International Transport Forum

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EXPANDING
INNOVATION HORIZONS

LEARNING FROM TRANSPORT SOLUTIONS IN THE GLOBAL SOUTH

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EXPANDING
INNOVATION HORIZONS

Innovation is the process of translating an idea or invention into a good, service or policy that societies will adopt on a large scale. Public authorities play a major role in fostering innovation; it is not just the realm of garage tinkerers, start-ups and venture capitalists.

Radical, technology-driven innovation is commonly associated with the developed economies of the Global North. The Global South is usually seen as the home of frugal innovation, where solutions are created under resource constraints and are designed to be affordable for many.

This report challenges such notions. It highlights transport solutions emanating from the Global South and discusses benefits and challenges of implementing them in the Global North. It puts aside the assumption that innovation flows from North to South only and asks what transferability really means.

Examples of successful innovations in the Global South with potential to spread internationally and make an impact in rich countries range from the health care sector to the mobile phone industry. This report shows the transport sector also stands to benefit from practices in the Global South.

The term Global South in this report refers to low- and middle-income countries in Asia, Africa, Latin America and the Caribbean. It is used interchangeably with "developing and emerging economies". Thus, the Global South includes countries north of the equator, while the Global North extends beyond the high-income countries of North America and Europe. As putative boundaries between the two regions blur the potential for south-to-north and south-to-south transfer increases.

Globally transport policy makers strive to achieve the same goals: to provide efficient, sustainable, safe and equitable transport systems that are tailored to local socio-economic cultures. This report focuses on innovations in public transport, shared mobility services and other ideas that increase the connectivity and accessibility of transport systems. It addresses both the transportation of people and goods, featuring case studies from urban mobility to long-haul logistics and air transport.

The report's aim is to expand innovation horizons and support transport policy makers in adopting new transport solutions. It champions the idea that by combining the innovation push of businesses and civic society with the right policies and incentives governments can generate growth that will significantly reduce the risks of climate change, while also providing near term economic, employment and health benefits.

This is the first installment of a two-part report. It introduces readers to the growing influence of innovations generated in the Global South on the Global North and, by describing examples and asking questions that policy makers should consider, sets the scene for a more comprehensive analysis in the second report that will integrate discussions and feedback generated by this publication. The second report will present findings and recommendations for policy makers and serve as input for the International Transport Forum's summit on "Innovation for Sustainable Development" in May 2020.

LEADING THE WAY
HOW GOVERNMENTS IN THE GLOBAL SOUTH FOSTER INNOVATION

The public often sees private entrepreneurs as the driving force behind innovation. Yet governments are frequently the hidden powerhouse that allows the ideas of these entrepreneurs to thrive. Governments at different local, regional and national levels are providing the enabling framework which allows for competition, treats new entrants fairly and supports market disruption. By introducing climate-related criteria to public procurement decisions, for instance, governments can shape lead markets such as transport in which innovative industries and new business models can emerge that support sustainable economic growth.

Education and Research & Development are fields that are particularly important for the innovation economy of a country, and which are critically impacted by public policy. In China, for instance, the tremendous uptake of electric mobility was made possible by a virtuous feedback loop between research institutes, public authorities, and industry. In India, the city of Bangalore became the country's first innovation hub thanks to top-ranked universities that train skilled and imaginative knowledge workers. All over the world, start-up incubators have mushroomed thanks to government support. The Global South is often at the forefront of these developments, exemplified by the emerging tech clusters in many Asian cities or the rise of Kenya's "Silicon Savannah" in Africa.

Behind such government activity lies the shared belief that the state remains a relevant player in the globalised economy. Its role in financing ground-breaking inventions and supporting their translation into marketable innovations is again being acknowledged by economists in the Global South and the Global North alike.

In *The Entrepreneurial State: Debunking Public vs. Private Sector Myths*, Mariana Mazzucato, professor for the economics of innovation at University College London, insists: "It was the visible hand of the State which made these innovations happen...This requires understanding the State as neither a 'meddler' nor a simple 'facilitator' of economic growth. It is a key partner of the private sector – and often a more daring one, willing to take the risks that business won't."

Mazzucato builds her case on various examples from the United States but also includes cases from emerging economies, such as China and Brazil. Their ability to invest confidently and take on risks in fields hampered by high levels of uncertainty, which usually scare off private banks and venture capitalists, may come as a surprise to policy makers in the Global North.

The two case studies in this section illustrate how governments foster transport innovation. The first showcases Malawi's implementation of the first-of-its-kind drone testing corridor. The second discusses China's decisive turn towards electric mobility.

NOTES FROM THE FIELD
Bambang Susantono

is Vice-President for Knowledge Management and Sustainable Development of the Asian Development Bank (ADB). Prior to this, he was the Acting Minister and Vice-Minister of Transportation of Indonesia.

Transport is changing. How people or goods move is different today than 40 years ago. It will be very different again 40 years hence. In this dynamic, governments of the Global South can be the leaders of change.

Developing countries can break the mould of traditional transport. Not locked into historical legacies, they enjoy the freedom to embrace innovation. The Global South pioneered transport advances such as Bus Rapid Transit (BRT). My home city of Jakarta was one of the first Asian cities to implement a full-service BRT system and leapfrogged public transport services that took decades to evolve in Europe and North America. ADB's focus on livable cities will see around USD 4 billion invested in modern urban transport systems over the next four years.

The booming demand for personal mobility is partially met by burgeoning local manufacturers of 2-, 3- and 4-wheelers. The Asian car industry is less wedded to internal combustion engines, hence the region now has the largest share of e-vehicles worldwide. The ADB is supporting countries across the region in the transition to electric mobility.

Big data will profoundly impact transport systems. As Asia implements systems to manage urban transport and road and rail networks, the use of big data, mobile apps and user interfaces will allow information sharing and efficient operations well beyond conventional systems. We already see this with integrated travel apps that combine payment and information with many other services.

The future of transport is in the Global South's hands. The ADB will help it to realise that future.

QUESTIONS FOR POLICY MAKERS

- How can economic growth be aligned with creating a sustainable transport system for all?

- At what governmental level should policies fostering innovation be implemented to maximise impact?

As drones are deployed on an increasingly larger scale, a fully functional Unmanned Traffic Management (UTM) system will be needed for Malawi's drone corridor to prevent collisions with manned aircraft, something akin to the Global North's needs in congested airspaces. Insights from Malawi's UTM will be shared with global policy makers.

