
TREND CARDS
REIMAGINING THE FUTURE OF TRANSPORT ACROSS ASIA AND THE PACIFIC
ARUP
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TREND CARDS

Reimagining the Future of Transport Across Asia and the Pacific

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TREND CARDS

Reimagining the Future of Transport Across Asia and the Pacific

We use these trends to inform the possible and plausible visions for the future of transport in Asia and the Pacific.

We define a trend as an emerging pattern of change likely to impact a specific focus area. The trends have been selected based on their expected influence on transport across Asia and the Pacific.

While some of these trends may be more important for particular subregions, others are global in nature, but carry regional or local implications. The trends provide a holistic and concise overview of the key changes to consider when making decisions on the future of transport in the respective city, country, or region. They help us understand how fast and where change is happening, and how one thematic area relates to another. A summary of trends and their key aspects are described in these cards.

Population Patterns

Asia and the Pacific has urbanized faster than any other global region over the past 40 years.[1] Dense populations can enable more efficient transport systems and infrastructure when significant investment and appropriate planning measures are taken.[2] However, without proper planning and clear understanding of user needs, high congestion, poor user experience, and greater safety risks could arise.[3]

KEY ASPECTS

Urbanization and land use

Population growth and shape

Inclusive design and planning

Photo by Madiha Aijaz / ADB 2015
Women and children riding the Lahore Bus Rapid Transit service.

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WHAT IS CHANGING?

Megacities are increasing in size and number across Asia. By 2025, Asia will be home to 7 of the world's 10 largest megacities. Significant population growth can also be expected from these megacities, and with it a significant rise in resource consumption. These regions will fuel half of all consumption growth worldwide by 2030.

The growing populations in Asian megacities are also aging. By 2050, the ratio of the elderly to working-aged people will reach 2.5 times current levels. This will raise demand for health care, while the number of people with vision disabilities globally is also projected to triple by 2050; many will be in Asia.

KEY CONSIDERATION

Rapid urbanization and the development of megacities risks growth outpacing planning and investment. This can result in mobility gaps, congestion, poor accessibility, and personal security risks.[4] Developing sustainable and proactive urban mobility plans can help rapidly growing cities to implement new active and public transport infrastructure and mitigate these risks.[5] Further, collecting better travel and infrastructure data can provide evidence for transport and land use planning decisions that are resilient to future growth.[6]

Photo by Victoria Laroche Creux on Unsplash
Small, busy streets of Shanghai

Urbanization and land use

Does your city or town have a comprehensive transport plan?

Today, over 50% of the population of Asia and the Pacific lives in urban environments.[7]

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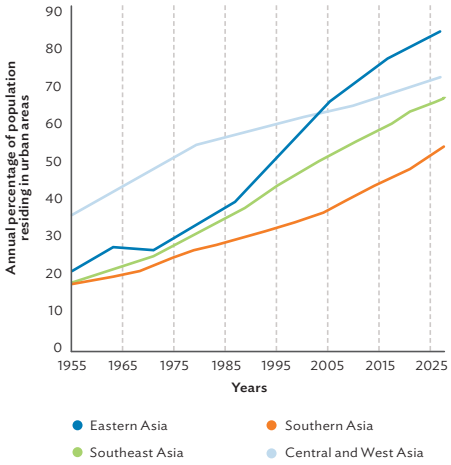
URBANIZATION AND LAND USE

Coordinated land use and transport planning will be critical in creating efficient urban systems. A dense population allows greater efficiency and investment in transport systems. However, without careful planning, cities can find themselves congested with significant knock-on impacts.[8] For example, in Southeast Asia, traffic congestion costs countries between 2% and 5% of gross domestic product annually.

Countries in the region can benefit from new technologies such as transport electrification, digitization, and automation.[9] Opportunities also exist to learn from already urbanized economies in the region, with Hong Kong, China and Singapore ranked first and second for public transport globally.[10]

Figure 1: Urbanization Population Dynamics Projections in Asia and the Pacific



Note: Western Asia is projected to urbanize more than Central Asia by 2045 (80% against 57%, respectively).

Sources: United Nations Department of Economic and Social Affairs. 2020. Population Dynamics data URL (accessed 28 June 2021); and Arup.

Photo by MR Hasan / ADB 2015
Passengers waiting for the train to leave the station in Bangladesh

Population growth and shape

How many people will live in your city in 2050?

Population growth in Asia and the Pacific is slowing 0.96% a year, yet still has the highest growth rate globally.[11]

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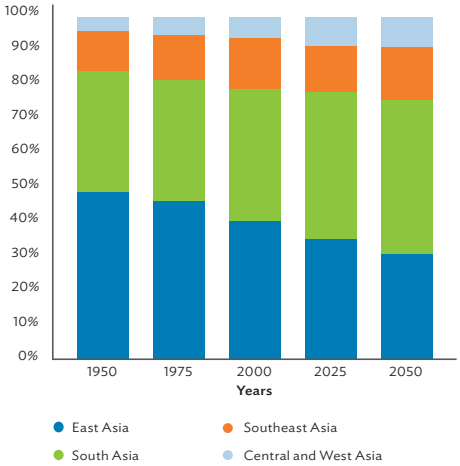
POPULATION GROWTH AND SHAPE

Dense populations can enable more efficient transport systems when significant investment and appropriate planning measures are taken.[12] With clear understanding of user needs, high congestion, poor user experience, and safety could be improved.[13]

Countries with younger demographics stand to benefit economically from their population dividend, but to do so, they need supporting infrastructure, including efficient transport systems to generate and connect people with opportunities. Countries with older populations will need to invest to retrofit systems to include elevators, escalators, and other accessibility designs.

Inclusive transport is crucial and should provide safe, secure, and affordable transportation for all communities on an intersectional basis—across gender, age, mobility, and other characteristics. Smart technologies and data can be used to better understand user needs and plan for more adequate, inclusive infrastructure while increasing capacity.

Figure 2: Current and Future Breakdown of Population in Asia and the Pacific



Note: Between 2013 and 2050, the proportion of population living in South Asia is projected to grow significantly, reaching ~45% of total regional population by 2050 (from ~35% in 1950).

Sources: United Nations Department of Economic and Social Affairs. 2020. Population Dynamics data URL (accessed 15 September 2020); and Arup.

POPULATION PATTERNS

Photo by Ray chan on Unsplash
Elderly woman being assisted on an accessible public path

Inclusive design and planning

How easy is it for citizens to access essential service?

Today, one in every six people in Asia and the Pacific lives with a disability, a proportion that is likely to increase in coming years.[14]

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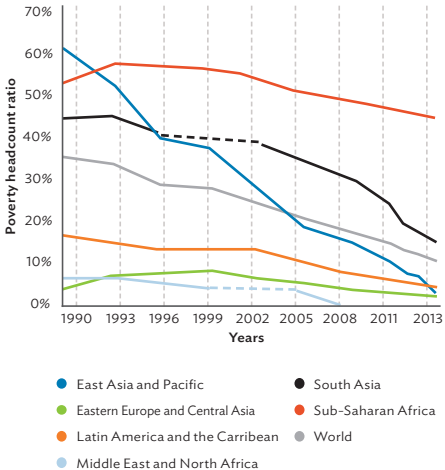
INCLUSIVE DESIGN AND PLANNING

While extreme poverty across the region is falling, inclusive transport is paramount to continuing its decline. Improved transport access provides vital connections to essential services, such as health, education, and jobs which would be otherwise inaccessible.

Inclusive urban planning should ensure that transport services accommodate the needs of all citizens and effectively consider affordability, issues of access for a variety of people including those with visible and non-visible disabilities, and safety and security for all, including marginalized groups, women, and children. Despite the benefits of such transport links, one-third of the world's rural population lives in settlements more than 2 kilometers from the nearest paved road.[15] This limits economic opportunities outside of the city and indicates that inclusive planning and accessibility remain pressing issues.

Figure 3: Decline in Global Poverty



Source: World Bank. 2016. *Poverty And Shared Prosperity 2016: Taking on Inequality.* p. 5. Washington, DC.

Behavior Patterns

Individual and collective transport behaviors are being influenced by a range of cultural, environmental, and economic factors. Key drivers include the rapid expansion of digital lifestyles, growth of global tourism, and a desire for healthier lifestyles. Concerns about climate change are also having significant impacts on travel patterns.

KEY ASPECTS

Digital lifestyles and e-commerce

Travel and tourism

Healthy and sustainable lifestyles

Photo by Lisanto on Unsplash
Tourist taking a photo on a smartphone in Taipei, China

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WHAT IS CHANGING?

Disposable incomes are projected to increase by 78% across Asia and the Pacific from 2017 to 2030. A growing middle class will drive demand for local and regional travel; enable more digital services and experiences; and increase associated spending on new vehicles, services, and e-commerce.[1,2,3]

Digital technology is important in shifting behavior patterns, increasing system efficiency, and reducing environmental impacts. Cashless transactions and ticketing can increase the speed and efficiency of journeys, provide valuable data for transport planners and providers, and reduce corruption and risk of theft.[4] Smartphone ownership is also changing the way people experience transport in many cities.

KEY CONSIDERATION

Behavior patterns are highly localized, context-dependent, and difficult to predict. In less-developed regions, factors such as accessibility, affordability, and safety will continue to dominate choices of transport. However, all regions are likely to see a growing impact from a continued digitalization of work, leisure, and retail, with significant effects on logistics, local market access, and future travel demand. Climate change is likely to impact on future travel patterns and demand too.

Photo by David Dvracek on Unsplash
Cashier receiving digital payment from a customer's smart phone

Digital lifestyles and e-commerce

Is your transport system ready for a "digital-first" world?

Malaysia aims to be cashless by 2050,[5] and India plans for more than 40% of all purchases to be digitalized by 2030.[6]

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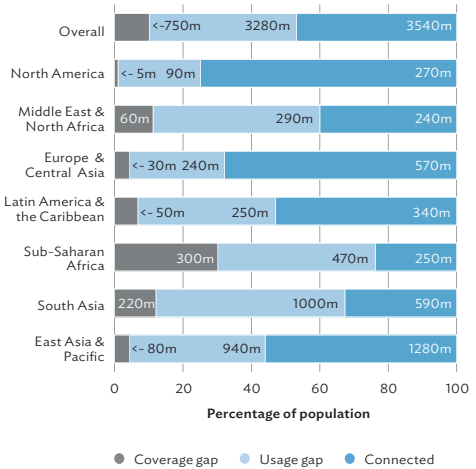
DIGITAL LIFESTYLES AND E-COMMERCE

The digital economy is growing rapidly, with e-commerce value doubling between 2017 and 2018 (from $10 billion to $23 billion). Digital infrastructure and smartphone ownership have increased across Asia and the Pacific over the past 5 years. Rising demand for e-commerce requires a rapid and reliable logistics network, in particular for last mile and local deliveries. In addition, technology-enabled "mobility as a service" and demand-responsive transport have the potential to improve the experience of accessibility, efficiency, and affordability.

