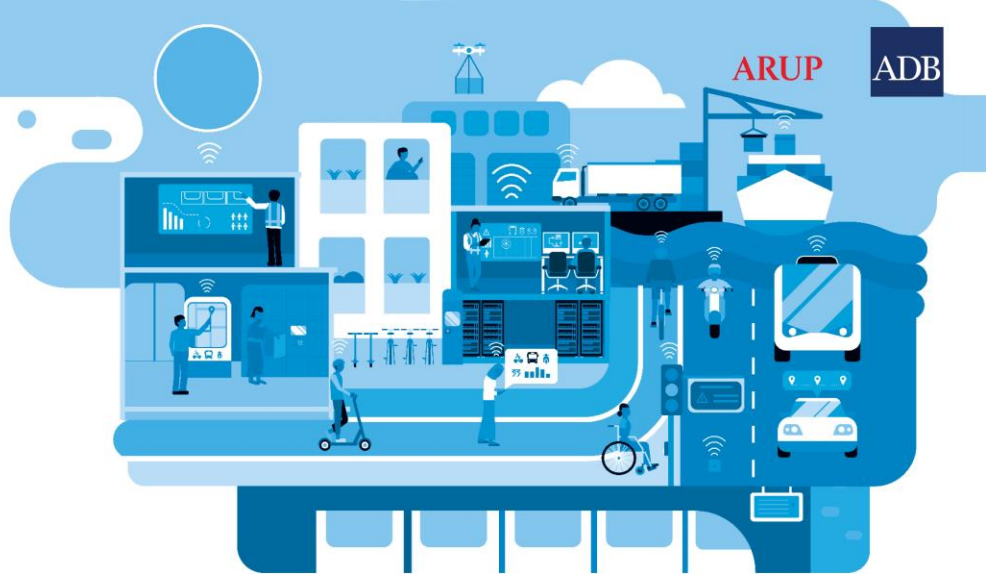
REIMAGINING THE FUTURE OF TRANSPORT ACROSS ASIA AND THE PACIFIC

ARUP

ADB

Program



1

1 hour

Introducing: *Reimagining the Future of Transport*

Opening Remarks
Introduction
Trends, Visions, Principles
Playbook (Toolkit)

2

30 mins

Showcase: *Futures Narratives*

Introduction
Panel Discussion

3

30 mins

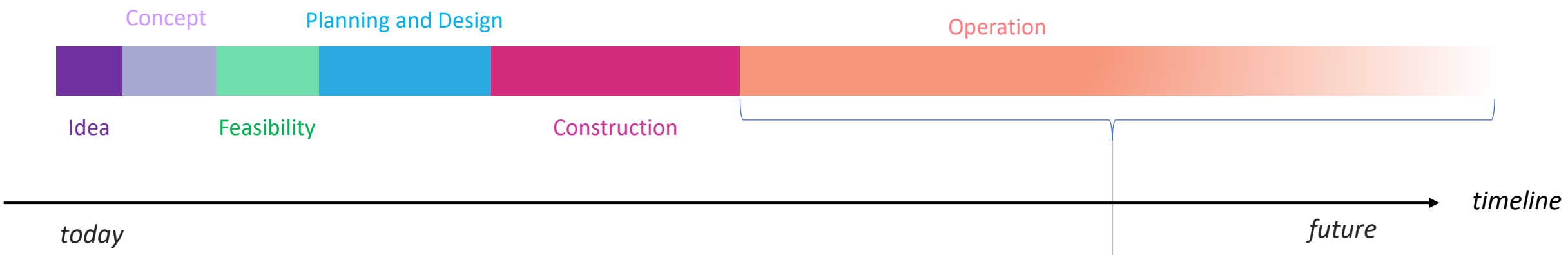
Open Forum

Join our speakers for Q&A and discussion (breakout groups)
(different Zoom link – will be displayed at the end of part 2)

WE ARE LIVING IN A VUCA WORLD

volatile, uncertain, complex and ambiguous

Influencing investments and projects with very long lifecycles



What would we like to know?

What should we know?

What do we have to know?

… to make better decisions today

- Demographics and Lifestyles
- User Needs and Expectations
- Climatic and Environmental Conditions
- Technology and Materials
- Policy and Regulation
- …

Future Context

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Y(Our) Foresight Study

Our study is designed to drive long-term thinking and support the design of a future-ready transport investment pipeline. The project started with trend-mapping and has resulted in a set of principles and strategies to inspire future transport policy and investments.

Trends	Implications	Visions	Principles
Map trends shaping the future of transport with a focus on Asia and the Pacific, and a view towards 2030.	Explore implications of trends for DMCs, across transport modes as well as associated risks and opportunities.	Develop draft visions to support thinking on future transport implementation, investments and policy.	Develop practical principles and strategies for each vision, to ensure relevance across all DMCs.
What is driving change?	**What will the impact be?**	**What future do we want?**	**How can we get there?**

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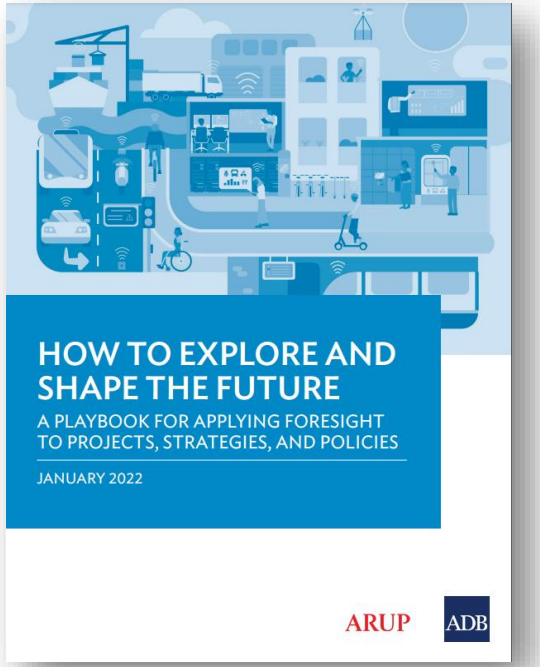
Core Knowledge Products

Report

www.adb.org/publications/future-transport-across-asia-pacific

Playbook



Trend Cards

Introductory Video

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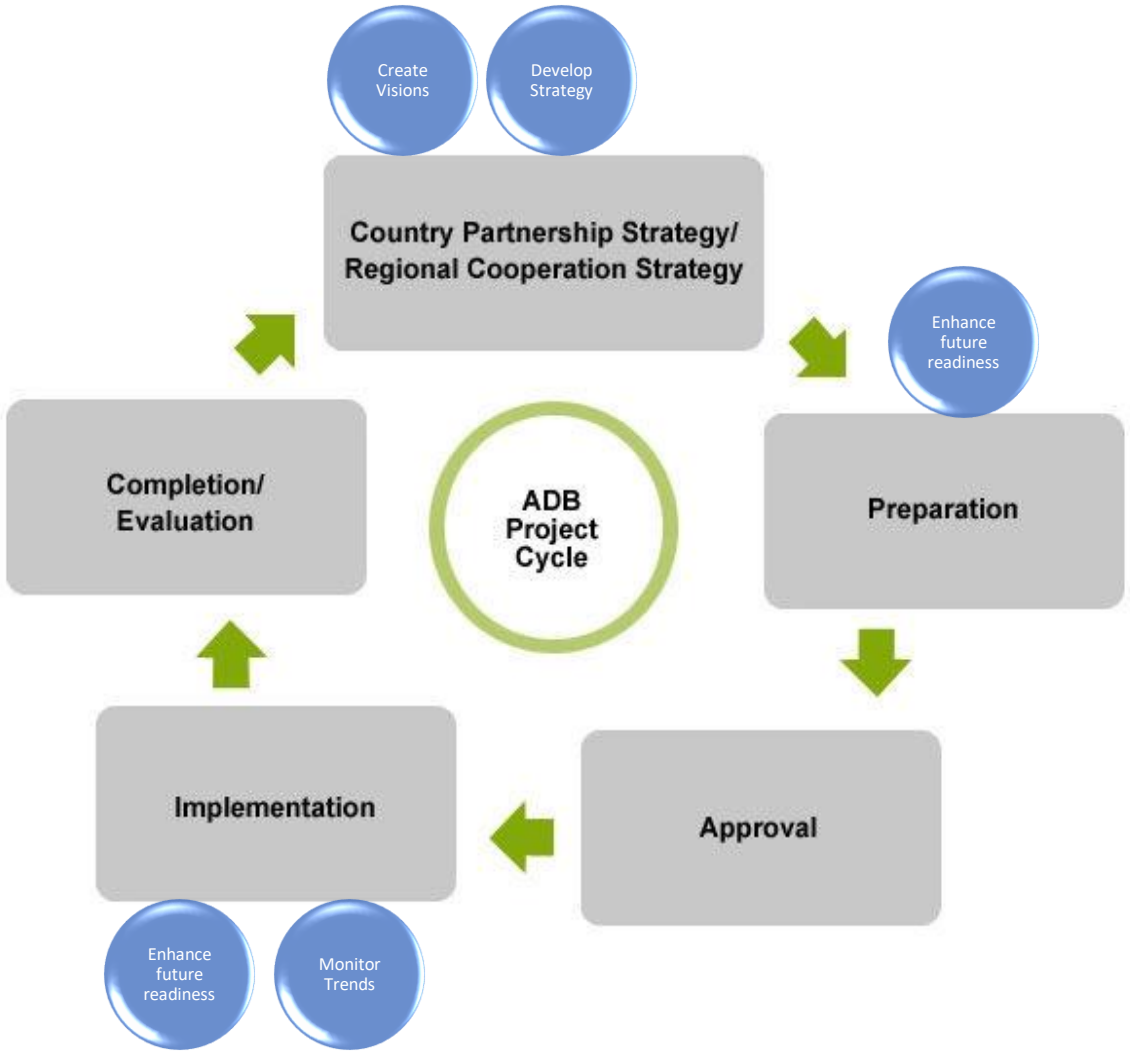
Foresight can influence key stages in the Project Development Cycle.

Foresight for…

Enriched policy dialogue

Better informed clients

Promote future-ready projects



Thereby enhancing …

Country Partnership Strategy

Regional Cooperation Strategy

Country Operations Business Plan

Policy and investment decisions

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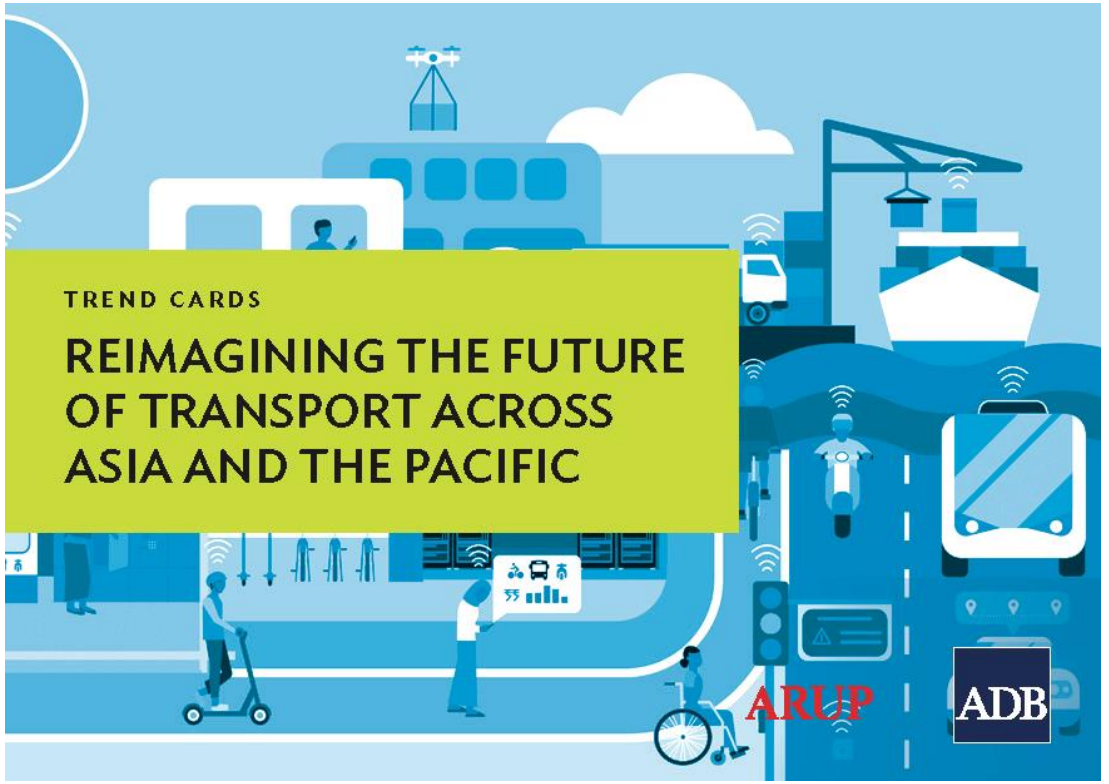

