range of activities that can support capacity building with varying durations. For example, short-term activities that can be completed in under a month such as study tours, workshops, conferences and training sessions. In contrast, longer-term initiatives such as peer reviews, mentorship programmes and committee meetings, can span several weeks or months. The categorisation also takes into account funding and budget constraints.

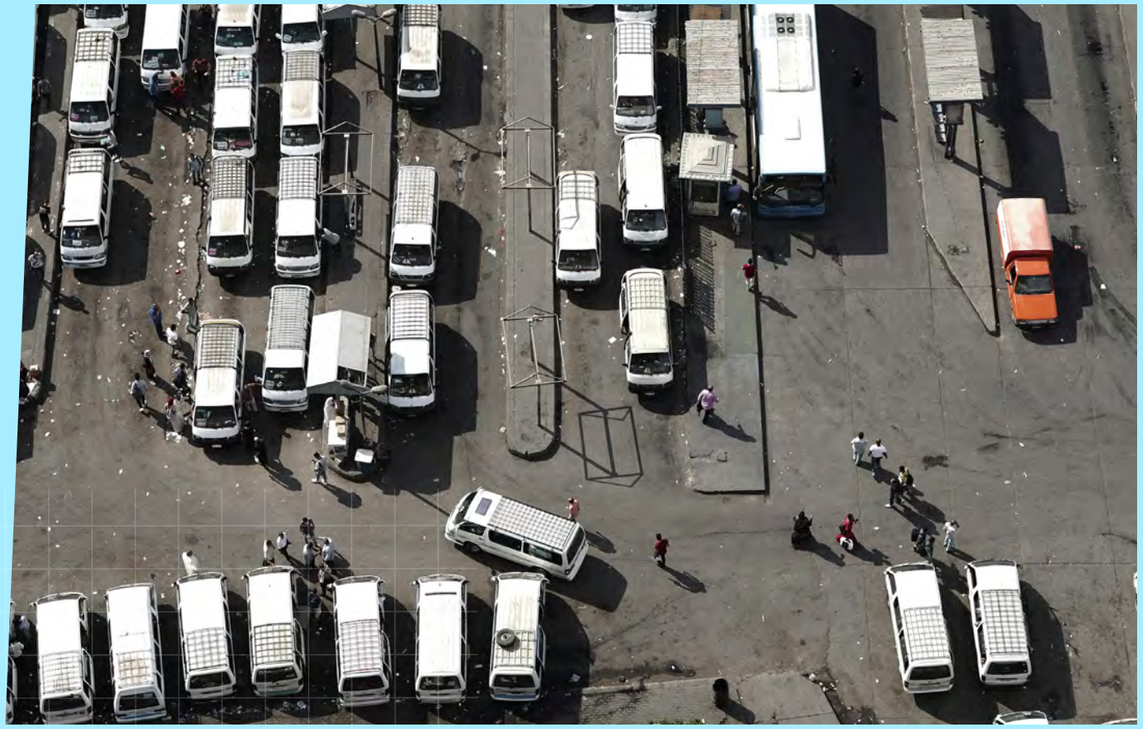
Key Insights

- There is not one most effective capacity building type or format. The context and circumstances determine which capacity building activities are most effective for specific cases.
- Deciding which type and format to use must be based on careful consideration including existing resources, overall objectives and goals of the activity as well its effectiveness with regard to filling the capacity gaps of transport institutions.
- Capacity needs assessments are a useful tool to make informed decisions when it comes to planning a capacity building activity and the report contains recommended guidance on the process.
- Employing digital tools to capacity building activities may support in making them more inclusive and less rivalrous.
- In the long-term, ensuring local ownership, institutionally embedding capacity building in the professional trajectory of employees and establishing cooperation mechanisms to align the efforts of different national and international agencies were among the key recommendations.

Access research

“This report provides a much-needed overview of the capacity building landscape for sustainable transport and mobility. We hope that transport authorities and operators as well as capacity building providers will be able to better plan, implement and assess capacity building programmes and activities based on our analysis of and recommendations for the different formats.”

- Hend Eltabey, Transport for Cairo



“Transport shapes every aspect of our lives - how we travel, deliver goods and design cities. Yet, today’s systems are often unfair and unsustainable, prioritising a few while leaving many without access to safe, affordable mobility. This playbook is a call to action. With practical tools and strategies, it helps inspire learners to rethink transport and build a better future.”