Demand for new mobility solutions and platforms can foster competition across providers, increase affordability for users, and expand the availability of last-mile options such as e-scooters.[7] Over the coming decade, digital technologies will influence and reshape transport behavior across the region. To be effective—and to achieve desired economic, social, and environmental outcomes—regulation must keep up with rapid private sector innovation.

Figure 4: State of Global Mobile Internet Connectivity by Region, 2018



Note: Global mobile internet connectivity shows how connected people are via their mobile devices. Here South Asia reaches over 50%, the highest proportion globally.

Source: GSMA. 2019. *The State of Mobile Internet Connectivity 2019*. p. 13. GSMA: London.

Photo by Milada Vigerova on Unsplash
Tourists visiting Angkor Wat, Cambodia

Travel and tourism

What will tomorrow's tourists expect?

India's air passenger traffic is expected to triple by 2036.[8]

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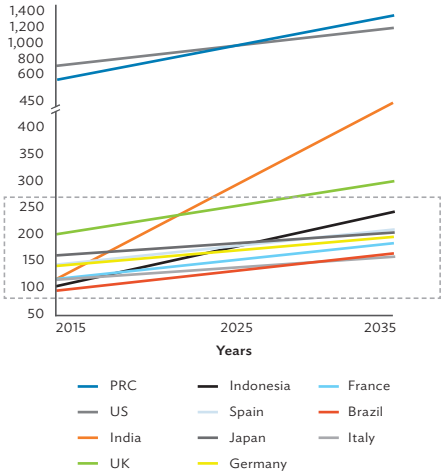
TRAVEL AND TOURISM

Asia and the Pacific is the fastest-growing market for travel and tourism globally, driven by greater spending power and a desire for new wellness, cultural, and entertainment experiences. In recent years, the region was the second-largest destination for international tourists and the biggest source of global outbound tourist spending, predominantly on intra-regional travel.[9]

The growing number of leisure travelers and frequent fliers in the region could significantly increase global aviation-related greenhouse gas emissions at a time when environmental sustainability remains the region's greatest competitive constraint.[10] Growing environmental concerns may eventually dampen long-distance leisure and business travel, shifting demand to regional or local experiences, or lower carbon modes.

Figure 5: Top 10 Air Passenger Markets Globally (million O-D passenger journeys to, from, and within)



O–D = origin–destination PRC = People's Republic of China, UK = United Kingdom, US = United States

Source: International Air Transport Association. 2020. Latest Edition of the 20-year Air Passenger Forecast. https://www.iata.org/en/publications/store/20-year-passenger-forecast/

BEHAVIOR PATTERNS

Photo by Dikaseva on Unsplash
Farmers cycling through rice fields in Indonesia

Healthy and sustainable lifestyles

Do travel users have safe and low-carbon travel alternatives on your network?

Electric vehicles , public transport, and stricter emissions standards could bring cleaner air to 22% of people living in Asia and the Pacific by 2030.[11]

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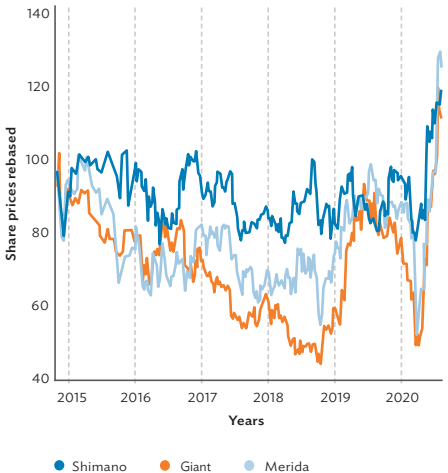
HEALTHY AND SUSTAINABLE LIFESTYLES

The 4 billion people living across Asia and the Pacific represent 65% of the world's total population. If motorized transport increases, it risks contributing to obesity, air pollution, and greenhouse gas emissions, as well as greater community inequality in who can and cannot afford mobility.[12]

Embracing healthy and sustainable lifestyles across the region will be critical to achieving the Sustainable Development Goals and avoiding the worst consequences of traditional transport modes.

Altering lifestyles includes a shift toward more active modes of travel and a reduction in emissions. Active mobility includes more walking, cycling, personal mobility solutions, and the integration of transport with "placemaking" and an accessible public realm. The trend toward healthy lifestyles is anticipated to increase over time.

Figure 6 : Bicycle Use Takes Off in the Pandemic



Note: Stocks of bicycle manufacturers increased during the coronavirus disease (COVID-19) pandemic.

Source: *Channel News Asia.* 2020. Singapore Sees Cycling Boom amid COVID-19, with Increased Ridership and Bicycle Sales; with data from the Financial Times.

Integrated Transport Systems

The increasing availability of real-time system data and information from operators and users is creating opportunity for more integrated transport networks and modes. This comes at the same time as a rapid diversification of transport modes and pressure to improve accessibility across existing transport systems.

KEY ASPECTS

Integrated land use and transport planning

Mode choice and diversification

Equity: access, pricing, and affordability

Photo by Dan Freeman on Unsplash
Traffic at a busy night market in Bangkok, Thailand

WHAT IS CHANGING?

A fast-expanding variety of transport modes is available in Asia and the Pacific. To better integrate them, all modes should form part of a managed transport ecosystem, bringing together strategic urban and rural transport modes and corridors with secondary and tertiary networks, including active mobility options.

In the coming decades it will be essential to achieve greater physical and digital integration across modes and operators to increase accessibility, system efficiency, and the overall user experience. Transport solutions not only provide access to essential services and livelihoods but can also be a space for health and exercise, recreation, and community. This requires a multifaceted and holistic approach, with transport seen as a critical enabler.

KEY CONSIDERATION

Continued mode diversification provides greater flexibility and choice, but in unregulated markets, this can also lead to a lack of integration between existing and new modes, increasing inefficiencies and undermining user experience. City and regional transport authorities will need to provide platforms and frameworks for better virtual and physical integration across modes. This will increase convenience, efficiency, and sustainable use.

Photo by Lester Ledesma / ADB 2015
Elevated walkways protect pedestrians from rush hour traffic in Bangkok, Thailand

Integrated land use and transport planning

How is your transport strategy affecting land use?

More compact, connected, and coordinated cities could reduce infrastructure capital investments by over $3 trillion between 2015 and 2030.[1]

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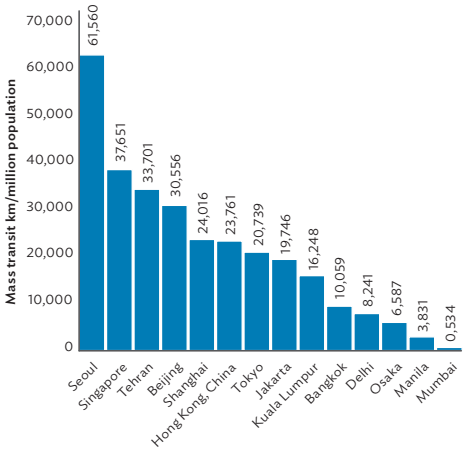
INTEGRATED LAND USE AND TRANSPORT PLANNING

Integrated land use and transport planning varies in the countries of Asia and the Pacific , ranging from the comprehensive approaches in Japan and Singapore to cities such as Ulaanbaatar (Mongolia), Jakarta (Indonesia), and Kathmandu (Nepal), where a lack of planning and limited finance cause significant congestion. The situation can be exacerbated by rapid urbanization, increasing demand for private vehicle ownership, and the emergence of new modes and services provided by multiple—often competing—public and private operators.

The United Nations Centre for Regional Development[2] defines eight core principles of integrated urban transport planning applicable across cities in the region and globally.[3] Recognizing local geographic, environmental, and socioeconomic conditions is critical for developing context-sensitive approaches to planning.

Figure 7: Mass Transit Networks in Selected Cities in Asia and the Pacific, 2018



km = kilometers

Source: United Nations Centre for Regional Development. 2018. Sustainable Urban Transport Index for Asian Cities. Background paper for EST Plenary Session 6. p. 5.

Photo by Afif Kusuma on Unsplash
Driver of a ride hailing company collecting passenger.

Mode choice and diversification

What modes will be most popular in the future?

In the Pacific region, car sharing represents some 60% of all journeys.[4]

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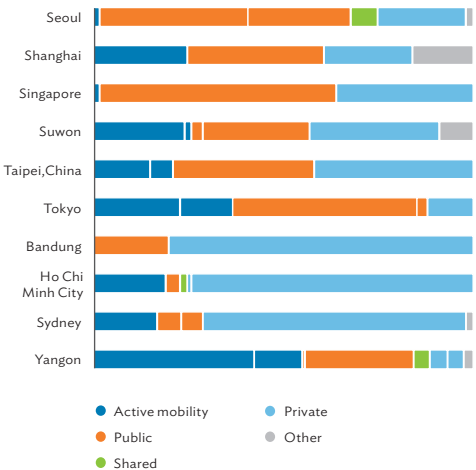
MODE CHOICE AND DIVERSIFICATION

As Asia and the Pacific continues to urbanize, demand for transport will follow. While public transport dominates in some cities, private cars and motorbikes and informal transport services are still the primary means of travel in many.[5]

A growing focus on active modes and the emergence of new mobility operators, platforms, and services will provide opportunities to increase accessibility and mode choice across all of Asia's developing countries. This will increase the need for more integrated approaches to planning, taxation, and transport policy.

The extent to which formal and informal private, on-demand ride-hailing services can harmonize with government-run public transport will be critical for future operations of transport networks. Planners and policy makers must also facilitate opportunities beyond densely populated cities to achieve greater mode choice and access in rural and remote areas where "leapfrogging" opportunities exist.

Figure 8: Mode Share in 10 Asia and Pacific Cities, 2017



Source: Centre for Livable Cities and Urban Land Institute. 2017. *Urban Mobility: 10 Cities Leading the Way in Asia-Pacific*. p. 49.

Photo by Rahim Mirza / ADB 2021
Karamat Ali showing Zu card because now he can travel easily.

Equity: Access, pricing, and affordability

How accessible and fair is your transport network?