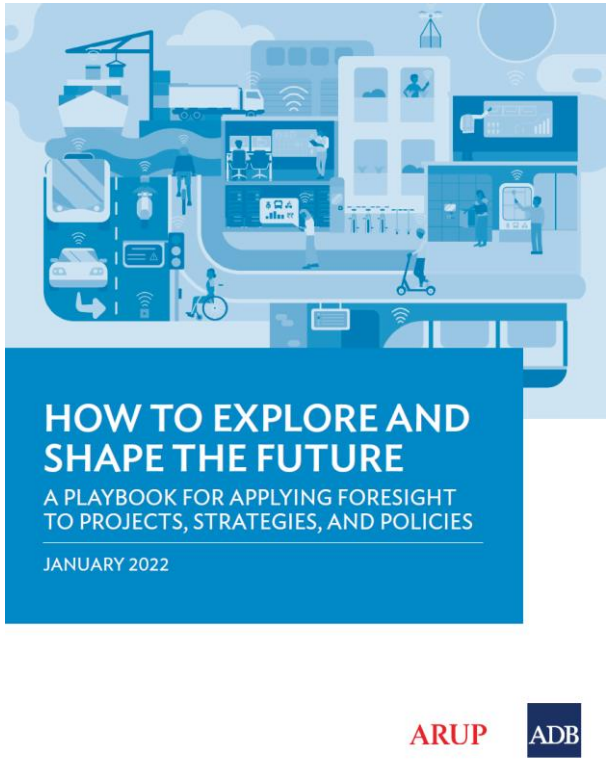

VISIONS — **TRENDS** — **PLAYBOOK**

https://www.adb.org/publications/future-transport-across-asia-pacific

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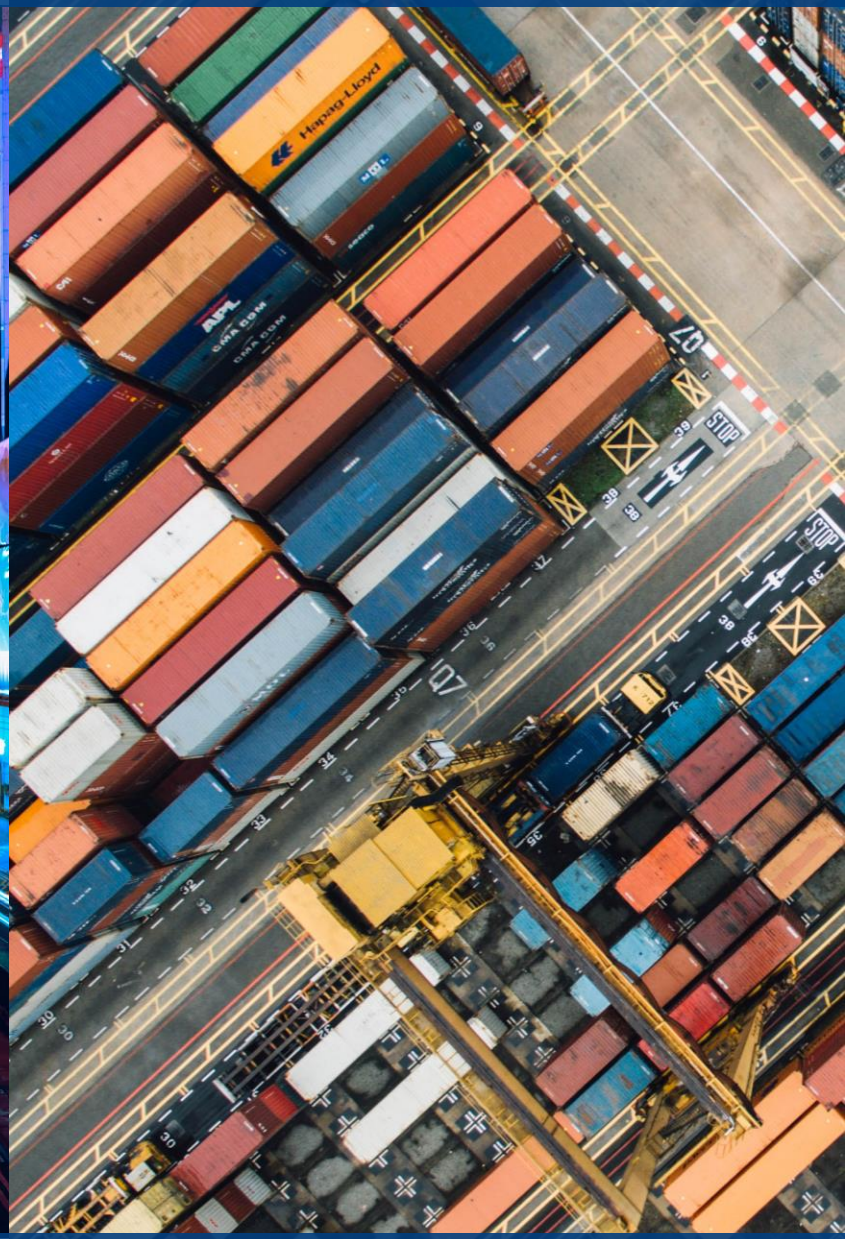
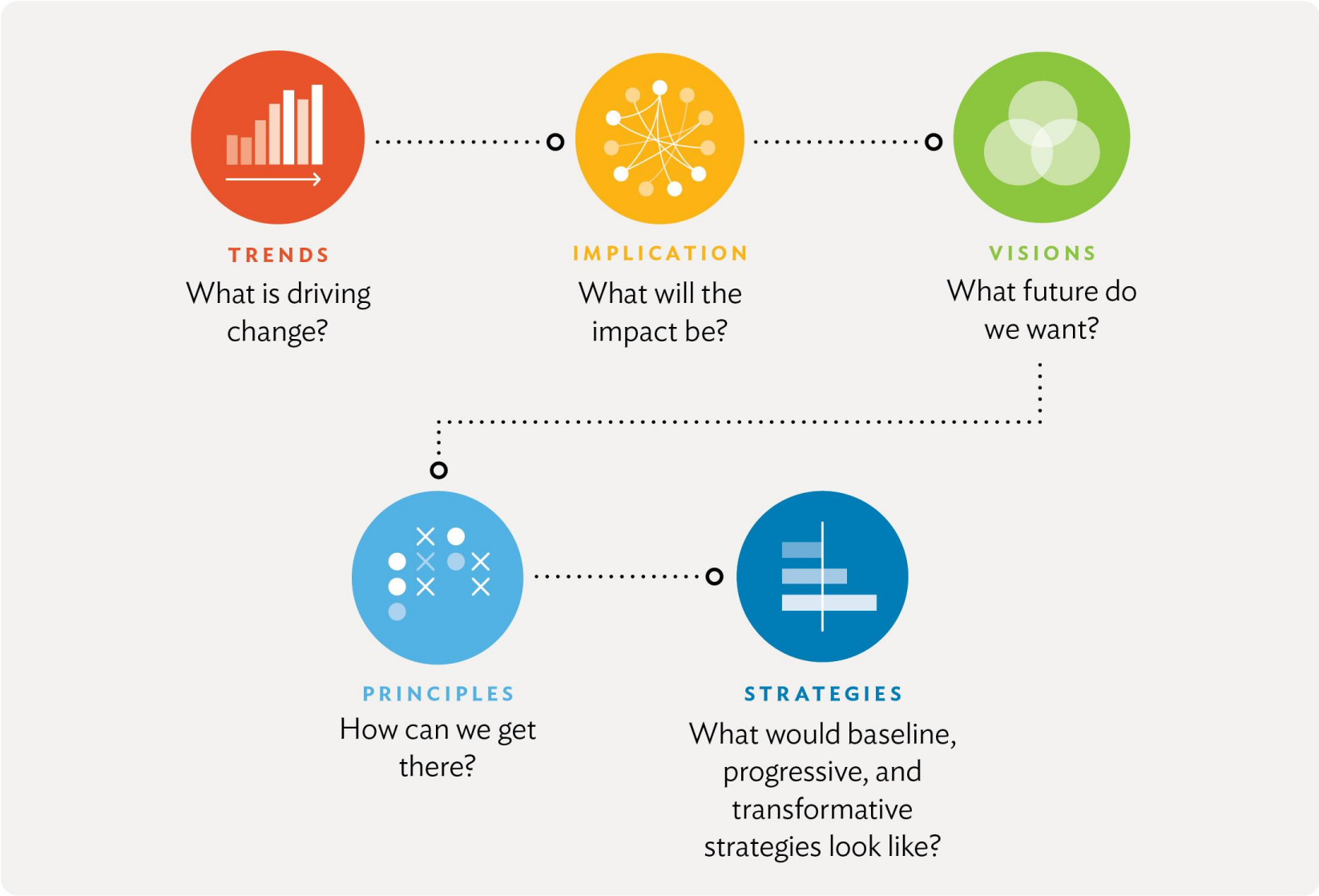
Assets, investments and projects often have very long lifecycles…



…and are shaped by a complex ecosystem of influencing factors.

WHAT DOES OUR FUTURE LOOK LIKE?

FIGURE 1: ARUP AND ADB'S APPROACH TO FORESIGHT ANALYSIS



Source: Authors.

A COMPLEX ECOSYSTEM OF CHANGE

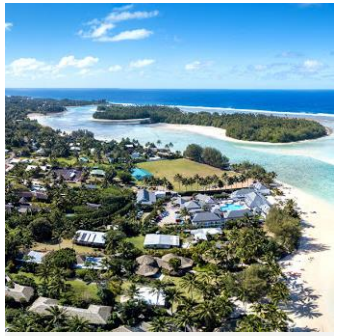
Population patterns

Behaviour patterns

Integrated transport systems

Infrastructure growth & renewal

Climate change



Environmental risks

Advanced technologies

Energy and resources

Economic and trade patterns

Geopolitics and policies

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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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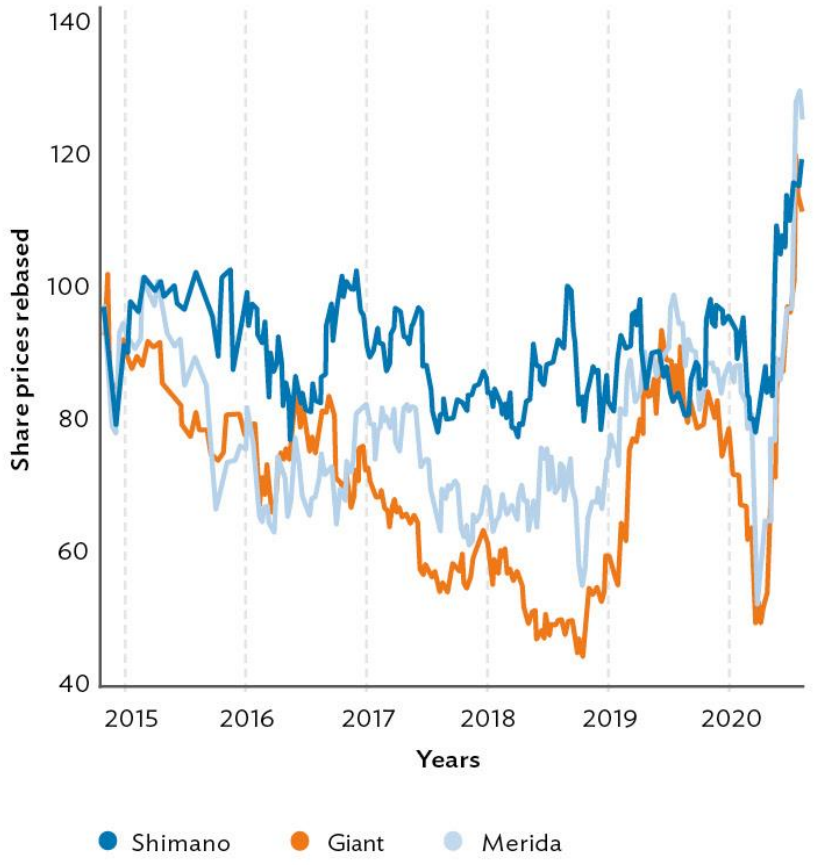
HEALTHY AND SUSTAINABLE LIFESTYLES

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.