- Constance Agyeman, Engineers Without Borders UK

Bringing Sustainable Mobility to Life

Engineers Without Borders UK

Summary

Engineers play a pivotal role in driving change for a more sustainable, equitable and resilient transport system. Yet, there exists a gap in the coverage of sustainability, inclusion and ethics within engineering education. A survey in 2022 showed that only approximately 30% of students had encountered the UN’s Sustainable Development Goals during their academic journey.

Integrating sustainable mobility into the engineering education curriculum is essential for preparing future engineers with the knowledge to address the complex challenges of transportation in a rapidly changing world.

Through this project, a playbook was designed specifically for educators, learners and other stakeholders involved in sustainable transport development. It offers guidance, design principles and practical exercises with case studies to foster the adoption of globally responsible engineering practices.

Alongside the playbook, an eight-week design challenge was launched, called Reshaping Transport, in partnership with UNESCO. This invited over 200 participants from diverse sectors and backgrounds to develop innovative and sustainable solutions to pressing transport issues.

Participants worked on real-world briefs addressing challenges through collaborative and creative problem-solving. The challenge culminated in a virtual celebration event where the winning solutions were shared.

Access research

Revamping Nairobi’s Railways

The winner of the design challenge was Team RT24-029S who took the top prize with their visionary plan to revitalise Nairobi’s railway infrastructure.

Their project focused on improving train schedules, upgrading existing trains, repairing critical rail infrastructure and expanding routes to enhance the efficiency and sustainability of public transit in the Kenyan capital.

By tackling road congestion, reducing carbon emissions and shortening travel times, this ambitious proposal stood out for its potential to transform urban mobility in Nairobi.

Spotlight

Capacity building is often overlooked when considering the development of transport strategies, plans, infrastructure and services. As such, the lack of regular and well-planned capacity building programmes is often the missing link in achieving positive outcomes in the transport sector.

I mention “well-planned” because ideally, capacity building activities should be designed based on the findings of capacity needs assessments: Where are we now? Where do we want to be? What is the identified gap, and what do we need to get there?

Only by investing in needs assessments and capacity building will policymakers, planners and practitioners have the skills, tools and networks available to effectively implement and maintain lasting change. In LMICs, capacity building can be an extremely cost-effective way to accelerate growth, and we strongly encourage attention to capacity building at national, regional and local levels.

Capacity building involves much more than improving individual knowledge and skills. It is about strengthening organisations, enhancing governance and creating an environment where the latest knowledge, lessons learned and key skills are shared. It’s a long-term commitment and investment, requiring collaboration between governments, agencies and other stakeholders involved in the transport sector, including the private sector, academia and Technical and Vocational Education and Training as well as civil society organisations.

Yet, there is a significant lack of sector-specific literature on capacity building in the field of passenger transport and urban mobility.