Across Asia and the Pacific, public transport's share of journeys could reach 60% by 2050, up from 24% in 2015.[6]

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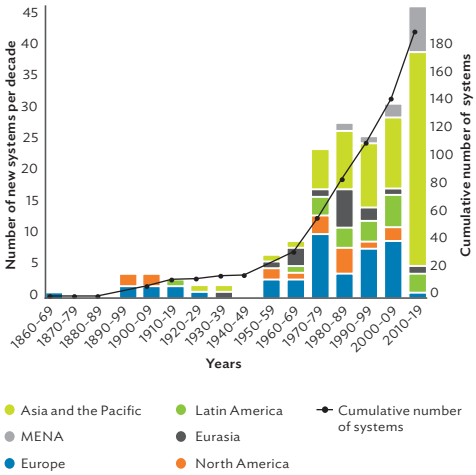
EQUITY: ACCESS, PRICING, AND AFFORDABILITY

The number of people living in extreme poverty in Asia and the Pacific has dropped from nearly 1.5 billion in 1990 to less than 400 million in 2020.[7] Over the coming decades, many people will continue to struggle with transport affordability, limiting their opportunities and preventing access to educational, cultural, and health-care facilities. Effects are even more pronounced in rural areas and outer-island communities. Currently, only 30% of rural households in Nepal have access to all-season roads.

Informal transport modes fill a crucial gap in transport provision in many cities, including use of autocars, rickshaws, and unregulated minibuses.[8] In addition to overall poverty reduction and a focus on universal access, new digital platforms for formal and informal service integration, mass public transit, and affordable electric mobility solutions provide the most promising mechanism for improving access and affordability.

Figure 9: Number of New Rapid Mass Transit Systems



MENA = Middle East and North Africa

Source: R. Florida. 2018. *The Global Mass Transit Revolution: A New Report Confirms That the US Lags Behind the Rest of the World in Mass Transit*. Bloomberg CityLab.

Adaptive Infrastructure Planning

Asia and the Pacific is tackling its aging infrastructure and harnessing technology to repair and maintain transport assets to get the most out of existing systems. There is an increasing need to invest in infrastructure that can adapt to a changing climate, demographics, and economic requirements and uses, both in the short and long term.

KEY ASPECTS

Adaptation and repurpose

Infrastructure investments

Aging infrastructure

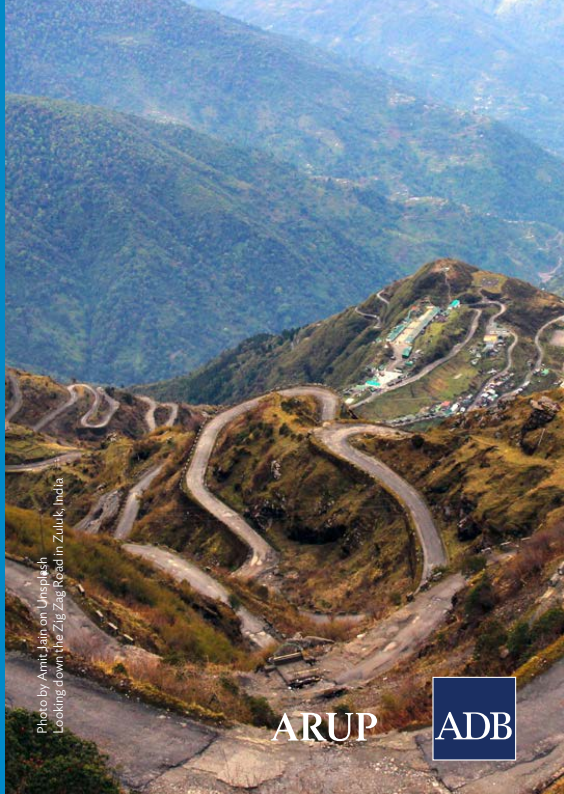


Photo by Amit Jain on Unsplash
Looking down the Zig Zag Road in Zuluk, India

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WHAT IS CHANGING?

The climate and population of Asia and the Pacific are changing. As a result, infrastructure needs to be adapted so it can respond to future needs.

An estimated $37 billion will be required annually from 2015 to 2030 for climate adaptation of transport in the region, including new infrastructure and maintenance investments. This is in addition to the planned $520 billion annual investment to meet ongoing and growing demand for transport.[1] Climate change impact will be uneven across the subregions. East Asia will account for 61% of climate-adjusted investment needs throughout 2030. To make the most of current and future investments, more infrastructure and transport solutions will need to be adaptable and flexible to changing conditions and multiple uses—for example, a road that can support floodwater retention or permeable surfaces that can hold excess water.

KEY CONSIDERATION

Significant investment in "stranded assets" could become prematurely outdated.[2] Projected investments are expected to cover new infrastructure and systems operation and maintenance. An estimated 1.1%–2.1% of gross domestic product (GDP) per year will be needed to maintain transport infrastructure in Asia's developing countries during 2020–2030, higher than estimated investment needs for new infrastructure.[3] In addition, limited coordination across governments can prevent completion of projects on time and within budget.[4] Developing more flexible and adaptable transport infrastructure strategies can help to "future-proof" assets and investments.

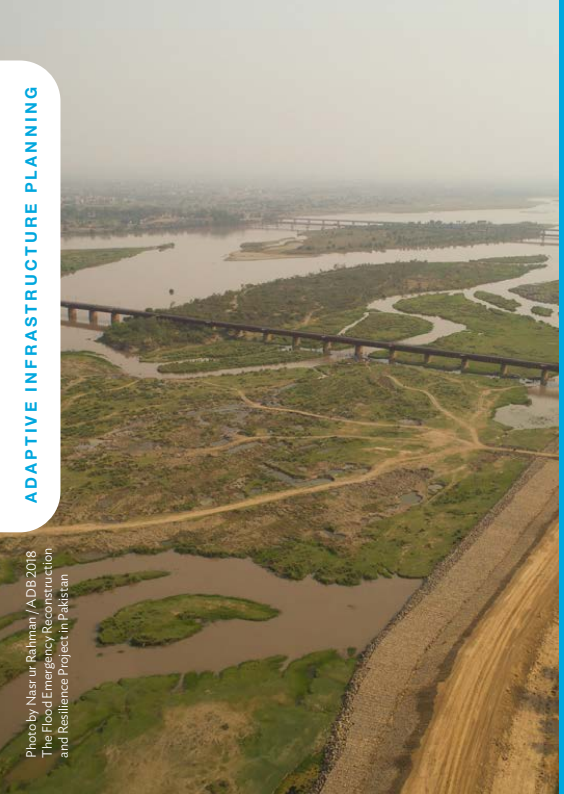

Photo by Nasrur Rahman / ADB 2018
The Flood Emergency Reconstruction and Resilience Project in Pakistan

Adaptation and repurpose

How resilient is your infrastructure to change?

The share of investment in rail will be greater than in roads in the future, with better integration of clean technologies.[5]

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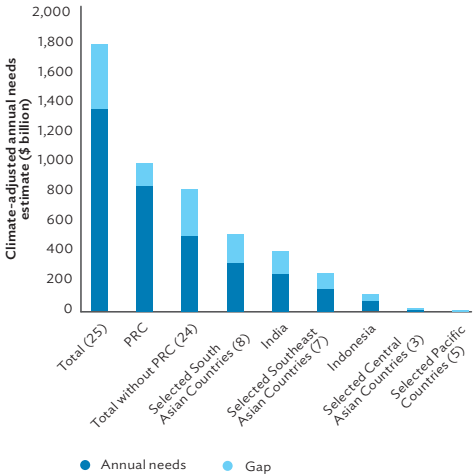
ADAPTATION AND REPURPOSE

Transport infrastructure and systems must be ready to adapt to a changing climate, shifting population needs, travel behavior patterns, and changes in mobility technologies while also being flexible, multipurpose, and adaptive.

The transport sector has a role to play in mitigating greenhouse gas emissions using more efficient modes of transport and saving energy within and across modes. Networks of existing infrastructure must be upgraded, and new infrastructure must be designed from the start to be resilient to changes such as sea-level rise and adaptable and flexible to future needs such as changing travel behavior and requirements. Climate-proof and adaptive investment will increase short-term costs, but long-term benefits will more than pay for it.[6]

Repurposing existing assets will also be important in helping Asia's developing countries to respond to the evolving needs of transport users without contributing to environmental degradation.

Figure 10: Annual Estimated (climate-adjusted) Infrastructure Investment and Gap, 25 Developing Asian Countries



Note: Across all Asian Development Bank (ADB) developing member countries, gaps represent ~25% of infrastructure investment needs. The gaps are much higher when subtracting the People's Republic of China (PRC) needs.

Source: ADB. 2017. *Meeting Asia's Infrastructure Needs: Highlights*. Arup graph with ADB date.

Photo by Deng Jia / ADB 2016
Hubei-Yichang Sustainable Urban Transport Project in the People's Republic of China.

Infrastructure investments

What are the areas of underinvestment in your transport systems?

The latest (2018) estimates from ADB suggest that Asia and the Pacific invests $881 billion annually in infrastructure.[7]

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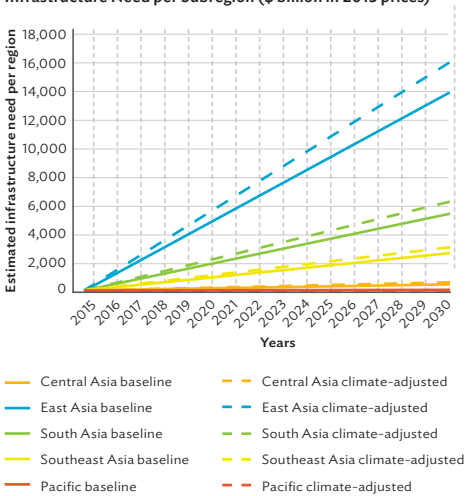
INFRASTRUCTURE INVESTMENTS

Countries in Asia and the Pacific are generally underinvesting in infrastructure. Movement of goods and passengers is still hindered by missing links and poor-quality connections in the transport system. The estimated $881.0 billion represents only 73% of the estimated baseline $1.2 trillion needed (for the period spanning 2016 to 2020). Factoring in the cost of climate adjustments, the required investment rises to $1.3 trillion.[8]

What is more, the climate-adjusted infrastructure investment gap is believed to be 2.4% of projected GDP for the region from 2016 to 2020. But when the People's Republic of China is removed from this estimate, the gap becomes 5%.[9] Longer term, an estimated $26.2 trillion is required for infrastructure across the region up to 2030. Transport comprises 32% of this figure ($8.4 trillion), second only to the power and energy sectors in estimated investment needs.[10]

Figure 11: Baseline and Climate-Adjusted Estimated Infrastructure Need per Subregion ($ billion in 2015 prices)



Note: Total infrastructure investment for developing Asia and the Pacific will reach $22.6 trillion over the next 15 years in a baseline scenario.