Among the most important lessons from the Malawi drone testing is the authorities' success in raising awareness about the potential benefits of drones among affected communities and creating wide public acceptance. In the Kasungu area alone, about 34 000 people learned about drones. Of those, 46% were children. The Malawi public outreach campaign can inform global policy makers on how to engage with civic society and overcome initial apprehensions about safety and privacy and convey the relevance of drone transport.

LEARN MORE

International Transport Forum, *(Un)certain Skies? Drones in the World of Tomorrow*, 2018

Unicef Malawi, *Drone Testing Corridor in Malawi: Exploring How Unmanned Aerial Vehicles (UAVs) Can Be Tools for Development and Humanitarian Programming*, 2018

What do policy makers need to know?

The Malawi drone corridor specifically addresses the issues policy makers face when engaging with the emerging private drone sector and the general public. Current regulation of drones is often restrictive. It hampers new developments and lags behind technological advances, causing reluctance among potential adopters. To integrate drones into the overall transport system in a smooth way and ensure the public's acceptance, governments must stay apprised of the rapidly developing concepts for drone designs and services and integrate them in the overall transport system.

CASE STUDY

OPENING THE SKIES
HOW AFRICA'S FIRST DRONE CORRIDOR ENABLES INNOVATION IN AVIATION

In October 2016, Malawi's Department of Civil Aviation (DCA) signed an agreement with Unicef establishing a zone for testing drones. The "drone corridor" covers a 40-kilometre perimeter around Kasungu Aerodrome in central Malawi. Maximum altitude for drone flights is set at 500 metres. Seven entities were vetted to operate drones in the corridor. They are companies, universities and non-profits that joined the trial program for free under the condition that they share their findings with a stakeholder task force that includes the DCA, representatives of the various governmental sectors and the media. The drone corridor has been a great success and Malawi authorities are currently planning to extend its operation period.

What is the innovation aspect?

The drone corridor is a testing ground for the application of drone technology for transport uses, imagery, and data transmission. It has become a hub for developing partnerships that combine the various specialties of the different stakeholders. One collaborative effort, for instance, resulted in the first long-distance flight of a drone charged with two separate tasks: delivering medical supplies to remote areas and mapping road quality, flooding and housing density. All findings on drone use that come from the trial program are shared with the Malawi authorities, providing policy makers with cutting-

edge insights that allow them to keep pace with fast-changing drone technology.

What are the benefits? What challenges exist?

The current approach to drone technology in the Global North is very different from that employed in Malawi. In most developed economies, separate entities define specific use cases and act as competitors in implementing them. The sharing culture at the core of Malawi's drone corridor set-up, on the other hand, allows all actors to learn from the tests and their findings and also share them with the general public, thus creating an innovation-friendly ecosystem.

TRANSPORT'S ELECTRIC FUTURE
HOW CHINA'S CO-ORDINATED POLICY APPROACH CREATES GREEN GROWTH

Electric mobility refers to the use of low- or zero-emission vehicles as opposed to fuel-powered vehicles. Technological progress is making electric vehicles (EV) more affordable worldwide and global e-vehicle sales reflect that trend: in 2017, they rose 56% compared to the previous year. China is today the world's leading e-vehicle user. Nearly 99% of all electric buses and two-wheelers in the world are currently operating on Chinese streets and roads, as are 40% of all private electric cars.

What is the innovation aspect?

The major innovation that made China's move towards e-vehicles possible has been the regulatory push by the Chinese government. It strongly encourages the use of e-vehicles in order to make its transport sector less dependent on oil, to bring down air pollution, reduce greenhouse gas emissions, and develop its national electric vehicle industry into a world market leader. China has launched a series of incentives that target all mobility actors across all modes of transport. Going beyond sale and production subsidies, the Chinese authorities are moving towards quotas with the 2018 "New Energy Vehicle mandate" policy as well as non-monetary incentives such as simplified registration procedures for EVs.

As part of its "Public Transportation First" policy, in place since 2008, China is specifically pioneering the shift towards electric public transport. By focusing on Research & Development and tailoring subsidies to reduce risk for bus operators, Chinese authorities have been able to encourage a massive switch to electric buses.

What are the benefits? What challenges exist?

Transport is responsible for around 23% of energy-related greenhouse gas emissions. The benefits of switching to electric mobility, then, are obvious, particularly when electricity is generated by sustainable means. Moreover, China's co-ordinated approach illustrates how, with the right policies and incentives in place, governments can generate industry growth while successfully tackling other policy priorities, such as providing sustainable, affordable and accessible transport.

What do policy makers need to know?

China's large-fleet pilot programmes for electrifying transport benefit from a virtuous circle between research, industry and policies that are aligned across local, regional and national levels. Today, China is also experimenting with creative tools in its shift away from subsidies and towards standards, non-monetary incentives and attractive contract conditions for fleet operators. The projected worldwide move toward electric mobility raises questions that go beyond mitigating climate change. They include aspects of industrial policy, such as who will be the leading manufacturer of e-vehicles in the future.

LEARN MORE

International Energy Agency, *Global EV Outlook 2018: Towards Cross-Modal Electrification*, 2018

Mariana Mazzucato, *The Entrepreneurial State: Debunking Public vs. Private Sector Myths*, 2013

OECD, *Investing in Climate, Investing in Growth*, 2017

EMBRACING THE INFORMAL
HOW TO MODERNISE TRANSPORT NETWORKS

Public transport in the Global South is often characterised by the co-existence of formal and informal systems. Informal transit is neither regulated by public authorities, nor managed by licensed operators, nor planned as part of an integrated transit system. The term "paratransit" has been used to capture the diversity of practices that blur the line between the formal and informal sectors. Paratransit typically consists of a large number of private operators managing small fleets of buses, vans and lighter vehicles.

To the outsider, paratransit may seem chaotic and backward. Its on-demand stops, undefined schedules, flexible routes and fares are not easily understandable to the uninitiated. Yet paratransit obeys the rules of a demand-responsive system to ensure sustainability and profitability: the informal stops are known to local users and most buses follow regular routes — that is, unless a road becomes extremely congested and passengers agree to ad-hoc itinerary changes.