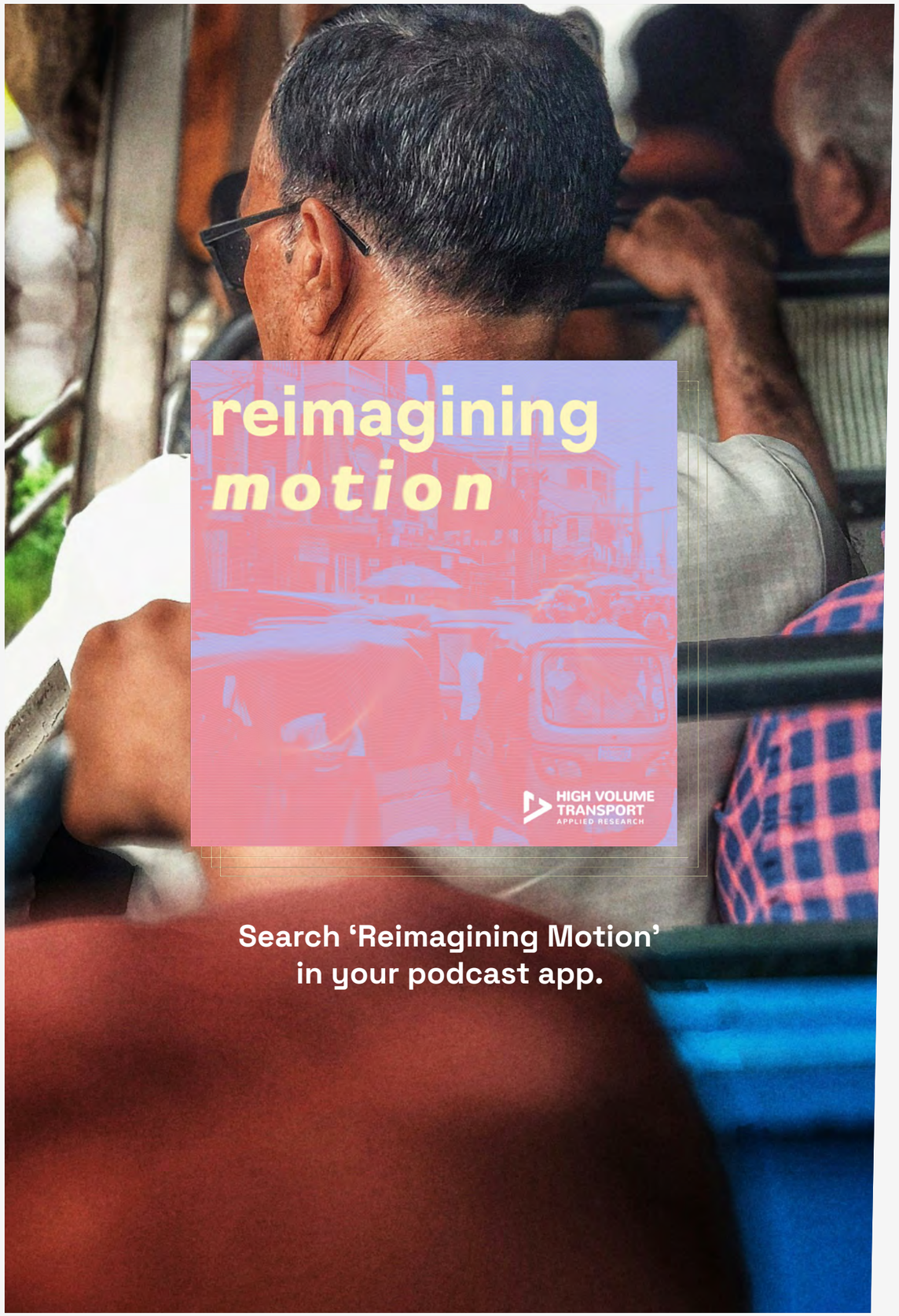
That is why HVT’s research has been so vital in empowering sector professionals with the skills and knowledge to design, implement and assess successful capacity needs assessments and capacity building activities for transport institutions.

The most effective capacity building initiatives are the ones which respond to the specifics of each local region and its unique circumstances. Transport for Cairo’s HVT-funded work has explored and categorised 14 capacity building formats that can be tailored to fit local needs. These include mentorship programmes, committee meetings and making knowledge products and data platforms available as capacity building activities.

Increasingly, we are seeing recognition of the importance of local leadership and context-specific design. Technology offers new opportunities for training and knowledge-sharing, from e-learning platforms to real-time data systems.

Looking ahead, my hope is that capacity building will no longer be viewed as something to check off a list, but as a core element of planning activities in the transport sector, both by transport institutions themselves and by providers of capacity building support. By investing in people and institutions, we can create transport systems that are functional, resilient and equitable. The potential is enormous, and the rewards – for individuals, communities, and nations – are well-worth the effort.

Farida Moawad
Research Lead, Transport for Cairo



HVT Podcast: Reimagining Motion

Launched in October 2022, the Reimaging Motion podcast explores transport development in LMICs through interviews with experts, policymakers, practitioners, academics and researchers from the sector.

Over six series, our podcast draws on the latest HVT research, case studies, lived experiences and newly developed frameworks offering insights and practical ideas in the transport sector.

Hosted by Holger Dalkmann, all episodes are available now on all podcast outlets, including Spotify and iTunes.

The six series are as follows:

1. Transit-Oriented Development

We talk to TOD experts from our HVT research programmes, and explore the nature of TOD; whether it can be beneficial to low-income countries, and how it might be implemented.