Source: ADB. 2017. *Meeting Asia's Infrastructure Needs: Highlights*. Manila. Arup graph with ADB data.

Photo by Daro Sulakauri/ADB 2014
Railway construction from Poyle to Salakhle in Azerbaijan

Aging infrastructure

Are you maintaining older transport assets?

The World Bank in 2005 estimated that many countries are spending just 20%–50% of what they should on road maintenance.[11]

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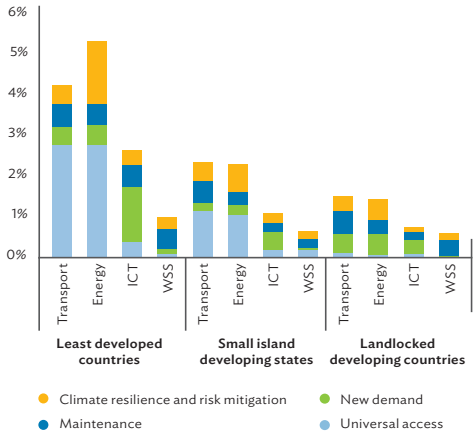
AGING INFRASTRUCTURE

Inadequate maintenance can lead to infrastructure deficits. Many countries in Asia and the Pacific prioritize development of new infrastructure over maintenance of existing stock. For example, in the Pacific, the Pacific Region Infrastructure Facility notes that "maintenance is being avoided within the 'build–neglect–rebuild' paradigm,"[12] whereas $1 saved in differing road maintenance increases road user costs by $2 to $3,[13] ultimately leading to negative outcomes for transport users.

Compounding matters, countries with weaker public revenue often accompany shortfalls in government review targets with cuts in maintenance spending. This creates the need for more costly repair and reconstruction in the future, even though governments know that preventative maintenance offers better financial returns than investment in new infrastructure.[14] Estimates suggest that $1 of deferred maintenance costs $5 in repairs or $25 in replacement long term.[15]

Figure 12: Annual Infrastructure Financing Needs by Country Group, Component, and Sector, 2018-2030 (% of GDP)



GDP = gross domestic product, ICT = information and communication technology, WSS = water supply and sanitation.

Note: Transport is the second biggest beneficiary of infrastructure investment in less developed countries (receiving over 4% of GDP).

Source: C. Branchoux, L. Fang, and Y. Tateno. 2018. Estimating Infrastructure Financing Needs in the Asia-Pacific Least Developed Countries, Landlocked Developing Countries, and Small Island Developing States. *Economies.* 6 (3): pp. 43.

Climate Change

Transport sector greenhouse gas emissions are projected to increase significantly in Asia and the Pacific's developing countries in coming decades, alongside increasing climate and disaster impacts.[1] Aggressive and sustained action is needed to ensure that transport systems provide the means for a resilient and low-carbon future.

KEY ASPECTS

Climate and disaster impacts

Greenhouse gas emissions

Climate policy

Photo by Jonathan Ford on Unsplash
Tourists try to stay dry in a flooded public square

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WHAT IS CHANGING?

Asia's share in total worldwide transport sector–related carbon dioxide (CO_2) emissions is growing rapidly and is expected to reach 31% by 2030.[2] Disaster impacts have also increased significantly in recent decades, an accelerating trend due to climate change. Many transport systems are highly exposed to natural hazards due to their wide spatial distribution, especially along coastlines. More than $3 trillion in port infrastructure assets in 136 of the world's largest port cities are already vulnerable to extreme weather.[3] Driven by international agreements and rapidly evolving climate policy, developing countries face a growing imperative to enhance resilience and reduce transport system emissions.[4]

KEY CONSIDERATION

Reducing greenhouse gas emissions and strengthening climate and disaster resilience in the transport sector requires a systems-wide approach. Due to the interconnected nature of transport and other services, disruption in one location can lead to regional or even global economic impacts. Enhancing the integration and flexibility of transport networks and services can help ensure developing countries in Asia and the Pacific can cope, adapt, and thrive when disruption and change occur.

CLIMATE CHANGE

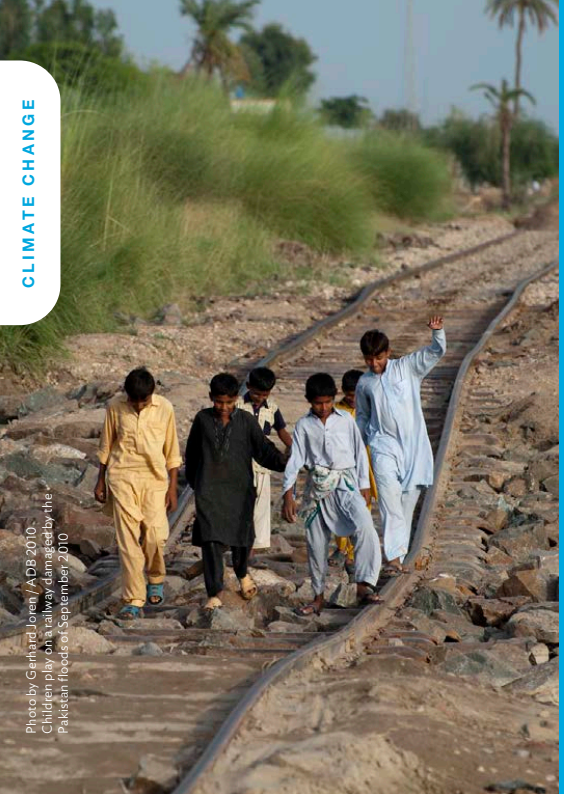

Photo by Gerhard Joren / ADB 2010
Children play on a railway damaged by the Pakistan floods of September 2010

Climate and disaster impacts

How can transport planning and design accommodate future risk and climate uncertainty?

Natural hazards cost around $15 billion a year in direct damage to global road and rail infrastructure, with developing countries in this region among those most severely affected.[5]

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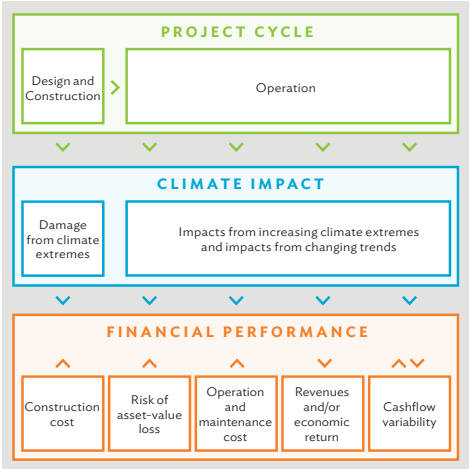
CLIMATE AND DISASTER IMPACTS

The cost of disasters is rising, driven by factors such as increasing asset value, poorly maintained assets, and urbanization in coastal areas and floodplains. Climate change is increasing the frequency and severity of extreme weather events and generating new threats, such as extreme heat and rising sea level. Over $37 billion is required annually to "climate-proof" transport investments in the Asian Development Bank's developing member countries, one component of adaptation costs.[6]

When built and operated to higher standards of resilience, transport systems can reduce vulnerability by enabling evacuation, delivery of relief, infrastructure reinstatement, and continuity of economic activity following a disaster. Resilient transport investments have a low incremental cost and are generally cost-effective in the long run.[7]

Figure 13: Climate Change Impact on Infrastructure Asset Financial Performance



Source: ADB. 2021. *A System-Wide Approach for Infrastructure Resilience.* Manila.

CLIMATE CHANGE

Photo by nomadicjulian on Unsplash
Rush hour in Bangkok, Thailand

Greenhouse gas emissions

How can transport systems become carbon neutral?

The Paris Climate Agreement requires limiting global warming to below 2°C, preferably to 1.5°C, compared to pre-industrial levels by achieving a climate neutral world by mid-century.

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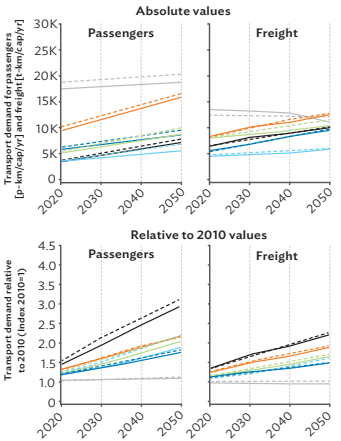
GREENHOUES GAS EMISSIONS

A primary cause of climate change is increasing concentrations of greenhouse gas emissions in the atmosphere, with CO_2 emissions accounting for around 76% of total emissions. In 2019 the global transport sector contributed to 24% of direct CO_2 emissions from fuel combustion, with road transport accounting for 75%.[8] Despite increased momentum in the discontinuation of conventional vehicles, rising efficiency, and growth in electric vehicles, transport emissions are projected to double by 2050.[9]

Asia and the Pacific is the largest regional vehicle market, accounting for 48% of global sales in 2019. Asia's share of total worldwide transport emissions is growing, with road transport emissions not predicted to peak until 2040.[10] Decoupling transport-sector-related greenhouse gas emissions growth from GDP growth will require rapid action to promote a mode shift, improve energy efficiency, and reduce fuel carbon intensity.

Figure 14: Global Passenger and Freight Regional Demand Projections to 2050



EIT = Economies in Transition, LAM = Latin America and the Caribbean, MAF = Middle East and Africa, OECD = Organisation for Economic Co-operation and Development

Note: Based on integrated models for various CO_2 equivalent concentration levels by 2100.

Source: Intergovernmental Panel on Climate Change. 2014. *Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change.* Geneva.

CLIMATE CHANGE

Photo by Cory Wright on Flickr
UN Climate conference

Climate policy

Do you know your national greenhouse gas emissions targets and climate adaptation priorities?

The Paris Climate Agreement, Sendai Framework for Disaster Risk Reduction, and Sustainable Development Goals provide a global framework to respond to climate change and disaster risk.