Paratransit provides an essential service, but it should not be romanticised. It suffers from many shortcomings and the lack of information makes it difficult to use. Coverage is often patchy and reliability issues persist. Since little regulation is enforced, paratransit is often less safe and more polluting than formal transport. In Manila in the Philippines, for instance, operators tend to concentrate their service on the main axes to maximise profits while the rest of the city is underserved.

Current paratransit systems thus leave room for improvement. But public authorities should recognise the role paratransit can play when upgrading transport networks. Also, ignoring semi-formal actors and their interests often results in failure. Mexico City's implementation of a Bus Rapid Transit (BRT) system, for instance, was successful in large part thanks to mutually advantageous negotiations between city officials and paratransit providers.

The new digital solutions that are changing mobility can also mitigate paratransit's flaws. This transformation starts with acquiring adequate knowledge of these networks. Encoding paratransit systems into an established transport data syntax, such as General Transit Feed Specification (GTFS), makes it easier for commuters to catch the best ride. It also allows transit planners to better understand user needs and operators to offer new routes.

Other solutions aim to upgrade these systems. Mexico City's van-sharing service Jetty incentivises operators to provide a safe and comfortable service while helping them to optimise their routes and increase their profits. By further blurring the line between formal and informal transport, the solutions presented in the following case studies could facilitate a future formalisation. At the same time they could stimulate nimble, smaller-scale community- and demand-based transport options in the Global North.

NOTES FROM THE FIELD
Fábio Duarte
is a Professor of Urban Planning at Pontifícia Universidade Católica do Paraná in Curitiba, Brazil, a research scientist at the Massachusetts Institute of Technology, and author of *Unplugging the City* (Routledge, 2017).

"Shared mobility is everywhere when I travel cities as a global researcher. I take taxis in Brasília, hold on tight to ojek motorcycles in Jakarta, or figure out how to reach my destinations with matatus in Nairobi and marshrutkas in Moscow.

These cities taught me that thinking of shared mobility as a novelty is a narrow view held in the Global North. It negates how countries with few cars and bad public transport are creatively coping with the lack of options.

This informal mobility operates at the fringe of legality and remains almost invisible to the uninitiated. Digitalisation has changed this and disrupted mobility in both developed and developing countries.

Firstly, geo-localisation of vehicles in real time helps users to better plan trips and increases the sense of safety among passengers and drivers. Secondly, rating schemes that auto-regulate who is allowed into the system create a direct relationship between drivers and passengers and thus a mutual sense of trust.
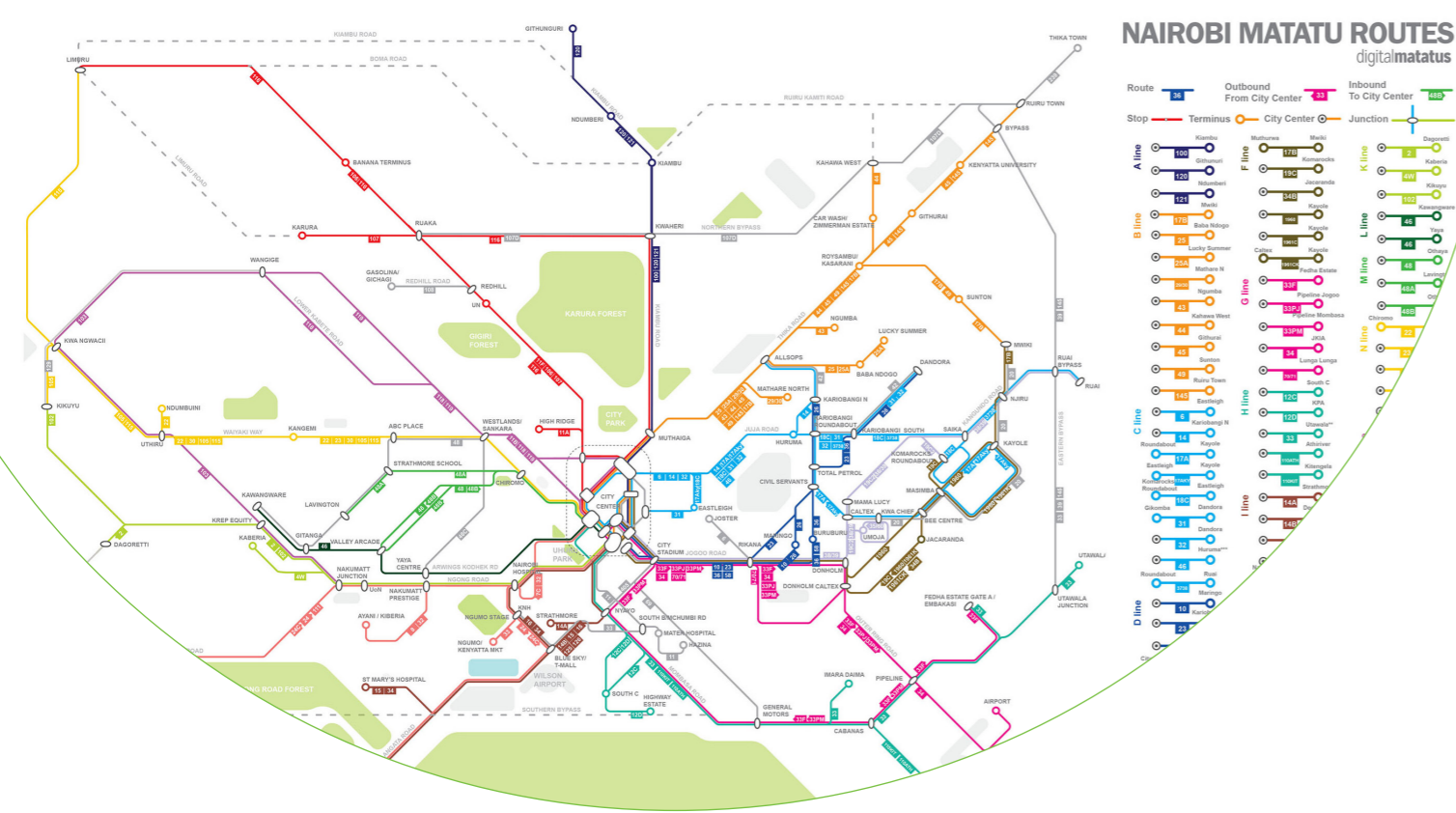
Finally, demand-based routing and pricing structures create more flexible markets. They extend options for users by matching drivers and passengers in different areas and at different times.