2. A Just Transition to Sustainable, Greener Transport

We talk to transport and climate experts, including guests from our HVT research programmes, to explore the opportunities and challenges that LMICs face in mitigating emissions, adapting to the impact of climate change and how to find a way to a just transition to a resilient and low carbon future.

3. Delivering Inclusive Public Transport

This series shines a light on the inequalities across the transport sector and explores how those currently excluded need to not only be the beneficiaries of development, but more importantly that they are agents of change driving that development.

4. The Future of Transport Infrastructure and Systems

This series discusses the specific challenges and opportunities for key land-based modes of transport and shares the latest research and tools for the future of transport infrastructure.

5. African Cities

We focus in on the opportunities in urban and transport planning for African cities – considering the need to understand the vital role of walking and cycling and informal transport as well as exploring the challenges to develop transport that creates a just transition to greener transport solutions.

6. South Asian Cities

This series explores infrastructure development in South Asia and what it needs to look like in the future. Discussion includes what strategies need to be adopted to decarbonise transport in the region; the role of electric vehicles and how to achieve a just transition.

Full Project List

Adaptation for Transport Resilience to Climate Change

The Transport Data Commons Initiative

Economic assessment of transport impact

Supporting the next generation of nationally determined contributions (NDCs)

Boosting the impact of the SUM4All Data Tracking initiative working group

OECD DAC indicators and amendments

Supporting the UN Decade of Sustainable Transport

Bringing sustainable mobility to life

Climate Parliament

Computer Vision for public transport (T-TRIID)

Empower II

Freight emission index for heritage city of Ahmedabad (T-TRIID)

Gendered approach of addressing adaptation capacity to hot conditions (T-TRIID)

HrDM-5.0

Improving Access to Climate Finance for Transport Projects in Low and Middle-Income Countries

Inclusive Interchanges (T-TRIID)

North-South Corridor Ghana

Pan-African Capacity Building Programme

Planning framework for low emission zone (LEZ) in core areas of Indian cities (T-TRIID)

Policy and regulation development for motorcycle taxi safety in Nepal (T-TRIID)

Safe and Secure public transport (T-TRIID)

Safety and Mobility Challenges of persons with disabilities in Mekelle city: Towards inclusive transport (T-TRIID)

Tackling Africa's road safety and emissions from the source (T-TRIID)

Transport Decarbonisation Index (TDI)

Women on the move: Boosting electric two- and three-wheelers

Transport for Cairo

Africa Urban Mobility Observatory

Applying the principles of COVID-19 emergency bicycle-lanes to Sub-Saharan African cities

City Retrofit for All

Climate resilient sustainable road pavement surfacing's

COVID-19 impact on long-distance road transport, Tanzania

COVID-19 impact on the mobility of people with disabilities in Tanzania

COVID-19 impact on transport and mobility in Africa

COVID-19 impacts on peri-urban mobility of women in Madagascar

Decision Support Systems for Resilient Strategic Transport Networks in Low Income Countries

Empower: Safer Transport for Women in Sub-Saharan Africa

HDM-4 Phase II

Impact of COVID-19 on urban motorcycle taxi transport

Impact of COVID-19 policies and decisions on transport in Bangladesh

Impacts of COVID-19 on mobility of people with disabilities

Improving transport resilience to pandemics in low income countries

Inclusive Climate Resilient Transport Planning in Africa

Innovative transport solutions to respond to the COVID-19 pandemic in Nigeria

Making low-income countries more resilient and crisis-ready for pandemics

Mitigating the financial risk of COVID-19 for public transport providers

More gender equitable urban transport to meet the COVID-19 challenge

Novel traction systems for sustainable railway futures in LICs

Pandemic impact on the mobility of persons with disabilities

Recommendations for gender-equitable post-COVID-19 transport policy and practice

Recovery from COVID-19 impact on public transport on Nepal

Reducing COVID-19 impact on the transport sector in landlocked countries of East Africa

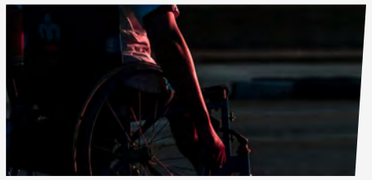
Tactical transit lanes to mitigate COVID-19 impacts in cities in Sub-Saharan Africa