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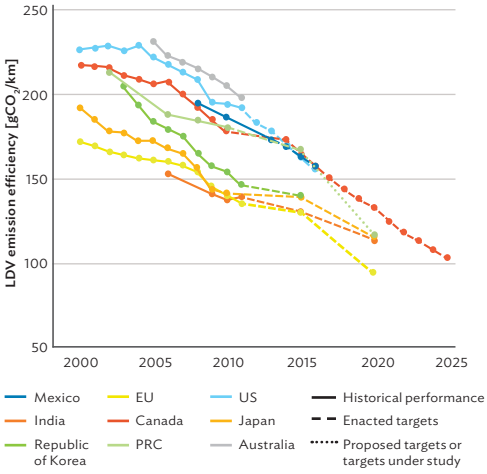
CLIMATE POLICY

As of 2020, greenhouse gas mitigation targets for the transport sector featured in 104 of the 163 Nationally Determined Contributions outlining countries' national climate priorities and commitments.[11] Countries in Asia and the Pacific are now translating these contribution priorities into policies that will increasingly impact and shape transport systems of the future. Policy measures include a mix of "push" and "pull" instruments such as carbon pricing, incentives for e-mobility and public transport, and standards for vehicle efficiency and climate resilient design. Over 60% of Asia's population lives in countries that have taken steps to phase out gas- or diesel-powered vehicles.[12,13]

"Ambition-raising" is built into the Paris Climate Agreement, meaning that policy will evolve and tighten over coming decades. Effective implementation will require long-term strategic planning, capacity building, and strong private sector engagement to raise the necessary financing to deliver on commitments.

Figure 15: Historic and Projected LDV Emission Targets for Selected Countries and the European Union, IPCC 2014



LDV = light-duty vehicle, IPCC = Intergovernmental Panel on Climate Change, EU = European Union, US = United States

Source: Intergovernmental Panel on Climate Change (IPCC). 2014. *Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change.* Geneva.

Environmental Risk

Environmental issues are increasingly impacting Asia and the Pacific. Ecological degradation is often driven by societal and economic development. Across the region we are seeing biodiversity and habitat loss, degraded ecosystems, flora and fauna extinction, and environmental pollution, all impacting and impacted by transport systems.

KEY ASPECTS

Biodiversity loss

Pollution

Spread of disease and invasive species

Photo by Marcin Jozwiak on Unsplash
Aerial view of an industrial factory

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WHAT IS CHANGING?

Many economies and cities around the world are developing at the expense of natural capital, which is particularly concerning given the region's importance to marine biodiversity in the Coral Triangle of Southeast Asia and because of its globally significant tropical forests.[1,2] Overfishing, pollution, wastewater treatment, infrastructure, and transport systems endanger wildlife and deforestation. These factors are stressing many of the region's ecosystems.

New models for urban and transport infrastructure systems are needed to balance people's needs with nature. This includes transformation of systems that enable biodiversity conservation alongside economic and societal development.

KEY CONSIDERATION

Asia and the Pacific has the largest number of climate-vulnerable people worldwide, with women among the most vulnerable.[3]

People are increasingly migrating to places near high-value coastal and estuarine ecosystems. In parallel, low-lying land, river, and delta systems are transforming from rich biodiverse ecosystems into locations with dangerous chemical runoff, smog, and widespread environmental degradation. Human settlements destroy and fragment habitats and displace species amid new construction and linear infrastructure projects that divide habitats and cause land, water, air, and noise pollution. Considering design solutions that enable wildlife habitat connectivity from the outset can avoid habitat fragmentation and reduce impact on biodiversity.

ENVIRONMENTAL RISK

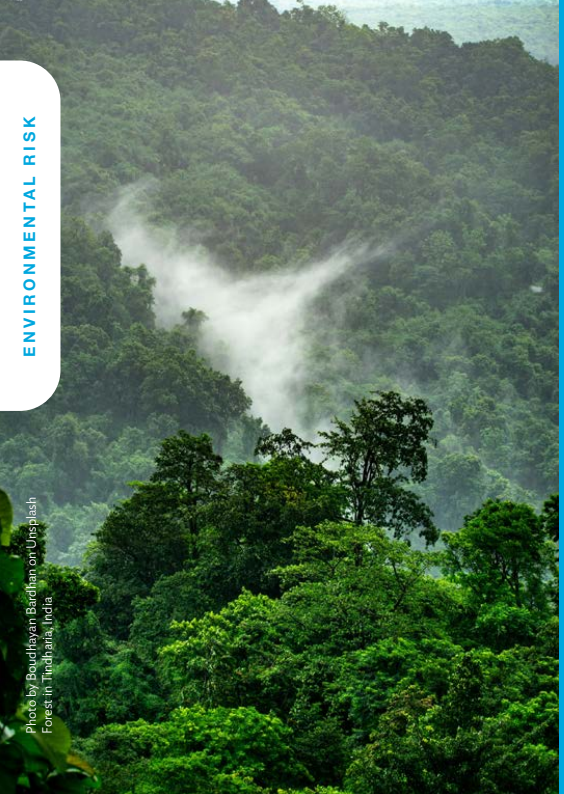

Photo by Boudhayan Bardhan on Unsplash
Forest in Tiudharia, India

Biodiversity loss

Can we reverse ecological damage?

Southeast Asia's biodiversity could reduce by over 40% by 2100.[4]

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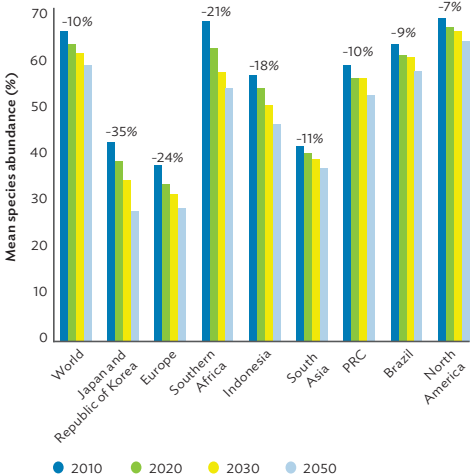
BIODIVERSITY LOSS

Some scientists contend that the planet is in the midst of a sixth extinction, largely caused by human activity.[5] Economic growth has benefited countries globally yet threatens ecosystem integrity and biodiversity. Continued biodiversity loss seems inevitable; however, the types, locations, and rates of decline can be altered.[6]

Environmental conservation is thus critical to halt further loss. Linear infrastructure is a major driver of species extinction as it divides habitats, territories, and ecological networks. Future investments must focus on projects that protect land and maritime flora and fauna.

Figure 16: Terrestrial Mean Species Abundance Globally (% of level that natural vegetation could support)



PRC = People's Republic of China

Note: Projections based on baseline scenario.

Source: European Environment Agency. 2014. *Terrestrial Mean Species Abundance, Globally and for Selected World Regions.* Copenhagen.

ENVIRONMENTAL RISK

Photo by Al Benavente / ADB 2019
Rehabilitation efforts of polluted creeks in Manila, Philippines.

Pollution

Does changing transport technology have the potential to reverse air pollution?

Transport emissions may increase at a faster rate than any other sector, reaching around 12 gigatonnes (Gt) CO_2 eq/year by 2050, compared with 7 Gt CO_2 eq/year in 2010.[7]

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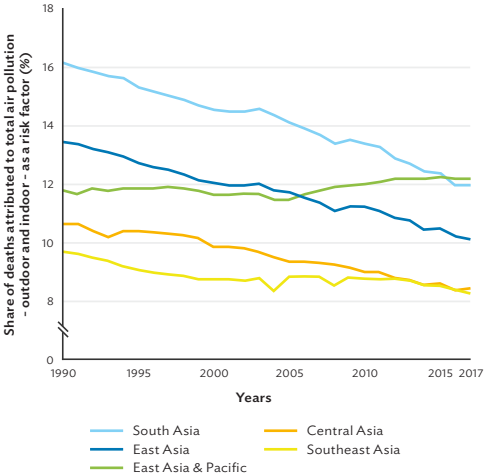
POLLUTION

The transport sector contributes significantly to environmental pollution through resource extraction for infrastructure and vehicles, exhaust, noise, contaminated runoff from roads, and waste when assets reach the end of their useful life. Air pollution was the fourth leading risk factor for death worldwide in 2019.[8] Particulate matter (PM)2.5 is found to be the most consistent and robust predictor of mortality from cardiovascular, respiratory, and other diseases, and transport is a significant source of this. Pollution is a health risk to people and the planet and damages the environment and crop yields,[9] impacting economic growth and tourism.[10] As transport transitions toward electrification and clean fuels, air pollution and contaminates from exhaust will be greatly reduced, yet pollution associated with resource extraction, asset production, and end of life will remain challenging.

Figure 17: Share of Deaths from Air Pollution, 1990–2017



Source: H. Ritchie and M. Roser. 2017. Air Pollution. *Our World in Data.* URL (accessed 15 September 2020).

ENVIRONMENTAL RISK

Photo by Edsel Roman / ADB 2020
Free transport was given to health workers during the enhanced community quarantine around Metro Manila.

Spread of disease and invasive species

Does your transport network contribute to the spread of disease?

There are 200 types of zoonotic diseases (infectious diseases that originate in animals), 61% of all human diseases are zoonotic in origin, and 75% discovered in the last decade are zoonotic.[11]

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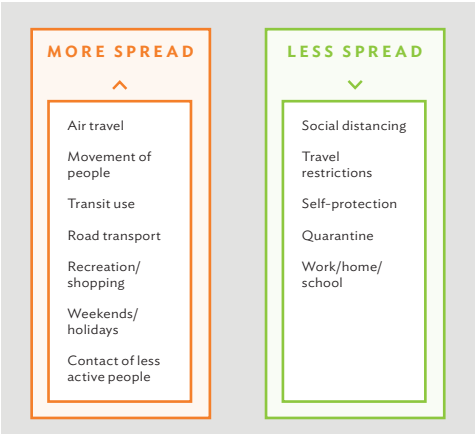
SPREAD OF DISEASE AND INVASIVE SPECIES

Regional connectivity is important for economic development, but greater connectivity raises the risk of unintended environmental consequences. As trade and logistics increase, land, air, and sea transport systems become potential vectors, carrying invasive species and communicable diseases, for example unintentional movement of marine organisms through ballast water in ships or transfer of weeds from the wheels of trucks. Constructing new transport corridors improves connectivity, yet also causes long-term issues including deforestation, illegal logging and poaching, greater exposure to animals, and transmission of zoonotic diseases. A study of the spread of the HIV/AIDS virus found it had spread much more in areas with well-connected transport links.

Managing these risks while balancing the economic benefits of increased trade and regional cooperation is challenging and requires new approaches to ensure safe and environmentally responsible transportation of goods and people.

Figure 18: Transport and Spread of Infectious Diseases



Source: D. Muley, M. D. Shahin, Charitha Dias, and Muhammad Abdullah. 2020. Role of Transport during Outbreak of Infectious Diseases: Evidence from the Past. *Sustainability*.