As a researcher with practical experience in planning and transport in the Global South, I focus on how to transfer lessons from app-based mobility to public transport and find ways to balance nimble private transport options with better mass transport tailored to the mobility culture of each city.

QUESTIONS FOR POLICY MAKERS
- What policy framework must be established to ensure that digitalisation is adapted to serve specific local mobility needs?
- Which regulatory environment will ensure that existing mobility services and new market entrants are treated equally?
- Is competitive pricing of app-based transport modes enough to persuade commuters to use shared services?

NAIROBI MATATU ROUTES
digital**matatus**

The Kenyan experience has highlighted the need to make data formats more adaptable to demand-responsive transit. For instance, the data field "continuous stops" was added to GTFS to indicate whether it is possible to board or exit at any point along the route. This inspired the development of the GTFS-flex extension, which gained relevance not only in cities of developing countries but also in rural areas of the Global North, where demand-responsive transit options are increasingly offered. It has also paved the way to include dockless bicycle and micromobility services in GTFS data.

LEARN MORE

Sarah Williams and others, *The Digital Matatu Project: Using Cell Phones to Create an Open Source Data for Nairobi's Semi-Formal Bus System*, 2015

Transport for Cairo and Takween Integrated Community Development, *How Can Transit Mapping Contribute to Achieving Adequate Urban Mobility*, 2017

What do policy makers need to know?

Mapping semi-formal routes provides a comprehensive picture of the whole transport network. It identifies geographical or social equity gaps in accessibility, allowing cities to plan a more efficient system with better coverage and trip durations for all. With GTFS-flex data, transit is encoded as a flexible process and can become increasingly so. Finally, modern transit concepts, e.g. Mobility as a Service (MaaS), require a high-quality digitally encoded "mirror" of all mobility modes and user behaviours. GTFS provides a means of mapping that.

CASE STUDY

GTFS FOR THE REST OF US
HOW ENCODING NAIROBI'S INFORMAL TRANSIT COULD HELP TRANSFORM GLOBAL TRANSPORT SERVICES

General Transit Feed Specification (GTFS) is a global standard for sharing transit information. GTFS was originally developed to encode the fixed schedules and stops of Western formal transport networks. However, transit systems in most Global South economies are based on semi-formal solutions. GTFS for the Rest of Us is an initiative that brings together actors who seek to encode semi-formal transit within GTFS language and uses.

What is the innovation aspect?

One of the first attempts to address the lack of GTFS data on semi-formal transit was conducted in Nairobi in 2012-13 with matatus, the informal busses serving the Kenyan capital. The Digital Matatus initiative (DM), used mobile phones and GPS technology to collect data on 135 informal bus routes, including stop names and fares. This data was then converted into GTFS and visualised as a comprehensive map of Nairobi's non-official transport network. In 2015, the GTFS data was uploaded to Google and Open Street maps, making Nairobi's matatus network the first paratransit system to be included in mainstream routing tools. Riders immediately benefited by being able to better plan their commutes. Private operators and Nairobi's transport planners were also able to develop a more adequate matatu route network and gain insights for a future Bus Rapid Transit (BRT) system that can complement informal mobility.

What are the benefits? What challenges exist?

DM's method has already been successfully replicated in other countries of the Global South. In Egypt, the start-up Transport for Cairo collected GTFS data and mapped parts of the semi-formal bus network in the capital, which was released in its entirety in 2018 and subsequently integrated into Google Maps. In 2019, the Urban Transport Resource Center for Latin American and Caribbean Cities was founded based on learnings from DM in Africa, showcasing the South-to-South knowledge exchange.

FIRST-CLASS JITNEY SERVICE
HOW AN APP-BASED MOBILITY COMPANY IN MEXICO CITY PROVIDES BETTER QUALITY FOR USERS OF INFORMAL TRANSIT

The majority of citizens in the Mexico City metropolitan area rely on a large network of semi-formal buses called jitneys. Every day, jitneys provide 11.5 million passenger trips, while Mexico City's Bus Rapid Transit and subway systems carry 1.1 and 4.5 million passengers respectively. Yet, travel by jitneys suffers from the typical downsides of non-regulated transport: lacking in safety, comfort and reliability.

Since 2017, Mexican start-up Jetty has been trying to upgrade the collective transport service offered by jitneys. Jetty does not own any vehicles but works in partnership with existing operators. Jetty incentivises the operators to provide a dedicated bus fleet tracked in real time, covered by more comprehensive insurance policies and driven by a trained and adequately rewarded workforce. In exchange, Jetty helps its partners to improve their performance by sharing with them the data gathered from its app users. It also brings their partners business. Jetty's mobile app enables its users to look for rides and book a seat on upgraded jitney buses.

What is the innovation aspect?
Jetty's offer reconciles better service with affordability and efficiency by bridging app-based mobility and collective transport. Increased safety and reliability significantly improve the jitney user experience. Offering more direct routes and higher capacities, Jetty's app-based jitney booking ensures a higher degree of efficiency compared to ad-hoc ride-sourcing. Continuous monitoring of itineraries, schedules, and pick-up points further helps to optimise the service; as does the collection of user data, which also enables Jetty to increase partner-operators' revenue.

What are the benefits? What challenges exist?
Jetty provides a low-cost solution to upgrading transit that requires limited investment and operational subsidies. This could be very appealing to countries and cities with tight transport budgets. Since Jetty's initiative helps slow the shift toward private cars, its experience is relevant in global cities struggling with severe congestion. Jetty's current expansion in Mexico City illustrates the program's easy scalability and could be quickly replicated in or adapted to other cities. Ultimately, Jetty provides the right context-adapted incentives to improve transit quality. In cities where transit operation is privatised, it will be crucial that regulators establish locally-appropriate incentives in their dialogue with operators.

What do policy makers need to know?
Mexico City's experience with improving the service quality of jitneys provides two main lessons for policy makers. Firstly, incremental service upgrades through technology-induced innovation can reshape the transit system in a way that serves the common good, but only if policy avoids stifling innovation through obsolete regulation. Secondly, sharing data among different mobility stakeholders can help address urban congestion and pollution by providing higher-quality transit services at prices that are above standard transit fares, but significantly below conventional ride-sourcing offers.