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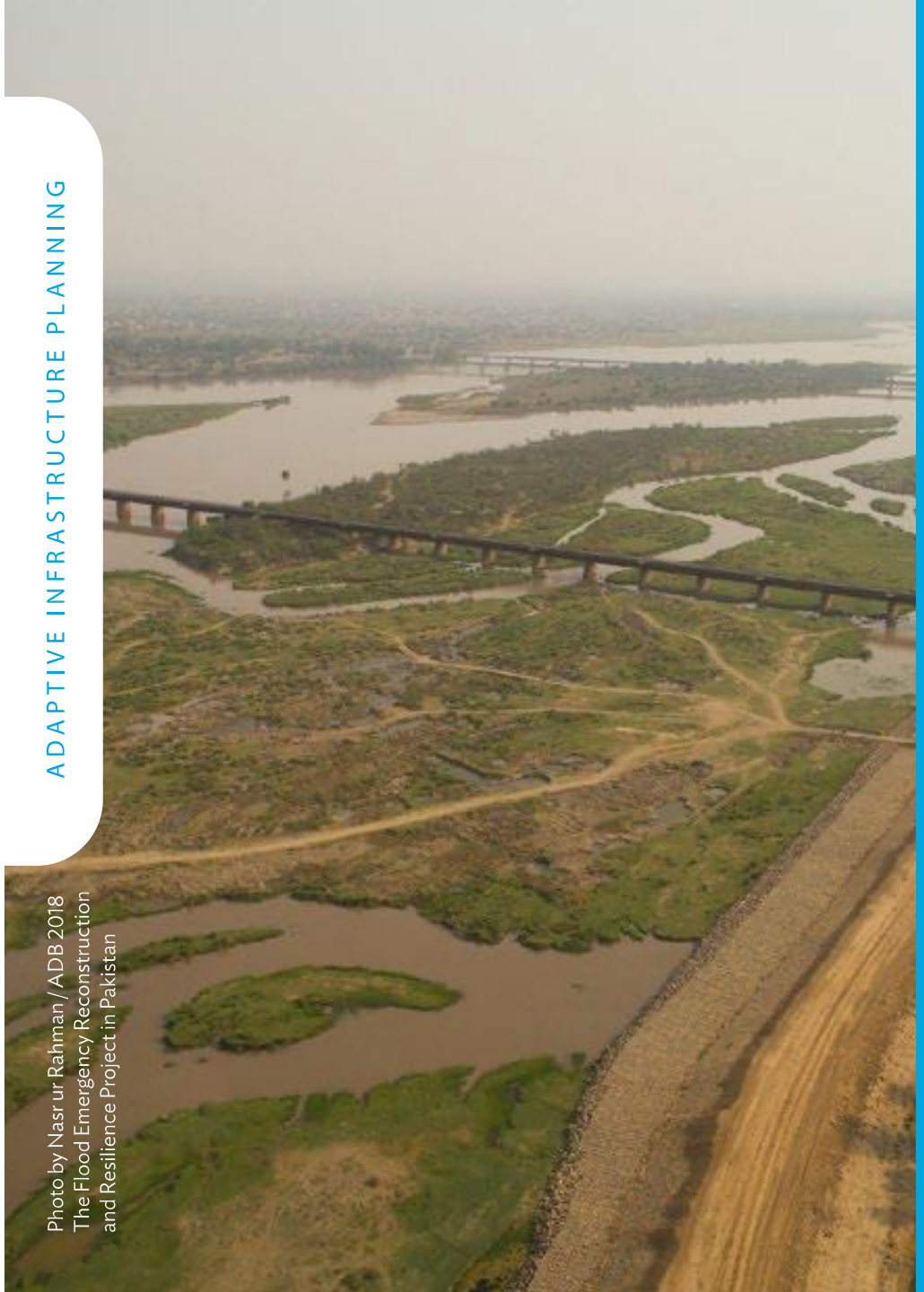

Photo by Nasr ur Rahman/ADB 2018
The Flood Emergency Reconstruction and Resilience Project in Pakistan

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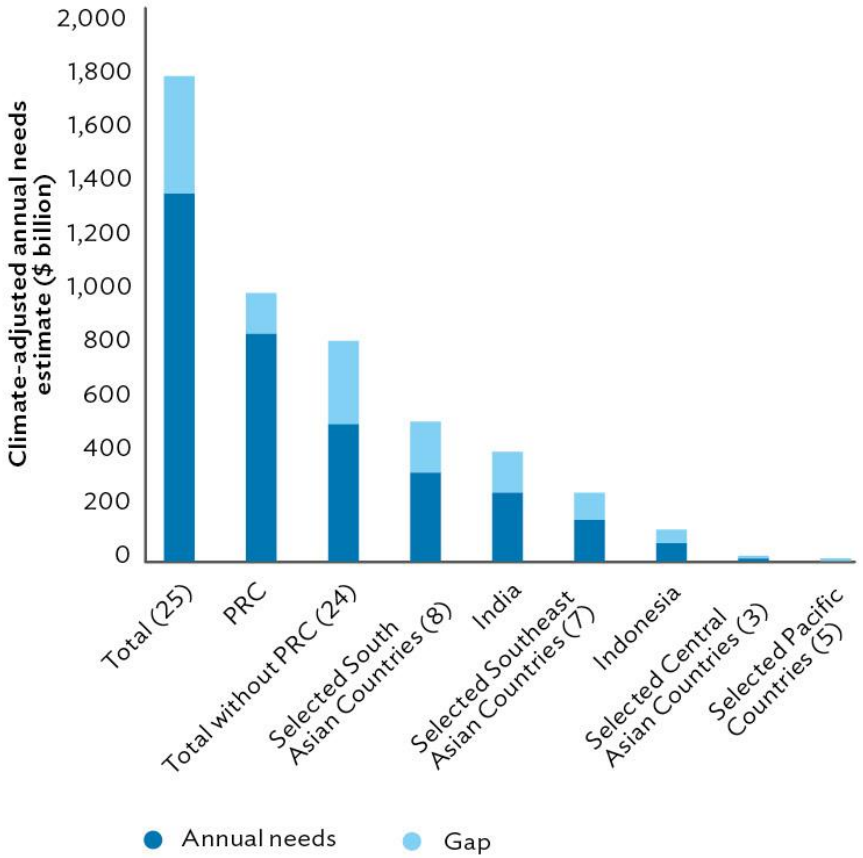
Transport infrastructure and systems must be ready to adapt to a changing climate, shifting population needs, travel behavior patterns, and changes in mobility technologies while also being flexible, multipurpose, and adaptive.

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.

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ENVIRONMENTAL RISK

Photo by Boudhayan Bardhan on Unsplash
Forest in Tindharia, India

Biodiversity loss

Can we reverse ecological damage?

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

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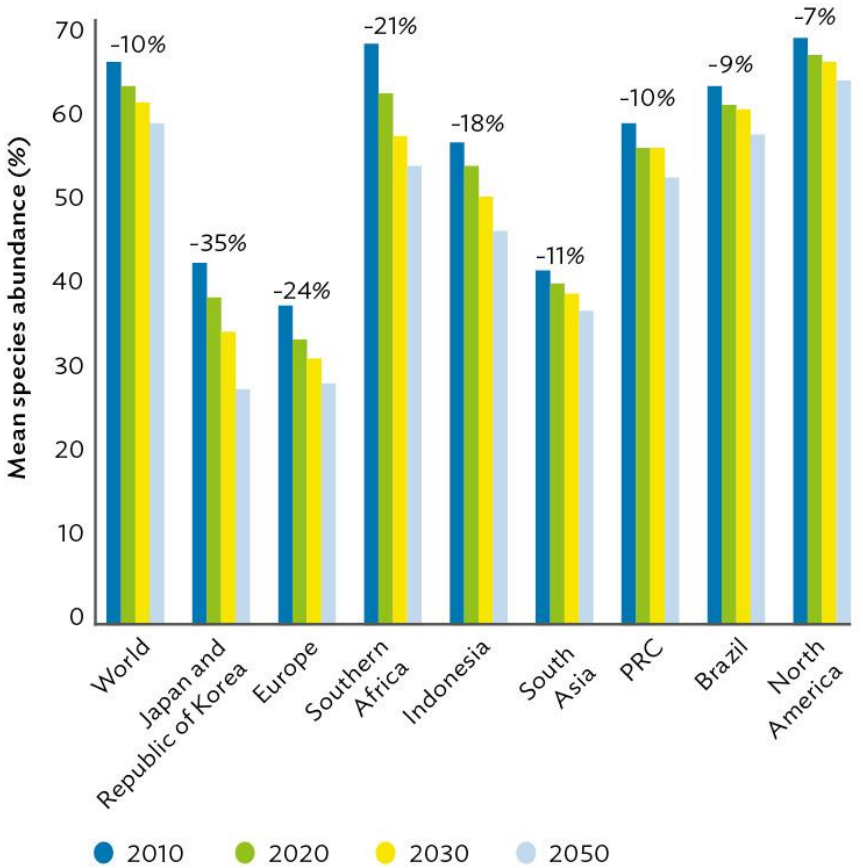
BIODIVERSITY LOSS

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.

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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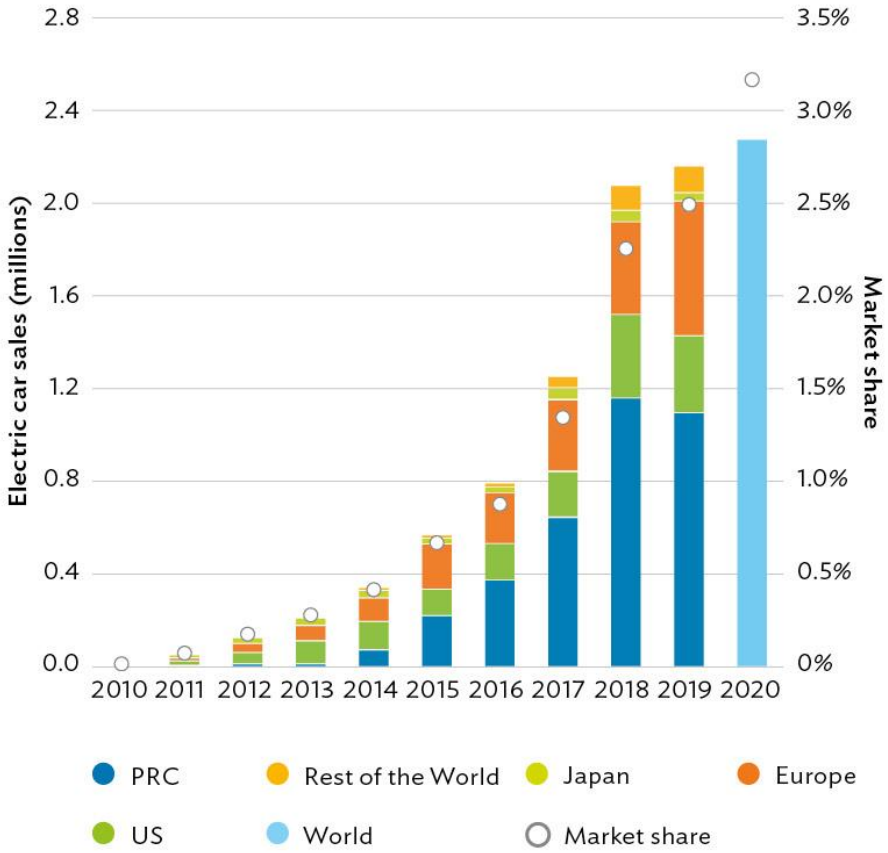
ENERGY SYSTEMS TRANSFORMATION

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

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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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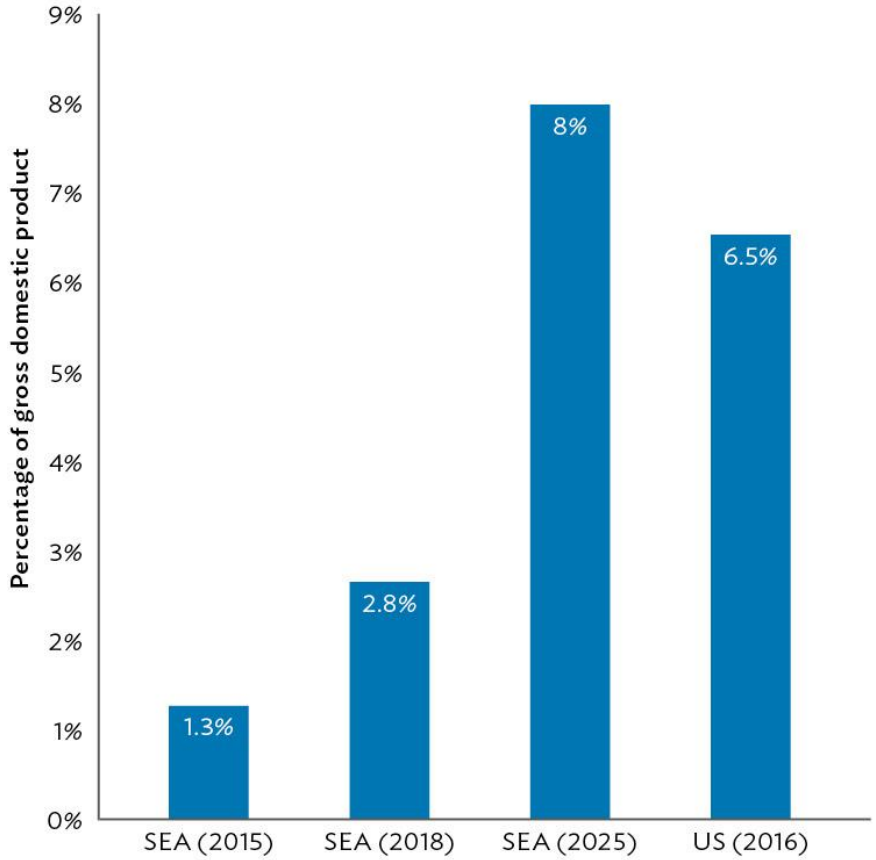
FUTURE GROWTH SECTORS

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*

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(Y)OUR FORESIGHT STUDY

Our study is designed to **drive long-term thinking and support the design of a future-ready transport investment pipeline**.