Advanced Technologies

Advanced technologies are increasingly deployed in transport infrastructure across Asia and the Pacific. This trend encompasses both new and emerging technologies in fields as diverse as digital components, autonomous systems, and communication networks. These technologies have the potential to radically transform the design, operation, and components of future transport systems.

KEY ASPECTS

Autonomous systems

Artificial intelligence and machine learning

Internet of things

WHAT IS CHANGING?

Advanced technologies have the potential to transform how transport systems are designed, constructed, monitored, maintained, operated, and experienced. New technologies could be deployed to achieve a broad range of social, environmental, and economic outcomes. A user-centered approach to technology deployment is important as behavior and demand patterns are likely to change significantly over time.

For example, declining costs in sensor technology facilitates data collection. This enables transport operators to better maintain infrastructure, measure environmental impacts, or capture user behavior. Globally, there will be over 40 billion internet-connected devices by the mid-2020s, up from 8 billion in 2019.[1,2,3] This increases opportunities for distributed and citizen-driven data capture, even in less developed regions.

KEY CONSIDERATION

Adoption rates of new technologies will vary from one place to another. Deployment should therefore focus on maximizing benefits within a specific local context. Applications of new technologies may range from enhancing the performance of existing or new infrastructure, to improving maintenance protocols and to expanding universal access for all.
A particular advantage of digital technologies is that they enable "leapfrogging," where countries become early adopters of new technology and accelerate their development. The Gartner Hype Cycle can be a useful reference point for horizon scanning and identifying plausible future disruptions. It illustrates the status of emerging technologies and their development status over time.[4]

ADVANCED TECHNOLOGIES

Photo by Asawin on pixhere
New intelligent car and transport technology allowing for internet of things

Autonomous systems

Which parts of your transport system could be automated first?

Deployed at scale, autonomous vehicles could lead to a reduction of front–rear crash rates by 50%.[5]

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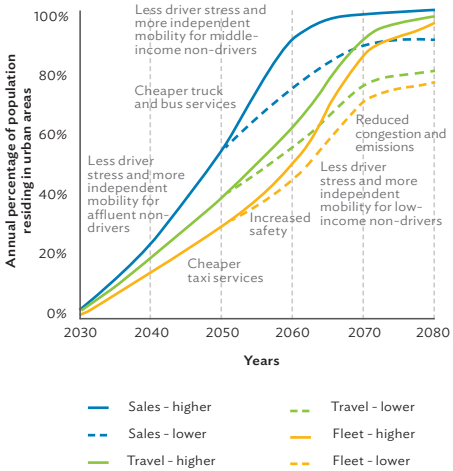
AUTONOMOUS SYSTEMS

Autonomous systems refer to sensors and control systems that allow machines to perform a task independent of direct human control. These systems are being developed and deployed for all modes of transportation.

Upgrading infrastructure to suit road-based autonomous vehicles will require significant investment, limiting the potential for application in less developed regions. Resurfacing roads is estimated to cost $1 million per mile, not including the cost of embedded sensors and enhanced road markings to prepare for autonomous transport.[6]

Successful deployment of autonomous systems will be a product of many factors including technological progress, economic viability, government regulations, and consumer acceptance. In less developed regions, deployment may initially focus on certain economic sectors and business applications only, including for example air-based systems for logistics services into remote areas.

Figure 19: Take-Up of Autonomous Vehicles, 2030–2080



Note: It will be at least 2045 before half of new vehicles are autonomous and 2060 before half of the vehicle fleet is autonomous.

Source: T. Litman. 2020. Autonomous Vehicle Implementation Predictions: Implication For Transport Planning. Victoria Transport Policy Institute. p. 5.

ADVANCED TECHNOLOGIES

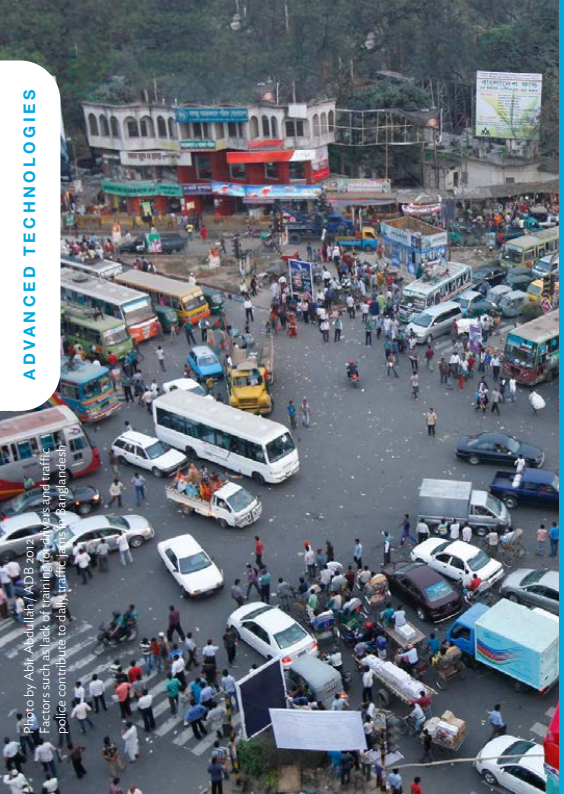


Photo by Abir Abdullah / ADB 2017
Factors such as lack of training for drivers and traffic police contribute to daily traffic jams in Bangladesh.

Artificial intelligence and machine learning

How smart is your network?

Artificial intelligence (AI) could improve traffic management — US trials demonstrated reduced travel times (by 25%), wait times (40%), and emissions (20%).[7,8]

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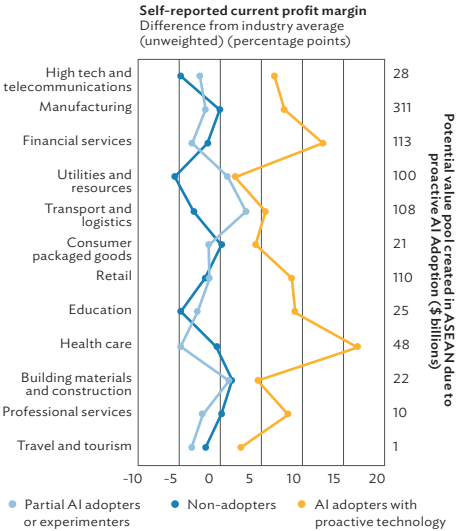
ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

AI refers to sophisticated algorithms programmed to make sense of data. Machine learning is the application of AI where, through trial and error, machines can improve their decision-making over time.

In coming decades, greater availability of real-time data and lower costs for processing power will allow more countries and operators to apply AI and machine learning solutions to improve the efficiency of transport systems. When AI solutions are coupled with geographic information systems and open-source earth observation data, it is possible to provide low-cost solutions for mapping, analytics, and monitoring that can inform the design, operation, and maintenance of infrastructure and various assets.

In transport, Singapore is an AI front-runner. Its "Smart Mobility 2030" plan calls for an AI system to manage various mode traffic in real time.[9]

Figure 20: Superior Profitability Created from AI Adoption in ASEAN Transportation and Logistics Industry



AI = artificial intelligence, ASEAN = Association of Southeast Asian Nations

Source: J. Bughin, E. Hazan, S. Ramaswamy, M. Chui, T. Allas, P. Dahlstrom, N. Henke, and M. Trench. 2017. *Artificial Intelligence: The Next Digital Frontier.* McKinsey Global Institute. p. 21.

Photo by Arup
"Smart city" connected by the internet of things

Internet of things

What could sensors tell you about your transport system?

The global market for internet of things operating systems will grow from around $800 million in 2020 to $7 billion by 2027.[10]

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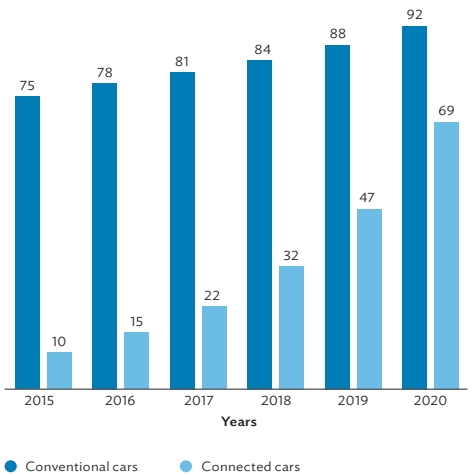
INTERNET OF THINGS

The internet of things describes the growing volume of components, devices, and products connected to the internet. Networks of sensors embedded within infrastructure send recordings and measurements (from footfall to temperature to noise levels) back to a central hub.

The technology is enabling new forms of real-time data capture and analysis that improves transport planning and management, maintenance of infrastructure and fleets, journey planning for commuters, and the adoption of new technologies such as autonomous vehicles.

Sensors and cameras can monitor the condition of roads and railways to inform predictive maintenance of infrastructure and assets, report accidents, and identify theft. The rapid decline in cost of sensors could enable less developed countries to deploy smart systems at scale or to address specific challenges around traffic management and congestion in a targeted manner.

Figure 21: Connected Cars vs. Conventional Cars Shipped, 2015–2020 (million units)



Note: Connected car shipments are increasing at a much faster rate than conventional vehicles.

Source: Mordor Intelligence. 2020. Connected Car Devices Market: Growth, Trends, COVID Impact and Forecasts (2021–2016).

Energy and Resources

Competing demands for energy and resources from other sectors and transformations in how we power, deliver, and consume products and services are affecting how transport systems are designed, built, and used in Asia and the Pacific.

KEY ASPECTS

Energy systems transformation

Material demand and consumption

Food systems and security

Photo by Luo Lei on Unsplash
Wind turbines at Modou Mountain, People's Republic of China

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WHAT IS CHANGING?

Material resource use is expected to more than double from 2015 to 2050 globally;[1] resource efficiency policies and initiatives could also cut resource use 26% by 2050. Transport infrastructure, services, and mobility choices will therefore be crucial in enabling the conservation of energy and resources in the coming decades.

The push toward clean energy to tackle climate change and pollution, unprecedented consumption of resources, a growing waste problem, and increased risk of water scarcity and loss of arable land will change how the transport sector consumes energy and resources and where transport infrastructure is required.

KEY CONSIDERATION

In the coming decades, electrification of the transport system is expected to increase sharply (including individual vehicles and public transport fleets).[2] This will create a new dependency between transport and power infrastructure, require the adaptation of power infrastructure to meet unprecedented increases in demand, and create new mechanisms to control grid loads. For example, uncontrolled electric vehicle charging could overload distribution grids, particularly where infrastructure is already poorly maintained.[3]

ENERGY AND RESOURCES

Photo by Asian Development Bank
A look into an ADB e-trike in Manila 2012

Energy systems transformation

How will the electrification of transport change infrastructure requirements?