LEARN MORE

Onésimo Flores Dewey, *App-Based Collective Transport Service in Mexico City: A Start-Up Case Study*, 2019

Fabio Duarte and Rodrigo Jose Firmino, *Unplugging the City: The Urban Phenomenon and Its Sociotechnical Controversies*, 2017

REVISITING GLOBAL PRACTICES
HOW TO INSPIRE A NEW MOBILITY CULTURE

Innovation is born out of need. Transport solutions are most often created in response to the specific needs of people in a specific place. With careful adaptation, they can often be successfully transplanted. Sometimes however, innovation is best achieved by simply looking at a familiar practice in a new light.

Transport practices are socio-cultural customs associated with the way people move in a given context. Reliance on two- and three-wheelers, for instance, is a distinctive trait of Southeast Asian transport heritage. Such practices are accepted and reproduced by commuters on a daily basis. Even when transformed by new technologies or business models, they retain a local flavour and continue to be adhered to by the population in the Global South. In the Global North they have sometimes been forgotten but can be (re-)adopted quickly and on a large scale.

The electrification of two- and three-wheelers, for instance, will have a significant impact in countries where these vehicles represent a large share of the total fleet. Two- and three-wheelers are small, lightweight and affordable and able to cover shorter-distance transport needs. In the Global North, with added technological features and upgraded designs, two-and three-wheelers may also contribute to the (re-)introduction of agile mobility options for urban first- and last-mile transport and stimulate a new micromobility culture.

Similarly, the cost-effective introduction of a pan-Indian relay truck service (modeled on the famous mid-19th century Pony Express in the United States, which linked Missouri and California via a system of relay riders on horseback) is only possible by employing a digital platform that integrates vehicle telematics, driver preferences, relay station status and client requests. Thus such upgrades to traditional transport practices can answer pressing on-the-ground needs – in these instances the widespread shortage of long-haul drivers and the need for more sustainable options for short-distance trips.

These solutions are also innovative in a more classical definition of the term, since they increase productivity. Shortening the duration of a truck trip or providing a last-mile solution where mobility options are scarce enhances transport efficiency. In the case of two- and three-wheelers, reduced energy consumption and more efficient use of available road capacity must also be taken into account.

The following two case studies illustrate how long-standing socio-cultural mobility practices in India and in the larger region of Southeast Asia have been revisited to produce more efficient transport solutions while promoting driver well-being, passenger comfort and sustainable first- and last-mile options.

NOTES FROM THE FIELD
Melinda Hanson
heads sustainability at Bird, the shared e-scooter company. She has worked for sustainable transport for over a decade, including at National Association of City Transportation Officials, Asian Development Bank and the ClimateWorks Foundation.

Transport in the Global North is starting to look more like that of cities in the Global South. What's changed? Urban transport has started to go small.

For decades, the automobile has dominated streets in the United States. Here, more than 75% of commuters travel to and from work by car, alone; just 5% commute by public transport, and less than one percent by bicycle.

Mode share is remarkably different in low- and middle-income countries. While working on transport projects in the Philippines and Ethiopia, I saw that what is sometimes perceived as a chaotic system made up of multiple shared modes could actually add up to be a much more efficient way to get around.

Dockless e-scooters hit US streets in 2017, and they have become extremely popular.

In the first year, shared e-scooter ridership in the United States surpassed bikeshare, replacing car trips about one-third of the time. Suddenly, we are seeing travelers in Denver and Baltimore opt for these small electric vehicles for reasons similar to why people take rickshaws in Delhi or moto-taxis in Bangkok: they are convenient, inexpensive, and get you where you need to go.

Reinvented in Santa Monica, California, but with roots in the Global South, micromobility is a big idea that has the potential to remake urban transport. That is great news for our cities, and I look forward to continued exchanges with international colleagues as we work to fight climate change and bring affordable, shared, and electric micromobility to cities around the world.

QUESTIONS FOR POLICY MAKERS

- What incentives might be put in place to encourage the upgrade of traditional transport modes and ensure customer adhesion in existing markets or (re-)adoption in the Global North?

- How can cities harness knowledge about marginalised transport models of the past to tackle current challenges in the transport system?

PONY EXPRESS REVISITED
HOW A RELAY TRUCK SERVICE IN INDIA RECONCILES RESOURCE OPTIMISATION, FAST DELIVERY AND DRIVER WELL-BEING

The recent introduction of relay trucks in India has changed the way the country's logistics industry operates. Since 2014, Rivigo, a start-up based in Gurgaon near Delhi, has established a network of 70 relay stations for trucks across the country, enabling a pan-Indian service.

In this new approach, a single shipment is transported not by one, but by several drivers. The first driver picks up the freight at its home station and drives it to the next relay station. There, the driver liaises with a second driver, who has stopped at the same station with a shipment going in the opposite direction. The two exchange trucks and each continues to the next station on the route to the shipments' final destination. The relay continues until the shipment is delivered.

Rivigo uses sensor-equipped trucks and Big Data analytics to co-ordinate this "logistical ballet". The individual drivers only make round-trips from their home base. In this way, they complete the same amount of kilometres as in a non-relay system, but they can go home after their working day and stay with their families overnight.

What is the innovation aspect?

Rivigo's trucks are permanently on the road and essentially never stop moving. Trip durations are thus drastically shortened. A journey from Bangalore to Delhi takes 96 hours with conventional methods, but only 44 hours with the relay truck system. On average, Rivigo's turnaround times are 50% to 70% shorter than transport by traditional trucking methods.

The relay system also significantly improves working and living conditions for truck drivers. Driving approximately 800 kilometres back and forth to their home stations, 92% of Rivigo's drivers are able to return home every night of the week.

What are the benefits? What challenges exist?

India faces an estimated shortage of one million truck drivers. Rivigo currently employs 4 000 drivers and the size of its workforce is growing exponentially. Leading logistics companies from the Global North have recognised the potential of the relay truck system. Amazon is using Rivigo to deliver its products and DHL is considering a similar approach for the Indian market.

The Global North also suffers from a severe shortage of truck drivers. The gap between available supply of drivers and demand from haulers is projected to reach 0.8 million in Europe and the United States combined by 2030. The relay truck service could offer a way to address the issue by making the driver profession more attractive, for instance for women. A network of relay stations would be especially suited to areas like the European Union and the United States where freight transport over long distances falls under common regulation and trade is free.

What do policy makers need to know?

The relay truck system, based on a historic transport practice, is an innovation that is disrupting India's logistics industry. Relay trucking addresses a number of issues that many countries face in similar ways, such as working conditions, driver shortages and the need for more efficient freight transport.