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OVERVIEW OF VISIONS

Vision 1
Safe, reliable, and efficient systems

Vision 2
Inclusive and accessible spaces and services

Vision 3
Deliver resilient transport infrastructure systems

Vision 4
Seamless transport and logistics systems

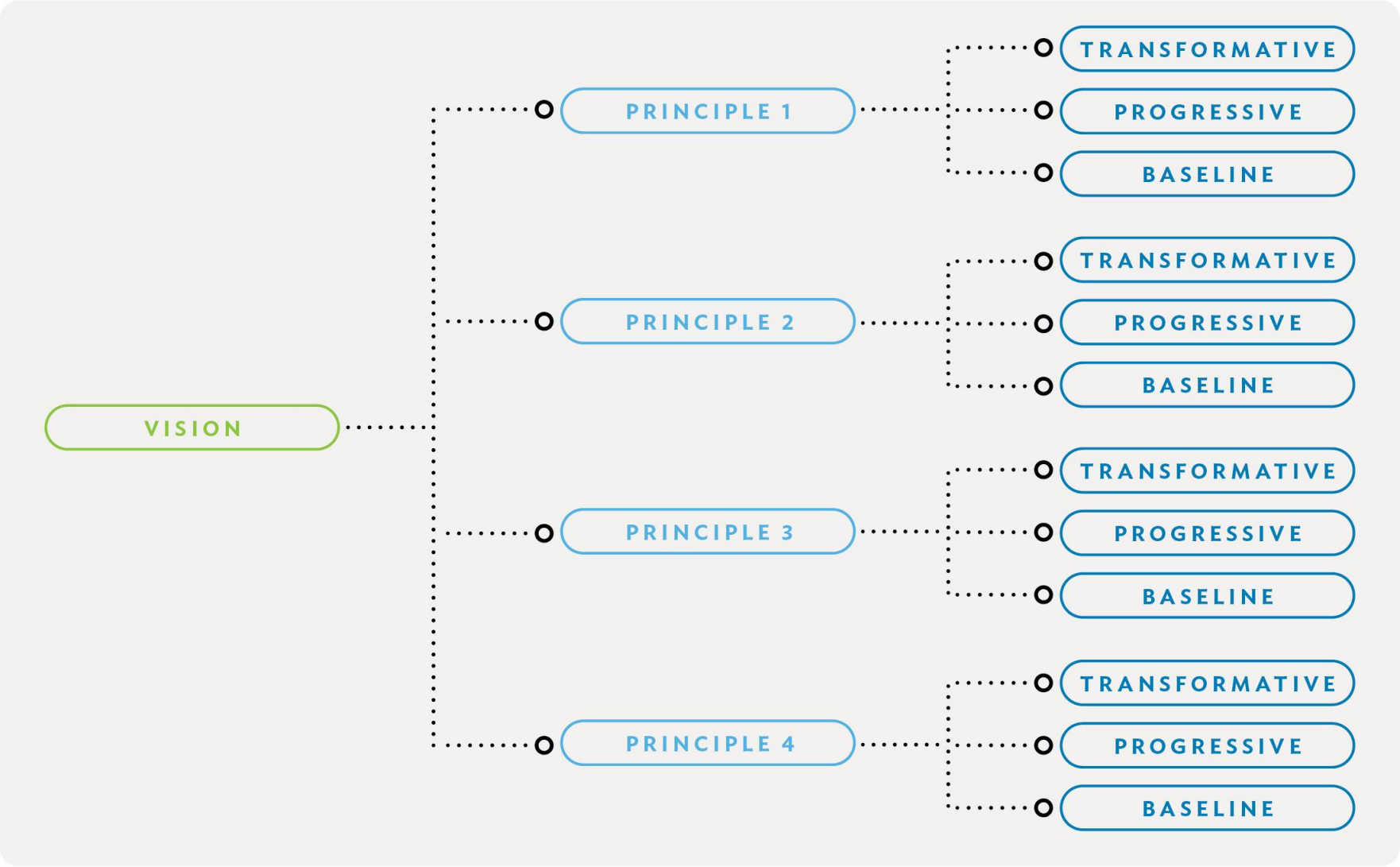
Vision 5
Deliver environmentally considerate outcomes

Vision 6
Robust institutional, financial, and technical capacity

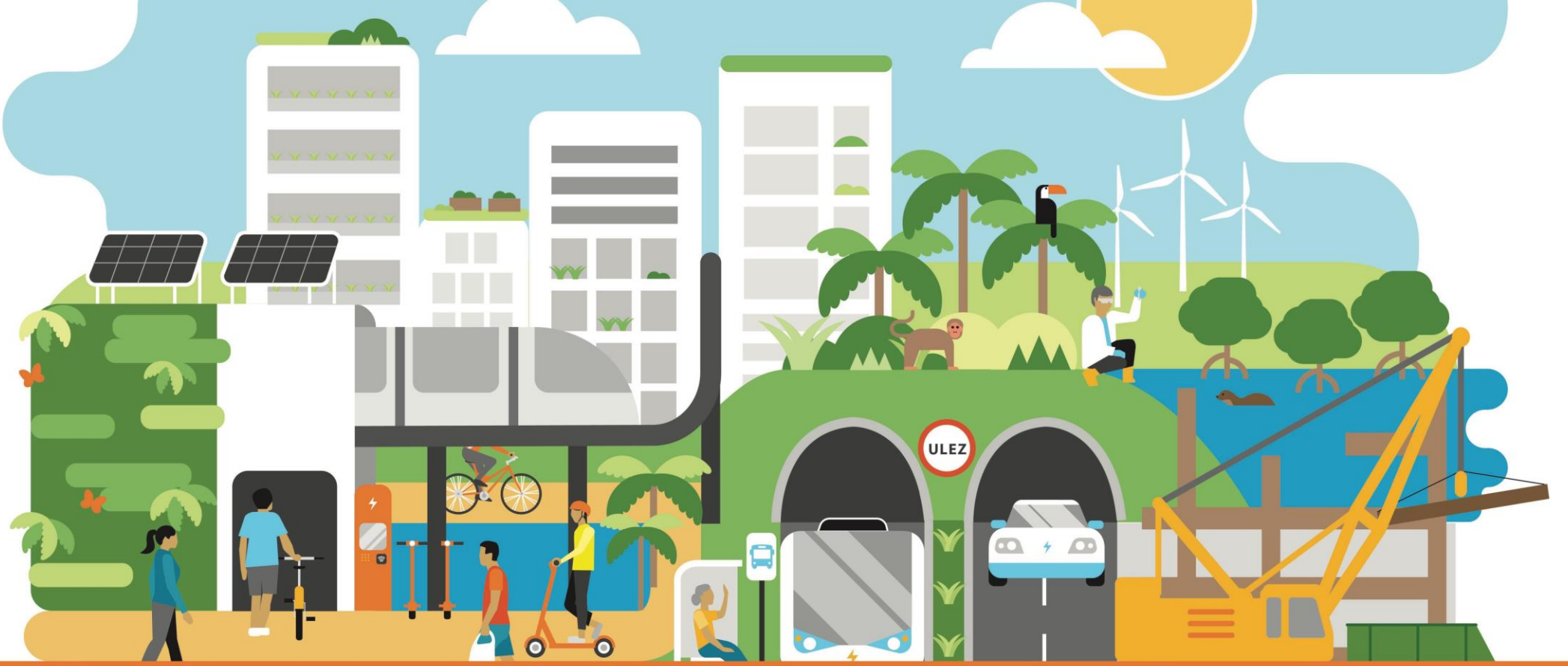
Vision 7
Technology-enabled transport services

Vision 8
Strong regional cooperation and comprehensive development

FIGURE 2: VISION FRAMEWORK



Source: Authors.



Vision 5

Deliver Environmentally Considerate Outcomes

Future transport infrastructure and systems will deliver environmentally considerate outcomes that go beyond mitigation to enable transport to support restorative and regenerative ecosystems.

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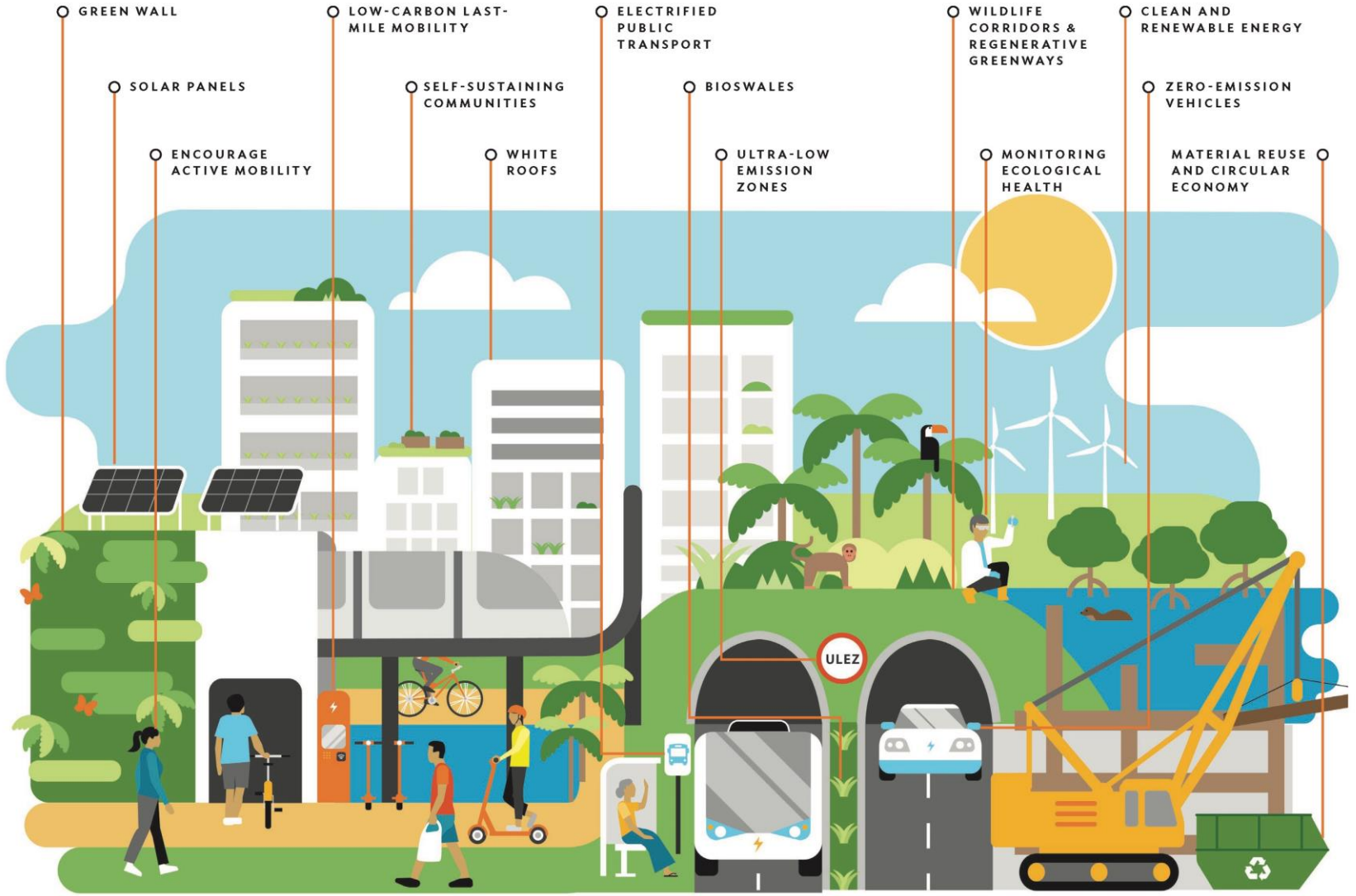

2050 transport systems run on clean and renewable energy, consider circularity and resource consciousness design, and deliver positive ecological outcomes.