The global electric two/three-wheeler fleet is projected to increase from ~300 million in 2019 to ~400 million by 2030.[4]

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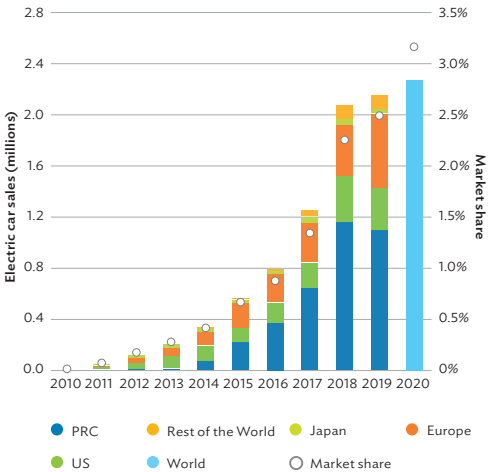
ENERGY SYSTEMS TRANSFORMATION

The need to reduce greenhouse gas emissions from fossil fuel-based energy sources puts energy systems at the center of a major transformation as the shift accelerates to clean renewable energy sources such as wind and solar. The transport sector's heavy dependence on fossil fuels and significant contribution to climate change make this a focus area for electrification and potential clean energy fuels such as hydrogen. This means growth in the transport sector will directly impact and rely on clean energy transformation and the provision of a high-capacity and low-carbon power grid. The electric vehicle transition is estimated to increase demand for electricity by about 5.2% globally by 2040.[5]

Figure 22: Global Electric Car Sales by Key Market, 2010–2020



PRC = People's Republic of China, US = United States.

Source: International Energy Agency (IEA). 2020. Global Electric Car Sales by Key Markets, 2010 – 2020. https://www.iea.org/data-and-statistics/charts/global-electric-car-sales-by-key-markets-2010-2020e

Photo by Andrey Tereshkov / ADB 2015
Locomotive assembly plant in Astana City, Kazakhstan.

Material demand and consumption

Will resource availability impact trade corridors?

Private car ownership globally has increased fivefold to over 1 billion vehicles since 1970,[6] compared with a doubling of population over the same period.[7]

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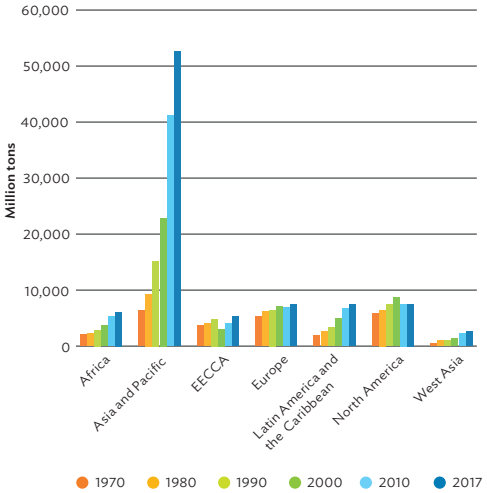
MATERIAL DEMAND AND CONSUMPTION

Urbanization, economic development, and the rising middle class in Asia and the Pacific are expected to increase material consumption.[8] Growing consumption of durable and fast-moving consumer goods will require transport sector to grow and additions to the network to enable transport of resources to new areas of growing demand and resource scarcity. The need to curb consumption of virgin materials, to control the growing global waste problem, will also require rethinking how transport infrastructure and vehicles are built, maintained, and recycled at the end of their life. This will require the transport sector to decouple today's linear material flows and become more circular.

Figure 23: Regional Shares in Global Material Extraction, 1970–2017



EECCA = Eastern Europe, Caucasus, and Central Asia

Source: United Nations Environment Programme. 2017. *Assessing Global Resource Use: A Systems Approach to Resource Efficiency and Pollution Reduction*. p.29. International Resource Panel.

ENERGY AND RESOURCES

Photo by Daro Sulakauri / ADB 2014
Entrepreneur Azer Abdullayev has built a flourishing business making packaging.

Food systems and security

What will future food sources, systems, and security mean for logistics?

Agricultural output will need to increase by 25%–70% from 2014 levels to feed the world in 2050.[9]

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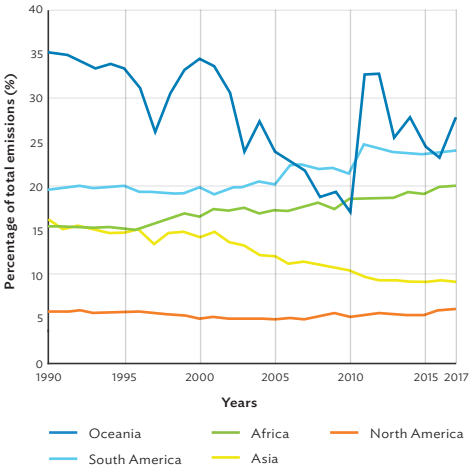
FOOD SYSTEMS AND SECURITY

Along the food chain, transport plays a role at two stages: between the farm and the collection center, and then from the collection center to the processing facility or market.[10] Typically, the energy input for transport accounts for about 10% of emissions for most food products.[11,12] Transport fuels and networks are key inputs for food production, and they directly impact market prices.[13] Continued rapid urbanization in Asia and the Pacific means that greater, strategic investment in transportation infrastructure will be required to enable access to food from where it is grown to urban areas in the years ahead.

Figure 24: Shares of Agriculture Sector Emissions, 2017 (total emissions)



Source: Food and Agriculture Organization of the United Nations. 2020. *Emissions shares*. Rome. http://www.fao.org/faostat/en/#data/EM/visualize (accessed 28 June 2021)

Economic and Trade Patterns

As the top driver of economic development in Asia and the Pacific,[1] ever-increasing national and cross-border trade are raising pressure on existing transport systems and affecting how they operate. Transport infrastructure must respond to growing consumer demand for goods to ensure market accessibility in all subregions.

KEY ASPECTS

Rural economies and markets

Future growth sectors

Labor and working patterns

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WHAT IS CHANGING?

The Asia and Pacific economy is the fastest-growing in the world, accounting for more than two-thirds of global growth in 2019,[2] putting new demands on infrastructure as rail, maritime, road, and air freight increase.

Signs suggest, however, that decelerating growth is weakening global trade and investment. Significant regional differences also exist in economic performance, with East Asia doing substantially better than other regions on most drivers of economic integration (cost of trading, infrastructure, competitiveness, quality of institutions, and conflict).

KEY CONSIDERATION

Infrastructure connectivity remains a challenge due to missing links along transport networks. This is exacerbated by substandard network quality and uneven capacity provision between countries.[3] While transport infrastructure in some countries and subregions thrives, others remain relatively underdeveloped, causing bottlenecks in trade around the region. The transport sector in Asia and the Pacific will thus need to focus investment on improving transport connectivity, particularly along emerging and established trade routes.

Photo by Samir Jung Thapa / ADB 2014
Locals riding a bus passing by the rural road in Nepal

Rural economies and markets

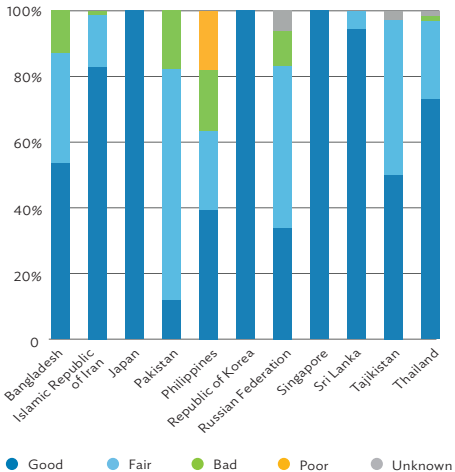
What investments will improve the connectivity and reliability of supply chains?

About 40% of the rural population lacks direct access to all-season roads, leaving them isolated from markets during wet seasons.[4]

RURAL ECONOMIES AND MARKETS

Inequality in living standards between people living in urban and rural areas persists in the region. Rural accessibility is a key component of success in connecting producers with consumers and enabling produce to reach relevant markets.[5] For agricultural producers, better market access can enhance the competitiveness of produce, as it lowers production and transport costs and enables better market information.[6] Increasing overall connectivity of rural areas can allow them to prosper, create new opportunities for innovation, and mitigate the risk of regional tensions by providing more equitable access to markets.

Figure 25: Road Surface Conditions in Selected Asian Highways



Source: United Nations Economic and Social Commission for Asia and the Pacific. 2015. *Review of Developments in Transport in Asia and the Pacific.* Bangkok. p.49.

Photo by © MagicH on Pixabay
Docking station for a bicycle-sharing scheme

Future growth sectors

How might emerging shifts toward a "shared" economy affect transport demand?

Manufacturing of capital goods is now a smaller share of Asia's economy, while infrastructure and financial services have grown substantially.[7]

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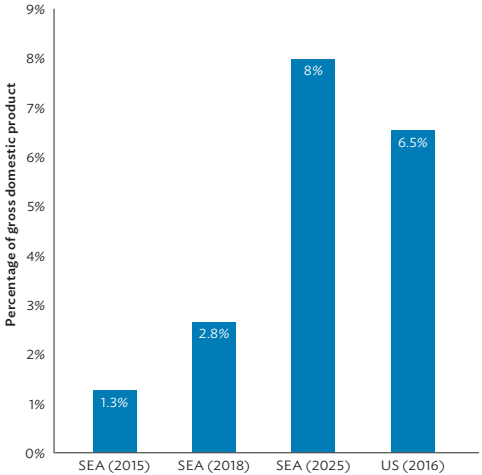
FUTURE GROWTH SECTORS

Future growth sectors will hold implications for the types of transport systems required to support the economy. Growth sectors within circular, sharing, digital, and green economies are significantly reshaping the economic ecosystem of the region. Traditional models of ownership are changing, and platform based peer-to-peer services are disrupting a growing number of industry sectors including transport,[8] particularly in urban areas and those with tourism-driven economies.[9] Social factors impact this uptake—for example, the demography of a population is likely to affect prospects for the sharing economy.[10] Through green growth, societies can achieve both economic growth and societal well-being,[11] and transport has a prominent role in green growth[12] as trade continues to drive the region's economic prosperity. The technology, finance, and logistics sectors are increasingly joining the industrial and automotive sectors as areas in which Asia and the Pacific dominates the global market. [13]

Figure 26: Internet Economy Gross Merchandise Value in Southeast Asia (% of gross domestic product)



SEA = Southeast Asia, US = United States.