Rivigo is a reminder that innovation in the transport sector is sometimes built on contradictory concepts. Central to the company's strategy is full ownership of its trucks and infrastructures, which stands in stark contrast to the Uber pioneered innovation paradigm that sheds any ownership of physical infrastructure and focuses solely on providing a digital service. Some global logistics companies are developing Uber-like platforms to link truck drivers with cargo shippers. This approach may respond to some needs, but it is not likely to solve the critical problem of current and future driver shortages.

LEARN MORE

Rivigo, *Not the 37th Caste: Stories of the Men and Their Families Who Drive Our Country*, 2017

The Economist, *Rivigo is Helping the Indian Truck-Driving Industry Out of a Jam*, Vol. 424/9060, 2017

chaotic and dangerous traffic, and obvious safety issues must be addressed wherever they operate. In Kigali, Rwanda, for example, the ride-sourcing company Safemoto uses telematics devices to track driver behavior and adapted incentives to ensure safe operation of its two-wheeler fleet.

Some entrepreneurs are seizing the opportunity: they enhance mobility in cities of the developed world with light vehicles. Electric two- and three-wheelers, like Paris's free floating taxi-motos and London's e-trikes, have rapidly become a part of these cities' transport ecosystems, pushing into markets that conventional taxi services, high-priced and limited by heavy regulation, have not covered. And additional possibilities lie on the horizon. E-trikes could easily evolve from a tourist attraction to providers of regular last-mile services. Three-wheelers can even be transformed into self-driving vehicles for autonomous deliveries, as demonstrated by MIT Media Lab in Chinese Taipei.

What do policy makers need to know?

Keeping light vehicles a relevant mobility option as rising incomes translate into more and more cars on the streets is paramount in the Global South. In the North, a shift to agile mobility is already underway. Shared or individually owned micromobility vehicles and cycling options are massively adopted in cities as awareness of their ability to provide clean and convenient last-mile mobility increases. Supported by innovation-friendly regulations, two- and three-wheelers can be important facilitators of a structural shift towards shared and electric mobility services.

LEARN MORE

Adele Peters, *Can This New Electric Rickshaw Stop Cars From Taking Over Asian Cities?*, 2018

Gesellschaft für Internationale Zusammenarbeit and United Bank for Africa, *Reverse Innovation: Rethinking Urban Transport Through Global Learning*, 2017

THE RICKSHAW OF TOMORROW
HOW AGILE MOBILITY PROVIDES CLEAN AND AFFORDABLE LAST-MILE COMMUTES IN VIETNAM, COLUMBIA AND FRANCE

"Agile mobility" describes the use of light vehicles. In the Global South, two- and three-wheelers — some pedal-powered, some engine-powered — are widespread because they offer affordable mobility adapted to poorly serviced areas. In Hanoi, the capital of Vietnam, light vehicles make up 94% of the total fleet; in Kathmandu in Nepal, their share is 74%. The emerging economies of Asia have the highest density of two- and three-wheelers, but other continents are seeing their share of these and other light vehicles increase exponentially. In Cartagena in Colombia, a city of one million inhabitants, the number of two-wheelers grew five-fold between 2008 and 2015, while that of private cars only increased by a factor of 1.7.

What is the innovation aspect?

Two- and three-wheelers are not a thing of the past. Instead they are moving to the forefront of mobility innovation. Electrification of three-wheelers is happening on a massive scale in the Global South. Around 1.5 million battery-powered three-wheelers operate in India today and around 11 000 new electric tricycles ("e-trikes") hit the country's streets every month. The Pedicab project launched by the Asian Development Bank in Nepal in 2017 seeks to make them an attractive alternative to the private car by modernising the image of three-wheelers, notably through contemporary design features, electric propulsion and new business models that integrate e-trikes with formal public transport providers.

What are the benefits? What challenges exist?

More and more, light vehicles in the Global South are powered by electric engines. They thus provide mobility that reconciles convenience, affordability and sustainability. This trend also presents a major opportunity for economies in the Global North. There, two- and three-wheelers could help bridge the first- and last-mile gap for public transport users, in addition to improving air quality and reducing congestion. That said, two-and three-wheelers are often associated with

EXPANDING TRANSPORT POLICIES
HOW TO BE AN INNOVATIVE POLICY PARTNER

To make informed regulatory decisions, transport policy makers consult widely with the traditional transport stakeholders that provide the infrastructure and services for the mobility system. Today they should widen that circle to include a growing number of players that come from outside the sector.

Much of the discussion in the transport sector over the past decade has centered on the impacts of technological innovations such as app-based mobility services, new engine types and automation across all transport modes.

Less analysed, however, are a wide range of new business models that are emerging outside the sector, which nevertheless rely on on-demand transport. For many of them moving people or goods is not their core business proposition, yet they have the market power to shape transport practices. Transport has become the backbone of the on-demand, platform-based service industry in particular. In the United States alone, the service industry attracted USD 8.1 billion in spending in 2016.

Services have proliferated for two reasons. Platform-based methods make it easy to connect supply with demand and market entry costs have fallen drastically: the handyman, the physiotherapist and the laundry maid are only an app download away. But they still have to reach the client, and thus the shift to an on-demand economy that relies heavily on transport.

The growing on-demand service industry is not limited to the Global North; it is equally booming in emerging economies - illustrated by the success of Go-Jek, an integrated on-demand multiservice platform in Indonesia.

At the same time, technological innovation in telecommunications, banking and finance are suddenly changing established models for accessing transport and fare collection. Among the most notable developments is mobile payment, which is reshaping mobility practices in many developing countries. Ethiopian Airlines offers ticket purchases through mobile payment in six African countries and in China, for instance. The potential is enormous: the Global South has over 172 million active mobile money accounts that are available to those that may not have a bank account. Mobile payment and micropayment-enabled mobility services could enhance access to transport in unprecedented ways and trigger innovative business models.

Partnering with well-established transport actors remains essential for public authorities. But authorities should stay apprised of the variety of unconventional actors also shaping the future of transport. Acknowledging their role and understanding how they benefit from, or challenge, current regulations is imperative for finding adequate regulatory responses to their business ideas.

NOTES FROM THE FIELD
Cezanne Maherali

is the Head of Policy for Uber East Africa, supporting cities in Kenya, Uganda and Tanzania to move towards smart mobility. She previously worked as an Engagement Manager with McKinsey & Co.