This vision recognizes that the planning, design, construction, and operation of transport systems are critical to ensuring the sustainable use of energy and resources and to meet the mitigation targets set. Regenerative design principles limit negative impacts on air, water, and land and restore natural ecosystems.

In 2050, solutions to enhance system connectivity respect the environment and encourage sustainable consumption. An emphasis is placed on green and renewable technologies, enabling healthy and active transport choices, applying nature-based solutions, and minimizing the destruction of biodiversity and natural resources. Transport systems and strategies are context specific, considering local physical environment, materials, climate, risks, and needs. GHG mitigation measures are implemented through structural reforms to promote transport mode shifts, improve energy efficiency, and reduce fuel carbon intensity, which contribute to a carbon-neutral world.

Global climate agreements and green economic development rely on healthy terrestrial and aquatic ecosystems to promote sustainable livelihoods. Reducing GHG emissions and pollution, promoting nature-positive solutions, and biodiversity considerations, underpinned by technology and automation, will allow more seamless transport experiences and improved well-being for people while delivering positive outcomes for nature.

TABLE 17: VISION 5 MATRIX

Principles and Strategies to 2030

SCENARIOS	STRATEGY: BASELINE	STRATEGY: PROGRESSIVE	STRATEGY: TRANSFORMATIVE
 **PRINCIPLE 1** *Accelerate low-carbon development*	**LOW-CARBON DEVELOPMENT** Develop transport sector plans and road maps to inform inclusive low-carbon development programming opportunities with air quality and health co-benefits, including low-cost renewable energy and energy efficiency improvements.	**LOW-CARBON SYSTEMS PLANNING** Undertake strategic systems-wide planning for investment pipelines that accelerate progress on GHG emissions reduction and provide co-benefits for air pollution, health, and inclusions. Prioritize mode shift to active travel and public transport, electrification of road-based vehicles, and urban logistic modes, transition to zero-emission vehicles, and uptake of low-carbon fuels.	**CARBON-NEUTRAL INCLUSIVE TRANSPORT SYSTEMS** Implement cross-sector reforms to decarbonize transport systems (i.e., regulation and incentives for a fully electric or hydrogen-based transport network). Achieve net-zero GHG emissions with significant reduction in air pollutants and related illnesses. Implement policy for self-sustained communities to reduce long-distance travel.
 **PRINCIPLE 2** *Invest in natural capital and maximize ecological gain*	**MITIGATION OF ECOLOGICAL IMPACTS** Ensure harmonized, standardized, and rigorous approaches to ecological impact assessments (i.e., supplemental to IFC PS6[a] and similar), with comprehensive application of the mitigation hierarchy.[b]	**NO NET LOSS OF NATURAL CAPITAL** Achieve no net loss of biodiversity and ecosystem services with new infrastructure projects, including biodiversity offsets, through implementation of the mitigation hierarchy, new projects demonstrate that overall gains in biodiversity are equal to the loss.	**NET GAIN IN NATURAL CAPITAL** Achieve net gain in biodiversity[c] and ecosystem services across projects through avoidance of ecologically sensitive areas and integration of regenerative design principles (i.e., greenways). Biodiversity and nature-based solutions are mainstreamed. Spread of invasive species and zoonotic disease controlled and watersheds maintained at healthy levels.
 **PRINCIPLE 3** *Minimize resource consumption and plan for circularity*	**MAP ENERGY AND MATERIAL USE** Catalog energy use, and risk indexes for major cities for appropriate investments, increase construction waste recycling and material reuse, and ensure efficient design options are considered. Consider the utilization of reusable materials for all new projects.	**RENEWABLE MATERIAL USE** Identify towns and cities with high growth potential, for green and climate smart investments minimizing consumption. Deliver zero waste construction and build with renewable materials. Invest in high-quality active travel and public transport infrastructure to help minimize emissions from vehicular transport. Implement disincentives for highly polluting vehicles.	**CIRCULAR MATERIAL USE** Apply and deliver circular economy principles to all new projects. Require projects to evaluate end-of-life options.
 **PRINCIPLE 4** *Design to minimize urban heat island effect and increase natural solutions*	**GREEN SOLUTIONS IN NEW BUILD** New construction projects consider heat-reducing solutions, use of green materials, and nature-based solutions (i.e., using white roofs to reflect heat and green facades, exposed earth, and vegetation to absorb heat).	**RETROFIT WITH NATURAL SOLUTIONS** Green/natural and heat-reducing solutions are considered for new and retrofit transport infrastructure and systems (i.e., bioswales on linear infrastructure, increased greening in streets for active mobility shade/protection).	**GREEN CORRIDORS AND HEAT REDUCTION** All new transport and infrastructure to deliver heat- reducing outcomes. More than 50% of surfaces are "green." Transport corridors help deliver increased greenery and biodiversity in the urban and rural fabric.

[a] International Finance Corporation Performance Standard 6.
[b] Mitigation Hierarchy (avoid, minimize, restore, and offset) is a tool to guide and limit negative impacts on biodiversity through the life cycle of a development project, according to CSBI.

c Achieving a net gain of biodiversity quantifies both the losses and gains of biodiversity (including offsets) through implementation of the mitigation hierarchy; demonstrates that overall gains are greater than the loss.

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Vision 6

Robust Institutional, Financial, and Technical Capacity

Future transport will be underpinned by stakeholders, champions, and leaders able to plan, deliver, monitor, and manage transport in the long term. They will have the required governance, technical capacity, collaboration, and innovative funding and financing partnerships, as well as the supporting legislative, regulatory, and enforcement frameworks.

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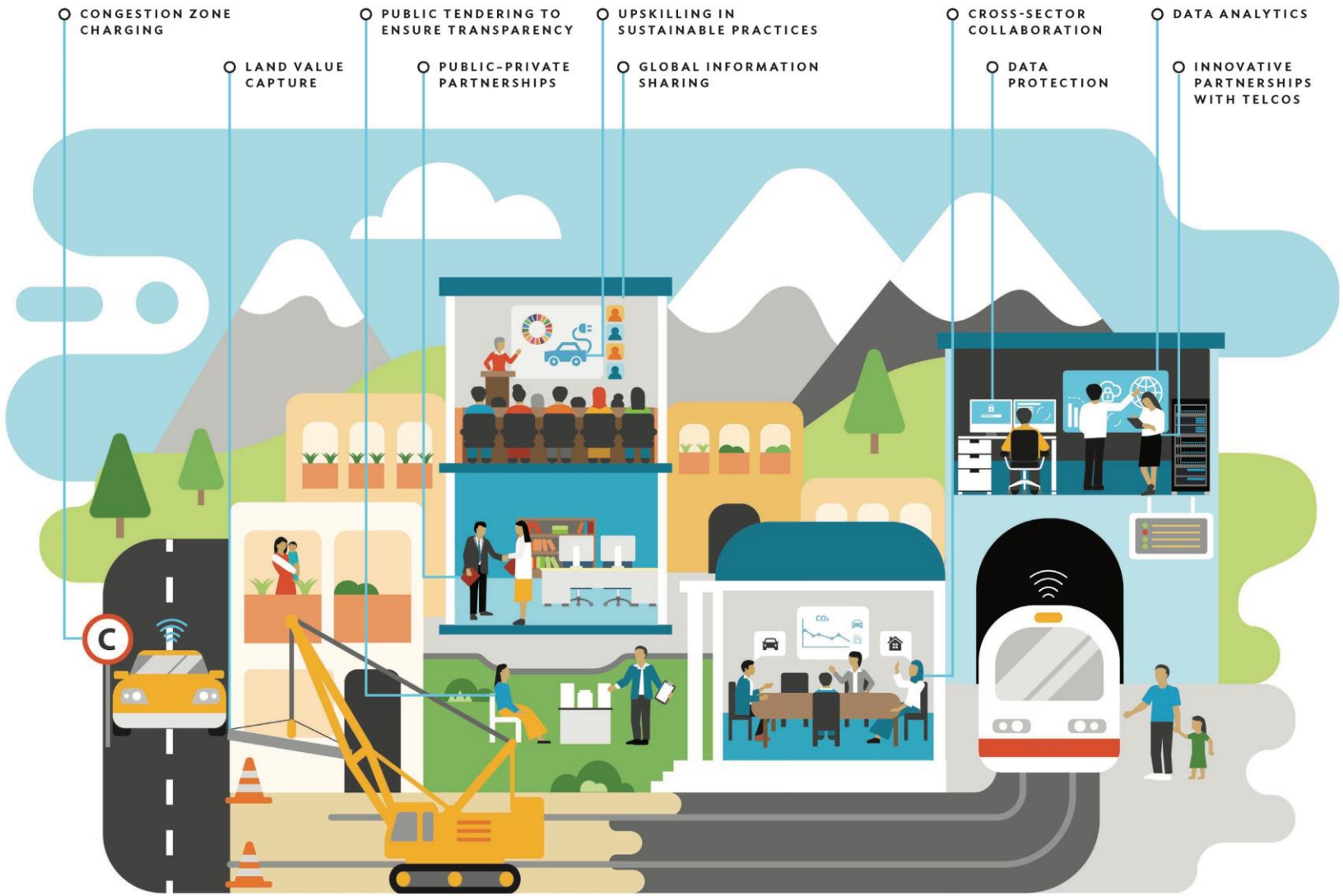

In 2050, the region's labor force is fully trained, skilled, and knowledgeable in the latest construction, implementation, operation, and maintenance practices. Leadership, financing, and institutional experts support the ongoing delivery of transport services.

The aim of this vision is to strengthen the knowledge, governance, capability, and adaptability of the transport sector to meet rising demands, new challenges, and innovative technologies and delivery mechanisms. This involves investing in education and training to encourage talent and strengthen the pool of professionals working in the transport sector. It also encompasses the need to build and maintain strong and efficient institutions capable of adapting to rapidly changing contexts. This entails reforming transport organizational structures to be agile and responsive to the needs of the sector as it undergoes changes over time.

In 2050, maintenance and operational plans are designed and delivered at the start of a project. Financial capacities and needs are determined from the beginning, enabling governments and institutions to operate transport networks for the future.

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TABLE 21: VISION 6 MATRIX

Principles and Strategies to 2030

SCENARIOS	STRATEGY: BASELINE	STRATEGY: PROGRESSIVE	STRATEGY: TRANSFORMATIVE
 **PRINCIPLE 1** *Strengthen governance and build fiscal capacity*	**SUSTAINABLE INITIATIVES** Strengthening governance and institution leading initiatives can help create an affordable, yet financially sustainable transport system that is accessible by all gender and vulnerable users.	**FISCAL SUSTAINABILITY** Domestic revenues are enhanced through tax reform and reducing illicit financial flows, providing fiscal space for governments to fund their development programs.	**FINANCIAL SUSTAINABILITY** Transport visions are fulfilled in a financially sustainable manner through alternative revenue streams (i.e., using effective land value capture mechanisms and robust revenue collection).
 **PRINCIPLE 2** *Build technical capacity and expertise in delivering sustainable projects*	**SHARE BEST PRACTICES** Employees participate in technically focused national and regional transport forums to share best practices in relevant transport fields depending on subregions' needs. University curriculum and technical and vocational education and training supports required knowledge and resources in the transport sector.	**PROVIDE TRAINING INCENTIVES** Incentives for upskilling are provided to interested and willing personnel to enable and empower delivery of sustainable transport infrastructure and services (i.e., operation and maintenance of high-technology operations, financial management, asset management—including operation and maintenance—post-construction).	**RADICAL UPSKILLING** Support for technological innovation with research and development funding and partnerships between universities, governments, and private sector. Countries are enabled to deliver with a skilled labor force.
 **PRINCIPLE 3** *Delivering through innovative partnership and new and expanded funding*	**EXPLORE INNOVATIVE PARTNERSHIPS** Adopt institutional, policy, legal, and regulatory frameworks to enable and catalyze private sector participation and data gathering and sharing (i.e., Big Data analytics). Public sector funding is supplemented by private sector contributions (i.e., developer contributions) and investment (i.e., public–private or data partnerships).	**DIRECT VALUE CAPTURE VIA PARTNERSHIPS** Use alternative funding (i.e., over site development, direct value capture such as road pricing and congestion fees or indirect value capture), and explore innovative partnerships (i.e., partnerships with telcos to collaborate on transport data analytics projects to better integrate services, etc.) for enhanced service delivery.	**INDIRECT VALUE CAPTURE VIA PARTNERSHIPS** Extensive use of indirect value capture, offering attractive funding opportunities for the private sector while managed and regulated by government authorities.
 **PRINCIPLE 4** *Strengthen legislative, regulatory, and enforcement capacity*	**DEPLOY SUSTAINABILITY STANDARDS** Appropriate legislation is in place for safety across all modes and sustainability standards are developed and deployed. Ensure clarity on functions and mandates within key government agencies and state-owned enterprises for delivering key transport services.	**DELIVER SUSTAINABLE OUTCOMES** Government agencies and state-owned enterprises are supported through policy, regulatory and institutional reform to deliver sustainable service delivery outcomes with a key focus on integrated land use and transport.	**ADOPT TRANSPARENT STANDARDS** Governments and state-owned enterprises adopt international transparency standards and corporate governance. Automated digital systems deployed for enforcement of relevant policies and legislation in the transport sector.