Source: R. Anandan, R. Sipahimalani, S. Saini, S. Aryasomayajula, and W. Smittinet. 2018. E-conomy SEA 2018: Southeast Asia's Internet Economy Hits an Inflection Point. *Think with Google*

Photo by Asian Development Bank 2012
Fruit sellers trading close to the Hanoi
Lao Cai Expressway

Labor and working patterns

Will an expanded "informal" economy affect the delivery of transport services?

Over 50% of transport and storage jobs could be at risk of automation over the next 20 years.[14]

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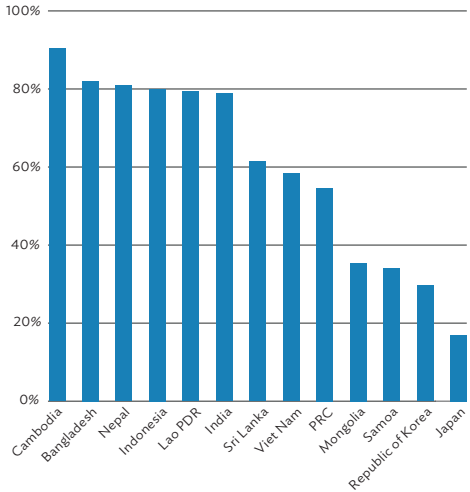
LABOR AND WORKING PATTERNS

Asia's informal economy is expanding as urban populations grow rapidly. The informal economy includes people working in informal transport networks and encompasses a large proportion of transport service.[15] Increased automation poses a risk to these jobs. The lack of systematic levers to influence informal labor could restrict opportunities to "upskill" workers to enable them to design and deliver advanced transport systems or work in emerging sectors as new technologies shift employment opportunities.

The gender gap in labor participation also remains a concern, with women in Asia and the Pacific typically found in fewer than 20% of transport jobs.[16] In recent years jobs have transitioned from agricultural work to service employment.[17] The impact of new and different work on the economy is potentially having a more congregated workforce that is easier to serve in terms of public transport, as well the options of emerging flexible working arrangements.

Figure 27: Share of Non-Agricultural Informal Employment, 2018 (%, latest year)



Lao PDR = Lao People's Democratic Republic, PRC = People's Republic of China

Source: E. Dabla-Norris and C. Rhee. 2020. A "New Deal" for Informal Workers in Asia. *IMF blog*. International Monetary Fund.

Geopolitics and Policies

Countries are more connected than ever.[1] Regional and global frameworks, agreements, and wider political relationships are shaping the growth of transport demand across Asia and the Pacific.[2] The prevalence of global supply chains increases the reliance on each other of disparate regions and the risk of tension during disruptions. Transport is a key means for balancing global prosperity and enabling sustainable distribution of essential and high-value resources and goods.

KEY ASPECTS

Globalization vs. nationalism

International relations and frameworks

Transport policy

Photo by Kyle Glenn on Unsplash
Close-up view of a globe in a library

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WHAT IS CHANGING?

Trade agreements, internationally focused environmental agreements, and alliances are an increasingly influential force in shaping geopolitics and cross-border infrastructure. The growing urgency around the need to take action on climate change and resulting emphasis on commitments such as the Paris Climate Agreement and frameworks such as the Sustainable Development Goals (SDGs) underlines the central role that transport infrastructure plays in tackling shared challenges.

Nations must agree on how to decarbonize existing cross-border transport infrastructure as they seek to meet international climate targets and the SDGs. This requires additional sustainable, zero-carbon transport systems to meet new demand for moving goods and people across frontiers as countries aim to support and develop vibrant economies.

KEY CONSIDERATION

By 2050, Asia and the Pacific will dominate global trade, with 45% of global export flows produced in the region.[3] New cross-border investments in transport projects designed to remove existing bottlenecks (e.g., aging infrastructure), combined with operational improvements can considerably improve the efficiency of international and regional road and rail freight in the region, while lowering trade costs.[4]

Photo by Madiha Aljaz / ADB 2015
Indian driver gets his one-day permit checked by the Pakistani officials as he leaves the border.

Globalization vs. nationalism

How will political movements in your country or region influence the quality of cross-regional connectivity?

In 2020, 21% of goods and services end up in a different country to where they were produced.[5]

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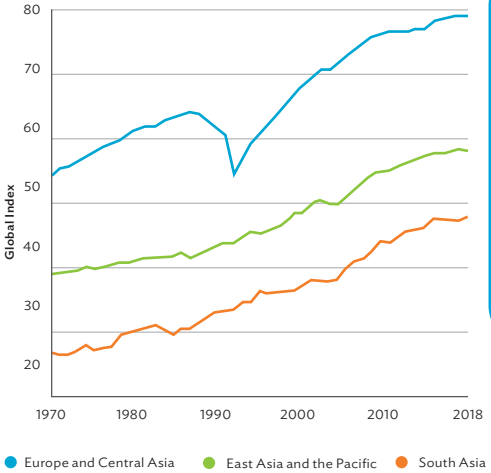
GLOBALIZATION VS. NATIONALISM

Cross-border transport projects can potentially expand trade, increase foreign investment, and reduce poverty by lowering trade costs.[6] Countries entering a joint infrastructure venture must recognize where complementary policy reforms are needed in their respective nations as a precondition to investment. This helps ensure that the expected gains from the project are ultimately realized and widely shared.[7] Cross-border collaboration has its challenges, such as transparency, openness, alignment on initiatives, and aligning economic interests; however, if done well these projects present increased trade, labor, and economic opportunities to citizens, corporations, and countries.[8]

Figure 28: KOF Globalization Index in 1970 and 2017



Note: The KOF Globalization Index measures the economic, social, and political dimensions of globalization. From 1970 to 2017, globalization has risen significantly in Asia and the Pacific, nearing developed market levels.

Source: ETH Zurich KOF. KOF Swiss Economic Institute. 2018. KOF Globalization Index. https://kof.ethz.ch/en/forecasts-and-indicators/indicators/kof-globalisation-index.html

Photo by Richard Atrero de Guzman / ADB 2018
Seminar on "Private Sector Participation in Asian Infrastructure Development"

International relations and frameworks

Can secure transport be delivered while ensuring all countries' interests are considered?

Limited transparency and openness of initiatives, as well as the weak economic fundamentals and governance of several countries, can make regional projects challenging.[9]

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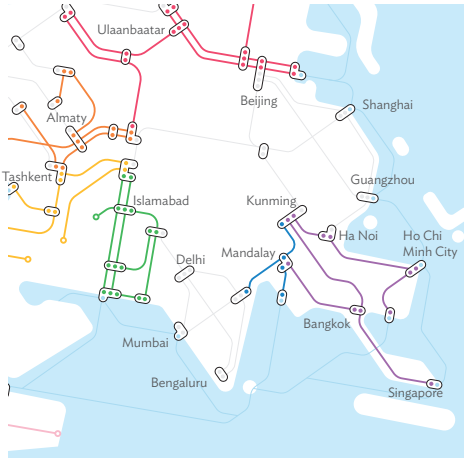
INTERNATIONAL RELATIONS AND FRAMEWORKS

The sphere of influence of Asia's advanced and developing nations such as People's Republic of China, Japan, and India, in addition to the Russian Federation, holds strong implications for their smaller neighbors. New megaregional trade agreements such as the Comprehensive and Progressive Agreement for Trans-Pacific Partnership and the Regional Comprehensive Economic Partnership can strengthen ties between the regions' larger and smaller players. Mechanisms could be put in place to measure actual progress of agreements and the projects that follow from these alliances. It is also critical to ensure equitable progress of not just developed countries, but also developing countries—particularly small island developing states and countries in fragile and conflict-affected situations. Projects and new investment should not create conditions which increase risks and tensions in Asia's already vulnerable regions.

Figure 29: Corridors on the People's Republic of China's Belt and Road Initiative



Source: World Bank. 2019. *Belt And Road Economics: Opportunities And Risks Of Transport Corridors.* Washington, DC.

Photo by andreas160578 on Pixabay
Electric car charging point

Transport policy

How can we foster stronger collaboration through transport policy?

The effective deployment of leading green policies and technologies could reduce global countries' annual emissions by 39% by 2050.[10]

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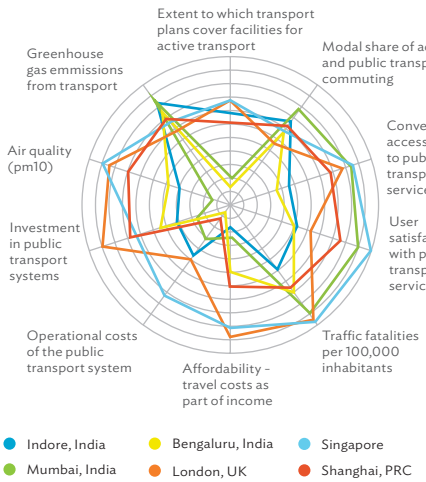
TRANSPORT POLICY

A broad range of global agendas influence the role and design of transport services and systems. The overarching agenda comprises the SDGs, Quality Infrastructure Principles, and the Paris Climate Agreement. A diverse range of subsector policies complement these. In addition, the International Maritime Organization's strategy considers reduction of harmful emissions from shipping. In 2020, the UN General Assembly passed a resolution to continue the global effort to address road safety by proclaiming 2021–2030 the Second Decade of Action for Road Safety.

Overall, opportunities exist to encourage the health of people and nature, leveraging technology and encouraging the exchange of experiences, goods, and resources. Synergies across these policies, their reporting targets and regional goals for sustainable transport can propel progress on transport sustainability and safety in national sector plans, strategies, and budgets, coordinated in a wider holistic vision in national and city plans.[12]

Figure 30: Comparing Cities on the Sustainability Urban Transport Index, Indicators in Setting Up New Policies



PRC = People's Republic of China, UK = United Kingdom

Source: United Nations Economic and Social Commission for Asia and the Pacific. 2017. *Assessment of Urban Transport Systems*. Monograph Series on Sustainable and Inclusive Transport. p. 64. Bangkok.

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About the Asian Development Bank

ADB is committed to achieving a prosperous, inclusive, resilient, and sustainable Asia and the Pacific, while sustaining its efforts to eradicate extreme poverty. Established in 1966, it is owned by 68 members —49 from the region. Its main instruments for helping its developing member countries are policy dialogue, loans, equity investments, guarantees, grants, and technical assistance.

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