There are over 250 000 boda bodas in Kampala. These motorcycles used for passenger transport move millions of people around Uganda's capital every day. Over 54% of road crashes involve boda boda, and less than 4% of drivers have licenses. This has created one of the biggest policy challenges for Uber in Africa - but also one of the biggest opportunities to transform the sector.

A partnership begins by declaring it. Ahead of launching UberBoda, we informed regulators of our commitment to safety and our intention to put a fully compliant product on the road - and that we were the only player that was doing this.

Getting momentum is hard. Over the past year we have been sensitising policy makers about the biggest challenge to scalability: the prohibitive cost of a driving license. In Uganda it will cost USD 60, compared to USD 20 in neighbouring countries. Yet a typical boda driver only makes USD 5 a day.

So Uber has partnered with local driving schools to train drivers and guide them through the process of acquiring a license. We are also contributing to upfront costs. We work with the police to offer road safety training, have provided drivers with an extra helmet for the passenger, and have paid for injury protection insurance to cover the rider and driver.

We pride ourselves in working to raise standards in the sector. Yet the sustainability of such investments will remain a challenge until policy makers not only acknowledge the efforts, but also play their part in creating an enabling environment for growth.

QUESTIONS FOR POLICY MAKERS

• How can regulators identify the unconventional actors who are making an impact, and in what capacity can they bring them to the discussion?

• How will regulators remain relevant in the radically changing transport landscape?

LIFESTYLE ON DEMAND
HOW INDONESIA'S ON DEMAND TRANSPORT SUPPLIER GO-JEK GREW INTO A FULL-SERVICE PROVIDER FOR UPWARDLY MOBILE URBANITES

Go-Jek started in 2010 as a call centre for booking motorcycle taxis in Jakarta. Since then, it has expanded into an on-demand multi-service platform. More than 200 000 drivers work for Go-Jek and its app registered 108 million downloads since 2015. Go-Jek operates in 167 cities and districts in Indonesia, as well as in Vietnam, Thailand, Singapore and the Philippines. Today, the company is valued at more than USD 1 billion, making Go-Jek the only Indonesian "unicorn".

What is the innovation aspect?

Go-Jek quickly understood the central role transport plays in all other service markets. Having started out as a taxi call centre, it has continually broadened its services to meet varied and evolving demands. In a first step, Go-Jek moved from dispatching taxis to offering a ride-sourcing service called Go-Ride. It then started to deliver food with its Go-Food service and convenience goods via Go-Mart. Go-Med offers home delivery for health products and urban logistics services are provided by Go-Send and Go-Box.

Today, Go-Jek even integrates a wide range of lifestyle services through its secondary app, Go-Life. With just one smartphone application, users can order services from Go-Massage, Go-Clean, Go-Auto, Go-Glam, Go-Fix and Go-Laundry, all

delivered on-demand to customers' homes. This type of service integration in a single app is reshaping the understanding of app-based mobility services globally: rather than non-transport sector players using transport providers as service, Go-Jek has used its in-depth understanding of how transport works as a springboard for expanding beyond its original business model, in the process flipping traditional roles on their head by sub-contracting non-transport businesses rather than being itself sub-contracted.

What are the benefits? What challenges exist?

Go-Jek also features a cashless payment system called Go-Pay. Go-Pay enables users to pay offline, transfer money and even purchase insurance or take out micro-loans with their app. Half of

Go-Jek's transactions in Indonesia pass through Go-Pay. This volume testifies to the attractiveness of using smart payments in the field of on-demand service delivery in the Global South.

On-demand services from dog walking to house maintenance also exist in the Global North. Here, however, they are accessed through a fragmented landscape of dedicated apps, such as Zeel, TaskRabbit, Handy, or Wog. The integration of personal mobility, delivery and lifestyle services in one single app pioneered by Go-Life thus has the potential to create synergies and significantly enhance urban transport efficiency not only in other cities and regions of the Global South, but at least as much in the North.

An important challenge exists, however: in a scenario where logistics information is not shared across public and private players, it could be counterproductive and lead to a huge increase in the number of trips.

What do policy makers need to know?

The service industry around the world is experiencing a major shift towards mobile-based on-demand business models. A growing number of tech companies claim to be the "Uber for this" or "Uber of that" by aspiring to connect demand to supply in some market or niche. One result is the rise of the "gig economy", meaning the reliance on more or less independent contractors to provide labour and infrastructure. This represents a regulatory challenge, both in the Global North and South. It may also offer opportunities, however: in the Global South, to improve the welfare of workers in the informal sector; in the Global North, to create more flexible job opportunities. Go-Jek again leads the way in this respect, by providing health and accident coverage for its drivers while offering them highly flexible work arrangements.

LEARN MORE

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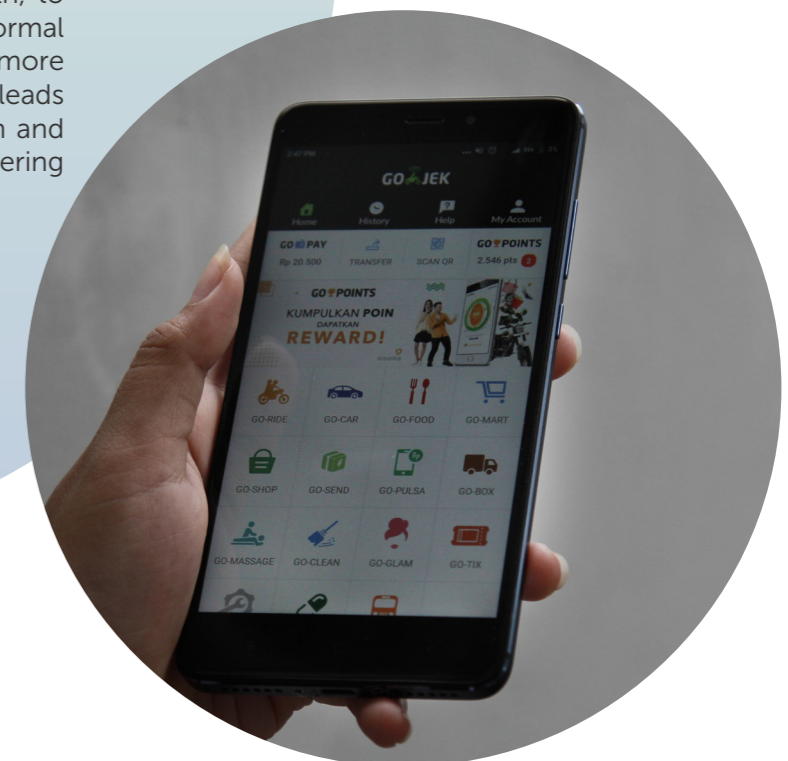
MOBILE PAYMENT FOR MOBILE PEOPLE
HOW ETHIOPIAN AIRLINES USES FIN-TECH TO MAKE AVIATION MORE ACCESSIBLE