The Impact of COVID-19 on Walking and Cycling Policy and Practice in Africa

Towards gender equitable public and paratransit post-COVID-19

TRANSitions

Update of Road Note 31: A Guide to the Structural Design of Bitumen-surfaced Roads in Tropical and Sub-tropical countries



Update of Road Note 21: Enhancing the mobility of disabled people: Guidelines for Practitioners

Women's Personal Safety, Participation and Employment Linkage in Urban Public Transport

Update of gTKP to include COVID-19

Road design guidelines considering three-wheeler slow-moving vehicles for urban and rural roads of Bangladesh (T-TRIID)

Investigation into the Impact on Social Inclusion of HVT Corridors, and Solutions to Identifying and Preventing Human Trafficking

Transport/Health Nexus think piece

Road Safety Initiatives

Safe Roads Matter

Low Carbon Scoping Study for Nepal

Low Carbon Scoping Study for Zambia and Uganda

Low Carbon Scoping Study for Pakistan and Bangladesh

Voice of the Youth in Transport

Inclusive Transport Policy Brief

Stake of Knowledge - Theme 1

State of Knowledge - Theme 2

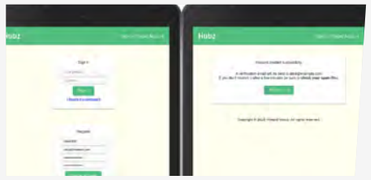
State of Knowledge - Theme 3

Low Carbon Hyderabad Bus Fleets

Modification of Pedal Driven Rickshaw to Electric

Project Balega

Smart Eye for Driver



Hubz

Feasibility of Developing a Transport Scheme Business Case Tool

Promoting Safety in Urban Transport

Network Explorer: A Bus Network Analysis Tool

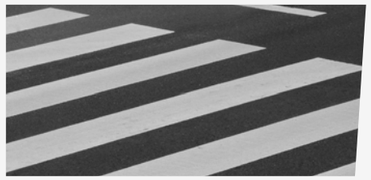
Metamorphisis Global

Impact of ‘Kids Court’ Speed Enforcement Interventions on Vehicle Speeds

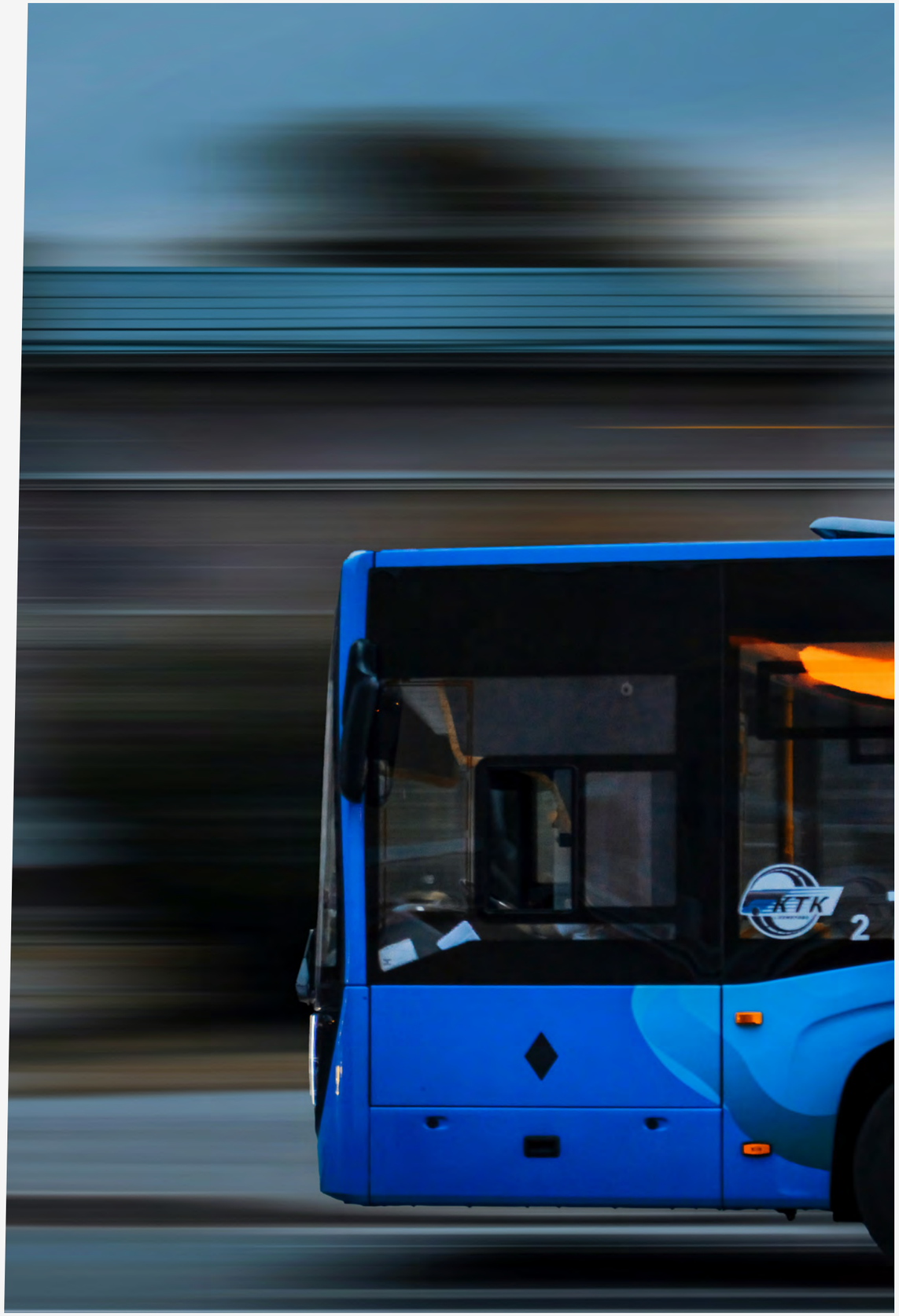
Transport Insight Papers

State of Knowledge - Theme 4: Youth, Older People, People with Disabilities

State of Knowledge - Theme 4: Gender



State of Knowledge - Theme 4: Road Safety



Endnotes

Research and Data:

1. World Bank. Transport overview: https://www.worldbank.org/en/topic/transport/overview#1
2. Science Direct. Road safety research in the context of low- and middle-income countries: Macro-scale literature analyses, trends, knowledge gaps and challenges: https://www.sciencedirect.com/science/article/abs/pii/S0925753521003568