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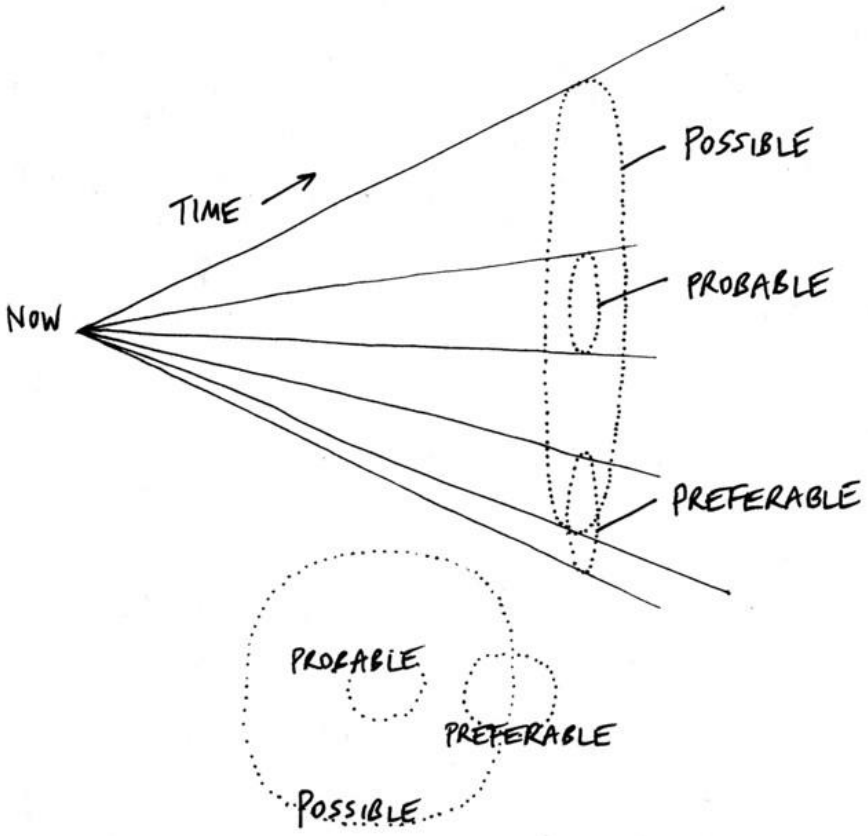

OUR FUTURE IS SHAPED BY THE DECISIONS WE MAKE TODAY

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YOUR FORESIGHT TOOLBOX

An alternative approach to considering future strategies and investment through the application of Foresight across ADB, DMCs and other stakeholders.

Trends + **Visions** + **Playbook** + **Workshop Materials**

A broad overview, knowledge base, and reference point on the key trends shaping the future of transport across Asia and the Pacific.

A set of desirable future visions along a range of cross-cutting themes, supported by practical principles and strategies for implementation.

A step by step playbook and guide describing different application pathways for our research across projects, policy and strategy work.

A package of workshop materials, printable posters, and digital resources to enable the independent application of foresight to your work.

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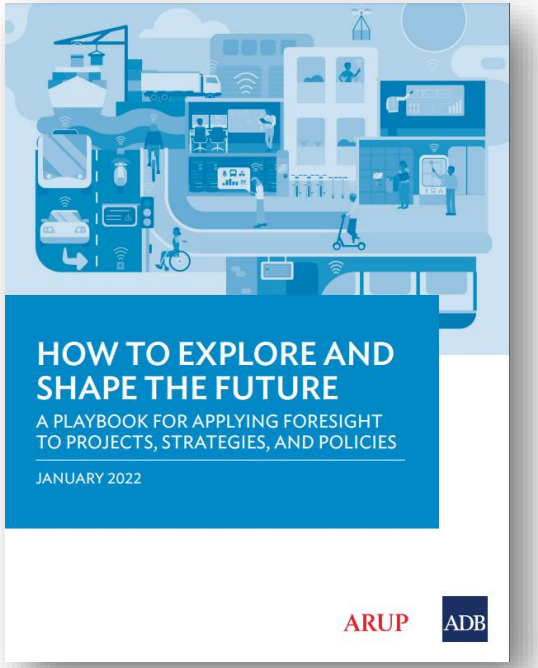
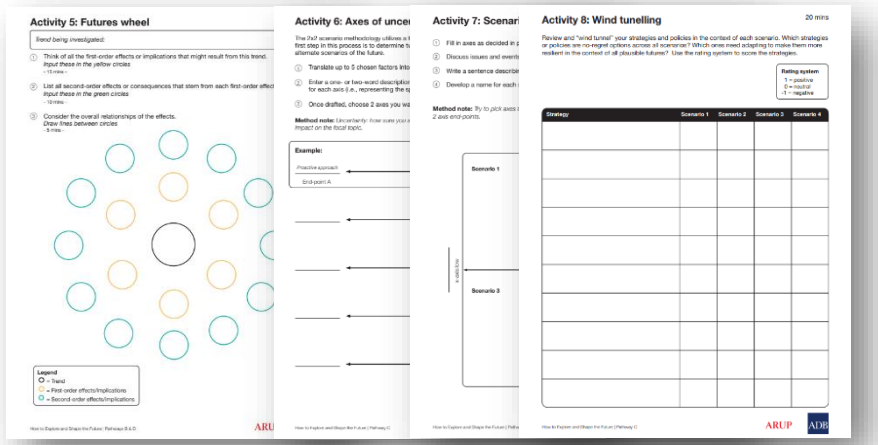
Reimagining the Future of Transport

Playbook



www.adb.org/publications/future-transport-across-asia-pacific

Proformas / Worksheets



4 pathways
12 worksheets

Trend Cards

10 cards with
3 sub-trends each

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Playbook: User Journeys

4 User Journeys
"Pathways"

A: Map and understand trends and their implications
Create a "futures-informed" situation analysis, identifying the impact of emerging trends on a project, theme, sector, or context.

B: Generate ideas or get future-ready
Develop a concept note or review existing plans across the entire project cycle.

C: Develop a strategy that is fit for the future
Build forward-looking strategies and policies, mapping out pathways toward their possible realization.

D: Create a forward-looking common vision
Create a desirable vision for your project/team, generating agreement on a preferred future state.

ARUP ADB

PATHWAY A

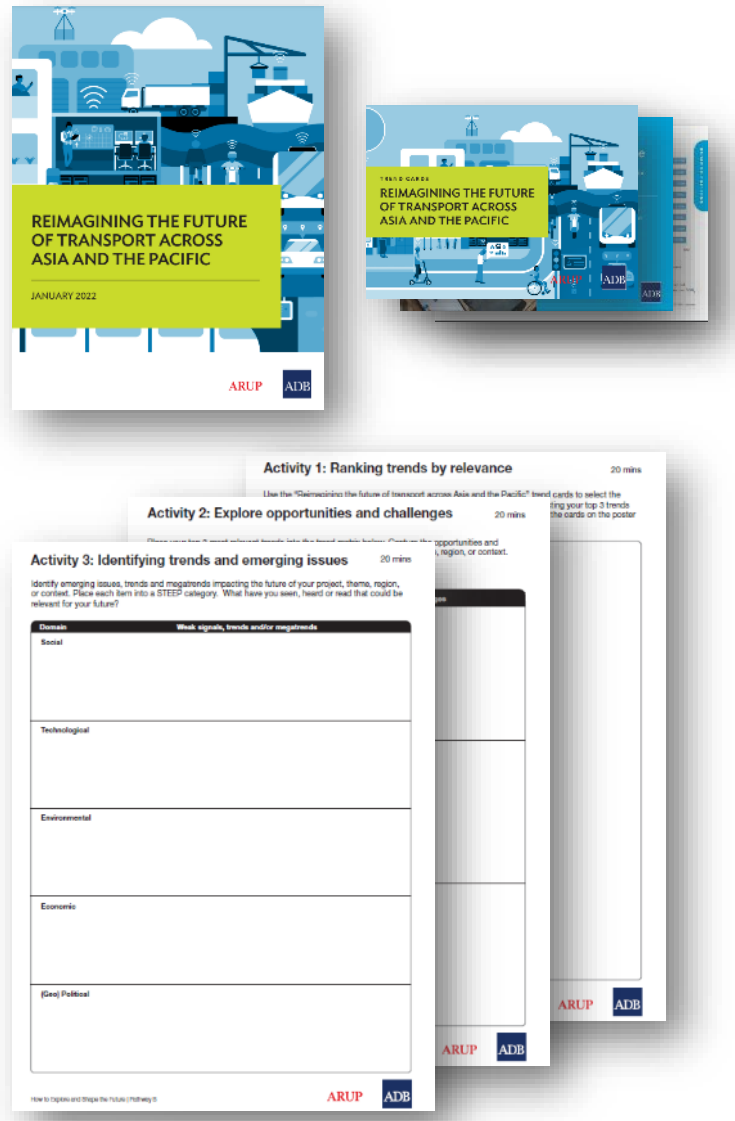
Map Trends

Create a futures-informed situation analysis, identifying the impact of emerging trends on a project, theme and/or sector, or context (subnational, national, subregional, regional, or global)

This pathway focuses on deepening understanding of key trends shaping the future. You will use this insight to contextualize and explore how trends shape your specific project, theme and/or sector, region, or your overall area of responsibility as a leader, decision maker, or team.

APPROXIMATE TIME REQUIRED
Between half a day and 2 days, depending on depth of analysis.

OVERALL COMPLEXITY
Basic



DESIRED OUTCOMES

- Understand key global trends shaping the future
- Select and analyze trends relevant to you and your work
- Capture possible implications for a project, region, or sector/theme
- Develop a more holistic understanding of future trends that matter to you

REQUIRED MATERIALS AND PRO FORMAS

- *Reimagining the Future of Transport Across Asia and the Pacific* full study for reference and background information on trends
- *Reimagining the Future of Transport Across Asia and the Pacific* trend cards for use in workshops and interactions (where applicable)
- Workshop pro formas as listed in Table 1

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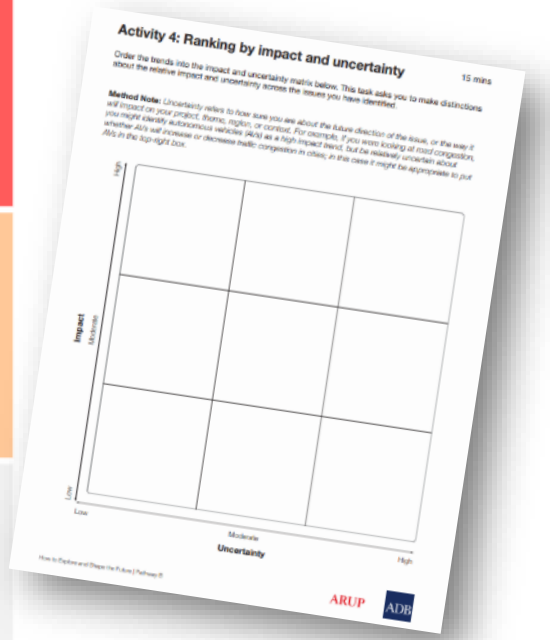
Activity 4.2: Ordering horizon scan material by impact and uncertainty

Order the brainstormed weak signals, trends and megatrends from activity 4.1 into the impact-uncertainty matrix below. This task asks you to make distinctions about the relative impact and uncertainty across the issues you have identified.