Mobile payment refers to an electronic commercial transaction conducted through mobile devices. Mobile payment requires some sort of "e-wallet" function on a smart phone, which can then be charged with actual money and used to purchase information, services or goods. Mobile payment uses smart phones to store electronic cash that can be spent anywhere and on anything. It goes far beyond electronic cash systems run by individual supermarket chains or transport companies, with which you can only buy their products. Africa's largest aviation company, Ethiopian Airlines, has offered the possibility to buy tickets through mobile payment in Kenya, Nigeria, Uganda and Ghana since 2010. In recent years, this option has become available in Ethiopia and Zimbabwe, and a partnership with China's AliPay has enabled Ethiopian Airlines to reach its Chinese customers in the same way.

What is the innovation aspect?

Mobile payment gives the large section of the population in the Global South that has no bank account improved access to transport services. In Africa and the Middle East over 61% of the population is excluded from traditional financial services – even middle-income earners in these regions often have no access to them. Yet these regions are also the main markets served by Ethiopian Airlines. Mobile phones and cellular subscriptions are ubiquitous in both regions. Offering mobile payment has made air travel accessible to people who can afford it, but could only pay cash in the few existing bricks-and-mortar travel agencies.

What are the benefits? What challenges exist?

There are over 172 million active mobile money account owners across the Global South. They could gain much improved access to air travel if they were offered mobile payment as an option. Some European airlines have started to experiment with mobile payment for in-flight services after realising that 65% of the 100 million Chinese tourists travelling abroad every year use mobile payments.

Mobile payment and micropayment options can be easily applied to urban public transportation. Here, they could have an even greater impact, both in the Global North and South. Mobile payments for public transport would reduce wait and travel time for customers. For providers, it would lower operational costs and the risk of theft, by no longer having to handle cash or implementing their own proprietary payment services. The Netherlands are among a few countries already looking into mobile payment technology for urban transit systems across the whole country.

What do policy makers need to know?

Mobile payment can generate new business models such as the pay-as-you-go model adopted by many providers in the energy sector. Go-Jek in Indonesia and Didi Chuxing in China have proven that mobile payment is a major factor for the success of ride-sourcing platforms. However, the mobile payment ecosystem is dominated by players that have no strong links to transport and usually lack a good understanding of mobility issues. Mostly, these are banks and telecommunication companies, tech or retail giants such as Facebook and Apple or Alibaba. Yet their impact on mobility is already palpable and their role in shaping transport policy will certainly grow.

LEARN MORE

James Manyika and others, *Digital Finance for All: Powering Inclusive Growth in Emerging Economies*, 2016

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TAKING KNOWLEDGE EXCHANGE BEYOND TRADITIONAL PERCEPTIONS AND BOUNDARIES

The global transport sector is undergoing a comprehensive transformation. Digital technologies, once considered high-tech innovation of the Global North, are disrupting economies on local, national and international scales. In the Global South, however, these innovations have not been blindly adopted. Rather, they have been reconfigured, remodeled and reshaped into new transport solutions. And these adaptations are now showing their potential to change mobility in the Global North in turn. Is the Global North ready?

Policy makers around the world face similar problems. They seek to provide their citizens and economies with safe, sustainable and equitable transport solutions. Might looking beyond traditional sources for inspiration help? Could looking to different places for interesting ideas that have already taken root mitigate a classic risk of early adopters, that of picking the loser over the winner in the innovation race?

The transport solutions from the Global South examined in this report give rise to a number of important questions that transport policy makers in the Global North should consider:

- How can economic growth be aligned with creating a sustainable transport system for all?
- At what governmental level should policies fostering innovation be implemented to maximise impact?
- What policy framework must be established to ensure that digitalisation is adapted to serve specific local mobility needs?
- Which regulatory environment will ensure that existing mobility services and new market entrants are treated equally?
- Is competitive pricing of app-based transport modes enough to persuade commuters to use shared services?
- What incentives might be put in place to encourage the upgrade of traditional transport modes and ensure customer adhesion in existing markets or (re-)adoption in the Global North?
- How can cities harness knowledge about marginalised transport models of the past to tackle current challenges in the transport system?
- How can regulators identify the unconventional actors who are making an impact, and in what capacity can they bring them to the discussion?
- How will regulators remain relevant in the radically changing transport landscape?

Implementing innovation in the transport sector requires a set of cross-cutting practices and processes. The Global North can benefit from investigating innovative solutions that are successful in the Global South. Similarly, countries in the Global South can further their own initiatives by looking at what has worked elsewhere and profit from South-to-South learning. Expanding the global discussion will help to accelerate the delivery of better mobility for all.

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The International Transport Forum at the OECD is an intergovernmental organisation with 59 member countries. It acts as a think tank for transport policy and organises the Annual Summit of transport ministers. ITF is the only global body that covers all transport modes. It is administratively integrated with the OECD, yet politically autonomous.

ITF works for transport policies that improve peoples' lives. Our mission is to foster a deeper understanding of the role of transport in economic growth, environmental sustainability and social inclusion and to raise the public profile of transport policy.

ITF organises global dialogue for better transport. We act as a platform for discussion and pre-negotiation of policy issues across all transport modes. We analyse trends, share knowledge and promote exchange among transport decision makers and civil society. ITF's Annual Summit is the world's largest gathering of transport ministers and the leading global platform for dialogue on transport policy.

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DISCLAIMER

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The hot transport innovations come from the Silicon Valley and tech hubs in the Global North? Innovation is often born out of need. Many creative mobility solutions hatch in the developing and emerging nations of the Global South. They could inspire transport policy makers around the world. This report aims to open readers' eyes to innovative ideas in unexpected places – ideas that could improve mobility everywhere, for everyone.

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