Gender:

3. Vectos South Ltd. Empower Project: https://transport-links.com/funded-projects/empower-safer-transport-for-women-in-sub-saharan-africa
4. Vectos South Ltd. Empower Project: https://transport-links.com/funded-projects/empower-safer-transport-for-women-in-sub-saharan-africa
5. Alert Engineering. Women's Personal Safety, Participation and Employment Linkage in Urban Public Transport: https://transport-links.com/wp-content/uploads/2023/10/womens-personal-safety-participation-and-employment-linkage-in-urban-public-transport-final-report.pdf

Disability:

6. World Health Organization. Disability: https://www.who.int/news-room/fact-sheets/detail/disability-and-health#:~:text=Key%20facts,earlier%20than%20those%20without%20disabilities
7. World Health Organization. Disability: https://www.who.int/news-room/fact-sheets/detail/disability-and-health#:~:text=Key%20facts,earlier%20than%20those%20without%20disabilities
8. World Health Organization. Health inequalities lead to early death in many persons with disabilities: https://www.who.int/news/item/02-12-2022-health-inequities-lead-to-early-death-in-many-persons-with-disabilities#:~:text=With%20an%20estimated%2080%25%20of,resources%2C%20much%20can%20be%20achieved

Informal Transport:

9. Islamic University of Technology. Road Design Guideline considering Three- Wheeler Slow-Moving Vehicles (Tri-SMV) for Urban and Rural Roads of Bangladesh: https://transport-links.com/wp-content/uploads/2024/09/Three-Wheeler-FINAL-REPORT-1A.pdf
10. University of the West of England, Bristol. Policy and regulation development for motorcycle taxi safety in Nepal: https://transport-links.com/wp-content/uploads/2024/12/HVT-Safer-motorcycle-taxis-Nepal-FINAL.pdf
11. Vectos South Ltd. Informal Public Transport Routemap & City Comparative Analysis: https://transport-links.com/wp-content/uploads/2023/10/informal-public-transport-routemap-city-comparative-analysis-executive-summary.pdf
12. Vectos South Ltd. Informal Public Transport Routemap & City Comparative Analysis: https://transport-links.com/wp-content/uploads/2023/10/informal-public-transport-routemap-city-comparative-analysis-executive-summary.pdf