Method Note: Uncertainty refers to how sure you are about the future direction of the issue, or the way it will impact on the focal topic. For example, if you were looking at the focal topic of road congestion, you might identify autonomous vehicles as a high impact trend, but be relatively uncertain about whether AVs will increase or decrease traffic congestion in cities; in this case it might be appropriate to put AVs in the red box.

Click and drag sticky notes across from previous activity (15 mins)



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PATHWAY B

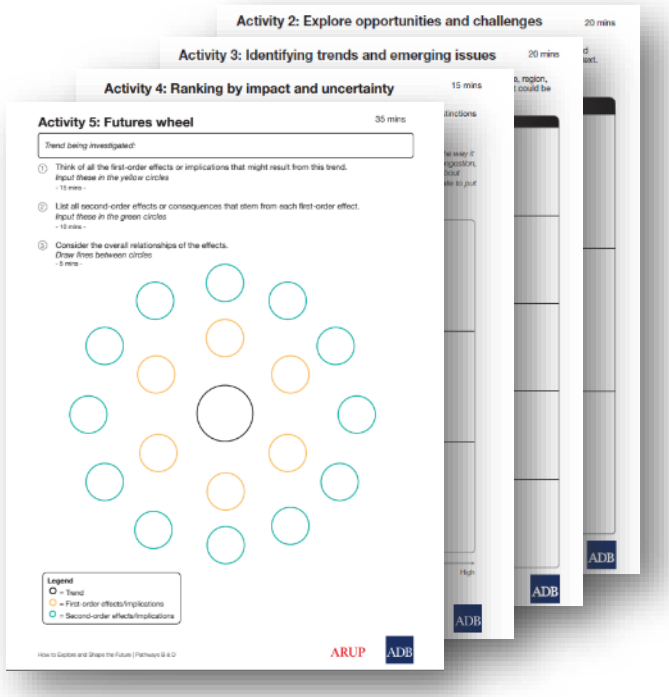
Generate Ideas or Get Future-Ready

Develop a concept note or review existing plans across the entire project cycle

This pathway focuses on generating new ideas and identifying opportunities that can help generate forward-looking and future-ready project concept notes or help review and/or refine existing ones. The aim is to "think beyond the obvious," discover opportunities, and explore how your project could become more resilient, sustainable, and inclusive.

APPROXIMATE TIME REQUIRED
1–3 days depending on depth of analysis

OVERALL COMPLEXITY
Intermediate



DESIRED OUTCOMES

Future-readiness—develop or refine project concept notes through a conscious consideration of emerging trends, opportunities, and challenges

Identify opportunities for thematic integration across different stakeholders

REQUIRED MATERIALS AND PRO FORMAS

Reimagining the Future of Transport Across Asia and the Pacific full study for reference and background information on trends

Reimagining the Future of Transport Across Asia and the Pacific trend cards for use in workshops and interactions (where applicable)

Workshop pro formas as listed in Table 2

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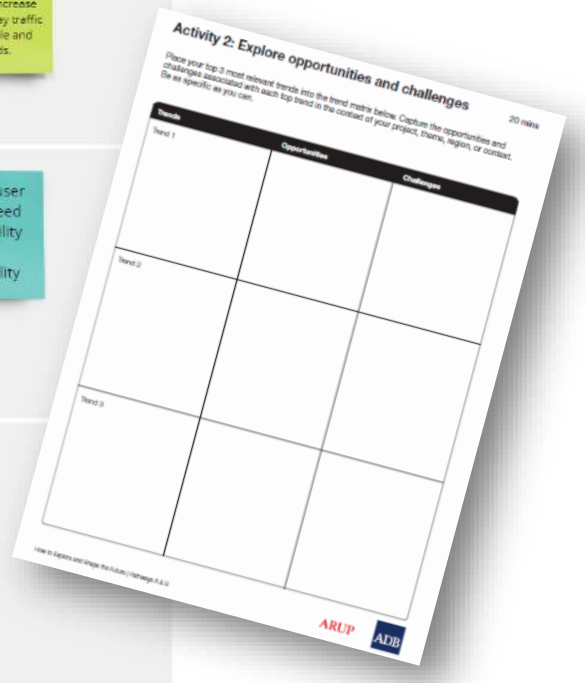
Generating ideas or getting future-ready

Activity 2.1: Explore opportunities and challenges

Drag across your top 3 most relevant trends to the trend matrix below. Use sticky notes to populate the Opportunities and Challenges columns for each trend - be as specific as you can.
(20 mins)

Trends	Opportunities for your project	Challenges for your project
Trend 1 Economic and Trade Patterns: Strong growth in the region will continue but with new challenges Integrated Transport Systems Disparity in the region between quality and spread of transport infrastructure	example sticky note size Links to accessibility of stations and last mile mobility Growth of personal vehicles at around 10%/pa Stations that are multi-model across rail, road and waterways Stations could/should be near the rivers in order to integration water transport with rail transport Fibre optic cable integration Integration with wet and dry ports Reduce congestion of roadways	Water vessels may be constrained if bridges not high enough. Bridge design with minimum navigational clearance e.g. in flood situations and sea level fluctuation Need to maximise benefits of parallel increase in waterway traffic for people and goods.
Trend 2 Infrastructure growth Balancing ageing infrastructure and demand for new investment Behaviour patterns: Technology at the heart of a shift in culture and lifestyles	Future freight demand and increased desire for green freight. This may increase. Changes in consumer patterns such as e-commerce and future freight implications. how to get the private sector Market entry mechanism for e.g. FMCG companies Private sector to carry demand risk? Future demand patterns, job opportunities and labour migration. rail-based tourism and travel private possibly offering travel experience Future sleeper train/experience for tourism. Luxury cars run by private operators. growth of disposable income Private container operators Digital ticketing, seamless mobility	Rural urban migration Greater inbound and outbound people flow into and out of Bangladesh: e.g. into neighbouring countries for entertainment, jobs, and business. Meeting user needs, need for flexibility and adaptability What is the optimal level to sustain?
Trend 3 Climate Change: Transport which both mitigates impact and curbs climate change Environmental Risks: Development at the cost of the natural environment	Resilience of connected ports and cities to future climate/environmental risk and habitat changes Opportunities to increase biodiversity and habitat conservation along line? Increase supply chain resilience and diversify economic centers of activity along railroad New technology for improved maintenance and operations as well as understanding of risk CCTV and environmental sensors to provide real-team and predictive risk profiles Elephant habitat conservation Technical assistance project is ongoing to segregate elephant and railway corridors Habitat segregation to reduce risk of animal crossing Infrared cameras have impact on elephant behaviour. Less intrusive options possible.	Future flood risk and profiles Sustainability of future waterways traffic



ARUP ADB

PATHWAY C

Develop a Strategy

Build forward-looking strategies and policies, mapping out pathways toward their possible realization

This pathway utilizes scenario development to explore plausible futures and to stress-test existing strategies and policies or to support development of new ones. The aim is to make strategies more future-ready and resilient in the face of rapid change and frequent disruption.

APPROXIMATE TIME REQUIRED
1–6 days depending on depth of analysis

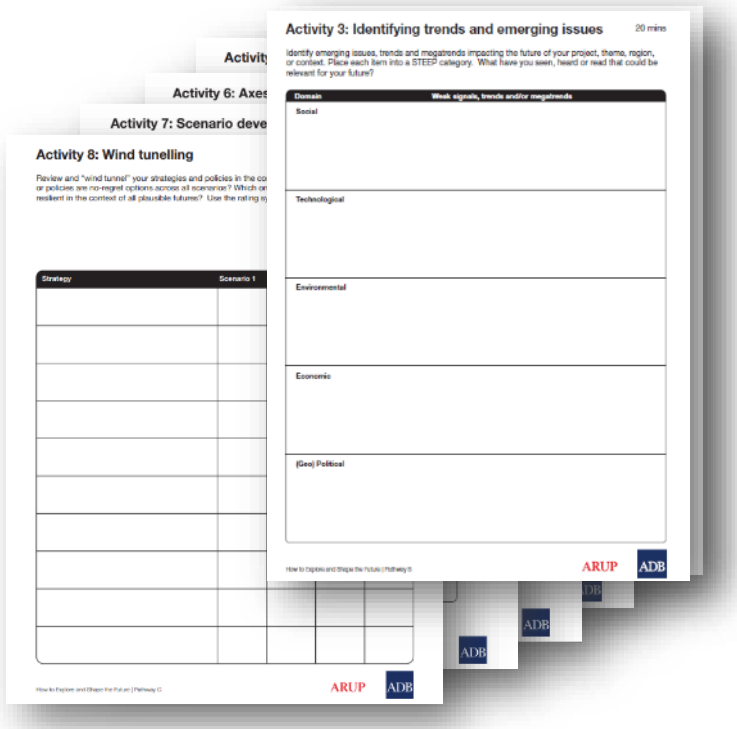
OVERALL COMPLEXITY
Advanced

DESIRED OUTCOMES

- Explore plausible and consistent pathways toward the future
- Develop a set of scenarios that represent different future states
- Identify implications for transport strategy and policy

REQUIRED MATERIALS AND PRO FORMAS

- *Reimagining the Future of Transport Across Asia and the Pacific* full study for reference and background information on trends
- Workshop pro formas as listed in Table 3



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Identifying Trends and Emerging Issues

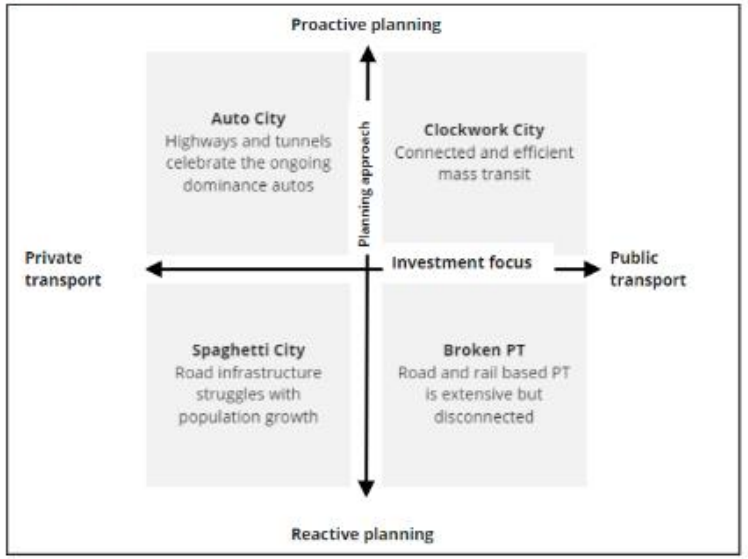
1. Fill in axis from previous exercise 1.1
2. Discuss issues and events that could push the world into each scenario quadrant
3. Write a sentence describing the main theme of each scenario
4. Develop a name for each scenario (consider using a book or movie title).