Active Mobility:

13. UN Habitat and UN Environment. Walking and cycling in Africa: https://unhabitat.org/sites/default/files/2022/07/walking_and_cycling_in_africa.pdf
14. UN Habitat and UN Environment. Walking and cycling in Africa: https://unhabitat.org/sites/default/files/2022/07/walking_and_cycling_in_africa.pdf
15. UN Habitat and UN Environment. Walking and cycling in Africa: https://unhabitat.org/sites/default/files/2022/07/walking_and_cycling_in_africa.pdf
16. iRap 3-star or better road policy targets: https://www.irap.org/3-star-or-better

Infrastructure and Access:

17. World Bank. Transport overview: https://www.worldbank.org/en/topic/transport/overview#:~:text=But%20in%20many%20developing%20countries,fear%20of%20harassment%20in%20transit.
18. African Development Bank. Economic Brief: https://www.afdb.org/sites/default/files/documents/publications/econ_brief_infrastructure_deficit_and_opportunities_in_africa_vol_1_issue_2.pdf
19. International Transport Forum. ITF Transport Outlook 2023: https://doi.org/10.1787/b6cc9ad5-en
20. World Bank. Transport overview: https://www.worldbank.org/en/topic/transport/overview#:~:text=But%20in%20many%20developing%20countries,fear%20of%20harassment%20in%20transit

Safety:

21. African Development Bank. Infrastructure Development: https://www.afdb.org/fileadmin/uploads/afdb/Documents/Publications/Tracking_Africa%E2%80%99s_Progress_in_Figures_-_Infrastructure_Development.pdf
22. Autosafety Uganda. Tackling Road Transport Emissions and Crashes from the Source: https://transport-links.com/wp-content/uploads/2024/12/Autosafety-FINAL-1.pdf
23. World Health Organization. Global status report on road safety: https://www.who.int/publications/i/item/9789241565684
24. World Health Organization. Road traffic injuries: https://www.who.int/news-room/fact-sheets/detail/road-traffic-injuries#:~:text=92%25t%20of%20the%20world's,including%20pedestrians%2C%20cyclists%20and%20motorcyclists.

Crisis Response:

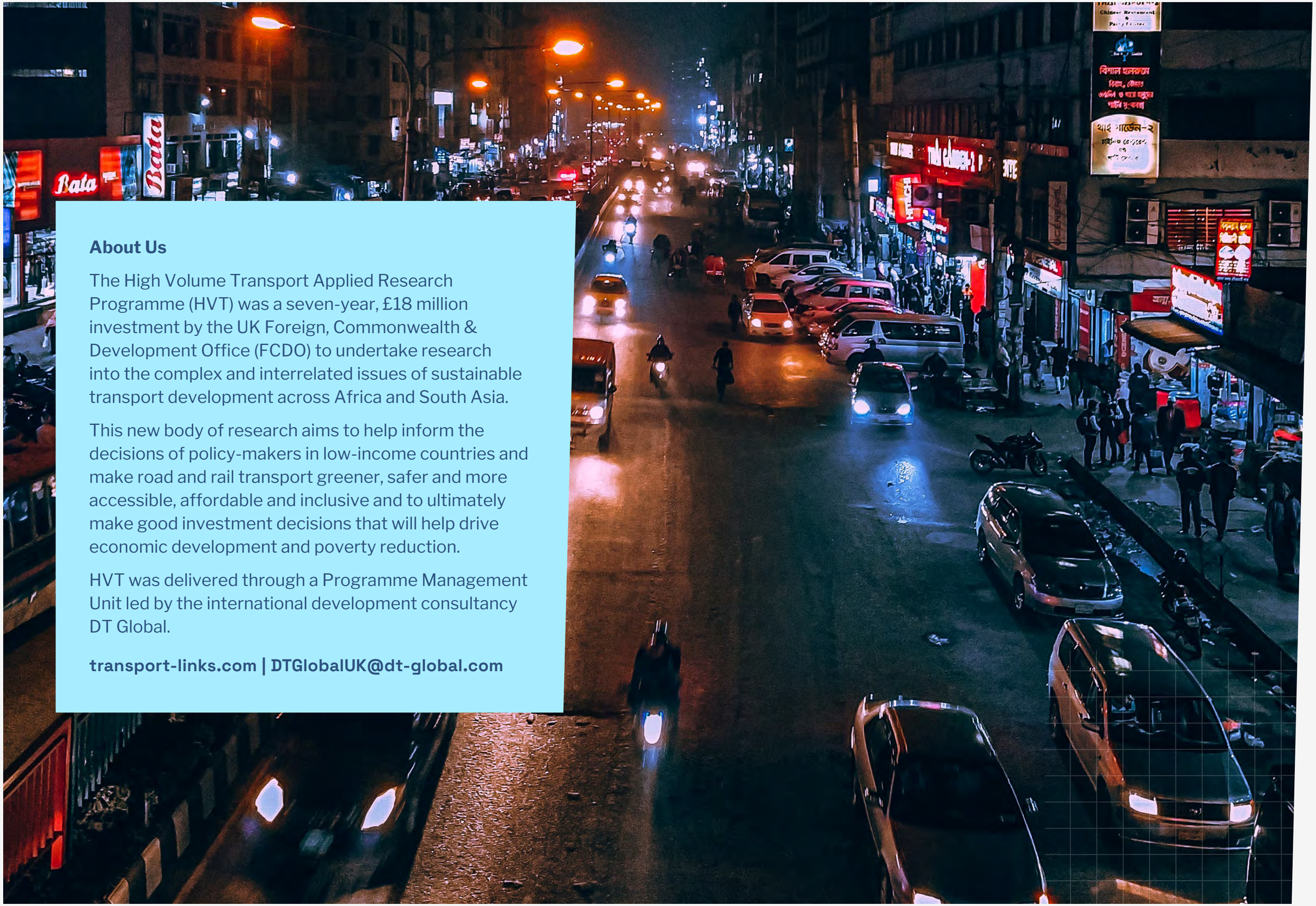
25. HVT. COVID-19 impacts on the peri-urban mobility of women and vulnerable households in Madagascar: https://transport-links.com/hvt-publications/covid-19-impacts-on-the-peri-urban-mobility-of-women-and-vulnerable-households-in-madagascar
26. HVT. What are the impacts of and responses to COVID-19 in addressing the mobility of people with disabilities? https://transport-links.com/funded-projects/impacts-of-covid-19-on-mobility-of-people-with-disabilities
27. Journal of Disability Studies: Analysis of Public Transport Inclusiveness among Persons with Disabilities during COVID-19 in Benin City, Nigeria: https://pubs.iscience.in/journal/index.php/jds/article/download/1500/843
28. HVT. Moving towards gender equitable public transport operations in a post COVID-19 world: https://transport-links.com/hvt-publications/final-report-moving-towards-gender-equitable-public-transport-operations-in-a-post-covid-19-world

Policy and Planning:

29. World Resources Institute. Access to climate finance in low and middle-income countries: 14 case studies in the transport sector: https://transport-links.com/wp-content/uploads/2024/11/WRI24_ClimateFinance_web_noDOI.pdf
30. World Resources Institute. Access to climate finance in low and middle-income countries: 14 case studies in the transport sector: https://transport-links.com/wp-content/uploads/2024/11/WRI24_ClimateFinance_web_noDOI.pdf

Capacity Building:

31. Engineers without Borders. Reshaping Transport Playbook: https://transport-links.com/wp-content/uploads/2025/01/Reshaping-Transport-FINAL.pdf
32. Engineers without Borders. Reshaping Transport Playbook: https://transport-links.com/wp-content/uploads/2025/01/Reshaping-Transport-FINAL.pdf



About Us

The High Volume Transport Applied Research Programme (HVT) was a seven-year, £18 million investment by the UK Foreign, Commonwealth & Development Office (FCDO) to undertake research into the complex and interrelated issues of sustainable transport development across Africa and South Asia.

This new body of research aims to help inform the decisions of policy-makers in low-income countries and make road and rail transport greener, safer and more accessible, affordable and inclusive and to ultimately make good investment decisions that will help drive economic development and poverty reduction.

HVT was delivered through a Programme Management Unit led by the international development consultancy DT Global.

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