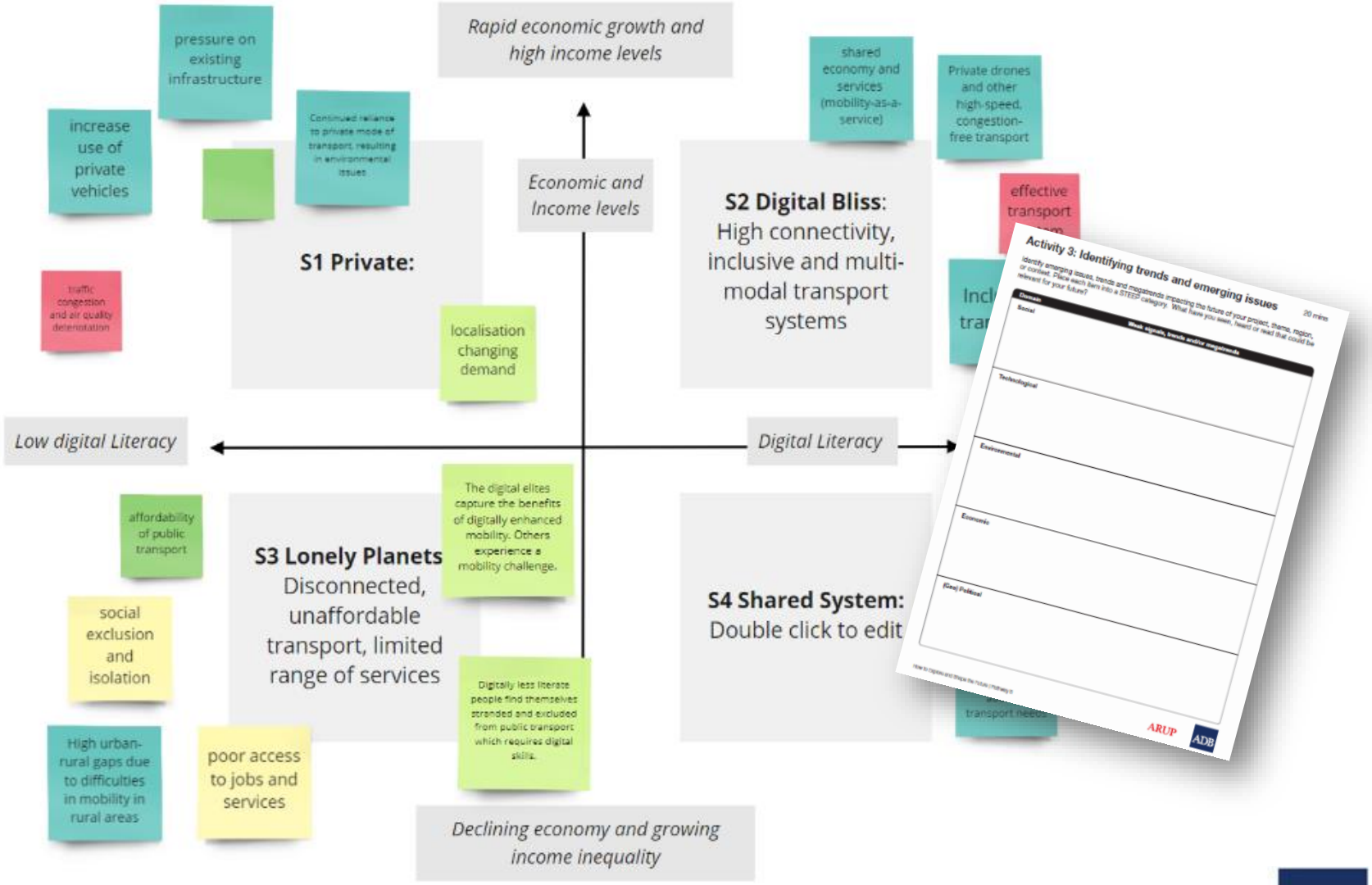
Use text tool or sticky notes (20 mins)

If you have time, think about the actors (people and groups) that you need to focus on in this scenario exploration.

Method Note: Try to pick **axes** that are different. Remember, each **quadrant** is a combination of 2 axis end-points.

Example





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Stress-testing a strategy

1. Identify a **positive outcome** for your focal topic and brainstorm strategies that could help achieve that outcome. *Use sticky notes (20 mins)*
2. Insert **up to** 10 strategies into the table below. Using the scenarios you have created, consider how well each strategy performs. Use the rating system to score the strategies. *Use sticky notes (20 mins)*

Strategy	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Designing child friendly streets				
Increasing accessibility of bus services	😐	😀	😀	😀
pedestrianised areas				
Digital tech ambassadors that assist digitally illiterate passengers.				
Segregated cycle lanes	😀	😀	😐	😐
Digital solution to wayfinding	😐	😀	😟	😀
Incentives for Working from Home / Nudging towards no travel				
Accessibility improvements for disabled and older users				
Mobility as a service solutions				
Low carbon infrastructure	😟			

Positive outcome

Highly inclusive, affordable and accessible transport system

Rating system

ARUP ADB

PATHWAY D

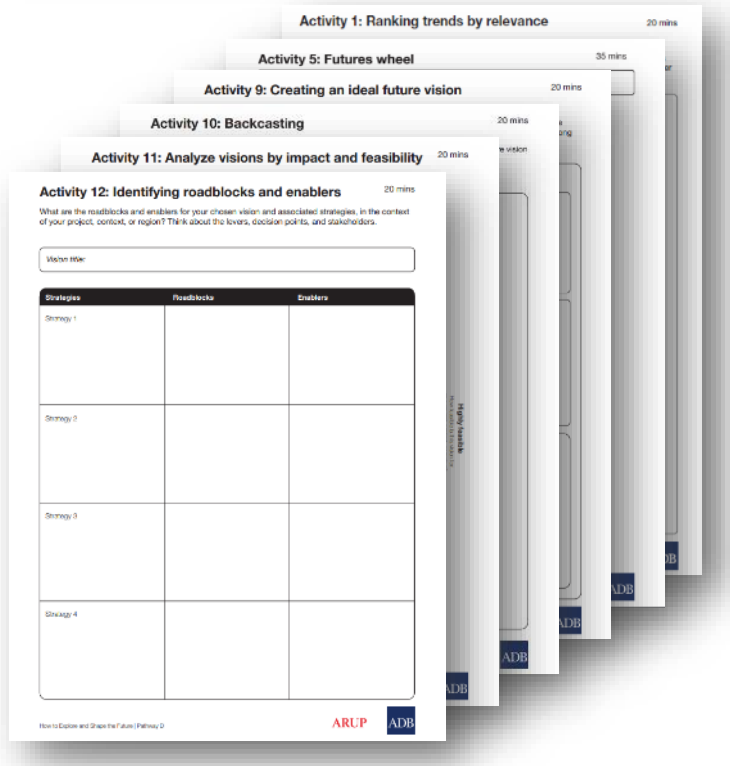
Create a Vision

Create a desirable vision for your project or team, generating agreement on a preferred future state

This pathway focuses on the development of a clear vision for your project, theme, region, or team. The aim is to collectively agree on a desired future state. This vision can then act as a common framework and guide for decision-making, investments, plans, and strategies.

APPROXIMATE TIME REQUIRED
1–6 days depending on depth of analysis

OVERALL COMPLEXITY
Advanced



DESIRED OUTCOMES

- Understand key global trends shaping the future
- Select relevant trends and understand their implications
- Explore and select visions and associated strategies relevant to you
- Identify roadblocks and enablers toward your preferred vision

REQUIRED MATERIALS AND PRO FORMAS

- *Reimagining the Future of Transport Across Asia and the Pacific* full study for reference and background information on trends
- *Reimagining the Future of Transport Across Asia and the Pacific* trend cards for use in workshops and interactions (where applicable)
- Workshop pro formas as listed in Table 4

ARUP ADB

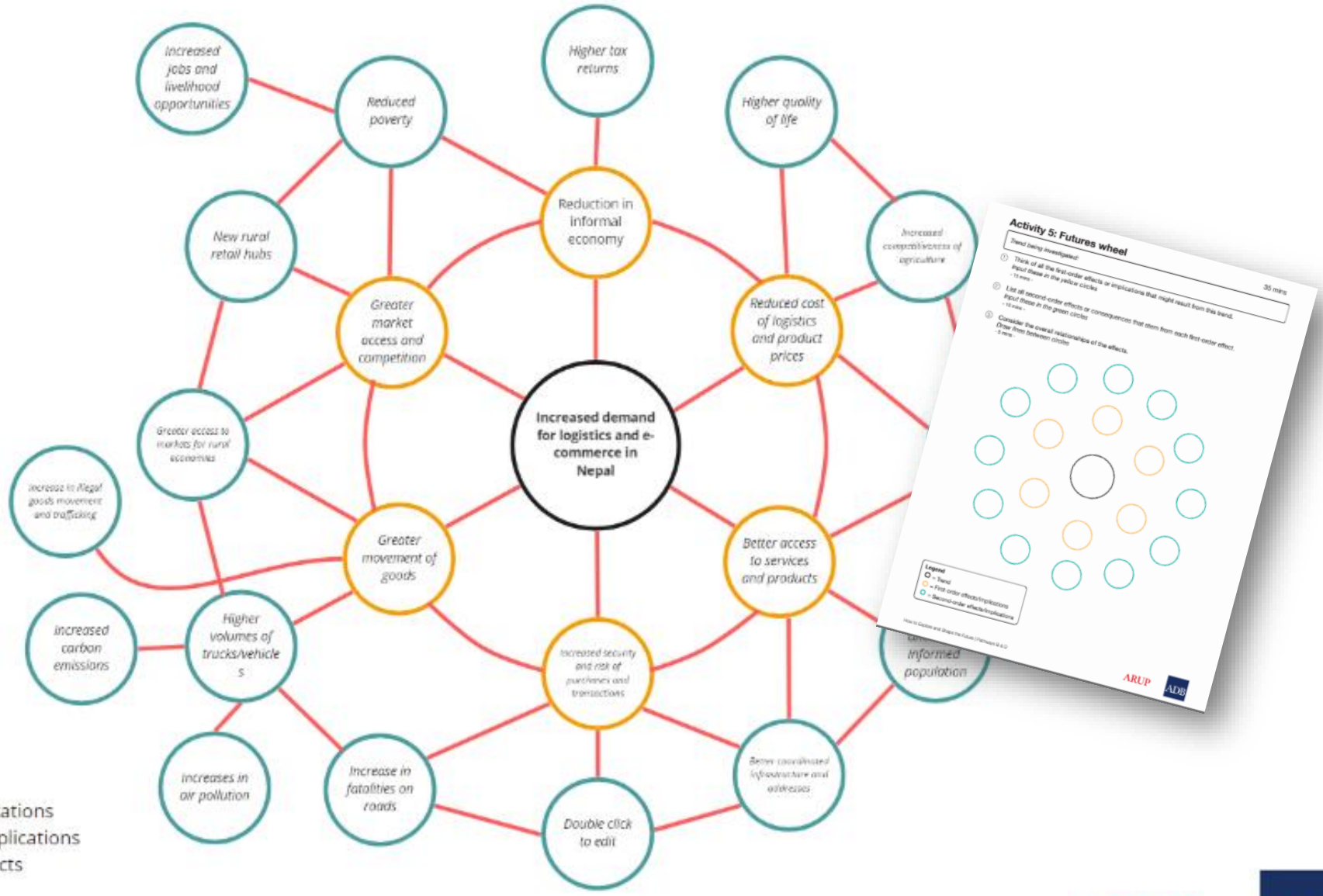
Exploring the effects and implications of trends

You have been given the following trend (timeframe 2050): **Increased demand for logistics and e-commerce in Nepal**

1. Think of all the first order effects/implications that might result from this trend.
Input these in the yellow circles (15 mins)

2.List all second order effects/consequences that stem from each first order effect.
Input these in the green circles (10 mins)

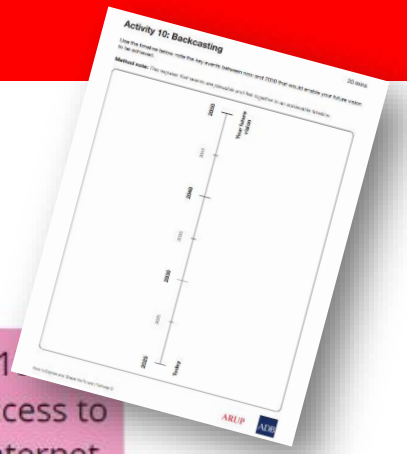
3.Consider the overall relationships of the effects.
Add or delete the red lines (5 mins)



Legend
- = Trend
- = First order effects/implications
- = Second order effects/implications
- = Relationships of the effects

ARUP ADB

Creating a forward looking common vision



Use the timeline below note the key events between now and 2050 that would enable your future vision to be achieved.
Note: this requires that events are plausible and link together in an achievable timeline

Use sticky notes (20 mins)

34% access to internet

Establishing a plan for road network safety

clear safety and usage guidelines for trucking

International standards for agriculture produce through sanitary and Phyto-sanitary

heavy vehicle traffic count regime ablished

establishment of virtual agricultural co-ops

50% access to internet

Established smart road network planning including prioritised road maintenance based on predicted ans real time freight vehicle traffic

real-time data collection and monitoring of networks

30% of rural population accessing e-learning

35% of rural gdp supported by digital transactions

1 access to internet

70% employed in informal economy

2020

2025

2030

2035

2040

2045

2050

nepal post revenue ?

Today

Your future vision

nepal post revenue _?

new services for mobile banking launch

logistics provision for agriculture e.g. cooling established

with multi-modal logistics c entres

rural e-commerce community hubs established

mobile provider offers free wi-fi across local economy

reforms in taxation

reforms in social protection and social security

further tax support to e-commerce

better quality control of goods sold through the internet

30-40% employed in informal economy

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https://www.adb.org/publications/future-transport-across-asia-pacific
or http://bit.ly/FutureTransportADB

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